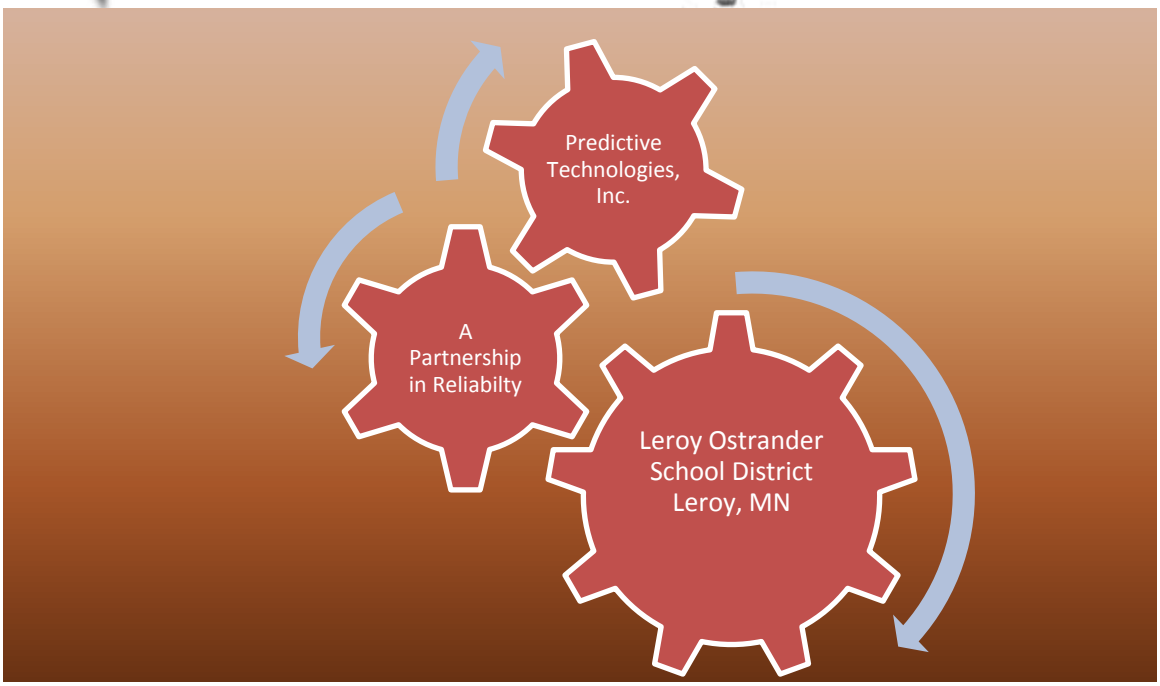
LeRoy-Ostrander Public School
Educational Excellence, For Life

Predictive Technologies Inc
... A Partnership in Reliability



Leroy-Ostrander School District
Mechanical Integrity: Steam Piping Thickness Testing

LeRoy-Ostrander Public Schools
406 W Main ST
LeRoy, MN 55951

Gregg Schwartz
Sr. Reliability Engineer
ISO Category: Level III

Eric Espe
NDT: Quality Assurance Manager
Level I: IR/VIB/PT/PA
Level II UT/VT/MT/ET

March 9th, 2017

Non-Destructive Testing

PREDICTIVE ANALYST: _Eric Espe_____ **DATE:** March 9th, 2017

Non-Destructive Testing Procedure

Predictive Technologies
18827 570th Ave
Austin, MN. 55912
(507) 438-6703

Document Title: Predictive Technologies Inc., Non-Destructive Testing Procedure				Page 1 of 1
Document Type: Procedure	Document Number QC-1, VT-1, UT-1, MT-1, PT-1	Initial Date 3/15/2014	Revision 1.0	Effective Date 3/15/2014
Equipment: Olympus EPOCH 600, S#140613801 Transducer: V260-SM, S# 916389	Calibration Information: Certificate # 41E9E22EA38D1EB8, 1/31/2015			Approve Date 3/15/2014

Miscellaneous Information

Action Code Descriptions on Piping Inspection Record

1	Asset Critical – underrated, leaking, welding involved for repair/replacement, possible shutdown required (requires individual work order and/or FCR)
2	Non-welded correction action – painting, thread adjustments, supports, chafing, etc. (bulk work order)
3	Non-operations deficiencies – engineering, inspections, etc.

Key to Information Provided Throughout Report

CUI	Corrosion Under Insulation
CML	Condition Monitoring Location
WPB	Wrought Process Base (Type of Material: Grade, Content)
LLC	Light Local Corrosion
LGC	Light General Corrosion
MLC	Moderate Local Corrosion
MGC	Moderate General Corrosion
AUT	Automated Ultrasonic Testing
MFL	Magnetic Flux Leakage
VTU	Visual Testing Unsatisfactory
HAZ	Heat Affected Zone
ERW	Electric Resistance Weld (85% of Seamless Joint Efficiency)
Ingress	An area that moisture can accumulate

Key to Certifications

ET	Eddy Current
IR	Infrared Analysis
MT	Magnetic Particle Examination
PA	Phased Array
PT	Dye Penetrant
UT	Ultrasonic Thickness Testing
VIB	Vibration Analysis
VT	Visual Inspection Testing

Overall Results Summary

Leroy - Ostrander: Summarized Results

Section #	Date of Survey	Equipment Tested	Nominal Thickness	Lowest Current Thickness	Lifetime Corrsion Rate Annually	Remaining Half life (yrs)	Next Inspection: API510/570	Next Inspection Ultrasonic	Condition	Comments
1	3/9/2017	(Entrance 4) 1/2" Steam	0.109	0.058	0.011"	2.0	N/A	2018	Alarm	**Defiencies Exist: See detailed report.**
2	3/9/2017	(Boiler Room) Pump 2 to Gate Valve	0.154	0.101	0.0106"	3.8	N/A	2018	**Alert**	**Deficiencies Exist: See detailed report.**
3	3/9/2017	(Boiler Room) Pump 4 to Gate Valve	0.154	0.132	0.0044"	12.6	N/A	2018	Acceptable	**Deficiencies Exist: See detailed report.**
4	3/9/2017	(Boiler Room) 10" Main Header	0.365	0.3	0.013"	9.4	N/A	2018	Acceptable	**Deficiencies Exist: See detailed report.**
5	3/9/2017	(Boiler Room) Pump 2 / Pump 4 Header	0.365	0.358	0.0014"	107.6	N/A	2018	Acceptable	**None Noted at Time of Inspection.**
6	3/9/2017	(Boiler Room) Pump 2 & 4 Riser to Header	0.216	0.197	0.0038"	22.0	N/A	2018	Acceptable	**None Noted at Time of Inspection.**
7	3/9/2017	(Boiler Room) 3" Supply to Pumps 2 & 4	0.216	0.185	0.0062"	12.5	N/A	2018	Acceptable	**Deficiencies Exist: See detailed report.**
8	3/9/2017	(East AHU) 2" Steam	0.154	0.129	0.005"	10.8	N/A	2018	Acceptable	**Deficiencies Exist: See detailed report.**
8	3/9/2017	(East AHU) 3" Steam	0.216	0.190	0.0052"	15.2	N/A	2018	Acceptable	**Deficiencies Exist: See detailed report.**
9	3/9/2017	(Little Gym) 1" Steam	0.133	0.126	0.0014"	38.5	N/A	2018	Acceptable	**None Noted at Time of Inspection.**
9	3/9/2017	(Little Gym) 3" Steam	0.216	0.186	0.006"	13.0	N/A	2018	Acceptable	**None Noted at Time of Inspection.**
10	3/9/2017	(Media Center) 1" Steam	0.179	0.162	0.0034"	20.4	N/A	2018	Acceptable	**None Noted at Time of Inspection.**
10	3/9/2017	(Media Center) 3" Steam	0.216	0.183	0.0066"	11.5	N/A	2018	Acceptable	**None Noted at Time of Inspection.**
10	3/9/2017	(Media Center) 4" Steam	0.237	0.236	0.0002"	507.6	N/A	2018	Acceptable	**None Noted at Time of Inspection.**
11	3/9/2017	(Classroom 101) 3/4" Steam	0.113	0.107	0.0012"	38.4	N/A	2018	Acceptable	**None Noted at Time of Inspection.**
12	3/9/2017	(Classroom 102) 3/4" Steam	0.113	0.104	0.0018"	24.7	N/A	2018	Acceptable	**Deficiencies Exist: See detailed report.**
13	3/9/2017	(Classroom 201) 3/4" Steam	0.113	0.098	0.0030"	13.8	N/A	2018	Acceptable	**None Noted at Time of Inspection.**
		Note: Refer to the Piping Inspection Records for Analysis. This is used only as a summary and isn't meant to be the final analysis.								

Entrance 4

Leroy-Ostrander School

PIPING INSPECTION RECORD

Facility: Leroy-Ostrander | P&ID No. (First & Last): | Status: A | Inspection Interval (yrs): 5
Line No.: N/A | N/A | **Regulated By:** | Owner: X | API: | PSM:
Description: Entrance Heater | Insulated: 0% | Underground:
Vibration: Light [X] Moderate [ ] Heavy [ ]
Location: Entrance 4 | Previous Failure [ ] | Sand Producing/High Velocity [ ]
Dead Leg [ ] | Injection Point [ ]
Service (Oil, Gas, Etc.): Steam | Sour Service [ ] | Air to Ground [ ] | Corrosion Coupon [ ]
Fabrication Code: B 31.1 | Piping Class (1,2,3,4): 4 | Over Water [ ] | Anodes [ ]
Comments: | Inspection Type: Full [ ] Partial [ ] UT/VT [X]
Other (Specify):

To be completed in the field (The following conditions apply to equipment listed above):

N/A No areas of concern noted during physical inspection.
X External Corrosion: X Light (surface rust, no scaling or pitting).
Moderate (pit depth not greater than C.A./light scale). Pit Scale
Extreme (pit depth greater than C.A./heavy scale). Pit Scale
N/A Visual Examination of existing welds (see comments): Satisfactory Unsatisfactory
N/A Non-typical fittings/components in service (see comments).
N/A Condition of insulation: Good Fair Poor
X Condition of supports/restraints (see comments) X Satisfactory Unsatisfactory
N/A Condition of coating (see comments): Good Fair Poor

UT II Tech: *Eric Espe* **Inspection Date:** 3/9/2017

To be completed in the office:

N/A RT Performed. % RT
x UT Readings Taken. 100 % UT Taken Inaccessible Insulated Not Required
NA Other NDE. % Other Type (LFET, PT, MT, Etc.)
N/A Thickness measurements are less than minimum to meet design pressure requirements
N/A Engineering evaluation requested (see comments).

Comments:
1. Internal Corrosion Pitting/w threaded components. Nominal Thickness 0.109, Remaining Thickness 0.058
2.
3.
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Action Items	Resp. Dept.	Govn. By	Mand	Rec	Action Code 1	2	3
1. Monitor piping with ultrasonic thickness testing. 0.058" remaining, minus	Ins	L-O	X				X
0.057" thread-cut. Pipe could have pitting near 0.001" remaining at threads.							
Owner/User to deicide if piping is replaced due to potential of leaking							
threaded components.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							

Final Review:

Authorized UTII Tech: *Eric Espe* **Review Date:** 3/24/2016

PIPING THICKNESS MEASUREMENTS
(inches)

SHEET 1 of 1

FACILITY **Leroy-Ostrander School** LINE NO. **N/A** INSPECTION DATE **3-9-17**

LOCATION **Entrance 4** PAINT/INSULATION **None**

DESCRIPTION **Entrance Heater** TECHNICIAN **Eric Espe**

REMARKS (Insp. Method, Equip. Type, Serial No., Etc.) **UTT, Olympus 38 DL Plus - S/N 120406903, Panametrics D790 - S/N 902401**

CODE	DESN. PRES.	SPEC.	LOC. NO.	COMP. TYPE	MATL.	SIZE	NOM. THICK	12:00	3:00	6:00	9:00	
B31.1	**30**	**N/A**	**1**	**Pipe**	**A106B**	**1/2"**	**0.113**	**0.088**	**0.058**	**0.113**	**0.118**	

Comments: **Components listed as "N/A" at heights, covered, contain excessive part geometry or otherwise not accessible.**
Threaded Components w/ Corrosion Pitting

Signature UTII Tech. *Eric Espe*

Piping
B31.1

Piping Remaining Life Calculations

Minimum Required Thickness, Long Term Corrosion Rate and Remaining Life Calculations

Facility: Leroy-Ostrander | Equip. #: N/A | Insp. Date: 3/9/2017
Location: 1938 Entrance 4 | Description: Heater

Inspection Information

Pipe Size	0.5	**D**	= Outside Diameter	0.8
Material	A106B	**S**	= Allowable Stress Value	20,000
Current Inspection Year	2017	**P**	= Design Pressure	30
Initial or Previous Thickness Reading Year	2012	**E**	= Joint Efficiency (*seamless E=1*)	0.9
API 570 Inspection Interval	5	**W**	= Weld Strength Reduction Factor	1.0
Initial Thickness	0.113		(*W=1 unless temp. above 800°F*)	
Actual Thickness	0.058	**Y**	= Temperature Factor	0.4

Calculation Information

Minimum Thickness Calculation:

$$t = \frac{PD}{2(SE+PY)} = \frac{30 \times 0.84}{2 \times ((20{,}000 \times 0.9)+(30 \times 0.4))} = \frac{25.2}{34{,}024} + 0.014$$

t = Required Minimum Thickness = **0.0147**

Based on the above calculation, this pipe meets the required minumum thickness for continued service at the current pressure.

st = Structural Minimum Thickness = **0.0900**

Structural minimum thickness based on carbon pipe

THIS PIPE DOES NOT MEET THE STRUCTURAL MINIMUM THICKNESS FOR CONTINUED SERVICE.

Corrosion Rate:

$$\frac{\text{t-initial - t-actual}}{\text{years between t-initial \& t-actual}} = \frac{0.1130 - 0.0580}{5} = \frac{0.0550}{5} = 0.0110 \text{ Inches Per Year}$$

Remaining Half Life:

$$\frac{\text{t-actual - t-minimum}}{\text{Corrosion Rate}} / 2 = \frac{0.0580 - 0.0147}{0.0110} / 2 = \frac{0.0433}{0.0110} \div 2 = 3.9 / 2 = 2.0 \text{ Years Remaining Half Life}$$

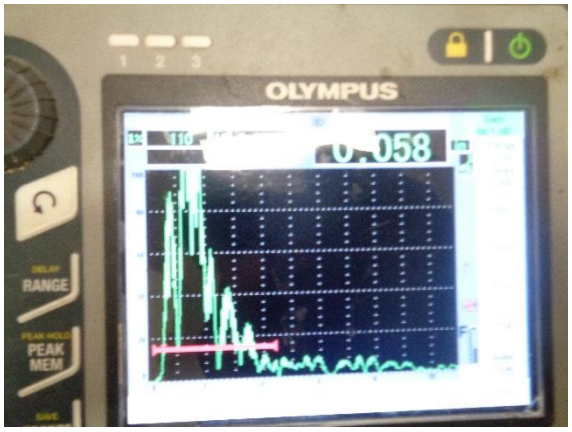
Based on the above corrosion rate and half life calculation, this pipe is due for inspection: Feb 2019

Comments

Eric Espe
VT/UT II Tech. Signature

3/9/2017
Date

Entrance 4



Nominal 0.109 Remaining Metal 0.058


Corrosion and Pitting

(Boiler Room) Pump 2 to Gate Valve

Leroy-Ostrander School

PIPING INSPECTION RECORD

Facility: Leroy-Ostrander | P&ID No. (First & Last): | Status: A | Inspection Interval (yrs): 5
Line No.: N/A | N/A | **Regulated By:** | Owner: X | API: | PSM:
Description: Pump 2 to Gate Valve | Insulated: 0% | Underground:
Vibration: Light [X] Moderate [ ] Heavy [ ]
Location: Boiler Room | Previous Failure [ ] | Sand Producing/High Velocity [ ]
Dead Leg [ ] | Injection Point [ ]
Service (Oil, Gas, Etc.): Steam | Sour Service [ ] | Air to Ground [ ] | Corrosion Coupon [ ]
Fabrication Code: B 31.1 | Piping Class (1,2,3,4): 4 | Over Water [ ] | Anodes [ ]
Comments: | Inspection Type: Full [ ] Partial [ ] UT/VT [X]
Other (Specify):

To be completed in the field (The following conditions apply to equipment listed above):

N/A	No areas of concern noted during physical inspection.					
X	External Corrosion:	X	Light (surface rust, no scaling or pitting).			
			Moderate (pit depth not greater than C.A./light scale).		Pit	Scale
			Extreme (pit depth greater than C.A./heavy scale).	Pit	Scale	
N/A	Visual Examination of existing welds (see comments):				Satisfactory	Unsatisfactory
N/A	Non-typical fittings/components in service (see comments).					
N/A	Condition of insulation:		Good		Fair	Poor
X	Condition of supports/restraints (see comments)			X	Satisfactory	Unsatisfactory
N/A	Condition of coating (see comments):		Good		Fair	Poor

UT II Tech: *Eric Espe* **Inspection Date:** 3/9/2017

To be completed in the office:

N/A	RT Performed.		% RT			
x	UT Readings Taken.	83	% UT Taken	Inaccessible	Insulated	Not Required
NA	Other NDE.		% Other		Type (LFET, PT, MT, Etc.)	
N/A	Thickness measurements are less than minimum to meet design pressure requirements					
N/A	Engineering evaluation requested (see comments).					

Comments:
1. All piping components threaded and acceptable per B31.1, but has potential for leak due to thread cut.
2. Light general external corrosion throughout.
3. Internal corrosion/pitting noted at location 7. Nominal Thickness 0.154, Remaining Thickness 0.101
4. Location 4 (90) forging imperfection, not comparable thickness from similar 90's. Visual inspection shows imperfection.
5.
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Action Items	Resp. Dept.	Govn. By	Mand	Rec	Action Code 1	2	3
1. Monitor piping with ultrasonic thickness testing. 0.101" remaining minus	Maint.	L-O	X			X	
0.070" thread-cut could potentially have 0.031" remaining metal near threads.							
2. Remove scale. Seal Coat w/ Devoe 235 or 236 for Carbon Steel	Maint.	L-O		X			X
3. Monitor with Ultrasonic Thickness Testing.	Ins.	L-O	X				
4. Monitor with Ultrasonic Thickness Testing and or replace.	Maint.	L-O		X	X		
5.							
6.							
7.							
8.							
9.							
10.							

Final Review:

Authorized UTII Tech: *Eric Espe* **Review Date:** 3/24/2016

PIPING THICKNESS MEASUREMENTS
(inches)

SHEET 1 of 1

FACILITY **Leroy-Ostrander School** LINE NO. **N/A** INSPECTION DATE **3-9-17**

LOCATION **Boiler Room** PAINT/INSULATION **None**

DESCRIPTION **Pump 2 to Gate Valve** TECHNICIAN **Eric Espe**

REMARKS (Insp. Method, Equip. Type, Serial No., Etc.) **UTT, Olympus 38 DL Plus - S/N 120406903, Panametrics D790 - S/N 902401**

CODE	DESN. PRES.	SPEC.	LOC. NO.	COMP. TYPE	MATL.	SIZE	NOM. THICK	12:00	3:00	6:00	9:00	
B31.1	30	N/A	1	CTN	A105	2"	-	N/A	N/A	N/A	N/A	
B31.1	30	N/A	2	90	CS	2"	0.250	-	-	0.248	-	
B31.1	30	N/A	3	Pipe	A106B	2"	0.154	0.144	-	0.148	-	
B31.1	30	N/A	4	CTN	A105	2"	-	N/A	N/A	N/A	N/A	
B31.1	30	N/A	5	90	CS	2"	0.250	0.260	-	-	-	
B31.1	30	N/A	6	Pipe	A106B	2"	0.154	0.168	0.150	0.157	0.153	
B31.1	30	N/A	7	Pipe	A106B	2"	0.154	0.148	-	0.146	-	
B31.1	30	N/A	8	Pipe	A106B	2"	0.154	0.153	0.156	0.157	0.158	
B31.1	30	N/A	9	45	CS	2"	-	-	-	0.197	-	
B31.1	30	N/A	10	Pipe	A106B	2"	0.154	0.146	0.143	0.152	0.150	
B31.1	30	N/A	11	45	CS	2"	-	0.188	-	-	-	
B31.1	30	N/A	12	Pipe	A106B	2"	0.154	0.136	0.142	0.132	0.137	
B31.1	30	N/A	13	CTN	A105	2"	-	NA	NA	NA	NA	

Comments: **Components listed as "N/A" at heights, covered, contain excessive part geometry or otherwise not accessible.**

All piping components threaded

Light general external corrosion due to areas of ingress/condensation

Signature UTII Tech. *Eric Espe*

Piping
B31.1

Piping Remaining Life Calculations

Minimum Required Thickness, Long Term Corrosion Rate and Remaining Life Calculations

Facility: Leroy-Ostrander | Equip. #: N/A | Insp. Date: 3/9/2017
Location: Boiler Room | Description: Pump 2 to Gate Valve

Inspection Information

Pipe Size	2	**D**	=	Outside Diameter	2.4
Material	A106B	**S**	=	Allowable Stress Value	20,000
Current Inspection Year	2017	**P**	=	Design Pressure	30
Initial or Previous Thickness Reading Year	2012	**E**	=	Joint Efficiency (*seamless E=1*)	0.9
API 570 Inspection Interval	5	**W**	=	Weld Strength Reduction Factor	1.0
Initial Thickness	0.154			(*W=1 unless temp. above 800°F*)	
Actual Thickness	0.132	**Y**	=	Temperature Factor	0.4

Calculation Information

Minimum Thickness Calculation:

$$t = \frac{PD}{2(SE+PY)} = \frac{30 \times 2.375}{2 \times ((20{,}000 \times 0.9)+(30 \times 0.4))} = \frac{71.25}{34{,}024} + 0.019$$

t = Required Minimum Thickness = **0.0211**

Based on the above calculation, this pipe meets the required minumum thickness for continued service at the current pressure.

st = Structural Minimum Thickness = **0.1000**

Structural minimum thickness based on carbon pipe

This pipe meets the required Structural Minimum Thickness for continued service.

Corrosion Rate:

$$\frac{\text{t-initial - t-actual}}{\text{years between t-initial \& t-actual}} = \frac{0.1540 - 0.1320}{5} = \frac{0.0220}{5} = 0.0044 \text{ Inches Per Year}$$

Remaining Half Life:

$$\frac{\text{t-actual - t-minimum}}{\text{Corrosion Rate}} / 2 = \frac{0.1320 - 0.0211}{0.0044} / 2 = \frac{0.1109}{0.0044} \div 2 = 25.2 / 2 = 12.6 \text{ Years Remaining Half Life}$$

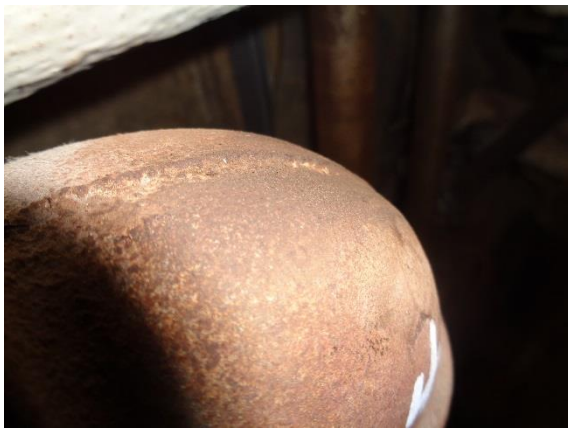
Based on the above corrosion rate and half life calculation, this pipe is due for inspection: Mar 2022

Comments

Eric Espe
VT/UT II Tech. Signature

10/31/2016
Date

(Boiler Room) Pump 2 to Gate Valve



Forging Imperfection at Location 4

Close Threaded Nipples/Threaded Fittings

Forging Imperfection at Location 4

Light General Corrosion

(Boiler Room) Pump 4 to Gate Valve

Leroy-Ostrander School

PIPING INSPECTION RECORD

Facility	Leroy-Ostrander	P&ID No. (First & Last):		Status	A	Inspection Interval (yrs)	5
Line No.	N/A	N/A		**Regulated By:**		Owner X API	PSM
Description	Pump 4 to Gate Vavle			Insulated	0%	Underground	
				Vibration:	Light [X]	Moderate [ ]	Heavy [ ]
Location	Boiler Room			Previous Failure	[ ]	Sand Producing/High Velocity	[ ]
				Dead Leg	[ ]	Injection Point	[ ]
Service (Oil, Gas, Etc.)	Steam	Sour Service [ ]		Air to Ground	[ ]	Corrosion Coupon	[ ]
Fabrication Code	B 31.1	Piping Class (1,2,3,4) 4		Over Water	[ ]	Anodes	[ ]
Comments				Inspection Type:		Full [ ] Partial [ ] UT/VT	[X]
				Other (Specify)			

To be completed in the field (The following conditions apply to equipment listed above):

N/A	No areas of concern noted during physical inspection.					
X	External Corrosion:	X	Light (surface rust, no scaling or pitting).			
			Moderate (pit depth not greater than C.A./light scale).		Pit	Scale
			Extreme (pit depth greater than C.A./heavy scale).		Pit	Scale
N/A	Visual Examination of existing welds (see comments):				Satisfactory	Unsatisfactory
N/A	Non-typical fittings/components in service (see comments).					
N/A	Condition of insulation:		Good		Fair	Poor
X	Condition of supports/restraints (see comments)			X	Satisfactory	Unsatisfactory
N/A	Condition of coating (see comments):		Good		Fair	Poor

UT II Tech: *Eric Espe* **Inspection Date:** 3/9/2017

To be completed in the office:

N/A	RT Performed.		% RT			
x	UT Readings Taken.	77	% UT Taken	Inaccessible	Insulated	Not Required
NA	Other NDE.		% Other		Type (LFET, PT, MT, Etc.)	
N/A	Thickness measurements are less than minimum to meet design pressure requirements					
N/A	Engineering evaluation requested (see comments).					

Comments:
1. Light general external corrosion throughout.
2.
3.
4.
5.
6.
7.
8.
9.
10.

Action Items	Resp. Dept.	Govn. By	Mand	Rec	Action Code 1	2	3
1. Remove scale. Seal Coat w/ Devoe 235 or 236 for Carbon Steel	Maint.	L-O	[X]	[X]	[ ]	[X]	[ ]
2.			[ ]	[ ]	[ ]	[ ]	[ ]
3.			[ ]	[ ]	[ ]	[ ]	[ ]
4.			[ ]	[ ]	[ ]	[ ]	[ ]
5.			[ ]	[ ]	[ ]	[ ]	[ ]
6.			[ ]	[ ]	[ ]	[ ]	[ ]
7.			[ ]	[ ]	[ ]	[ ]	[ ]
8.			[ ]	[ ]	[ ]	[ ]	[ ]
9.			[ ]	[ ]	[ ]	[ ]	[ ]
10.			[ ]	[ ]	[ ]	[ ]	[ ]

Final Review:

Authorized UTII Tech: *Eric Espe* **Review Date:** 10/31/2016

PIPING THICKNESS MEASUREMENTS
(inches)

SHEET 1 of 1

FACILITY **Leroy-Ostrander School** LINE NO. **N/A** INSPECTION DATE **3-9-17**

LOCATION **Boiler Room** PAINT/INSULATION **None**

DESCRIPTION **Pump 4 to Gate Valve** TECHNICIAN **Eric Espe**

REMARKS (Insp. Method, Equip. Type, Serial No., Etc.) **UTT, Olympus 38 DL Plus - S/N 120406903, Panametrics D790 - S/N 902401**

CODE	DESN. PRES.	SPEC.	LOC. NO.	COMP. TYPE	MATL.	SIZE	NOM. THICK	12:00	3:00	6:00	9:00	
B31.1	30	N/A	1	Pipe	A106B	2"	0.148	0.138	0.134	0.140	-	
B31.1	30	N/A	2	90	CS	2"	0.250	-	-	0.246	-	
B31.1	30	N/A	3	Pipe	A106B	2"	0.154	0.141	-	0.137	0.14	
B31.1	30	N/A	4	90	CS	2"	0.218	0.193	-	-	-	
B31.1	30	N/A	5	Pipe	A106B	2"	0.154	0.141	-	0.136	0.14	
B31.1	30	N/A	6	Pipe	A106B	2"	0.154	0.146	0.146	0.146	0.138	
B31.1	30	N/A	7	Pipe	A106B	2"	0.154	0.144	-	0.101	-	C,P
B31.1	30	N/A	8	45	CS	2"	0.154	-	-	0.147	-	
B31.1	30	N/A	9	CTN	A105	2"	-	N/A	N/A	N/A	N/A	
B31.1	30	N/A	10	45	CS	2"	0.154	0.147	-	-	-	
B31.1	30	N/A	11	CTN	A105	2"	-	N/A	N/A	N/A	N/A	
B31.1	30	N/A	12	Pipe	A106B	2"	0.154	0.148	-	-	-	

Comments: Components listed as "N/A" at heights, covered, contain excessive part geometry or otherwise not accessible.

Internal Corrosion/Pitting Noted

All piping components threaded

Light general external corrosion

Signature UTII Tech. *Eric Espe*

Piping Remaining Life Calculations

Minimum Required Thickness, Long Term Corrosion Rate and Remaining Life Calculations

Facility: Leroy-Ostrander | Equip. #: N/A | Insp. Date: 3/9/2017
Location: Boiler Room | Description: Pump 4 to Gate Valve

Inspection Information

Pipe Size	2	**D**	=	Outside Diameter	2.4
Material	A106B	**S**	=	Allowable Stress Value	20,000
Current Inspection Year	2017	**P**	=	Design Pressure	30
Initial or Previous Thickness Reading Year	2012	**E**	=	Joint Efficiency (*seamless E=1*)	0.9
API 570 Inspection Interval	5	**W**	=	Weld Strength Reduction Factor	1.0
Initial Thickness	0.154			(*W=1 unless temp. above 800°F*)	
Actual Thickness	0.101	**Y**	=	Temperature Factor	0.4

Calculation Information

Minimum Thickness Calculation:

$$t = \frac{PD}{2(SE+PY)} = \frac{30 \times 2.375}{2 \times ((20{,}000 \times 0.9)+(30 \times 0.4))} = \frac{71.25}{34{,}024} + 0.019$$

t = Required Minimum Thickness = **0.0211**

Based on the above calculation, this pipe meets the required minumum thickness for continued service at the current pressure.

st = Structural Minimum Thickness = **0.1000**

Structural minimum thickness based on carbon pipe

This pipe meets the required Structural Minimum Thickness for continued service.

Corrosion Rate:

$$\frac{\text{t-initial - t-actual}}{\text{years between t-initial \& t-actual}} = \frac{0.1540 - 0.1010}{5} = \frac{0.0530}{5} = 0.0106 \text{ Inches Per Year}$$

Remaining Half Life:

$$\frac{\text{t-actual - t-minimum}}{\text{Corrosion Rate}} / 2 = \frac{0.1010 - 0.0211}{0.0106} / 2 = \frac{0.0799}{0.0106} \div 2 = 7.5 / 2 = 3.8 \text{ Years Remaining Half Life}$$

Based on the above corrosion rate and half life calculation, this pipe is due for inspection: Dec 2020

Comments

Eric Espe — VT/UT II Tech. Signature

10/31/2016 — Date

(Boiler Room) Pump 4 to Gate Valve

Light General Corrosion


Close Threaded Nipple (CTN)

(Boiler Room) 10" Main Header

Leroy-Ostrander School

PIPING INSPECTION RECORD

Facility	Leroy-Ostrander	P&ID No. (First & Last):		Status	A	Inspection Interval (yrs)	5
Line No.	N/A	N/A		**Regulated By:**		Owner X API	PSM
Description	10 " Boiler Main Header			Insulated	0%	Underground	
				Vibration:	Light [X]	Moderate [ ]	Heavy [ ]
Location	Boiler Room			Previous Failure	[ ]	Sand Producing/High Velocity	[ ]
				Dead Leg	[ ]	Injection Point	[ ]
Service (Oil, Gas, Etc.)	Steam	Sour Service [ ]		Air to Ground	[ ]	Corrosion Coupon	[ ]
Fabrication Code	B 31.1	Piping Class (1,2,3,4)	4	Over Water	[ ]	Anodes	[ ]
Comments				Inspection Type:		Full [ ] Partial [ ]	UT/VT [X]
				Other (Specify)			

To be completed in the field (The following conditions apply to equipment listed above):

N/A	No areas of concern noted during physical inspection.					
X	External Corrosion:		Light (surface rust, no scaling or pitting).			
		X	Moderate (pit depth not greater than C.A./light scale).	X Pit	X Scale	
			Extreme (pit depth greater than C.A./heavy scale).	Pit	Scale	
N/A	Visual Examination of existing welds (see comments):				Satisfactory	Unsatisfactory
N/A	Non-typical fittings/components in service (see comments).					
X	Condition of insulation:		Good	Fair	X	Poor
X	Condition of supports/restraints (see comments)			X	Satisfactory	Unsatisfactory
N/A	Condition of coating (see comments):		Good	Fair		Poor

UT II Tech: *Eric Espe* **Inspection Date:** 3/9/2017

To be completed in the office:

N/A	RT Performed.	% RT				
x	UT Readings Taken.	83 % UT Taken	Inaccessible	Insulated		Not Required
NA	Other NDE.	% Other		Type (LFET, PT, MT, Etc.)		
N/A	Thickness measurements are less than minimum to meet design pressure requirements					
N/A	Engineering evaluation requested (see comments).					

Comments:
1. Light general external corrosion throughout and at support hangers. Inspect for corrosion under insulation
2. External pitting/scale on end cap (Loc.1)
3. Leaking valve/flange at location 4.2
4.
5.
6.
7.
8.
9.
10.

Action Items	Resp. Dept.	Govn. By	Mand	Rec	Action Code 1	2	3
1. Remove insulation, buff scale. Seal Coat w/ Devoe 235 or 236 for Carbon Steel	Maint.	L-O	[ ]	[X]	[ ]	[X]	[ ]
2. Remove insulation, buff scale. Seal Coat w/ Devoe 235 or 236 for Carbon Steel	Maint.	L-O	[ ]	[X]	[ ]	[X]	[ ]
3. Repair leaking valve/flange	Maint.	L-O	[X]	[ ]	[X]	[ ]	[ ]
4.			[ ]	[ ]	[ ]	[ ]	[ ]
5.			[ ]	[ ]	[ ]	[ ]	[ ]
6.			[ ]	[ ]	[ ]	[ ]	[ ]
7.			[ ]	[ ]	[ ]	[ ]	[ ]
8.			[ ]	[ ]	[ ]	[ ]	[ ]
9.			[ ]	[ ]	[ ]	[ ]	[ ]
10.			[ ]	[ ]	[ ]	[ ]	[ ]

Final Review:

Authorized UTII Tech: *Eric Espe* **Review Date:** 3/24/2016

PIPING THICKNESS MEASUREMENTS
(inches)

SHEET 1 of 1

FACILITY **Leroy-Ostrander School** LINE NO. **N/A** INSPECTION DATE **3-9-17**

LOCATION **Boiler Room** PAINT/INSULATION **None**

DESCRIPTION **10" Boiler Main Header** TECHNICIAN **Eric Espe**

REMARKS (Insp. Method, Equip. Type, Serial No., Etc.) **UTT, Olympus 38 DL Plus - S/N 120406903, Panametrics D790 - S/N 902401**

CODE	DESN. PRES.	SPEC.	LOC. NO.	COMP. TYPE	MATL.	SIZE	NOM. THICK	12:00	3:00	6:00	9:00	
B31.1	30	N/A	1	End Cap	A53B	10"	0.375	-	-	0.378	-	
B31.1	30	N/A	2	Pipe	A53B	10"	0.365	-	0.313	0.312	-	
B31.1	30	N/A	3	Pipe	A53B	10"	0.365	-	0.312	0.311	-	
B31.1	30	N/A	3.1	Branch	A106B	2"	0.154	0.156	0.154	-	-	
B31.1	30	N/A	3.2	Branch	A106B	6"	0.280	NA	0.247	N/A	N/A	
B31.1	30	N/A	3.3	Branch	A106B	6"	0.280	N/A	0.230	N/A	N/A	
B31.1	30	N/A	3.4	Branch	A106B	2"	0.154	0.168	0.155	0.171	0.164	
B31.1	30	N/A	3.5	Branch	A106B	6"	0.154	N/A	N/A	0.235	N/A	
B31.1	30	N/A	3.6	Branch	A106B	6"	-	0.272	0.274	0.267	0.27	
B31.1	30	N/A	4	Pipe	A53B	10"	0.365	0.318	0.300	0.312	0.316	
B31.1	30	N/A	4.1	Branch	A106B	6"	-	N/A	N/A	N/A	N/A	
B31.1	30	N/A	4.2	Branch	A106B	4"	0.154	N/A	N/A	N/A	N/A	
B31.1	30	N/A	5	Tee	A53B	10"	0.375	-	-	0.370	-	
B31.1	30	N/A	5.1	Pipe	A106B	6"	0.280	-	-	0.265	-	
B31.1	30	N/A	5.2	Pipe	A106B	2"	0.154	0.151	-	0.159	0.157	
B31.1	30	N/A	6	End Cap	A53B	10"	0.375	-	-	0.367	-	

Comments: **Components listed as "N/A" at heights, covered, contain excessive part geometry or otherwise not accessible.**
Light general external corrosion

Signature UTII Tech. *Eric Espe*

Piping Remaining Life Calculations

Minimum Required Thickness, Long Term Corrosion Rate and Remaining Life Calculations

Facility: Leroy-Ostrander | Equip. #: N/A | Insp. Date: 3/9/2017
Location: Boiler Room | Description: 10" Main Header

Inspection Information

Pipe Size	10	**D**	=	Outside Diameter	10.8
Material	A53 Gr B	**S**	=	Allowable Stress Value	16,000
Current Inspection Year	2017	**P**	=	Design Pressure	30
Initial or Previous Thickness Reading Year	2012	**E**	=	Joint Efficiency (*seamless E=1*)	0.9
API 570 Inspection Interval	5	**W**	=	Weld Strength Reduction Factor	1.0
Initial Thickness	0.365			(*W=1 unless temp. above 800°F*)	
Actual Thickness	0.3	**Y**	=	Temperature Factor	0.4

Calculation Information

Minimum Thickness Calculation:

$$t = \frac{PD}{2(SE+PY)} = \frac{30 \times 10.75}{2 \times ((16{,}000 \times 0.9)+(30 \times 0.4))} = \frac{322.5}{27{,}224} + 0.045$$

t = Required Minimum Thickness = **0.0568**

Based on the above calculation, this pipe meets the required minumum thickness for continued service at the current pressure.

st = Structural Minimum Thickness = **0.1000**

Structural minimum thickness based on carbon pipe

This pipe meets the required Structural Minimum Thickness for continued service.

Corrosion Rate:

$$\frac{\text{t-initial - t-actual}}{\text{years between t-initial \& t-actual}} = \frac{0.3650 - 0.3000}{5} = \frac{0.0650}{5} = 0.0130 \text{ Inches Per Year}$$

Remaining Half Life:

$$\frac{\text{t-actual - t-minimum}}{\text{Corrosion Rate}} / 2 = \frac{0.3000 - 0.0568}{0.0130} / 2 = \frac{0.2432}{0.0130} \div 2 = 18.7 / 2 = 9.4 \text{ Years Remaining Half Life}$$

Based on the above corrosion rate and half life calculation, this pipe is due for inspection: Mar 2022

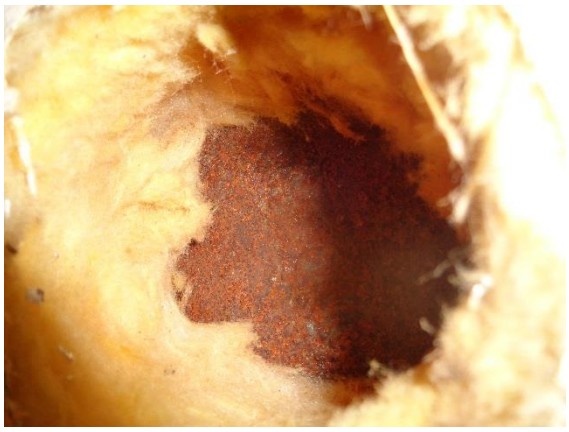
Comments

Eric Espe
VT/UT II Tech. Signature

10/31/2016
Date

(Boiler Room) 10" Main Header

Leaking Valve at Loc. 4.1 (CUI



End Cap Showing Light General w/Pitting

Testing Branch Connections on Header

Support Hangers Under Insulation (LGC)

(Boiler Room) Pump 2 / Pump 4 Header

Leroy-Ostrander School

PIPING INSPECTION RECORD

Facility	Leroy-Ostrander	P&ID No. (First & Last):		Status	A	Inspection Interval (yrs)	5
Line No.	N/A	N/A		**Regulated By:**		Owner X API	PSM
Description	P2/P4 Header			Insulated	0%	Underground	
				Vibration:	Light [X]	Moderate [ ]	Heavy [ ]
Location	Boiler Room			Previous Failure	[ ]	Sand Producing/High Velocity	[ ]
				Dead Leg	[ ]	Injection Point	[ ]
Service (Oil, Gas, Etc.)	Steam	Sour Service [ ]		Air to Ground	[ ]	Corrosion Coupon	[ ]
Fabrication Code	B 31.1	Piping Class (1,2,3,4)	4	Over Water	[ ]	Anodes	[ ]
Comments				Inspection Type:		Full [ ] Partial [ ] UT/VT	[X]
				Other (Specify)			

To be completed in the field (The following conditions apply to equipment listed above):

N/A No areas of concern noted during physical inspection.

X External Corrosion: X Light (surface rust, no scaling or pitting).

Moderate (pit depth not greater than C.A./light scale). Pit Scale

Extreme (pit depth greater than C.A./heavy scale). Pit Scale

N/A Visual Examination of existing welds (see comments): Satisfactory Unsatisfactory

N/A Non-typical fittings/components in service (see comments).

X Condition of insulation: Good Fair X Poor

X Condition of supports/restraints (see comments) X Satisfactory Unsatisfactory

N/A Condition of coating (see comments): Good Fair Poor

UT II Tech: *Eric Espe* **Inspection Date:** 3/9/2017

To be completed in the office:

N/A RT Performed. % RT

x UT Readings Taken. 100 % UT Taken Inaccessible Insulated Not Required

NA Other NDE. % Other Type (LFET, PT, MT, Etc.)

N/A Thickness measurements are less than minimum to meet design pressure requirements

N/A Engineering evaluation requested (see comments).

Comments:
1. None noted at time of inspection
2.
3.
4.
5.
6.
7.
8.
9.
10.

Action Items	Resp. Dept.	Govn. By	Mand	Rec	Action Code 1	2	3
1.			[ ]	[ ]	[ ]	[ ]	[ ]
2.			[ ]	[ ]	[ ]	[ ]	[ ]
3.			[ ]	[ ]	[ ]	[ ]	[ ]
4.			[ ]	[ ]	[ ]	[ ]	[ ]
5.			[ ]	[ ]	[ ]	[ ]	[ ]
6.			[ ]	[ ]	[ ]	[ ]	[ ]
7.			[ ]	[ ]	[ ]	[ ]	[ ]
8.			[ ]	[ ]	[ ]	[ ]	[ ]
9.			[ ]	[ ]	[ ]	[ ]	[ ]
10.			[ ]	[ ]	[ ]	[ ]	[ ]

Final Review:

Authorized UTII Tech: *Eric Espe* **Review Date:** 3/24/2016

PIPING THICKNESS MEASUREMENTS
(inches)

SHEET 1 of 1

FACILITY **Leroy-Ostrander School** LINE NO. **N/A** INSPECTION DATE **3-9-17**

LOCATION **Boiler Room** PAINT/INSULATION **None**

DESCRIPTION **P2/P4 Header** TECHNICIAN **Eric Espe**

REMARKS (Insp. Method, Equip. Type, Serial No., Etc.) **UTT, Olympus 38 DL Plus - S/N 120406903, Panametrics D790 - S/N 902401**

CODE	DESN. PRES.	SPEC.	LOC. NO.	COMP. TYPE	MATL.	SIZE	NOM. THICK	12:00	3:00	6:00	9:00	
B31.1	**30**	**N/A**	**1**	**Pipe**	**A53B**	**10"**	**0.365**	**-**	**0.361**	**0.358**	**-**	

Comments: **Components listed as "N/A" at heights, covered, contain excessive part geometry or otherwise not accessible.**

Signature UTII Tech. *Eric Espe*

Piping Remaining Life Calculations

Minimum Required Thickness, Long Term Corrosion Rate and Remaining Life Calculations

Facility: Leroy-Ostrander | Equip. #: N/A | Insp. Date: 3/9/2017
Location: Boiler Room | Description: P2/P4 Header

Inspection Information

Pipe Size	10	**D**	=	Outside Diameter	10.8
Material	A53 Gr B	**S**	=	Allowable Stress Value	16,000
Current Inspection Year	2017	**P**	=	Design Pressure	30
Initial or Previous Thickness Reading Year	2012	**E**	=	Joint Efficiency (*seamless E=1*)	0.9
API 570 Inspection Interval	5	**W**	=	Weld Strength Reduction Factor	1.0
Initial Thickness	0.365			(*W=1 unless temp. above 800°F*)	
Actual Thickness	0.358	**Y**	=	Temperature Factor	0.4

Calculation Information

Minimum Thickness Calculation:

$$t = \frac{PD}{2(SE+PY)} = \frac{30 \times 10.75}{2 \times ((16{,}000 \times 0.9)+(30 \times 0.4))} = \frac{322.5}{27{,}224} + 0.045$$

t = **Required Minimum Thickness** = **0.0568**

Based on the above calculation, this pipe meets the required minumum thickness for continued service at the current pressure.

st = **Structural Minimum Thickness** = **0.1000**

Structural minimum thickness based on carbon pipe

This pipe meets the required Structural Minimum Thickness for continued service.

Corrosion Rate:

$$\frac{\text{t-initial - t-actual}}{\text{years between t-initial \& t-actual}} = \frac{0.3650 - 0.3580}{5} = \frac{0.0070}{5} = 0.0014 \text{ Inches Per Year}$$

Remaining Half Life:

$$\frac{\text{t-actual - t-minimum}}{\text{Corrosion Rate}} / 2 = \frac{0.3580 - 0.0568}{0.0014} / 2 = \frac{0.3012}{0.0014} \div 2 = 215.1 / 2 = 107.6 \text{ Years Remaining Half Life}$$

Based on the above corrosion rate and half life calculation, this pipe is due for inspection: Mar 2022

Comments

Eric Espe — VT/UT II Tech. Signature

3/9/2017 — Date

(Boiler Room) Pump 2 & 4 Riser

Leroy-Ostrander School

PIPING INSPECTION RECORD

Facility	Leroy-Ostrander	P&ID No. (First & Last):		Status	A	Inspection Interval (yrs)	5
Line No.	N/A	N/A		**Regulated By:**		Owner X API	PSM
Description	P2/P4 Riser to Header			Insulated	0%	Underground	
				Vibration:	Light [X]	Moderate [ ]	Heavy [ ]
Location	Boiler Room			Previous Failure	[ ]	Sand Producing/High Velocity	[ ]
				Dead Leg	[ ]	Injection Point	[ ]
Service (Oil, Gas, Etc.)	Steam	Sour Service [ ]		Air to Ground	[ ]	Corrosion Coupon	[ ]
Fabrication Code	B 31.1	Piping Class (1,2,3,4)	4	Over Water	[ ]	Anodes	[ ]
Comments				Inspection Type:		Full [ ] Partial [ ] UT/VT	[X]
				Other (Specify)			

To be completed in the field (The following conditions apply to equipment listed above):

N/A No areas of concern noted during physical inspection.

X External Corrosion: X Light (surface rust, no scaling or pitting).

Moderate (pit depth not greater than C.A./light scale). Pit Scale

Extreme (pit depth greater than C.A./heavy scale). Pit Scale

N/A Visual Examination of existing welds (see comments): Satisfactory Unsatisfactory

N/A Non-typical fittings/components in service (see comments).

X Condition of insulation: Good Fair X Poor

X Condition of supports/restraints (see comments) X Satisfactory Unsatisfactory

N/A Condition of coating (see comments): Good Fair Poor

UT II Tech: *Eric Espe* **Inspection Date:** 3/9/2017

To be completed in the office:

N/A RT Performed. % RT

x UT Readings Taken. 100 % UT Taken Inaccessible Insulated Not Required

NA Other NDE. % Other Type (LFET, PT, MT, Etc.)

N/A Thickness measurements are less than minimum to meet design pressure requirements

N/A Engineering evaluation requested (see comments).

Comments:
1. None noted at time of inspection
2.
3.
4.
5.
6.
7.
8.
9.
10.

Action Items	Resp. Dept.	Govn. By	Mand	Rec	Action Code 1	2	3
1.			[ ]	[ ]	[ ]	[ ]	[ ]
2.			[ ]	[ ]	[ ]	[ ]	[ ]
3.			[ ]	[ ]	[ ]	[ ]	[ ]
4.			[ ]	[ ]	[ ]	[ ]	[ ]
5.			[ ]	[ ]	[ ]	[ ]	[ ]
6.			[ ]	[ ]	[ ]	[ ]	[ ]
7.			[ ]	[ ]	[ ]	[ ]	[ ]
8.			[ ]	[ ]	[ ]	[ ]	[ ]
9.			[ ]	[ ]	[ ]	[ ]	[ ]
10.			[ ]	[ ]	[ ]	[ ]	[ ]

Final Review:

Authorized UTII Tech: *Eric Espe* **Review Date:** 3/24/2016

PIPING THICKNESS MEASUREMENTS
(inches)

SHEET 1 of 1

FACILITY **Leroy-Ostrander School** LINE NO. **N/A** INSPECTION DATE **3-9-17**

LOCATION **Boiler Room** PAINT/INSULATION **None**

DESCRIPTION **P2/P4 Riser** TECHNICIAN **Eric Espe**

REMARKS (Insp. Method, Equip. Type, Serial No., Etc.) **UTT, Olympus 38 DL Plus - S/N 120406903, Panametrics D790 - S/N 902401**

CODE	DESN. PRES.	SPEC.	LOC. NO.	COMP. TYPE	MATL.	SIZE	NOM. THICK	12:00	3:00	6:00	9:00	
B31.1	**30**	**N/A**	**1**	**Pipe**	**A106B**	**3"**	**0.216**	**-**	**-**	**0.197**	**-**	
B31.1	**30**	**N/A**	**2**	**Pipe**	**A106B**	**3"**	**0.216**	**-**	**-**	**0.199**	**-**	

Comments: **Components listed as "N/A" at heights, covered, contain excessive part geometry or otherwise not accessible.**

Signature UTII Tech. *Eric Espe*

Leroy-Ostrander School

PIPING INSPECTION RECORD

Facility: Leroy-Ostrander | P&ID No. (First & Last): | Status: A | Inspection Interval (yrs): 5
Line No.: N/A | N/A | **Regulated By:** | Owner: X | API: | PSM:
Description: P2/P4 Riser to Header | Insulated: 0% | Underground:
Vibration: Light [X] Moderate [ ] Heavy [ ]
Location: Boiler Room | Previous Failure [ ] | Sand Producing/High Velocity [ ]
Dead Leg [ ] | Injection Point [ ]
Service (Oil, Gas, Etc.): Steam | Sour Service [ ] | Air to Ground [ ] | Corrosion Coupon [ ]
Fabrication Code: B 31.1 | Piping Class (1,2,3,4): 4 | Over Water [ ] | Anodes [ ]
Comments: | Inspection Type: Full [ ] Partial [ ] UT/VT [X]
Other (Specify):

To be completed in the field (The following conditions apply to equipment listed above):

N/A No areas of concern noted during physical inspection.
X External Corrosion: X Light (surface rust, no scaling or pitting).
Moderate (pit depth not greater than C.A./light scale). Pit Scale
Extreme (pit depth greater than C.A./heavy scale). Pit Scale
N/A Visual Examination of existing welds (see comments): Satisfactory Unsatisfactory
N/A Non-typical fittings/components in service (see comments).
X Condition of insulation: Good Fair X Poor
X Condition of supports/restraints (see comments) X Satisfactory Unsatisfactory
N/A Condition of coating (see comments): Good Fair Poor

UT II Tech: *Eric Espe* **Inspection Date:** 3/9/2017

To be completed in the office:

N/A RT Performed. % RT
x UT Readings Taken. 100 % UT Taken Inaccessible Insulated Not Required
NA Other NDE. % Other Type (LFET, PT, MT, Etc.)
N/A Thickness measurements are less than minimum to meet design pressure requirements
N/A Engineering evaluation requested (see comments).

Comments:
1. None noted at time of inspection
2.
3.
4.
5.
6.
7.
8.
9.
10.

Action Items	Resp. Dept.	Govn. By	Mand	Rec	Action Code 1	2	3
1.			[ ]	[ ]	[ ]	[ ]	[ ]
2.			[ ]	[ ]	[ ]	[ ]	[ ]
3.			[ ]	[ ]	[ ]	[ ]	[ ]
4.			[ ]	[ ]	[ ]	[ ]	[ ]
5.			[ ]	[ ]	[ ]	[ ]	[ ]
6.			[ ]	[ ]	[ ]	[ ]	[ ]
7.			[ ]	[ ]	[ ]	[ ]	[ ]
8.			[ ]	[ ]	[ ]	[ ]	[ ]
9.			[ ]	[ ]	[ ]	[ ]	[ ]
10.			[ ]	[ ]	[ ]	[ ]	[ ]

Final Review:

Authorized UTII Tech: *Eric Espe* **Review Date:** 3/24/2016

POET Biorefining

PIPING THICKNESS MEASUREMENTS
(inches)

SHEET **1** of **1**

FACILITY **Leroy-Ostrander School** LINE NO. **N/A** INSPECTION DATE **3-9-17**

LOCATION **Boiler Room** PAINT/INSULATION **None**

DESCRIPTION **P2/P4 Riser** TECHNICIAN **Eric Espe**

REMARKS (Insp. Method, Equip. Type, Serial No., Etc.) **UTT, Olympus 38 DL Plus - S/N 120406903, Panametrics D790 - S/N 902401**

CODE	DESN. PRES.	SPEC.	LOC. NO.	COMP. TYPE	MATL.	SIZE	NOM. THICK	12:00	3:00	6:00	9:00	
B31.1	**30**	**N/A**	**1**	**Pipe**	**A106B**	**3"**	**0.216**	**-**	**-**	**0.197**	**-**	
B31.1	**30**	**N/A**	**2**	**Pipe**	**A106B**	**3"**	**0.216**	**-**	**-**	**0.199**	**-**	

Comments: **Components listed as "N/A" at heights, covered, contain excessive part geometry or otherwise not accessible.**

Signature UTII Tech. *Eric Espe*

Piping Remaining Life Calculations

Minimum Required Thickness, Long Term Corrosion Rate and Remaining Life Calculations

Facility: Leroy-Ostrander | Equip. #: N/A | Insp. Date: 3/9/2017
Location: Boiler Room | Description: Pump 2 / Pump 4 Riser to Header

Inspection Information

Pipe Size	3	**D**	=	Outside Diameter	3.5
Material	A106B	**S**	=	Allowable Stress Value	20,000
Current Inspection Year	2017	**P**	=	Design Pressure	30
Initial or Previous Thickness Reading Year	2012	**E**	=	Joint Efficiency (*seamless E=1*)	0.9
API 570 Inspection Interval	5	**W**	=	Weld Strength Reduction Factor	1.0
Initial Thickness	0.216			(*W=1 unless temp. above 800°F*)	
Actual Thickness	0.197	**Y**	=	Temperature Factor	0.4

Calculation Information

Minimum Thickness Calculation:

$$t = \frac{PD}{2(SE+PY)} = \frac{30 \times 3.5}{2 \times ((20{,}000 \times 0.9)+(30 \times 0.4))} = \frac{105}{34{,}024} + 0.027$$

t **= Required Minimum Thickness = 0.0301**

Based on the above calculation, this pipe meets the required minumum thickness for continued service at the current pressure.

st **= Structural Minimum Thickness = 0.1000**

Structural minimum thickness based on carbon pipe

This pipe meets the required Structural Minimum Thickness for continued service.

Corrosion Rate:

$$\frac{\text{t-initial - t-actual}}{\text{years between t-initial \& t-actual}} = \frac{0.2160 - 0.1970}{5} = \frac{0.0190}{5} = 0.0038 \text{ Inches Per Year}$$

Remaining Half Life:

$$\frac{\text{t-actual - t-minimum}}{\text{Corrosion Rate}} / 2 = \frac{0.1970 - 0.0301}{0.0038} / 2 = \frac{0.1669}{0.0038} \div 2 = 43.9 / 2 = 22.0 \text{ Years Remaining Half Life}$$

Based on the above corrosion rate and half life calculation, this pipe is due for inspection: Mar 2022

Comments

Eric Espe — VT/UT II Tech. Signature

3/9/2017 — Date

(Boiler Room) Pump 2 & 4 Riser

P2 & P4 Riser to Header

(Boiler Room) 3" Supply to Pumps 2 & 4

Leroy-Ostrander School

PIPING INSPECTION RECORD

Facility	Leroy-Ostrander	P&ID No. (First & Last):		Status	A	Inspection Interval (yrs)	5
Line No.	N/A	N/A		**Regulated By:**		Owner X API	PSM
Description	Supply to Pumps			Insulated	0%	Underground	
				Vibration:	Light [X]	Moderate [ ]	Heavy [ ]
Location	Boiler Room			Previous Failure	[ ]	Sand Producing/High Velocity	[ ]
				Dead Leg	[ ]	Injection Point	[ ]
Service (Oil, Gas, Etc.)	Steam	Sour Service [ ]		Air to Ground	[ ]	Corrosion Coupon	[ ]
Fabrication Code	B 31.1	Piping Class (1,2,3,4)	4	Over Water	[ ]	Anodes	[ ]
Comments				Inspection Type:		Full [ ] Partial [ ] UT/VT	[X]
				Other (Specify)			

To be completed in the field (The following conditions apply to equipment listed above):

N/A No areas of concern noted during physical inspection.

X External Corrosion: X Light (surface rust, no scaling or pitting).

__ Moderate (pit depth not greater than C.A./light scale). __ Pit __ Scale

__ Extreme (pit depth greater than C.A./heavy scale). __ Pit __ Scale

N/A Visual Examination of existing welds (see comments): __ Satisfactory __ Unsatisfactory

N/A Non-typical fittings/components in service (see comments).

X Condition of insulation: __ Good __ Fair X Poor

X Condition of supports/restraints (see comments) X Satisfactory __ Unsatisfactory

N/A Condition of coating (see comments): __ Good __ Fair __ Poor

UT II Tech: *Eric Espe* **Inspection Date:** 3/9/2017

To be completed in the office:

N/A RT Performed. __ % RT

x UT Readings Taken. 100 % UT Taken __ Inaccessible __ Insulated __ Not Required

NA Other NDE. __ % Other __ Type (LFET, PT, MT, Etc.)

N/A Thickness measurements are less than minimum to meet design pressure requirements

N/A Engineering evaluation requested (see comments).

Comments:
1. Damaged Insulation.
2.
3.
4.
5.
6.
7.
8.
9.
10.

Action Items	Resp. Dept.	Govn. By	Mand	Rec	Action Code 1	2	3
1. Repair and or replace damaged insulation.	Mait.	L-O	[ ]	[X]	[ ]	[X]	[ ]
2.			[ ]	[ ]	[ ]	[ ]	[ ]
3.			[ ]	[ ]	[ ]	[ ]	[ ]
4.			[ ]	[ ]	[ ]	[ ]	[ ]
5.			[ ]	[ ]	[ ]	[ ]	[ ]
6.			[ ]	[ ]	[ ]	[ ]	[ ]
7.			[ ]	[ ]	[ ]	[ ]	[ ]
8.			[ ]	[ ]	[ ]	[ ]	[ ]
9.			[ ]	[ ]	[ ]	[ ]	[ ]
10.			[ ]	[ ]	[ ]	[ ]	[ ]

Final Review:

Authorized UTII Tech: *Eric Espe* **Review Date:** 3/24/2016

PIPING THICKNESS MEASUREMENTS
(inches)

SHEET 1 of 1

FACILITY **Leroy-Ostrander School** LINE NO. **N/A** INSPECTION DATE **3-9-17**

LOCATION **Boiler Room** PAINT/INSULATION **None**

DESCRIPTION **Supply to Pumps 2&4** TECHNICIAN **Eric Espe**

REMARKS (Insp. Method, Equip. Type, Serial No., Etc.) **UTT, Olympus 38 DL Plus - S/N 120406903, Panametrics D790 - S/N 902401**

CODE	DESN. PRES.	SPEC.	LOC. NO.	COMP. TYPE	MATL.	SIZE	NOM. THICK	12:00	3:00	6:00	9:00	
B31.1	**30**	**N/A**	**1**	**Pipe**	**A106B**	**3"**	**0.216**	**-**	**0.185**	**-**	**0.195**	

Comments: **Components listed as "N/A" at heights, covered, contain excessive part geometry or otherwise not accessible.**

Signature UTII Tech. *Eric Espe*

Piping
B31.1

Piping Remaining Life Calculations

Minimum Required Thickness, Long Term Corrosion Rate and Remaining Life Calculations

Facility: Leroy-Ostrander | Equip. #: N/A | Insp. Date: 3/9/2017
Location: Boiler Room | Description: Supply to Pumps 2 & 4

Inspection Information

Pipe Size	3	**D**	=	Outside Diameter	3.5
Material	A106B	**S**	=	Allowable Stress Value	20,000
Current Inspection Year	2017	**P**	=	Design Pressure	30
Initial or Previous Thickness Reading Year	2012	**E**	=	Joint Efficiency (*seamless E=1*)	0.9
API 570 Inspection Interval	5	**W**	=	Weld Strength Reduction Factor	1.0
Initial Thickness	0.216			(*W=1 unless temp. above 800°F*)	
Actual Thickness	0.185	**Y**	=	Temperature Factor	0.4

Calculation Information

Minimum Thickness Calculation:

$$t = \frac{PD}{2(SE+PY)} = \frac{30 \times 3.5}{2 \times ((20{,}000 \times 0.9)+(30 \times 0.4))} = \frac{105}{34{,}024} + 0.027$$

t = **Required Minimum Thickness** = **0.0301**

Based on the above calculation, this pipe meets the required minumum thickness for continued service at the current pressure.

st = **Structural Minimum Thickness** = **0.1000**

Structural minimum thickness based on carbon pipe

This pipe meets the required Structural Minimum Thickness for continued service.

Corrosion Rate:

$$\frac{\text{t-initial - t-actual}}{\text{years between t-initial \& t-actual}} = \frac{0.2160 - 0.1850}{5} = \frac{0.0310}{5} = 0.0062 \text{ Inches Per Year}$$

Remaining Half Life:

$$\frac{\text{t-actual - t-minimum}}{\text{Corrosion Rate}} / 2 = \frac{0.1850 - 0.0301}{0.0062} / 2 = \frac{0.1549}{0.0062} \div 2 = 25.0 / 2 = 12.5 \text{ Years Remaining Half Life}$$

Based on the above corrosion rate and half life calculation, this pipe is due for inspection: Mar 2022

Comments

Eric Espe
VT/UT II Tech. Signature

3/9/2017
Date

(Boiler Room) 3" Supply to Pumps 2 & 4

Damaged Insulation

East AHU Steam Line

Leroy-Ostrander School

PIPING INSPECTION RECORD

Facility	Leroy-Ostrander	P&ID No. (First & Last):		Status	A	Inspection Interval (yrs)	5
Line No.	N/A	N/A		**Regulated By:**		Owner X API	PSM
Description	East AHU Steam Line			Insulated	0%	Underground	
				Vibration:	Light [X]	Moderate [ ]	Heavy [ ]
Location	Boiler Room			Previous Failure	[ ]	Sand Producing/High Velocity	[ ]
				Dead Leg	[ ]	Injection Point	[ ]
Service (Oil, Gas, Etc.)	Steam	Sour Service [ ]		Air to Ground	[ ]	Corrosion Coupon	[ ]
Fabrication Code	B 31.1	Piping Class (1,2,3,4)	4	Over Water	[ ]	Anodes	[ ]
Comments				Inspection Type:		Full [ ] Partial [ ]	UT/VT [X]
				Other (Specify)			

To be completed in the field (The following conditions apply to equipment listed above):

N/A	No areas of concern noted during physical inspection.					
X	External Corrosion:	X	Light (surface rust, no scaling or pitting).			
			Moderate (pit depth not greater than C.A./light scale).		Pit	Scale
			Extreme (pit depth greater than C.A./heavy scale).		Pit	Scale
N/A	Visual Examination of existing welds (see comments):				Satisfactory	Unsatisfactory
N/A	Non-typical fittings/components in service (see comments).					
X	Condition of insulation:		Good		Fair	X Poor
X	Condition of supports/restraints (see comments)			X	Satisfactory	Unsatisfactory
N/A	Condition of coating (see comments):		Good		Fair	Poor

UT II Tech: *Eric Espe* **Inspection Date:** 3/9/2017

To be completed in the office:

N/A	RT Performed.	% RT				
x	UT Readings Taken.	100 % UT Taken	Inaccessible	Insulated		Not Required
NA	Other NDE.	% Other		Type (LFET, PT, MT, Etc.)		
N/A	Thickness measurements are less than minimum to meet design pressure requirements					
N/A	Engineering evaluation requested (see comments).					

Comments:
1. Visual Testing Unsatisfactory at location 3. Weld undercut on piping.
2. Threaded components used in piping circuit.
3.
4.
5.
6.
7.
8.
9.
10.

Action Items	Resp. Dept.	Govn. By	Mand	Rec	Action Code 1	2	3
1. Repair weld undercut at location 3.	Maint.	L-O	[X]	[ ]	[X]	[ ]	[ ]
2. Monitor with visual inspection.	Maint.	L-O	[ ]	[X]	[ ]	[ ]	[X]
3.			[ ]	[ ]	[ ]	[ ]	[ ]
4.			[ ]	[ ]	[ ]	[ ]	[ ]
5.			[ ]	[ ]	[ ]	[ ]	[ ]
6.			[ ]	[ ]	[ ]	[ ]	[ ]
7.			[ ]	[ ]	[ ]	[ ]	[ ]
8.			[ ]	[ ]	[ ]	[ ]	[ ]
9.			[ ]	[ ]	[ ]	[ ]	[ ]
10.			[ ]	[ ]	[ ]	[ ]	[ ]

Final Review:

Authorized UTII Tech: *Eric Espe* **Review Date:** 3/24/2016

PIPING THICKNESS MEASUREMENTS
(inches)

SHEET 1 of 1

FACILITY **Leroy-Ostrander School** LINE NO. **N/A** INSPECTION DATE **3-9-17**

LOCATION **East AHU Steam Line** PAINT/INSULATION **None**

DESCRIPTION **Steam Line to East AHU** TECHNICIAN **Eric Espe**

REMARKS (Insp. Method, Equip. Type, Serial No., Etc.) **UTT, Olympus 38 DL Plus - S/N 120406903, Panametrics D790 - S/N 902401**

CODE	DESN. PRES.	SPEC.	LOC. NO.	COMP. TYPE	MATL.	SIZE	NOM. THICK	12:00	3:00	6:00	9:00	
B31.1	30	N/A	1	Pipe	A106B	3"	0.216	0.190	0.194	0.196	0.210	
B31.1	30	N/A	2	Reducer	A106B	3"x2"	0.216	0.212	0.213	0.226	0.219	
B31.1	30	N/A	3	Pipe	A106B	2"	0.154	0.130	0.135	0.137	0.145	
B31.1	30	N/A	4	Pipe	A106B	2"	0.154	0.145	-	0.140	-	
B31.1	30	N/A	5	CTN	A106B	2"	-	N/A	N/A	N/A	N/A	
B31.1	30	N/A	6	Pipe	A106B	2"	0.154	-	0.129	-	-	
B31.1	30	N/A	7	90	A106B	2"	0.154	-	0.152	-	-	
B31.1	30	N/A	8	CTN	A106B	2"	-	N/A	N/A	N/A	N/A	
B31.1	30	N/A	9	Pipe	A106B	2"	0.154	N/A	N/A	N/A	0.14	

Comments: **Components listed as "N/A" at heights, covered, contain excessive part geometry or otherwise not accessible.**

Location 3 - VTU, Weld Undercut

Threaded fittings except at locations 1, 2 and 3

Signature UTII Tech. *Eric Espe*

Piping
B31.1

Piping Remaining Life Calculations

Minimum Required Thickness, Long Term Corrosion Rate and Remaining Life Calculations

Facility: Leroy-Ostrander | Equip. #: N/A | Insp. Date: 3/9/2017
Location: East AHU | Description: East AHU Steam Line

Inspection Information

Pipe Size	2	**D**	= Outside Diameter	2.4
Material	A106B	**S**	= Allowable Stress Value	20,000
Current Inspection Year	2017	**P**	= Design Pressure	30
Initial or Previous Thickness Reading Year	2012	**E**	= Joint Efficiency (*seamless E=1*)	0.9
API 570 Inspection Interval	5	**W**	= Weld Strength Reduction Factor	1.0
Initial Thickness	0.154		(*W=1 unless temp. above 800°F*)	
Actual Thickness	0.129	**Y**	= Temperature Factor	0.4

Calculation Information

Minimum Thickness Calculation:

$$t = \frac{PD}{2(SE+PY)} = \frac{30 \times 2.375}{2 \times ((20{,}000 \times 0.9)+(30 \times 0.4))} = \frac{71.25}{34{,}024} + 0.019$$

t = Required Minimum Thickness = **0.0211**

Based on the above calculation, this pipe meets the required minumum thickness for continued service at the current pressure.

st = Structural Minimum Thickness = **0.1000**

Structural minimum thickness based on carbon pipe

This pipe meets the required Structural Minimum Thickness for continued service.

Corrosion Rate:

$$\frac{\text{t-initial - t-actual}}{\text{years between t-initial \& t-actual}} = \frac{0.1540 - 0.1290}{5} = \frac{0.0250}{5} = 0.0050 \text{ Inches Per Year}$$

Remaining Half Life:

$$\frac{\text{t-actual - t-minimum}}{\text{Corrosion Rate}} / 2 = \frac{0.1290 - 0.0211}{0.0050} / 2 = \frac{0.1079}{0.0050} \div 2 = 21.6 / 2 = 10.8 \text{ Years Remaining Half Life}$$

Based on the above corrosion rate and half life calculation, this pipe is due for inspection: Mar 2022

Comments

Eric Espe
VT/UT II Tech. Signature

3/9/2017
Date

Piping Remaining Life Calculations

Minimum Required Thickness, Long Term Corrosion Rate and Remaining Life Calculations

Facility: Leroy-Ostrander | Equip. #: N/A | Insp. Date: 3/9/2017
Location: East AHU | Description: East AHU Steam Line

Inspection Information

Pipe Size	3	**D**	=	Outside Diameter	3.5
Material	A106B	**S**	=	Allowable Stress Value	20,000
Current Inspection Year	2017	**P**	=	Design Pressure	30
Initial or Previous Thickness Reading Year	2012	**E**	=	Joint Efficiency (*seamless E=1*)	0.9
API 570 Inspection Interval	5	**W**	=	Weld Strength Reduction Factor	1.0
Initial Thickness	0.216			(*W=1 unless temp. above 800°F*)	
Actual Thickness	0.19	**Y**	=	Temperature Factor	0.4

Calculation Information

Minimum Thickness Calculation:

$$t = \frac{PD}{2(SE+PY)} = \frac{30 \times 3.5}{2 \times ((20{,}000 \times 0.9)+(30 \times 0.4))} = \frac{105}{34{,}024} + 0.027$$

t **= Required Minimum Thickness = 0.0301**

Based on the above calculation, this pipe meets the required minumum thickness for continued service at the current pressure.

st **= Structural Minimum Thickness = 0.1000**

Structural minimum thickness based on carbon pipe

This pipe meets the required Structural Minimum Thickness for continued service.

Corrosion Rate:

$$\frac{\text{t-initial - t-actual}}{\text{years between t-initial \& t-actual}} = \frac{0.2160 - 0.1900}{5} = \frac{0.0260}{5} = 0.0052 \text{ Inches Per Year}$$

Remaining Half Life:

$$\frac{\text{t-actual - t-minimum}}{\text{Corrosion Rate}} / 2 = \frac{0.1900 - 0.0301}{0.0052} / 2 = \frac{0.1599}{0.0052} \div 2 = 30.8 / 2 = 15.4 \text{ Years Remaining Half Life}$$

Based on the above corrosion rate and half life calculation, this pipe is due for inspection: Mar 2022

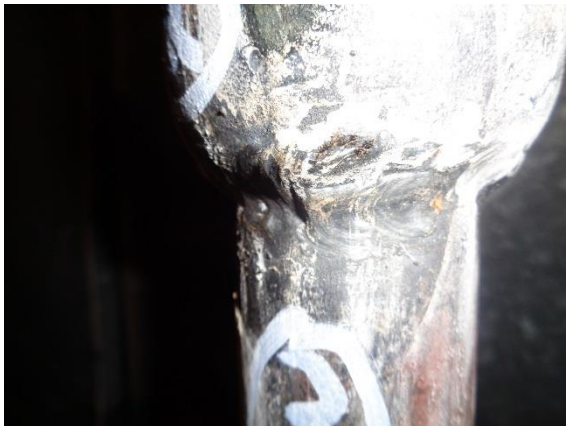
Comments

Eric Espe — VT/UT II Tech. Signature

3/9/2017 — Date

East AHU Steam Line

VTU – Undercut on pipe Loc. 3



Undercut/Underfill Loc. 3

Little Gym AHU Steam Lines

Leroy-Ostrander School

PIPING INSPECTION RECORD

Facility	Leroy-Ostrander	P&ID No. (First & Last):		Status	A	Inspection Interval (yrs)	5
Line No.	N/A	N/A		**Regulated By:**		Owner X API	PSM
Description	Steam Lines for AHU			Insulated	0%	Underground	
				Vibration:	Light [X]	Moderate [ ]	Heavy [ ]
Location	Little Gym			Previous Failure	[ ]	Sand Producing/High Velocity	[ ]
				Dead Leg	[ ]	Injection Point	[ ]
Service (Oil, Gas, Etc.)	Steam	Sour Service [ ]		Air to Ground	[ ]	Corrosion Coupon	[ ]
Fabrication Code	B 31.1	Piping Class (1,2,3,4)	4	Over Water	[ ]	Anodes	[ ]
Comments				Inspection Type:		Full [ ] Partial [ ] UT/VT	[X]
				Other (Specify)			

To be completed in the field (The following conditions apply to equipment listed above):

N/A No areas of concern noted during physical inspection.

X External Corrosion: X Light (surface rust, no scaling or pitting).

Moderate (pit depth not greater than C.A./light scale). Pit Scale

Extreme (pit depth greater than C.A./heavy scale). Pit Scale

N/A Visual Examination of existing welds (see comments): Satisfactory Unsatisfactory

N/A Non-typical fittings/components in service (see comments).

X Condition of insulation: Good Fair X Poor

X Condition of supports/restraints (see comments) X Satisfactory Unsatisfactory

N/A Condition of coating (see comments): Good Fair Poor

UT II Tech: *Eric Espe* **Inspection Date:** 3/9/2017

To be completed in the office:

N/A RT Performed. % RT

x UT Readings Taken. 100 % UT Taken Inaccessible Insulated Not Required

NA Other NDE. % Other Type (LFET, PT, MT, Etc.)

N/A Thickness measurements are less than minimum to meet design pressure requirements

N/A Engineering evaluation requested (see comments).

Comments:
1. None noted at time of inspection
2.
3.
4.
5.
6.
7.
8.
9.
10.

Action Items	Resp. Dept.	Govn. By	Mand	Rec	Action Code 1	2	3
1.			[ ]	[ ]	[ ]	[ ]	[ ]
2.			[ ]	[ ]	[ ]	[ ]	[ ]
3.			[ ]	[ ]	[ ]	[ ]	[ ]
4.			[ ]	[ ]	[ ]	[ ]	[ ]
5.			[ ]	[ ]	[ ]	[ ]	[ ]
6.			[ ]	[ ]	[ ]	[ ]	[ ]
7.			[ ]	[ ]	[ ]	[ ]	[ ]
8.			[ ]	[ ]	[ ]	[ ]	[ ]
9.			[ ]	[ ]	[ ]	[ ]	[ ]
10.			[ ]	[ ]	[ ]	[ ]	[ ]

Final Review:

Authorized UTII Tech: *Eric Espe* **Review Date:** 3/24/2016

PIPING THICKNESS MEASUREMENTS
(inches)

SHEET 1 of 1

FACILITY **Leroy-Ostrander School** LINE NO. **N/A** INSPECTION DATE **3-9-17**

LOCATION **Little Gym** PAINT/INSULATION **None**

DESCRIPTION **Supply Line to AHU's** TECHNICIAN **Eric Espe**

REMARKS (Insp. Method, Equip. Type, Serial No., Etc.) **UTT, Olympus 38 DL Plus - S/N 120406903, Panametrics D790 - S/N 902401**

CODE	DESN. PRES.	SPEC.	LOC. NO.	COMP. TYPE	MATL.	SIZE	NOM. THICK	12:00	3:00	6:00	9:00	
B31.1	30	N/A	1	Pipe	A106B	3"	0.216	0.199	0.198	0.186	0.197	
B31.1	30	N/A	2	Tee	A106B	3"	0.216	0.201	-	-	0.316	
B31.1	30	N/A	3	Pipe	A106B	3"	0.216	0.190	0.193	0.198	0.19	
B31.1	30	N/A	4	Pipe	A106B	3"	0.216	0.192	0.195	0.196	0.195	
B31.1	30	N/A	5	Pipe	A106B	1"	0.133	0.136	0.136	0.126	0.132	
B31.1	30	N/A	6	Pipe	A106B	1"	0.133	0.125	0.130	0.129	0.128	

Comments: **Components listed as "N/A" at heights, covered, contain excessive part geometry or otherwise not accessible.**

Signature UTII Tech. *Eric Espe*

Piping Remaining Life Calculations

Minimum Required Thickness, Long Term Corrosion Rate and Remaining Life Calculations

Facility: Leroy-Ostrander | Equip. #: N/A | Insp. Date: 3/9/2017
Location: Little Gym | Description: East AHU Steam Line

Inspection Information

Pipe Size	1	D	=	Outside Diameter	1.3
Material	A106B	S	=	Allowable Stress Value	20,000
Current Inspection Year	2017	P	=	Design Pressure	30
Initial or Previous Thickness Reading Year	2012	E	=	Joint Efficiency (*seamless E=1*)	0.9
API 570 Inspection Interval	5	W	=	Weld Strength Reduction Factor	1.0
Initial Thickness	0.133			(*W=1 unless temp. above 800°F*)	
Actual Thickness	0.126	Y	=	Temperature Factor	0.4

Calculation Information

Minimum Thickness Calculation:

$$t = \frac{PD}{2(SE+PY)} = \frac{30 \times 1.315}{2 \times ((20{,}000 \times 0.9)+(30 \times 0.4))} = \frac{39.45}{34{,}024} + 0.017$$

t = Required Minimum Thickness = **0.0182**

Based on the above calculation, this pipe meets the required minumum thickness for continued service at the current pressure.

st = Structural Minimum Thickness = **0.0900**

Structural minimum thickness based on carbon pipe

This pipe meets the required Structural Minimum Thickness for continued service.

Corrosion Rate:

$$\frac{\text{t-initial - t-actual}}{\text{years between t-initial \& t-actual}} = \frac{0.1330 - 0.1260}{5} = \frac{0.0070}{5} = 0.0014 \text{ Inches Per Year}$$

Remaining Half Life:

$$\frac{\text{t-actual - t-minimum}}{\text{Corrosion Rate}} / 2 = \frac{0.1260 - 0.0182}{0.0014} / 2 = \frac{0.1078}{0.0014} \div 2 = 77.0 / 2 = 38.5 \text{ Years Remaining Half Life}$$

Based on the above corrosion rate and half life calculation, this pipe is due for inspection: Mar 2022

Comments

Eric Espe — VT/UT II Tech. Signature

3/9/2017 — Date

Piping Remaining Life Calculations

Minimum Required Thickness, Long Term Corrosion Rate and Remaining Life Calculations

Facility: Leroy-Ostrander | Equip. #: N/A | Insp. Date: 3/9/2017
Location: Little Gym | Description: East AHU Steam Line

Inspection Information

Pipe Size	3	**D**	=	Outside Diameter	3.5
Material	A106B	**S**	=	Allowable Stress Value	20,000
Current Inspection Year	2017	**P**	=	Design Pressure	30
Initial or Previous Thickness Reading Year	2012	**E**	=	Joint Efficiency (*seamless E=1*)	0.9
API 570 Inspection Interval	5	**W**	=	Weld Strength Reduction Factor	1.0
Initial Thickness	0.216			(*W=1 unless temp. above 800°F*)	
Actual Thickness	0.186	**Y**	=	Temperature Factor	0.4

Calculation Information

Minimum Thickness Calculation:

$$t = \frac{PD}{2(SE+PY)} = \frac{30 \times 3.5}{2 \times ((20{,}000 \times 0.9)+(30 \times 0.4))} = \frac{105}{34{,}024} + 0.027$$

t = Required Minimum Thickness = **0.0301**

Based on the above calculation, this pipe meets the required minumum thickness for continued service at the current pressure.

st = Structural Minimum Thickness = **0.1000**

Structural minimum thickness based on carbon pipe

This pipe meets the required Structural Minimum Thickness for continued service.

Corrosion Rate:

$$\frac{\text{t-initial - t-actual}}{\text{years between t-initial \& t-actual}} = \frac{0.2160 - 0.1860}{5} = \frac{0.0300}{5} = 0.0060 \text{ Inches Per Year}$$

Remaining Half Life:

$$\frac{\text{t-actual - t-minimum}}{\text{Corrosion Rate}} / 2 = \frac{0.1860 - 0.0301}{0.0060} / 2 = \frac{0.1559}{0.0060} \div 2 = 26.0 / 2 = 13.0 \text{ Years Remaining Half Life}$$

Based on the above corrosion rate and half life calculation, this pipe is due for inspection: Mar 2022

Comments

Eric Espe
VT/UT II Tech. Signature

3/9/2017
Date

Little Gym AHU Steam Lines

Little Gym Testing Location

Media Center

Leroy-Ostrander School

PIPING INSPECTION RECORD

Facility	Leroy-Ostrander	P&ID No. (First & Last):		Status	A	Inspection Interval (yrs)	5
Line No.	N/A	N/A		**Regulated By:**		Owner X API	PSM
Description	Media Center Spot-check			Insulated	0%	Underground	
				Vibration:	Light [X]	Moderate [ ]	Heavy [ ]
Location	Media Center			Previous Failure	[ ]	Sand Producing/High Velocity	[ ]
				Dead Leg	[ ]	Injection Point	[ ]
Service (Oil, Gas, Etc.)	Steam	Sour Service [ ]		Air to Ground	[ ]	Corrosion Coupon	[ ]
Fabrication Code	B 31.1	Piping Class (1,2,3,4)	4	Over Water	[ ]	Anodes	[ ]
Comments				Inspection Type:		Full [ ] Partial [ ] UT/VT	[X]
				Other (Specify)			

To be completed in the field (The following conditions apply to equipment listed above):

N/A No areas of concern noted during physical inspection.

X External Corrosion: X Light (surface rust, no scaling or pitting).

__ Moderate (pit depth not greater than C.A./light scale). __ Pit __ Scale

__ Extreme (pit depth greater than C.A./heavy scale). __ Pit __ Scale

N/A Visual Examination of existing welds (see comments): __ Satisfactory __ Unsatisfactory

N/A Non-typical fittings/components in service (see comments).

X Condition of insulation: __ Good X Fair __ Poor

X Condition of supports/restraints (see comments) X Satisfactory __ Unsatisfactory

N/A Condition of coating (see comments): __ Good __ Fair __ Poor

UT II Tech: *Eric Espe* **Inspection Date:** 3/9/2017

To be completed in the office:

N/A RT Performed. __ % RT

x UT Readings Taken. 83 % UT Taken __ Inaccessible __ Insulated __ Not Required

NA Other NDE. __ % Other __ Type (LFET, PT, MT, Etc.)

N/A Thickness measurements are less than minimum to meet design pressure requirements

N/A Engineering evaluation requested (see comments).

Comments:
1. None Noted at time of Inspection.
2.
3.
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7.
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10.

Action Items	Resp. Dept.	Govn. By	Mand	Rec	Action Code 1	2	3
1.			[ ]	[ ]	[ ]	[ ]	[ ]
2.			[ ]	[ ]	[ ]	[ ]	[ ]
3.			[ ]	[ ]	[ ]	[ ]	[ ]
4.			[ ]	[ ]	[ ]	[ ]	[ ]
5.			[ ]	[ ]	[ ]	[ ]	[ ]
6.			[ ]	[ ]	[ ]	[ ]	[ ]
7.			[ ]	[ ]	[ ]	[ ]	[ ]
8.			[ ]	[ ]	[ ]	[ ]	[ ]
9.			[ ]	[ ]	[ ]	[ ]	[ ]
10.			[ ]	[ ]	[ ]	[ ]	[ ]

Final Review:

Authorized UTII Tech: *Eric Espe* **Review Date:** 3/24/2016

PIPING THICKNESS MEASUREMENTS
(inches)

SHEET 1 of 1

FACILITY **Leroy-Ostrander School** LINE NO. **N/A** INSPECTION DATE **3-9-17**

LOCATION **Media Center** PAINT/INSULATION **None**

DESCRIPTION **Spot Check** TECHNICIAN **Eric Espe**

REMARKS (Insp. Method, Equip. Type, Serial No., Etc.) **UTT, Olympus 38 DL Plus - S/N 120406903, Panametrics D790 - S/N 902401**

CODE	DESN. PRES.	SPEC.	LOC. NO.	COMP. TYPE	MATL.	SIZE	NOM. THICK	12:00	3:00	6:00	9:00	
B31.1	30	N/A	1	Pipe	A106B	4"	0.237	-	0.243	-	0.236	
B31.1	30	N/A	2	Pipe	A106B	3"	0.216	-	0.183	-	-	
B31.1	30	N/A	3	Pipe	A106B	1"	0.179	-	-	-	-	
B31.1	30	N/A	3.1	90	A106B	1"	0.179	0.215	-	-	-	
B31.1	30	N/A	3.2	Pipe	A106B	1"	0.179	-	0.164	0.173	0.177	
B31.1	30	N/A	3.3	Pipe	A106B	1"	0.179	0.162	0.169	-	-	

Comments: **Components listed as "N/A" at heights, covered, contain excessive part geometry or otherwise not accessible.**

Signature UTII Tech. *Eric Espe*

Piping
B31.1

Piping Remaining Life Calculations

Minimum Required Thickness, Long Term Corrosion Rate and Remaining Life Calculations

Facility: Leroy-Ostrander | Equip. #: N/A | Insp. Date: 3/9/2017
Location: Media Center | Description: Media Center 1" Spot-check

Inspection Information

Pipe Size	1	**D**	=	Outside Diameter	1.3
Material	A106B	**S**	=	Allowable Stress Value	20,000
Current Inspection Year	2017	**P**	=	Design Pressure	30
Initial or Previous Thickness Reading Year	2012	**E**	=	Joint Efficiency (*seamless E=1*)	0.9
API 570 Inspection Interval	5	**W**	=	Weld Strength Reduction Factor	1.0
Initial Thickness	0.179			(*W=1 unless temp. above 800°F*)	
Actual Thickness	0.162	**Y**	=	Temperature Factor	0.4

Calculation Information

Minimum Thickness Calculation:

$$t = \frac{PD}{2(SE+PY)} = \frac{30 \times 1.315}{2 \times ((20{,}000 \times 0.9)+(30 \times 0.4))} = \frac{39.45}{34{,}024} + 0.022$$

t = Required Minimum Thickness = **0.0232**

Based on the above calculation, this pipe meets the required minumum thickness for continued service at the current pressure.

st = Structural Minimum Thickness = **0.0900**

Structural minimum thickness based on carbon pipe

This pipe meets the required Structural Minimum Thickness for continued service.

Corrosion Rate:

$$\frac{\text{t-initial - t-actual}}{\text{years between t-initial \& t-actual}} = \frac{0.1790 - 0.1620}{5} = \frac{0.0170}{5} = 0.0034 \text{ Inches Per Year}$$

Remaining Half Life:

$$\frac{\text{t-actual - t-minimum}}{\text{Corrosion Rate}} / 2 = \frac{0.1620 - 0.0232}{0.0034} / 2 = \frac{0.1388}{0.0034} \div 2 = 40.8 / 2 = 20.4 \text{ Years Remaining Half Life}$$

Based on the above corrosion rate and half life calculation, this pipe is due for inspection: Mar 2022

Comments

Eric Espe — VT/UT II Tech. Signature

3/9/2017 — Date

Piping
B31.1

Piping Remaining Life Calculations

Minimum Required Thickness, Long Term Corrosion Rate and Remaining Life Calculations

Facility: Leroy-Ostrander | Equip. #: N/A | Insp. Date: 3/9/2017
Location: Media Center | Description: Media Center 3" Spot-check

Inspection Information

Pipe Size	3	**D**	=	Outside Diameter	3.5
Material	A106B	**S**	=	Allowable Stress Value	20,000
Current Inspection Year	2017	**P**	=	Design Pressure	30
Initial or Previous Thickness Reading Year	2012	**E**	=	Joint Efficiency (*seamless E=1*)	0.9
API 570 Inspection Interval	5	**W**	=	Weld Strength Reduction Factor	1.0
Initial Thickness	0.216			(*W=1 unless temp. above 800°F*)	
Actual Thickness	0.183	**Y**	=	Temperature Factor	0.4

Calculation Information

Minimum Thickness Calculation:

$$t = \frac{PD}{2(SE+PY)} = \frac{30 \times 3.5}{2 \times ((20{,}000 \times 0.9)+(30 \times 0.4))} = \frac{105}{34{,}024} + 0.028$$

t = **Required Minimum Thickness** = **0.0311**

Based on the above calculation, this pipe meets the required minumum thickness for continued service at the current pressure.

st = **Structural Minimum Thickness** = **0.1000**

Structural minimum thickness based on carbon pipe

This pipe meets the required Structural Minimum Thickness for continued service.

Corrosion Rate:

$$\frac{\text{t-initial - t-actual}}{\text{years between t-initial \& t-actual}} = \frac{0.2160 - 0.1830}{5} = \frac{0.0330}{5} = 0.0066 \text{ Inches Per Year}$$

Remaining Half Life:

$$\frac{\text{t-actual - t-minimum}}{\text{Corrosion Rate}} / 2 = \frac{0.1830 - 0.0311}{0.0066} / 2 = \frac{0.1519}{0.0066} \div 2 = 23.0 / 2 = 11.5 \text{ Years Remaining Half Life}$$

Based on the above corrosion rate and half life calculation, this pipe is due for inspection: Mar 2022

Comments

Eric Espe
VT/UT II Tech. Signature

3/9/2017
Date

Piping
B31.1

Piping Remaining Life Calculations

Minimum Required Thickness, Long Term Corrosion Rate and Remaining Life Calculations

Facility: Leroy-Ostrander | Equip. #: N/A | Insp. Date: 3/9/2017
Location: Media Center | Description: Media Center 4" Spot-check

Inspection Information

Pipe Size	4	**D**	=	Outside Diameter	4.5
Material	A106B	**S**	=	Allowable Stress Value	20,000
Current Inspection Year	2017	**P**	=	Design Pressure	30
Initial or Previous Thickness Reading Year	2012	**E**	=	Joint Efficiency (*seamless E=1*)	0.9
API 570 Inspection Interval	5	**W**	=	Weld Strength Reduction Factor	1.0
Initial Thickness	0.237			(*W=1 unless temp. above 800°F*)	
Actual Thickness	0.236	**Y**	=	Temperature Factor	0.4

Calculation Information

Minimum Thickness Calculation:

$$t = \frac{PD}{2(SE+PY)} = \frac{30 \times 4.5}{2 \times ((20{,}000 \times 0.9)+(30 \times 0.4))} = \frac{135}{34{,}024} + 0.029$$

t = **Required Minimum Thickness** = **0.0330**

Based on the above calculation, this pipe meets the required minumum thickness for continued service at the current pressure.

st = **Structural Minimum Thickness** = **0.1000**

Structural minimum thickness based on carbon pipe

This pipe meets the required Structural Minimum Thickness for continued service.

Corrosion Rate:

$$\frac{\text{t-initial - t-actual}}{\text{years between t-initial \& t-actual}} = \frac{0.2370 - 0.2360}{5} = \frac{0.0010}{5} = 0.0002 \text{ Inches Per Year}$$

Remaining Half Life:

$$\frac{\text{t-actual - t-minimum}}{\text{Corrosion Rate}} / 2 = \frac{0.2360 - 0.0330}{0.0002} / 2 = \frac{0.2030}{0.0002} \div 2 = \#\#\#\#\# / 2 = 507.6 \text{ Years Remaining Half Life}$$

Based on the above corrosion rate and half life calculation, this pipe is due for inspection: Mar 2022

Comments

Eric Espe — VT/UT II Tech. Signature

3/9/2017 — Date

Media Center

Media Center Testing Location

Classroom 101

Leroy-Ostrander School

PIPING INSPECTION RECORD

Facility	Leroy-Ostrander	P&ID No. (First & Last):		Status	A	Inspection Interval (yrs)	5
Line No.	N/A	N/A		**Regulated By:**		Owner X API	PSM
Description	Classroom Heater			Insulated	0%	Underground	
				Vibration:	Light [X]	Moderate [ ]	Heavy [ ]
Location	Classroom 102			Previous Failure	[ ]	Sand Producing/High Velocity	[ ]
				Dead Leg	[ ]	Injection Point	[ ]
Service (Oil, Gas, Etc.)	Steam	Sour Service [ ]		Air to Ground	[ ]	Corrosion Coupon	[ ]
Fabrication Code	B 31.1	Piping Class (1,2,3,4)	4	Over Water	[ ]	Anodes	[ ]
Comments				Inspection Type:		Full [ ] Partial [ ] UT/VT	[X]
				Other (Specify)			

To be completed in the field (The following conditions apply to equipment listed above):

N/A No areas of concern noted during physical inspection.

X External Corrosion: X Light (surface rust, no scaling or pitting).

__ Moderate (pit depth not greater than C.A./light scale). __ Pit __ Scale

__ Extreme (pit depth greater than C.A./heavy scale). __ Pit __ Scale

N/A Visual Examination of existing welds (see comments): __ Satisfactory __ Unsatisfactory

N/A Non-typical fittings/components in service (see comments).

N/A Condition of insulation: __ Good __ Fair __ Poor

X Condition of supports/restraints (see comments) X Satisfactory __ Unsatisfactory

N/A Condition of coating (see comments): __ Good __ Fair __ Poor

UT II Tech: *Eric Espe* **Inspection Date:** 3/9/2017

To be completed in the office:

N/A RT Performed. __ % RT

x UT Readings Taken. 60 % UT Taken __ Inaccessible __ Insulated __ Not Required

NA Other NDE. __ % Other __ Type (LFET, PT, MT, Etc.)

N/A Thickness measurements are less than minimum to meet design pressure requirements

N/A Engineering evaluation requested (see comments).

Comments:
1. None noted at time of inspection
2.
3.
4.
5.
6.
7.
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10.

Action Items	Resp. Dept.	Govn. By	Mand	Rec	Action Code 1	2	3
1.			[ ]	[ ]	[ ]	[ ]	[ ]
2.			[ ]	[ ]	[ ]	[ ]	[ ]
3.			[ ]	[ ]	[ ]	[ ]	[ ]
4.			[ ]	[ ]	[ ]	[ ]	[ ]
5.			[ ]	[ ]	[ ]	[ ]	[ ]
6.			[ ]	[ ]	[ ]	[ ]	[ ]
7.			[ ]	[ ]	[ ]	[ ]	[ ]
8.			[ ]	[ ]	[ ]	[ ]	[ ]
9.			[ ]	[ ]	[ ]	[ ]	[ ]
10.			[ ]	[ ]	[ ]	[ ]	[ ]

Final Review:

Authorized UTII Tech: *Eric Espe* **Review Date:** 3/24/2016

PIPING THICKNESS MEASUREMENTS
(inches)

SHEET 1 of 1

FACILITY **Leroy-Ostrander School** LINE NO. **N/A** INSPECTION DATE **3-9-17**

LOCATION **Main 101** PAINT/INSULATION **None**

DESCRIPTION **Classroom Heater** TECHNICIAN **Eric Espe**

REMARKS (Insp. Method, Equip. Type, Serial No., Etc.) **UTT, Olympus 38 DL Plus - S/N 120406903, Panametrics D790 - S/N 902401**

CODE	DESN. PRES.	SPEC.	LOC. NO.	COMP. TYPE	MATL.	SIZE	NOM. THICK	12:00	3:00	6:00	9:00	
B31.1	30	N/A	1	Nipple	A106B	3/4"	0.113	-	-	0.107	-	
B31.1	30	N/A	2	45	A106B	3/4"	-	0.130	-	-	-	
B31.1	30	N/A	3	45 CTN	A106B	3/4"	-	N/A	N/A	N/A	N/A	
B31.1	30	N/A	4	45 CTN	A106B	3/4"	-	N/A	N/A	N/A	N/A	
B31.1	30	N/A	5	45	A106B	3/4"	0.113	0.130	-	-	-	

Comments: **Components listed as "N/A" at heights, covered, contain excessive part geometry or otherwise not accessible. Threaded Components**

Signature UTII Tech. *Eric Espe*

Piping
B31.1

Piping Remaining Life Calculations

Minimum Required Thickness, Long Term Corrosion Rate and Remaining Life Calculations

Facility: Leroy-Ostrander | Equip. #: N/A | Insp. Date: 3/9/2017
Location: 1938 Class Room 101 | Description: Classroom Heater

Inspection Information

Pipe Size	0.75	**D**	= Outside Diameter	1.1
Material	A106B	**S**	= Allowable Stress Value	20,000
Current Inspection Year	2017	**P**	= Design Pressure	30
Initial or Previous Thickness Reading Year	2012	**E**	= Joint Efficiency (*seamless E=1*)	0.9
API 570 Inspection Interval	5	**W**	= Weld Strength Reduction Factor	1.0
Initial Thickness	0.113		(*W=1 unless temp. above 800°F*)	
Actual Thickness	0.107	**Y**	= Temperature Factor	0.4

Calculation Information

Minimum Thickness Calculation:

$$t = \frac{PD}{2(SE+PY)} = \frac{30 \times 1.05}{2 \times ((\ 20{,}000 \times 0.9\ ) + (\ 30 \times 0.4\ ))} = \frac{31.5}{34{,}024} + 0.014$$

t = Required Minimum Thickness = **0.0149**

Based on the above calculation, this pipe meets the required minumum thickness for continued service at the current pressure.

st = Structural Minimum Thickness = **0.0900**

Structural minimum thickness based on carbon pipe

This pipe meets the required Structural Minimum Thickness for continued service.

Corrosion Rate:

$$\frac{\text{t-initial - t-actual}}{\text{years between t-initial \& t-actual}} = \frac{0.1130 - 0.1070}{5} = \frac{0.0060}{5} = 0.0012 \text{ Inches Per Year}$$

Remaining Half Life:

$$\frac{\text{t-actual - t-minimum}}{\text{Corrosion Rate}} / 2 = \frac{0.1070 - 0.0149}{0.0012} / 2 = \frac{0.0921}{0.0012} \div 2 = 76.7 / 2 = 38.4 \text{ Years Remaining Half Life}$$

Based on the above corrosion rate and half life calculation, this pipe is due for inspection: Mar 2022

Comments

Eric Espe
VT/UT II Tech. Signature

3/9/2017
Date

Classroom 101

101 Testing Location

Classroom 102

Leroy-Ostrander School

PIPING INSPECTION RECORD

Facility	Leroy-Ostrander	P&ID No. (First & Last):		Status	A	Inspection Interval (yrs)	5
Line No.	N/A	N/A		**Regulated By:**		Owner X API	PSM
Description	Classroom Heater			Insulated	0%	Underground	
				Vibration:	Light [X]	Moderate [ ]	Heavy [ ]
Location	Classroom 102			Previous Failure	[ ]	Sand Producing/High Velocity	[ ]
				Dead Leg	[ ]	Injection Point	[ ]
Service (Oil, Gas, Etc.)	Steam	Sour Service [ ]		Air to Ground	[ ]	Corrosion Coupon	[ ]
Fabrication Code	B 31.1	Piping Class (1,2,3,4)	4	Over Water	[ ]	Anodes	[ ]
Comments				Inspection Type:		Full [ ] Partial [ ]	UT/VT [X]
				Other (Specify)			

To be completed in the field (The following conditions apply to equipment listed above):

N/A No areas of concern noted during physical inspection.

X External Corrosion: X Light (surface rust, no scaling or pitting).

__ Moderate (pit depth not greater than C.A./light scale). __ Pit __ Scale

__ Extreme (pit depth greater than C.A./heavy scale). __ Pit __ Scale

N/A Visual Examination of existing welds (see comments): __ Satisfactory __ Unsatisfactory

N/A Non-typical fittings/components in service (see comments).

N/A Condition of insulation: __ Good __ Fair __ Poor

X Condition of supports/restraints (see comments) X Satisfactory __ Unsatisfactory

N/A Condition of coating (see comments): __ Good __ Fair __ Poor

UT II Tech: *Eric Espe* **Inspection Date:** 3/9/2017

To be completed in the office:

N/A RT Performed. __ % RT

x UT Readings Taken. 75 % UT Taken __ Inaccessible __ Insulated __ Not Required

NA Other NDE. __ % Other __ Type (LFET, PT, MT, Etc.)

N/A Thickness measurements are less than minimum to meet design pressure requirements

N/A Engineering evaluation requested (see comments).

Comments:
1. Leaking steam valve
2.
3.
4.
5.
6.
7.
8.
9.
10.

Action Items	Resp. Dept.	Govn. By	Mand	Rec	Action Code 1	2	3
1. Repair and or replace leaking valve	Maint.	L-O	[X]	[ ]	[X]	[ ]	[ ]
2.			[ ]	[ ]	[ ]	[ ]	[ ]
3.			[ ]	[ ]	[ ]	[ ]	[ ]
4.			[ ]	[ ]	[ ]	[ ]	[ ]
5.			[ ]	[ ]	[ ]	[ ]	[ ]
6.			[ ]	[ ]	[ ]	[ ]	[ ]
7.			[ ]	[ ]	[ ]	[ ]	[ ]
8.			[ ]	[ ]	[ ]	[ ]	[ ]
9.			[ ]	[ ]	[ ]	[ ]	[ ]
10.			[ ]	[ ]	[ ]	[ ]	[ ]

Final Review:

Authorized UTII Tech: *Eric Espe* **Review Date:** 3/24/2016

PIPING THICKNESS MEASUREMENTS
(inches)

SHEET 1 of 1

FACILITY **Leroy-Ostrander School** LINE NO. **N/A** INSPECTION DATE **3-9-17**

LOCATION **Main 102** PAINT/INSULATION **None**

DESCRIPTION **Classroom Heater** TECHNICIAN **Eric Espe**

REMARKS (Insp. Method, Equip. Type, Serial No., Etc.) **UTT, Olympus 38 DL Plus - S/N 120406903, Panametrics D790 - S/N 902401**

CODE	DESN. PRES.	SPEC.	LOC. NO.	COMP. TYPE	MATL.	SIZE	NOM. THICK	12:00	3:00	6:00	9:00	
B31.1	30	N/A	1	Nipple	A106B	3/4"	0.113	0.109	-	0.110	0.111	
B31.1	30	N/A	2	45	A106B	3/4"	-	N/A	N/A	N/A	N/A	
B31.1	30	N/A	3	Nipple	A106B	3/4"	0.113	0.103	-	0.103	-	
B31.1	30	N/A	4	Nipple	A106B	3/4"	0.113	0.104	-	0.104	-	
B31.1	30	N/A	5	45	A106B	3/4"	0.113	-	-	0.121	-	
B31.1	30	N/A	6	Nipple	A106B	3/4"	-	N/A	N/A	N/A	N/A	
B31.1	30	N/A	7	90	A106B	3/4"	0.113	-	-	0.133	-	
B31.1	30	N/A	8	Nipple	A106B	3/4"	0.113	N/A	N/A	0.106	0.109	

Comments: **Components listed as "N/A" at heights, covered, contain excessive part geometry or otherwise not accessible.**

Threaded Components

Signature UTII Tech. *Eric Espe*

Piping Remaining Life Calculations

Minimum Required Thickness, Long Term Corrosion Rate and Remaining Life Calculations

Facility: Leroy-Ostrander | Equip. #: N/A | Insp. Date: 3/9/2017
Location: 1938 Class Room 102 | Description: Classroom Heater

Inspection Information

Pipe Size	0.75	**D**	=	Outside Diameter	1.1
Material	A106B	**S**	=	Allowable Stress Value	20,000
Current Inspection Year	2017	**P**	=	Design Pressure	30
Initial or Previous Thickness Reading Year	2012	**E**	=	Joint Efficiency (*seamless E=1*)	0.9
API 570 Inspection Interval	5	**W**	=	Weld Strength Reduction Factor	1.0
Initial Thickness	0.113			(*W=1 unless temp. above 800°F*)	
Actual Thickness	0.104	**Y**	=	Temperature Factor	0.4

Calculation Information

Minimum Thickness Calculation:

$$t = \frac{PD}{2(SE+PY)} = \frac{30 \times 1.05}{2 \times ((\ 20{,}000 \times 0.9\ ) + (\ 30 \times 0.4\ ))} = \frac{31.5}{34{,}024} + 0.014$$

t = Required Minimum Thickness = **0.0149**

Based on the above calculation, this pipe meets the required minumum thickness for continued service at the current pressure.

st = Structural Minimum Thickness = **0.0900**

Structural minimum thickness based on carbon pipe

This pipe meets the required Structural Minimum Thickness for continued service.

Corrosion Rate:

$$\frac{\text{t-initial - t-actual}}{\text{years between t-initial \& t-actual}} = \frac{0.1130 - 0.1040}{5} = \frac{0.0090}{5} = 0.0018 \text{ Inches Per Year}$$

Remaining Half Life:

$$\frac{\text{t-actual - t-minimum}}{\text{Corrosion Rate}} / 2 = \frac{0.1040 - 0.0149}{0.0018} / 2 = \frac{0.0891}{0.0018} \div 2 = 49.5 / 2 = 24.7 \text{ Years Remaining Half Life}$$

Based on the above corrosion rate and half life calculation, this pipe is due for inspection: Mar 2022

Comments

Eric Espe — VT/UT II Tech. Signature

3/9/2017 — Date

Classroom 102

102 Leaking Valve

Classroom 201

Leroy-Ostrander School

PIPING INSPECTION RECORD

Facility	Leroy-Ostrander	P&ID No. (First & Last):		Status	A	Inspection Interval (yrs)	5
Line No.	N/A	N/A		**Regulated By:**		Owner X API	PSM
Description	Classroom Heater			Insulated	0%	Underground	
				Vibration:	Light [X]	Moderate [ ]	Heavy [ ]
Location	Room 201			Previous Failure	[ ]	Sand Producing/High Velocity	[ ]
				Dead Leg	[ ]	Injection Point	[ ]
Service (Oil, Gas, Etc.)	Steam	Sour Service [ ]		Air to Ground	[ ]	Corrosion Coupon	[ ]
Fabrication Code	B 31.1	Piping Class (1,2,3,4)	4	Over Water	[ ]	Anodes	[ ]
Comments				Inspection Type:		Full [ ] Partial [ ]	UT/VT [X]
				Other (Specify)			

To be completed in the field (The following conditions apply to equipment listed above):

N/A	No areas of concern noted during physical inspection.					
X	External Corrosion:	X	Light (surface rust, no scaling or pitting).			
			Moderate (pit depth not greater than C.A./light scale).		Pit	Scale
			Extreme (pit depth greater than C.A./heavy scale).		Pit	Scale
N/A	Visual Examination of existing welds (see comments):				Satisfactory	Unsatisfactory
N/A	Non-typical fittings/components in service (see comments).					
N/A	Condition of insulation:		Good		Fair	Poor
X	Condition of supports/restraints (see comments)			X	Satisfactory	Unsatisfactory
N/A	Condition of coating (see comments):		Good		Fair	Poor

UT II Tech: *Eric Espe* **Inspection Date:** 3/9/2017

To be completed in the office:

N/A	RT Performed.	% RT				
x	UT Readings Taken.	100 % UT Taken	Inaccessible	Insulated		Not Required
NA	Other NDE.	% Other		Type (LFET, PT, MT, Etc.)		
N/A	Thickness measurements are less than minimum to meet design pressure requirements					
N/A	Engineering evaluation requested (see comments).					

Comments:
1. None noted at time of inspection
2.
3.
4.
5.
6.
7.
8.
9.
10.

Action Items	Resp. Dept.	Govn. By	Mand	Rec	Action Code 1	2	3
1.			[ ]	[ ]	[ ]	[ ]	[ ]
2.			[ ]	[ ]	[ ]	[ ]	[ ]
3.			[ ]	[ ]	[ ]	[ ]	[ ]
4.			[ ]	[ ]	[ ]	[ ]	[ ]
5.			[ ]	[ ]	[ ]	[ ]	[ ]
6.			[ ]	[ ]	[ ]	[ ]	[ ]
7.			[ ]	[ ]	[ ]	[ ]	[ ]
8.			[ ]	[ ]	[ ]	[ ]	[ ]
9.			[ ]	[ ]	[ ]	[ ]	[ ]
10.			[ ]	[ ]	[ ]	[ ]	[ ]

Final Review:

Authorized UTII Tech: *Eric Espe* **Review Date:** 3/24/2016

PIPING THICKNESS MEASUREMENTS
(inches)

SHEET 1 of 1

FACILITY **Leroy-Ostrander School** LINE NO. **N/A** INSPECTION DATE **3-9-17**

LOCATION **Main 201** PAINT/INSULATION **None**

DESCRIPTION **Classroom Heater** TECHNICIAN **Eric Espe**

REMARKS (Insp. Method, Equip. Type, Serial No., Etc.) **UTT, Olympus 38 DL Plus - S/N 120406903, Panametrics D790 - S/N 902401**

CODE	DESN. PRES.	SPEC.	LOC. NO.	COMP. TYPE	MATL.	SIZE	NOM. THICK	12:00	3:00	6:00	9:00	
B31.1	**30**	**N/A**	**1**	**Nipple**	**A106B**	**1/2"**	**0.113**	**0.102**	**-**	**0.100**	**0.098**	

Comments: **Components listed as "N/A" at heights, covered, contain excessive part geometry or otherwise not accessible.**

Threaded Components

Signature UTII Tech. *Eric Espe*

Piping Remaining Life Calculations

Minimum Required Thickness, Long Term Corrosion Rate and Remaining Life Calculations

Facility: Leroy-Ostrander | Equip. #: N/A | Insp. Date: 3/9/2017
Location: 1950 Class Room 201 | Description: Classroom Heater

Inspection Information

Pipe Size	0.75	**D**	= Outside Diameter	1.1
Material	A106B	**S**	= Allowable Stress Value	20,000
Current Inspection Year	2017	**P**	= Design Pressure	30
Initial or Previous Thickness Reading Year	2012	**E**	= Joint Efficiency (*seamless E=1*)	0.9
API 570 Inspection Interval	5	**W**	= Weld Strength Reduction Factor	1.0
Initial Thickness	0.113		(*W=1 unless temp. above 800°F*)	
Actual Thickness	0.098	**Y**	= Temperature Factor	0.4

Calculation Information

Minimum Thickness Calculation:

$$t = \frac{PD}{2(SE+PY)} = \frac{30 \times 1.05}{2 \times ((\ 20{,}000 \times 0.9\ ) + (\ 30 \times 0.4\ ))} = \frac{31.5}{34{,}024} + 0.014$$

t = Required Minimum Thickness = **0.0149**

Based on the above calculation, this pipe meets the required minumum thickness for continued service at the current pressure.

st = Structural Minimum Thickness = **0.0900**

Structural minimum thickness based on carbon pipe

This pipe meets the required Structural Minimum Thickness for continued service.

Corrosion Rate:

$$\frac{\text{t-initial - t-actual}}{\text{years between t-initial \& t-actual}} = \frac{0.1130 - 0.0980}{5} = \frac{0.0150}{5} = 0.0030 \text{ Inches Per Year}$$

Remaining Half Life:

$$\frac{\text{t-actual - t-minimum}}{\text{Corrosion Rate}} / 2 = \frac{0.0980 - 0.0149}{0.0030} / 2 = \frac{0.0831}{0.0030} \div 2 = 27.7 / 2 = 13.8 \text{ Years Remaining Half Life}$$

Based on the above corrosion rate and half life calculation, this pipe is due for inspection: Mar 2022

Comments

Eric Espe — VT/UT II Tech. Signature

3/9/2017 — Date

DHW Tank

POET Biorefining

TANK THICKNESS MEASUREMENTS
(inches)

SHEET 1 of 1

FACILITY **Leroy-Ostrander School** LINE NO. **N/A** INSPECTION DATE **3-9-17**

LOCATION **Boiler Room** PAINT/INSULATION **None**

DESCRIPTION **Storage Tank - DHW** TECHNICIAN **Eric Espe**

REMARKS (Insp. Method, Equip. Type, Serial No., Etc.) **UTT, Olympus 38 DL Plus - S/N 120406903, Panametrics D790 - S/N 902401**

CODE	DESN. PRES.	SPEC.	LOC. NO.	COMP. TYPE	MATL.	SIZE	NOM. THICK	12:00	3:00	6:00	9:00	
N/A	30	N/A	1	Head 1	A36	60"	0.625	0.615	-	-		
N/A	30	N/A	2	Head 1	A36	60"	0.625	0.618	-	-		
N/A	30	N/A	3	Head 1	A36	60"	0.625	0.625	-	-		
N/A	30	N/A	4	Course 1	A36	60"	0.500	0.450	-	-	0.429	
N/A	30	N/A	5	Course 2	A36	60"	0.500	0.451	-	-	0.447	
N/A	30	N/A	6	Head 2	A36	60"	0.625	-	-	-	0.615	
N/A	30	N/A	7	Head 2	A36	60"	0.625	-	-	-	0.622	
N/A	30	N/A	8	Head 2	A36	60"	0.625	-	-	-	0.625	

Comments: **Components listed as "N/A" at heights, covered, contain excessive part geometry or otherwise not accessible.**
Damaged Insulation Throughout

Signature UTII Tech. *Eric Espe*

DHW Tank

Damaged Insulation