Inspection Report – Pressure Vessel Visual External

☐Installation	☐ U1A reflects nameplate data	☐ PSV settings verified against PEng. stamped drawing or document

☒ External	☒ Regulatory	☐ Periodic	☒ Sweet	☐ Sour
Date: 2020-09-02	Description: ☒Vessel ☐Exchanger ☐Boiler		Etag: E32443	
Inspector: Derek Pfisterer	Equipment Name: Separator		CRN#: 02-006HS	
Agent Co: Brias Inc.	Jurisdiction #: A0482583		Serial #: F8484.2	
Owner: Enerplus Corp.	Manufacturer: Orban Industries		Year Built: 2002	
District: NA	Field: JOARCAM 11-7 FACILITY		LSD: 11-07-050-21W4	

Vessel			PSV							**MDMT: -20°F**			
Zones	MAWP	MAWT	E Tag	Set Press	Capacity	Manf.	S/N	Inlet Size	Out Size	Seal Intact Y/N	CSO? Y/N	Serv Co.	Serv. Date
Shell Side	285	100	32444	230	6162	Crosby	CF33530-001	2	3	Y	Y	Powell	06/15
Tube Side													
Other													

	Shell	**Head**	**Channel**	**Tube**	**Comment**
Material	SA 516 70N				
Nominal T	0.500”				
CA					

Orientation: ☒ Horizontal ☐ Vertical	Foundation: ☐ Concrete ☐ Gravel ☐ Timbers ☒ Steel	Condition: Acceptable to regulation

Support	☐ Saddle	☐ Seal Welded	☒ Free to Move	Condition: Acceptable to regulation
	☐ Skirt	☐ Free of Debris		Condition: NA
	☐ Hangers	☐ Secure		Condition: NA
	☐ Other:			Condition: NA

Ext. Surface	☒ Painted	☐ Insulated	☐ Fire-proofed	☐ Cladded	Condition: Acceptable to regulation
Ext. Fixtures	☐ Ladder	☐ Platform	☐ Other: NA		

Inspection Nozzles	☒ Manway	☐ Port	Size: 20”	☒ Reinforcement Pad	☒ Weep Hole Present
Davit Arm	☒ Present	☐ Greased	☒ Double nutted	Condition: Acceptable to regulation	
Overall	General Conditions: Acceptable to regulation		Electrical Grounding: ☒ Direct ☐ Indirect ☐ None		

Piping					
☒ PSV	☒ Supported	Vented outside building? ☐ Yes ☐ No ☒ N/A		Discharge Piping Installed to prevent water ingress? ☒ Yes ☐ No ☐ N/A	
☒ Inlet	☒ Supported	☒ Welded	☐ Treaded	☒ Free from leaks	Comment: Acceptable to regulation
☒ Outlet	☒ Supported	☒ Welded	☐ Threaded	☒ Free from leaks	Comment: Acceptable to regulation
☒ Drains	☒ Supported	☒ Welded	☐ Threaded	☒ Free from leaks	Comment: Acceptable to regulation
☒ Instrumentation	☒ Supported	☒ Free From Leaks	Comment: Acceptable to regulation		

Valves			
☒ Manual Isolation Valve	☐ Free from leaks	Short bolting? ☐ Yes ☒ No	Comment: Acceptable to regulation
☒ Automated Control Valve	☐ Free from leaks	Short bolting? ☐ Yes ☒ No	Comment: Acceptable to regulation

Gauges		
☒ Pressure Gauge	Good Condition? ☒ Yes ☐ No	Comment: Acceptable to regulation
☒ Temperature Gauge	Good Condition? ☒ Yes ☐ No	Comment: Acceptable to regulation
☒ Sight Glass	Good Condition? ☒ Yes ☐ No	Comment: Acceptable to regulation

Inspection Summary:

- Vessel has had a UT corrosion survey in the past
- Vessel has had a visual external and a UT corrosion survey Inspection which complies with an On-Stream Inspection as per AB506 (10.4 (a)) & API 510 6.5.2 & 5.3.3
- PSV is overdue for servicing (last serviced June 2015). Follow AB-506 Appendix A Table 1 for servicing intervals
- Vessel can have internal inspection through manway

Corrective Action Item(s):

- Service PSV. Re-set to no higher than vessel MAWP of 285 PSI - Not a Corrective action JC
- Perform visual internal inspection through manway following API 572 9.4 - Not a Corrective action JC

NCR:

- PSV is overdue for servicing (last serviced June 2015). Follow AB-506 Appendix A Table 1 for servicing intervals - Not an NCR JC, interval changed to 6 years

Integrity Status:	Suitable for continued Service? ☐ Yes ☒ No		Immediate repairs required? ☒ Yes ☐ No
Inventory Status:	☒ In service	☐ Out of service	

Inspector Sign Off

Recommended External Inspection Interval (months): 60	
Recommended PSV Service Interval (months): 0	
Signature:	Jurisdictional Inspector #: ABSA ISI # 000876 – Expires May 2020

Enerplus In-service Inspector Sign Off

External Inspection Interval changes to (months):
Recommended PSV Service Interval (months): 72 mths - JC
Signature and Jurisdictional Inspector #: Jeff Crabbe PESL 240

VE UT 60 mths
VI 72 mths

	
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	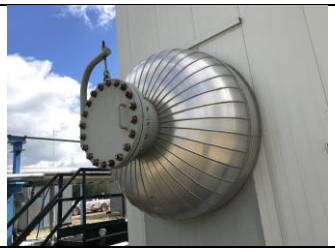
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BRIAS Inc.

Box 3278, Wainwright, AB T9W 1T2
780 842 6264 dale.myggland@brias.ca www.brias.ca

An Integrity Focused Inspection Company

Etag# E32443

Date 2020-09-02 **Brias Job #** 2590

Owner Enerplus **LSD** 11-7-50-21W4

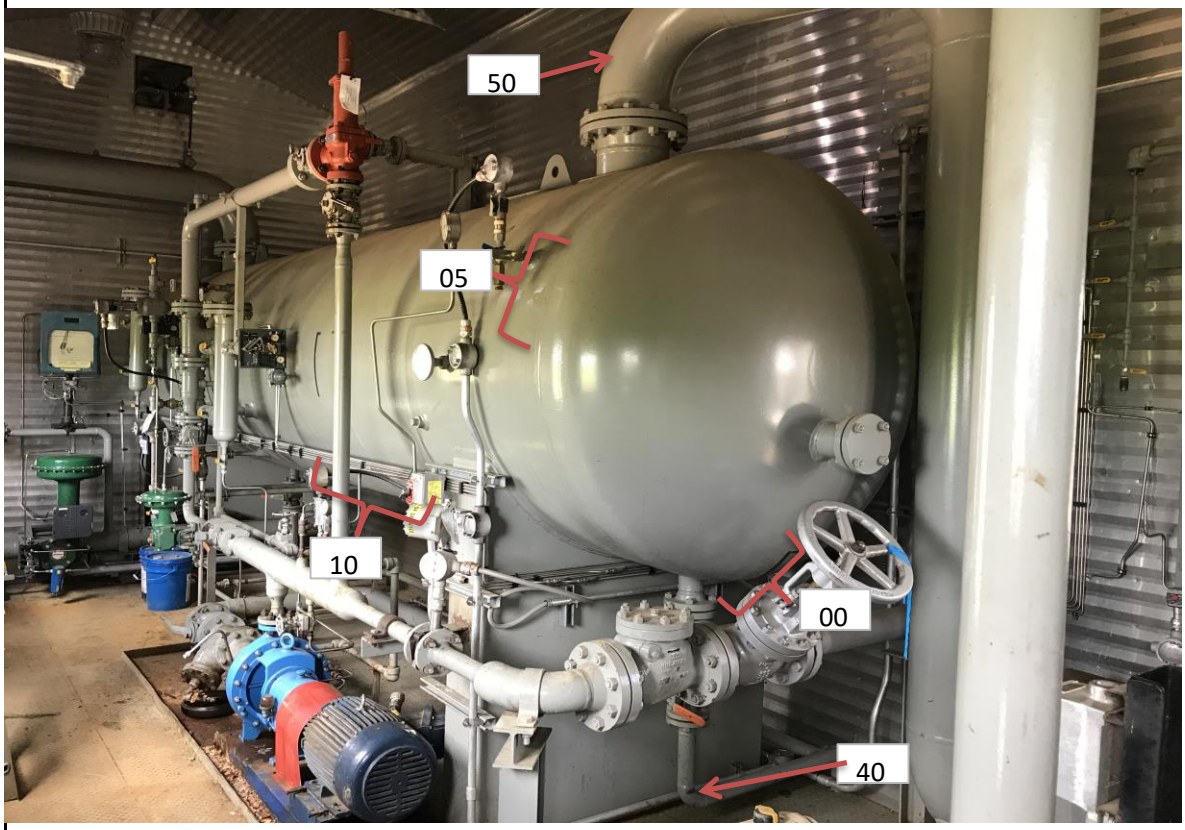
Vessel Description Separator

Jur# A0482583 **CRN** 02-006HS

Manufacturer Orban Industries **Serial #** F8484.2

Comments:

ULTRASONIC INSPECTION REPORT



Reviewed By _____ Date

Signature

UT performed by: Derek Pfisterer _____ Date 2020-09-02

CGSB level 2 cert # 18452 Signature

Expiry Date: 2021-04-15

UT Scanner: Olympus, Epoch 600 **SN:** 130477502 **Calibration Date:** 6/24/2020

Daily performance check on step wedge

UT interval set at

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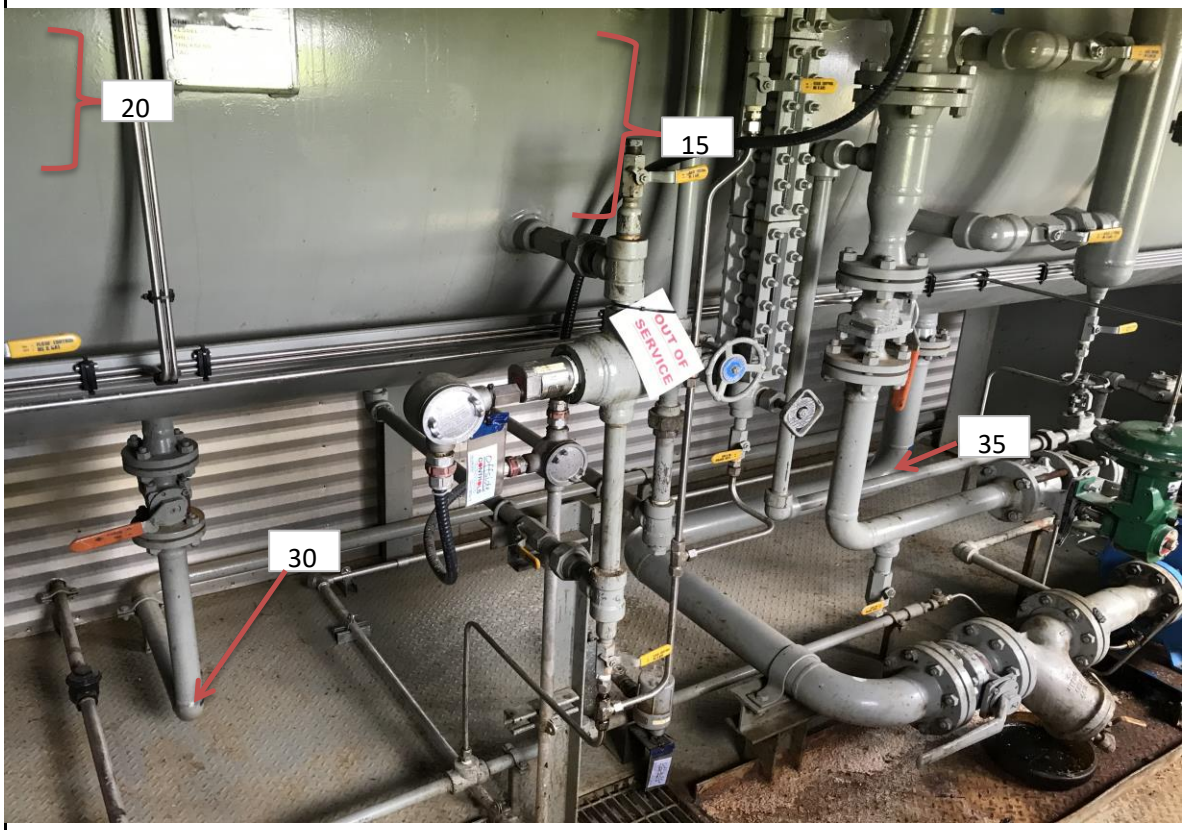

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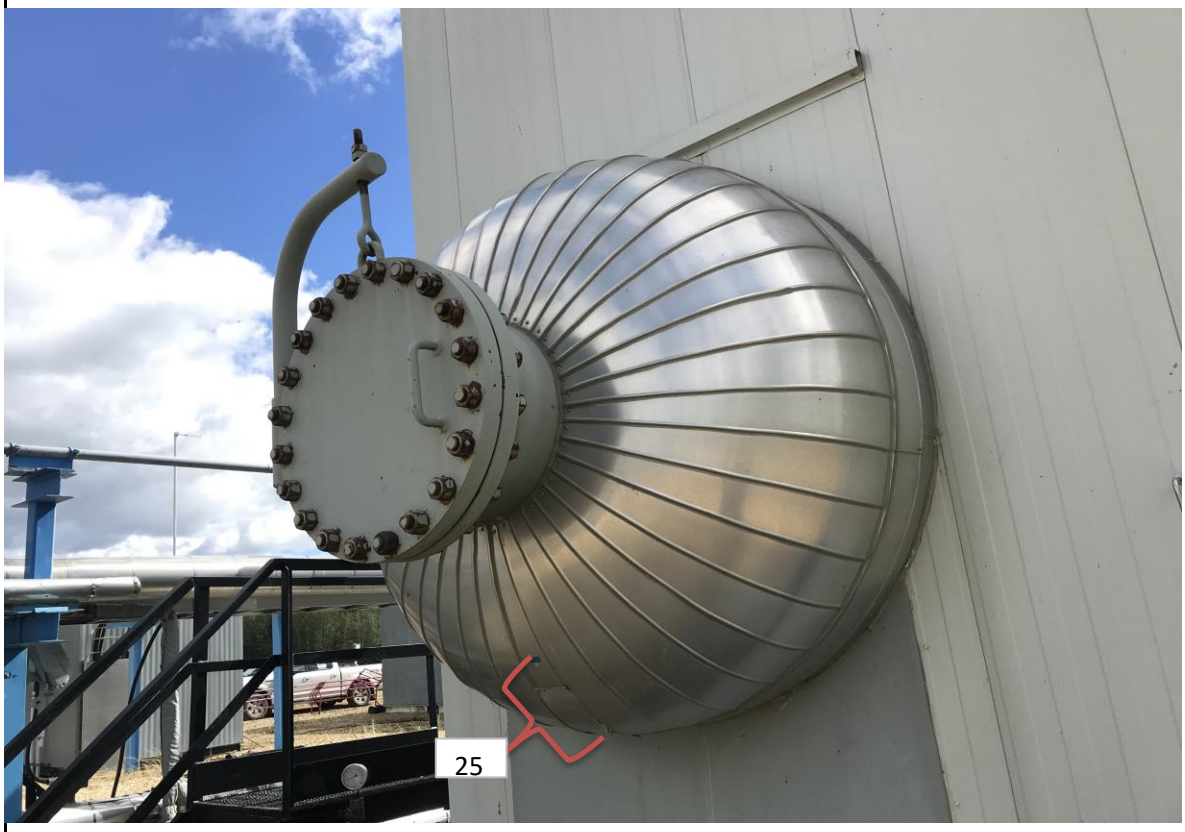

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CGSB level 2 cert # 18452 Signature

Expiry Date: 2021-04-15

UT Scanner: Olympus, Epoch 600 **SN:** 130477502 **Calibration Date:** 6/24/2020

Daily performance check on step wedge

UT interval set at

Tmin Calculator

MDR on File	Yes	No
Assumed	Yes	

S=	20000
Radius	30
E=	1
MAWP=	285

Shell

Tmin 0.431187

S=	20000
Radius	30
E=	1
MAWP=	285

Head

Tmin 0.431187

Piping Tmin Diameter

Tmin 0

Allowable Stress

	Pre-1999	**Post 1999**
SA516-70	17500	20000
SA106B	15000	17100
SA105	17500	20000
SA333 6	15000	17100
SA350LF2	17500	20000
SA283 A	11300	12900
SA283 B	12500	14300
SA283 C	13800	15700
SA285A	11300	12900
SA285B	12500	14300
SA285C	13800	15700
SA36	14500	16600
SA-212 B	17500	
SA-53B (SMLS)	15000	17100
SA-53B (WLD)	12800	14600
Assumed (lowest grade)	11300	12900

Radiography	Effeciency
Full Type 1	1
Spot Type 1	0.85
Default	0.7
As per MDR	

CML Number 0
Average thickness 0.6001 Year Built 2002
Minimum thickness 0.552 Current Year 2020
CML Location South Head

Assumed Nominal Thickness	Last Survey Date	Last Survey Thickness	Current Survey Thickness	Short Term CR (in/yr)	Long Term CR (in/yr)	T Min	Short Term Remaining Life to T Min (yrs)	Long Term Remaining life to T Min (yrs)	Time to half wall thickness (yrs)
0.625	N/A	N/A	0.652	N/A	0.000	0.431	N/A	INF	INF
0.625	N/A	N/A	0.608	N/A	0.001	0.431	N/A	187.214	312.882
0.625	N/A	N/A	0.630	N/A	0.000	0.431	N/A	INF	INF
0.625	N/A	N/A	0.610	N/A	0.001	0.431	N/A	214.576	357.000
0.625	N/A	N/A	0.595	N/A	0.002	0.431	N/A	98.288	169.500
0.625	N/A	N/A	0.552	N/A	0.004	0.431	N/A	29.790	59.055
0.625	N/A	N/A	0.570	N/A	0.003	0.431	N/A	45.430	84.273
0.625	N/A	N/A	0.559	N/A	0.004	0.431	N/A	34.858	67.227
0.625	N/A	N/A	0.615	N/A	0.001	0.431	N/A	330.864	544.500
0.625	N/A	N/A	0.610	N/A	0.001	0.431	N/A	214.576	357.000

CML Number 5
Average thickness 0.5239 Year Built 2002
Minimum thickness 0.511 Current Year 2020
CML Location Shell

Nominal Thickness	Last Survey Date	Last Survey Thickness	Current Survey Thickness	Short Term CR (in/yr)	Long Term CR (in/yr)	T Min	Short Term Remaining Life to T Min (yrs)	Long Term Remaining life to T Min (yrs)	Time to half wall thickness (yrs)
0.500	N/A	N/A	0.533	N/A	0.000	0.431	N/A	INF	INF
0.500	N/A	N/A	0.517	N/A	0.000	0.431	N/A	INF	INF
0.500	N/A	N/A	0.550	N/A	0.000	0.431	N/A	INF	INF
0.500	N/A	N/A	0.521	N/A	0.000	0.431	N/A	INF	INF
0.500	N/A	N/A	0.520	N/A	0.000	0.431	N/A	INF	INF
0.500	N/A	N/A	0.515	N/A	0.000	0.431	N/A	INF	INF
0.500	N/A	N/A	0.529	N/A	0.000	0.431	N/A	INF	INF
0.500	N/A	N/A	0.528	N/A	0.000	0.431	N/A	INF	INF
0.500	N/A	N/A	0.515	N/A	0.000	0.431	N/A	INF	INF
0.500	N/A	N/A	0.511	N/A	0.000	0.431	N/A	INF	INF

CML Number 10
Average thickness 0.5158 Year Built 2002
Minimum thickness 0.503 Current Year 2020
CML Location Shell

Nominal Thickness	Last Survey Date	Last Survey Thickness	Current Survey Thickness	Short Term CR (in/yr)	Long Term CR (in/yr)	T Min	Short Term Remaining Life to T Min (yrs)	Long Term Remaining life to T Min (yrs)	Time to half wall thickness (yrs)
0.500	N/A	N/A	0.520	N/A	0.000	0.431	N/A	INF	INF
0.500	N/A	N/A	0.509	N/A	0.000	0.431	N/A	INF	INF
0.500	N/A	N/A	0.518	N/A	0.000	0.431	N/A	INF	INF
0.500	N/A	N/A	0.511	N/A	0.000	0.431	N/A	INF	INF
0.500	N/A	N/A	0.511	N/A	0.000	0.431	N/A	INF	INF
0.500	N/A	N/A	0.527	N/A	0.000	0.431	N/A	INF	INF
0.500	N/A	N/A	0.529	N/A	0.000	0.431	N/A	INF	INF
0.500	N/A	N/A	0.503	N/A	0.000	0.431	N/A	INF	INF
0.500	N/A	N/A	0.515	N/A	0.000	0.431	N/A	INF	INF
0.500	N/A	N/A	0.515	N/A	0.000	0.431	N/A	INF	INF

CML Number 15
Average thickness 0.5199 Year Built 2002
Minimum thickness 0.513 Current Year 2020
CML Location Shell

Nominal Thickness	Last Survey Date	Last Survey Thickness	Current Survey Thickness	Short Term CR (in/yr)	Long Term CR (in/yr)	T Min	Short Term Remaining Life to T Min (yrs)	Long Term Remaining life to T Min (yrs)	Time to half wall thickness (yrs)
0.500	N/A	N/A	0.526	N/A	0.000	0.431	N/A	INF	INF
0.500	N/A	N/A	0.524	N/A	0.000	0.431	N/A	INF	INF
0.500	N/A	N/A	0.524	N/A	0.000	0.431	N/A	INF	INF
0.500	N/A	N/A	0.524	N/A	0.000	0.431	N/A	INF	INF
0.500	N/A	N/A	0.520	N/A	0.000	0.431	N/A	INF	INF
0.500	N/A	N/A	0.513	N/A	0.000	0.431	N/A	INF	INF
0.500	N/A	N/A	0.516	N/A	0.000	0.431	N/A	INF	INF
0.500	N/A	N/A	0.517	N/A	0.000	0.431	N/A	INF	INF
0.500	N/A	N/A	0.515	N/A	0.000	0.431	N/A	INF	INF
0.500	N/A	N/A	0.520	N/A	0.000	0.431	N/A	INF	INF

CML Number 20
Average thickness 0.5111 Year Built 2002
Minimum thickness 0.507 Current Year 2020
CML Location Shell

Nominal Thickness	Last Survey Date	Last Survey Thickness	Current Survey Thickness	Short Term CR (in/yr)	Long Term CR (in/yr)	T Min	Short Term Remaining Life to T Min (yrs)	Long Term Remaining life to T Min (yrs)	Time to half wall thickness (yrs)
0.500	N/A	N/A	0.527	N/A	0.000	0.431	N/A	INF	INF
0.500	N/A	N/A	0.508	N/A	0.000	0.431	N/A	INF	INF
0.500	N/A	N/A	0.507	N/A	0.000	0.431	N/A	INF	INF
0.500	N/A	N/A	0.522	N/A	0.000	0.431	N/A	INF	INF
0.500	N/A	N/A	0.507	N/A	0.000	0.431	N/A	INF	INF
0.500	N/A	N/A	0.511	N/A	0.000	0.431	N/A	INF	INF
0.500	N/A	N/A	0.507	N/A	0.000	0.431	N/A	INF	INF
0.500	N/A	N/A	0.507	N/A	0.000	0.431	N/A	INF	INF
0.500	N/A	N/A	0.507	N/A	0.000	0.431	N/A	INF	INF
0.500	N/A	N/A	0.508	N/A	0.000	0.431	N/A	INF	INF

CML Number 25
Average thickness 0.6429 Year Built 2002
Minimum thickness 0.6 Current Year 2020
CML Location North Head

Assumed Nominal Thickness	Last Survey Date	Last Survey Thickness	Current Survey Thickness	Short Term CR (in/yr)	Long Term CR (in/yr)	T Min	Short Term Remaining Life to T Min (yrs)	Long Term Remaining life to T Min (yrs)	Time to half wall thickness (yrs)
0.625	N/A	N/A	0.600	N/A	0.001	0.431	N/A	121.546	207.000
0.625	N/A	N/A	0.619	N/A	0.000	0.431	N/A	563.440	919.500
0.625	N/A	N/A	0.615	N/A	0.001	0.431	N/A	330.864	544.500
0.625	N/A	N/A	0.653	N/A	0.000	0.431	N/A	INF	INF
0.625	N/A	N/A	0.652	N/A	0.000	0.431	N/A	INF	INF
0.625	N/A	N/A	0.658	N/A	0.000	0.431	N/A	INF	INF
0.625	N/A	N/A	0.688	N/A	0.000	0.431	N/A	INF	INF
0.625	N/A	N/A	0.661	N/A	0.000	0.431	N/A	INF	INF
0.625	N/A	N/A	0.667	N/A	0.000	0.431	N/A	INF	INF
0.625	N/A	N/A	0.616	N/A	0.001	0.431	N/A	369.627	607.000

CML Number 30
Average thickness 0.181 Year Built 2002
Minimum thickness 0.177 Current Year 2020
CML Location Drain Piping

Nominal Thickness	Last Survey Date	Last Survey Thickness	Current Survey Thickness	Short Term CR (in/yr)	Long Term CR (in/yr)	T Min	Short Term Remaining Life to T Min (yrs)	Long Term Remaining life to T Min (yrs)	Time to half wall thickness (yrs)
0.218	N/A	N/A	0.178	N/A	0.002	0.070	N/A	48.600	31.050
0.218	N/A	N/A	0.182	N/A	0.002	0.070	N/A	56.000	36.500
0.218	N/A	N/A	0.183	N/A	0.002	0.070	N/A	58.114	38.057
0.218	N/A	N/A	0.185	N/A	0.002	0.070	N/A	62.727	41.455
0.218	N/A	N/A	0.177	N/A	0.002	0.070	N/A	46.976	29.854

CML Number 35
Average thickness 0.2026 Year Built 2002
Minimum thickness 0.197 Current Year 2020
CML Location Drain Piping

Assumed Nominal Thickness	Last Survey Date	Last Survey Thickness	Current Survey Thickness	Short Term CR (in/yr)	Long Term CR (in/yr)	T Min	Short Term Remaining Life to T Min (yrs)	Long Term Remaining life to T Min (yrs)	Time to half wall thickness (yrs)
0.216	N/A	N/A	0.210	N/A	0.000	0.080	N/A	390.000	306.000
0.216	N/A	N/A	0.197	N/A	0.001	0.080	N/A	110.842	84.316
0.216	N/A	N/A	0.200	N/A	0.001	0.080	N/A	135.000	103.500
0.216	N/A	N/A	0.205	N/A	0.001	0.080	N/A	204.545	158.727
0.216	N/A	N/A	0.201	N/A	0.001	0.080	N/A	145.200	111.600

CML Number 40
Average thickness 0.1952 Year Built 2002
Minimum thickness 0.186 Current Year 2020
CML Location Drain Piping

Assumed Nominal Thickness	Last Survey Date	Last Survey Thickness	Current Survey Thickness	Short Term CR (in/yr)	Long Term CR (in/yr)	T Min	Short Term Remaining Life to T Min (yrs)	Long Term Remaining life to T Min (yrs)	Time to half wall thickness (yrs)
0.218	N/A	N/A	0.195	N/A	0.001	0.070	N/A	97.826	67.304
0.218	N/A	N/A	0.199	N/A	0.001	0.070	N/A	122.211	85.263
0.218	N/A	N/A	0.198	N/A	0.001	0.070	N/A	115.200	80.100
0.218	N/A	N/A	0.186	N/A	0.002	0.070	N/A	65.250	43.313
0.218	N/A	N/A	0.198	N/A	0.001	0.070	N/A	115.200	80.100

CML Number 45
Average thickness 0.3762 Year Built 2002
Minimum thickness 0.361 Current Year 2020
CML Location Inlet Piping

Nominal Thickness	Last Survey Date	Last Survey Thickness	Current Survey Thickness	Short Term CR (in/yr)	Long Term CR (in/yr)	T Min	Short Term Remaining Life to T Min (yrs)	Long Term Remaining life to T Min (yrs)	Time to half wall thickness (yrs)
0.365	N/A	N/A	0.377	N/A	0.000	0.110	N/A	INF	INF
0.365	N/A	N/A	0.379	N/A	0.000	0.110	N/A	INF	INF
0.365	N/A	N/A	0.379	N/A	0.000	0.110	N/A	INF	INF
0.365	N/A	N/A	0.385	N/A	0.000	0.110	N/A	INF	INF
0.365	N/A	N/A	0.361	N/A	0.000	0.110	N/A	1129.500	803.250

CML Number	50		
Average thickness	0.3816	Year Built	2002
Minimum thickness	0.376	Current Year	2020
CML Location	Outlet Piping		

Nominal Thickness	Last Survey Date	Last Survey Thickness	Current Survey Thickness	Short Term CR (in/yr)	Long Term CR (in/yr)	T Min	Short Term Remaining Life to T Min (yrs)	Long Term Remaining life to T Min (yrs)	Time to half wall thickness (yrs)
0.365	N/A	N/A	0.394	N/A	0.000	0.110	N/A	INF	INF
0.365	N/A	N/A	0.383	N/A	0.000	0.110	N/A	INF	INF
0.365	N/A	N/A	0.377	N/A	0.000	0.110	N/A	INF	INF
0.365	N/A	N/A	0.378	N/A	0.000	0.110	N/A	INF	INF
0.365	N/A	N/A	0.376	N/A	0.000	0.110	N/A	INF	INF