Appendix A: Coating Repair Forms (Revised November 9, 2018)

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ENBRIDGE

Coating Repair Form for L5 Straits of Mackinac

General Information

Date:	11/12/2017 11/13/2017 12/02/2017	Diver:	11/12 – Joe Reiman, Andrew Alber, ChadCantrell, 11/13 – Brad Jonas 12/02 – Shawn Binsfield
AFE / W.O.#:	20011702	Company Inspector:	Brandon Price/Neil Pittman
Segment:	EAOI-1	Water Depth (ft):	196
Longitude:	-84.758548	Latitude:	45.822884

Material Information

BIO- DUR™ 563 SW Epoxy Base – Black	17T-715	Expiration Date:	11/06/2019
BIO – DUR ™ 563SW Curing Agent – White	17T-717	Expiration Date:	11/06/2019
X100 – UW Epoxy Base – Blue	17T-598 17T-596	Expiration Date:	9/25/2019 9/25/2019
BIO-SEAL ™ X-100 Curing Agent – Clear	17t-581	Expiration Date:	9/20/2019

Temperature (°F):	46, 46, 44,48	Wall Thickness Measurements (mil):	816, 818, 814, 814, 812
Location of the Coating Repair:	Top of Pipe	Coating Repair Method:	Full Circumferential Composite Wrap Repair

Quaity Assurance During Application

☑	The steel surface was cleaned using scarpers, hydroblasting cleaning, wet abrasive blasting, or pneumatic power wire wheel brush. (3.1)
☑	Feathering removed the sharp edge at the transition from the parent coating. The parent coating was roughened (abraded) using a cup disk brush to remove the loosely adherent biota, coating and provide a surface for overcoating (3.2).
☑	Immediately prior to coating application, the Diver removed any flash rust and/or accumulated debris (silt, clay, etc.) using a wire brush or other method approved by the Manufacturer (4.1).
☑	The diver applied sufficient BIO-DUR epoxy filler so that the bare steel is completely covered and the repair area is flush with the adjacent parent coating (4.2.2 and 4.2.3).
☑	Full Circumferential Composite Wrap Repair (4.3) or Composite Patch Repair (4.4) applied in accordance with the coating procedure.
☑	Blue Stricture Banding® or alternative protective wraps/encasements allowed by the coating Manufacturer applied over the composite wrap or patch repair.

After Cure of Coating Repair

Date:	12/02/2017	Cure Time (days)	19
Temperature (°F):	41	Hardness Quaility Check (4.5.2)	Pass
Total thickness measurements of the Coating Repair (mil):	250+, 250+, 250+		

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Coating Repair Form for L5 Straits of Mackinac

- No external corrosion reported by diver.
- Additional bare metal exposed during surface preparation. No external corrosion reported by diver at these areas.
- After surface preparation, anchor profile was 3.5 mils and 3.2 mils.
- Epoxy filler transferred to diver within 6 minutes after initial mixing.

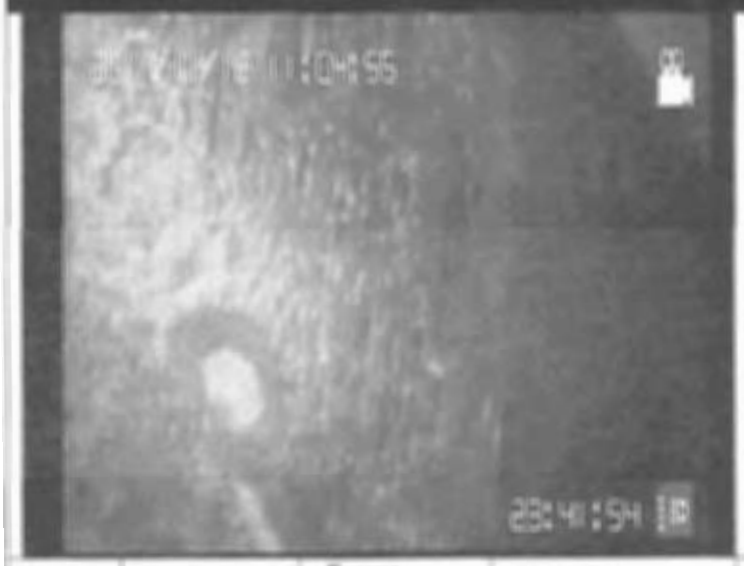
	Brandon Price
Contractor Signature	Company Inspector Signature

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Coating Repair Form for L5 Straits of Mackinac

Surface of pipe after surface preparation.



Date:	11/12/2017	Frame (HH:MM:SS)	11:04:55

Surface of the pipe after filler application.



Date:	11/12/2017	Frame (HH:MM:SS)	11:22:52

Surface of the pipe after composite wrap.



Date:	11/13/2017	Frame (HH:MM:SS)	12:31:25

Surface of the pipe after Stricture Banding.



Date:	12/02/2017	Frame (HH:MM:SS)	11:24:09

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Coating Repair Form for L5 Straits of Mackinac

Surface of the pipe after cure and removal of Stricture banding.	[Additional Photograph Caption]
	

Date:	12/02/2017	Frame (13:20:55)	11:44:31	Date:	DD/MM/YY	Frame (HH:MM:SS)

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Coating Repair Form for L5 Straits of Mackinac

General Information

Date:	10/01/2017	Diver:	Chad Palmer Mackenzie Thopkins
AFE / W.O.#:	BPI-1264792-17	Company Inspector:	Neil Pittman
Segment:	EAOI-5	Water Depth (ft):	103
Longitude:	-84.76510434	Latitude:	45.80581380

Material Information

BIO- DUR™ 563 SW Epoxy Base – Black	17T-391	Expiration Date:	07/04/19
BIO – DUR ™ 563SW Curing Agent – White	17T-534	Expiration Date:	09/05/19
X100 – UW Epoxy Base – Blue	17T-580	Expiration Date:	09/20/19
BIO-SEAL ™ X-100 Curing Agent – Clear	17T-581 17T-571	Expiration Date:	09/20/19 09/12/19

Temperature (°F):	54	Wall Thickness Measurements (mil):	766, 762, 762, 766, 754, 764
Location of the Coating Repair:	Top of Pipe	Coating Repair Method:	Full Circumferential Composite Wrap Repair

Quaity Assurance During Application

☑	The steel surface was cleaned using scarpers, hydroblasting cleaning, wet abrasive blasting, or pneumatic power wire wheel brush. (3.1)
☑	Feathering removed the sharp edge at the transition from the parent coating. The parent coating was roughened (abraded) using a cup disk brush to remove the loosely adherent biota, coating and provide a surface for overcoating (3.2).
☑	Immediately prior to coating application, the Diver removed any flash rust and/or accumulated debris (silt, clay, etc.) using a wire brush or other method approved by the Manufacturer (4.1).
☑	The diver applied sufficient BIO-DUR epoxy filler so that the bare steel is completely covered and the repair area is flush with the adjacent parent coating (4.2.2 and 4.2.3).
☑	Full Circumferential Composite Wrap Repair (4.3) or Composite Patch Repair (4.4) applied in accordance with the coating procedure.
☑	Blue Stricture Banding® or alternative protective wraps/encasements allowed by the coating Manufacturer applied over the composite wrap or patch repair.

After Cure of Coating Repair

Date:	10/28/2017	Cure Time (days):	27
Temperature (°F):	54	Hardness Quaiity Check (4.5.2)	PASS
Total thickness measurements of the Coating Repair (mil):	250+, 250+, 250+		

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Coating Repair Form for L5 Straits of Mackinac

Comments/Issues/Discussion

- No external corrosion reported by diver.
- Additional bare metal exposed during surface preparation. No external corrosion reported by diver at these areas.
- After surface preparation, two anchor profile were measured at 2.9 and 3.3 mils.
- Epoxy filler transferred to diver within 14 minutes after initial mixing.

Contractor Signature	Company Inspector Signature

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Coating Repair Form for L5 Straits of Mackinac

Surface of pipe after surface preparation.



Date:	10/01/2017	Frame (HH:MM:SS)	15:15:20

Surface of the pipe after filler application.



Date:	10/01/2017	Frame (HH:MM:SS)	16:02:17

Surface of the pipe after composite wrap.



Date:	10/01/2017	Frame (HH:MM:SS)	16:23:10

Surface of the pipe after Stricture Banding.



Date:	10/01/2017	Frame (HH:MM:SS)	16:38:43

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Coating Repair Form for L5 Straits of Mackinac

Surface of the pipe after cure and removal of Stricture banding.	[Additional Photograph Caption]



Date:	10/28/2017	Frame	11:58:43	Date:	DD/MM/YY	Frame (HH:MM:SS)	

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Coating Repair Form for L5 Straits of Mackinac

General Information

Date:	10/01/2017 10/12/2017 10/13/2017 10/14/2017 10/16/2017 10/20/2017 10/21/2017 10/22/2017 10/23/2017 11/01/2017	Diver:	10/01 - Shawn Binsfield 10/12 – Shawn Binsfield, Craig Palmer, Joe Rieman, Jesse Tabor 10/13 – Daylon Hutton, Mike Rosette 10/14 – Andrew Alber, Shawn Binsfield, Craig Palmer, Joe Rieman, Jesse Tabor 10/16 – Mike Rosette, Shawn Binsfield, Craig Palmer 10/20 – McKenzie Tompkins, Joe Rieman, Jesse Tabor 10/21 Mike Rosette, Shawn Binsfield, Craig Palmer,Mckenzie Tompkins 10/22 Joe Reiman, Jessie Tabor, Mike Rosette,Andrew Alber 10/23 Shawn Binsfield, Mackenzie Tompson 11/01 Daylin Hutton, Mackenzie Tompson
AFE / W.O.#:	BPI-1264792-17	Company Inspector:	Neil Pittman, Brandon Price
Segment:	EAOI-7	Water Depth (ft):	81
Longitude:	-84.76583464	Latitude:	45.80393026

Material Information

BIO- DUR™ 563 SW Epoxy Base – Black	17T-582 17T-586	Expiration Date:	09/19/2019 09/20/2019
BIO – DUR ™ 563SW Curing Agent – White	17T-583 17T-587	Expiration Date:	09/19/2019 09/20/2019
X100 – UW Epoxy Base – Blue	17T-580	Expiration Date:	09/20/2019
BIO-SEAL ™ X-100 Curing Agent – Clear	17T-571	Expiration Date:	09/12/19

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Coating Repair Form for L5 Straits of Mackinac

Temperature (°F):	54, 56, 55, 55, 59, 55, 55, 56, 56, 59,56,56, 58,56,58,56,53,56,56,53	**Wall Thickness Measurements (mil):**	1	824, 824, 822, 812, 802, 828, 812, 822
			1a	790, 792, 794, 784, 788, 788, 792, 792
			1b	810, 806, 790, 776, 804, 794, 776, 776
			1c/d/e	832, 826, 822, 806, 794, 796, 794, 786, 774, 776, 800, 792, 778, 818, 804, 812, 824, 828, 836, 836, 840, 840, 840, 830, 826, 820
			1f	814, 816, 824, 826, 822, 798, 788, 798, 808
			1g	840, 836, 836, 838, 838
			1h	818, 818, 820, 820, 822
			1i	830, 812, 794, 814, 834, 826, 798, 786, 786
			1j	826, 830, 834, 840, 834, 834, 846, 840
			1k	779, 778, 772, 774, 774, 782, 778, 810, 808, 810
			1l	786, 804, 794, 800, 810, 806, 808, 798
			1m	768, 768, 774, 784, 780, 806, 802
			1n	784, 784, 802, 802, 816, 814, 834, 838
			1o	802, 802, 818, 834, 830, 838, 844, 836
Location of the Coating Repair:	Top, Side, and Bottom of Pipe		**Coating Repair Method:**	Full Circumferential Composite Wrap Repair

Quaity Assurance During Application	
☑	The steel surface was cleaned using scarpers, hydroblasting cleaning, wet abrasive blasting, or pneumatic power wire wheel brush. (3.1)
☑	Feathering removed the sharp edge at the transition from the parent coating. The parent coating was roughened (abraded) using a cup disk brush to remove the loosely adherent biota, coating and provide a surface for overcoating (3.2).
☑	Immediately prior to coating application, the Diver removed any flash rust and/or accumulated debris (silt, clay, etc.) using a wire brush or other method approved by the Manufacturer (4.1).
☑	The diver applied sufficient BIO-DUR epoxy filler so that the bare steel is completely covered and the repair area is flush with the adjacent parent coating (4.2.2 and 4.2.3).
☑	Full Circumferential Composite Wrap Repair (4.3) or Composite Patch Repair (4.4) applied in accordance with the coating procedure.
☑	Blue Stricture Banding® or alternative protective wraps/encasements allowed by the coating Manufacturer applied over the composite wrap or patch repair.

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Coating Repair Form for L5 Straits of Mackinac

After Cure of Coating Repair			
Date:	11/01/2017	Cure Time (days)	9
Temperature (°F):	53	Hardness Quaiity Check (4.5.2)	PASS
Total thickness measurements of the Coating Repair (mil):		245, 250+, 250+, 250+, 250+, 250+, 250+, 250+, 250+, 250+,	

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Coating Repair Form for L5 Straits of Mackinac

Comments/Issues/Discussion

- No external corrosion reported by diver.
- Additional bare metal exposed during surface preparation. No external corrosion reported by diver at these areas.
- After surface preparation, anchor profile at 1, 1a, …, 1o were 4.0, 3.9, 3.0, 3.4, 3.3, 3.7, 3.6, 3.8, 2.7, 3.7, 3.3, 4.0, 4.0, 2.8, 3.4, 4.0, 4.1 mils, respectively.
- Filler was applied within 16 minutes of mixing.

Contractor Signature	Brandon Price Company Inspector Signature

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Coating Repair Form for L5 Straits of Mackinac

Surface of pipe after surface preparation.



Date:	10/21/2017	Frame (HH:MM:SS)	13:38:24

Surface of the pipe after filler application.



Date:	10/21/2017	Frame (HH:MM:SS)	11:33:38

Surface of the pipe after composite wrap.



Date:	11/01/2017	Frame (HH:MM:SS)	10:03:35

Surface of the pipe after Stricture Banding.



Date:	10/23/2017	Frame (HH:MM:SS)	14:04:09

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Coating Repair Form for L5 Straits of Mackinac

Surface of the pipe after cure and removal of Stricture banding.	[Additional Photograph Caption]
	

Date:	11/01/2017	Frame (HH:MM:SS)	10:03:35	Date:	DD/MM/YY	Frame (HH:MM:SS)	

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Coating Repair Form for L5 Straits of Mackinac

General Information			
Date:	10/06/2017 10/09/2017 10/10/2017 10/22/2017	Diver:	10/06 – Mike Rosette, Andrew Alber 10/09 – McKenzie Tompkins, Joe Rieman, Mike Rosette, Andrew Alber 10/10 – Joe Rieman, Mike Rosette, Andrew Alber 10/22 – Andrew Alber
AFE / W.O.#:	BPI-1264792-17	Company Inspector:	Neil Pittman
Segment:	EAS-1	Water Depth (ft):	76
Longitude:	-84.76762989	Latitude:	45. 79912833

Material Information			
BIO- DUR™ 563 SW Epoxy Base – Black	17T-391 17T-582 17T-586	Expiration Date:	7/04/2019 9/19/2019 9/20/2019
BIO – DUR ™ 563SW Curing Agent – White	17T-534 17T-583 17T-587	Expiration Date:	9/05/2019 9/19/2019 9/20/2019
X100 – UW Epoxy Base – Blue	17T-580 17T-570 17T-598	Expiration Date:	9/20/2019 9/12/2019 9/25/2019
BIO-SEAL ™ X-100 Curing Agent – Clear	17T-581 17T-571 17T-597	Expiration Date:	9/20/2019 9/12/2019 9/25/2019

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Coating Repair Form for L5 Straits of Mackinac

Temperature (°F):	61, 56, 57, 56, 61	Wall Thickness Measurements (mil):	1	808, 814, 824, 824, 824, 824,822
			1b	UT cannot read on weld.
			1c/d	842, 842, 850, 838, 818, 788, 798, 790, 788, 788, 786, 782, 776, 764, 770, 772, 774, 780, 790, 780, 780, 792, 808, 798, 808, 820, 834
			1e	838, 830, 822, 816
			1f	812, 814, 812, 814, 816
Location of the Coating Repair:		Top, Side, and Bottom of Pipe	Coating Repair Method:	Full Circumferential Composite Wrap Repair

Quaity Assurance During Application

☑	The steel surface was cleaned using scarpers, hydroblasting cleaning, wet abrasive blasting, or pneumatic power wire wheel brush. (3.1)
☑	Feathering removed the sharp edge at the transition from the parent coating. The parent coating was roughened (abraded) using a cup disk brush to remove the loosely adherent biota, coating and provide a surface for overcoating (3.2).
☑	Immediately prior to coating application, the Diver removed any flash rust and/or accumulated debris (silt, clay, etc.) using a wire brush or other method approved by the Manufacturer (4.1).
☑	The diver applied sufficient BIO-DUR epoxy filler so that the bare steel is completely covered and the repair area is flush with the adjacent parent coating (4.2.2 and 4.2.3).
☑	Full Circumferential Composite Wrap Repair (4.3) or Composite Patch Repair (4.4) applied in accordance with the coating procedure.
☑	Blue Stricture Banding® or alternative protective wraps/encasements allowed by the coating Manufacturer applied over the composite wrap or patch repair.

After Cure of Coating Repair

Date:	10/22/2017	Cure Time (days):	12
Temperature (°F):	56	Hardness Quaity Check (4.5.2)	Pass
Total thickness measurements of the Coating Repair (mil):		250+, 250+, 250+, 250+, 250+	

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Coating Repair Form for L5 Straits of Mackinac

Comments/Issues/Discussion

- No external corrosion reported by diver.
- Additional bare metal exposed during surface preparation. No external corrosion reported by diver at these areas. After surface preparation, anchor profile was (1) 3.2 mils, (1b) 4.5 mils, (1c/d/e) 2.6, 2.5, 2.6, 2.5, and 3.5 mils, and (1f) 3.5 mils.
- Time from mixing filler to application did not exceed 16 minutes.

Contractor Signature	Company Inspector Signature

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Coating Repair Form for L5 Straits of Mackinac

Surface of pipe after surface preparation.



Date:	9/10/2017	Frame (HH:MM:SS)	12:11:43

Surface of the pipe after filler application.



Date:	9/10/2017	Frame (HH:MM:SS)	12:58:42

Surface of the pipe after composite wrap.



Date:	10/10/2017	Frame (HH:MM:SS)	14:26:08

Surface of the pipe after Stricture Banding.



Date:	10/10/2017	Frame (HH:MM:SS)	14:26:47

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Surface of the pipe after cure and removal of Stricture banding.	[Additional Photograph Caption]
	

Date:	10/22/2017	Frame (HH:MM:SS)	15:27:01	Date:	DD/MM/YY	Frame (HH:MM:SS)	

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Coating Repair Form for L5 Straits of Mackinac

General Information

Date:	09/21/2017	Diver:	Mackenzie Thopkins Mike Rosette
AFE / W.O.#:	BPI-1264792-17	Company Inspector:	Neil Pittman
Segment:	EAS-2	Water Depth (ft):	74
Longitude:	-84.76797867	Latitude:	45.7982423

Material Information

BIO- DUR™ 563 SW Epoxy Base – Black	17T-391	Expiration Date:	07/04/19
BIO – DUR ™ 563SW Curing Agent – White	17T-534	Expiration Date:	09/05/19
X100 – UW Epoxy Base – Blue	17T-535	Expiration Date:	09/05/19
BIO-SEAL ™ X-100 Curing Agent – Clear	17T-537	Expiration Date:	09/05/19

Temperature (°F):	55	Wall Thickness Measurements (mil):	848, 848, 854, 852, 850
Location of the Coating Repair:	Top of Pipe	Coating Repair Method:	Full Circumferential Composite Wrap Repair

Quaity Assurance During Application

☑	The steel surface was cleaned using scarpers, hydroblasting cleaning, wet abrasive blasting, or pneumatic power wire wheel brush. (3.1)
☑	Feathering removed the sharp edge at the transition from the parent coating. The parent coating was roughened (abraded) using a cup disk brush to remove the loosely adherent biota, coating and provide a surface for overcoating (3.2).
☑	Immediately prior to coating application, the Diver removed any flash rust and/or accumulated debris (silt, clay, etc.) using a wire brush or other method approved by the Manufacturer (4.1).
☑	The diver applied sufficient BIO-DUR epoxy filler so that the bare steel is completely covered and the repair area is flush with the adjacent parent coating (4.2.2 and 4.2.3).
☑	Full Circumferential Composite Wrap Repair (4.3) or Composite Patch Repair (4.4) applied in accordance with the coating procedure.
☑	Blue Stricture Banding® or alternative protective wraps/encasements allowed by the coating Manufacturer applied over the composite wrap or patch repair.

After Cure of Coating Repair

Date:	10/6/2017	Cure Time (days): 15	Craig Palmer
Temperature (°F):	82	Hardness Quality Check (4.5.2)	Pass
Total thickness measurements of the Coating Repair (mil):		250+, 250+, 250+, 250+	

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Coating Repair Form for L5 Straits of Mackinac

Comments/Issues/Discussion

- No external corrosion reported by diver.
- Additional bare metal exposed during surface preparation. No external corrosion reported by Diver at these areas.
- After surface preparation, anchor profile was 3.4 mils.

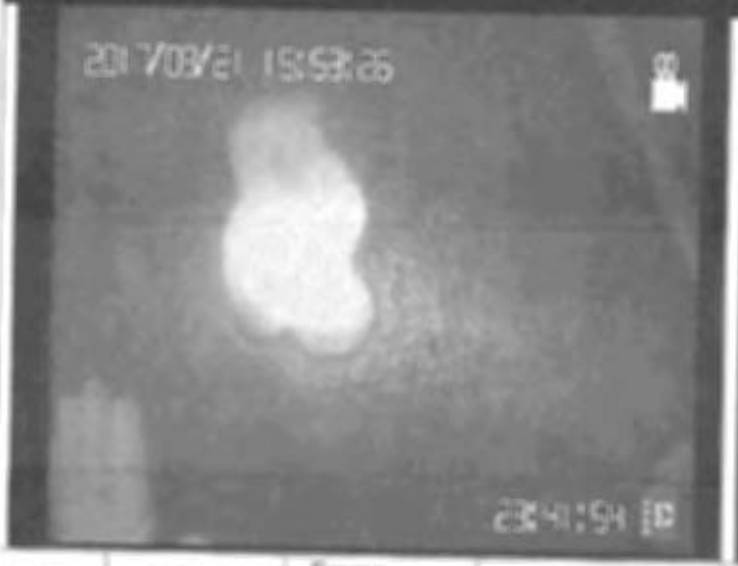
Contractor Signature	Company Inspector Signature

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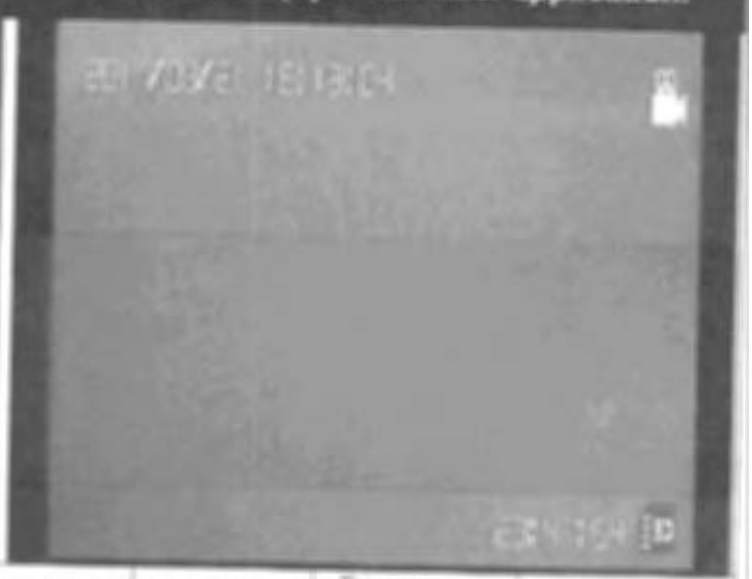
Coating Repair Form for L5 Straits of Mackinac

Surface of pipe after surface preparation.



Date:	09/21/2017	Frame (HH:MM:SS)	15:53:26

Surface of the pipe after filler application.



Date:	09/21/2017	Frame (HH:MM:SS)	16:19:04

Surface of the pipe after composite wrap.



Date:	09/21/2017	Frame (HH:MM:SS)	18:08:24

Surface of the pipe after Stricture Banding.



Date:	09/21/2017	Frame (HH:MM:SS)	18:16:16

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Coating Repair Form for L5 Straits of Mackinac

Surface of the pipe after cure and removal of Stricture banding.	[Additional Photograph Caption]



Date:	10/06/2017	Frame (HH:MM:SS)	16:02:08	Date:	DD/MM/YY	Frame (HH:MM:SS)	

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ENBRIDGE — Coating Repair Form for L5 Straits of Mackinac

General Information

Date:	10/01/2017 10/29/2017 12/15/2017	**Diver:**	10/01 - Joe Rieman 10/29 – Mike Rosette, Andrew Alber 12/15 – Joe Rieman
AFE / W.O.#:	BPI-1264792-17	**Company Inspector:**	Neil Pittman/ Brandon Price
Segment:	EAS-3	**Water Depth (ft):**	133
Longitude:	-84.76103226	**Latitude:**	45.81648309

Material Information

BIO- DUR™ 563 SW Epoxy Base – Black	17T-582	**Expiration Date:**	9/19/19
BIO – DUR ™ 563SW Curing Agent – White	17T-583	**Expiration Date:**	9/19/19
X100 – UW Epoxy Base – Blue	17T-580 17T-570	**Expiration Date:**	9/20/19 9/12/19
BIO-SEAL ™ X-100 Curing Agent – Clear	17T-581 17T-571	**Expiration Date:**	9/20/19 9/12/19

Temperature (°F):	55	**Wall Thickness Measurements (mil):**	1	806, 802, 804, 800, 800, 802, 808, 810, 806, 806, 804
			1a	810, 810, 812, 810, 808, 808
Location of the Coating Repair:	Top of Pipe and side of pipe		**Coating Repair Method:**	Full Circumferential Composite Wrap Repair

Quaity Assurance During Application

☑	The steel surface was cleaned using scrapers, hydroblasting cleaning, wet abrasive blasting, or pneumatic power wire wheel brush. (3.1)
☑	Feathering removed the sharp edge at the transition from the parent coating. The parent coating was roughened (abraded) using a cup disk brush to remove the loosely adherent biota, coating and provide a surface for overcoating (3.2).
☑	Immediately prior to coating application, the Diver removed any flash rust and/or accumulated debris (silt, clay, etc.) using a wire brush or other method approved by the Manufacturer (4.1).
☑	The diver applied sufficient BIO-DUR epoxy filler so that the bare steel is completely covered and the repair area is flush with the adjacent parent coating (4.2.2 and 4.2.3).
☑	Full Circumferential Composite Wrap Repair (4.3) or Composite Patch Repair (4.4) applied in accordance with the coating procedure.
☑	Blue Stricture Banding® or alternative protective wraps/encasements allowed by the coating Manufacturer applied over the composite wrap or patch repair.

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Coating Repair Form for L5 Straits of Mackinac

After Cure of Coating Repair			
Date:	112/15/2017	**Cure Time (days)**	54
Temperature (°F):	38	**Hardness Quaiity Check (4.5.2)**	PASS
Total thickness measurements of the Coating Repair (mil):	240, 250+, 250+, 225		

Comments/Issues/Discussion

- No external corrosion reported by diver.
- Additional bare metal exposed during surface preparation. No external corrosion reported by diver at these areas.
- After surface preparation, anchor profile was (1) - 4.3 and 3.7, and (1a) - 3.3 mils.
- Filler was applied within 15 minutes of mixing.

Contractor Signature	Brandon Price **Company Inspector Signature**

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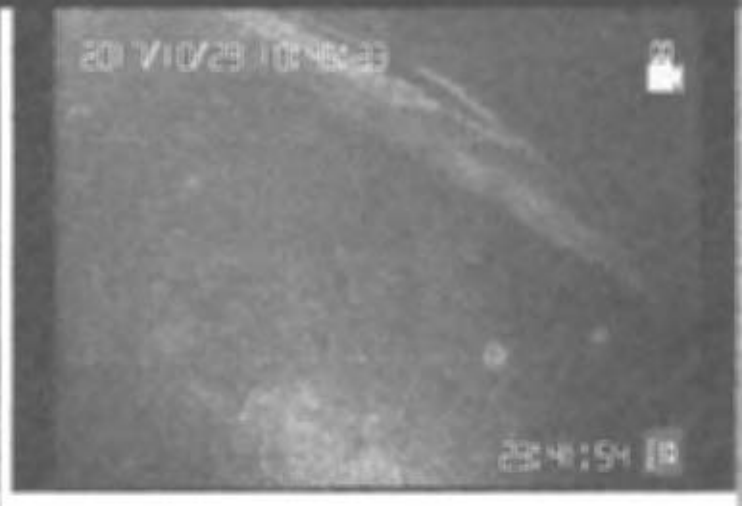
Coating Repair Form for L5 Straits of Mackinac

Surface of pipe after surface preparation.



Date:	10/29/2017	Frame (HH:MM:SS)	10:26:50

Surface of the pipe after filler application.



Date:	10/29/2017	Frame (HH:MM:SS)	10:45:33

Surface of the pipe after composite wrap.



Date:	10/29/2017	Frame (HH:MM:SS)	12:28:32

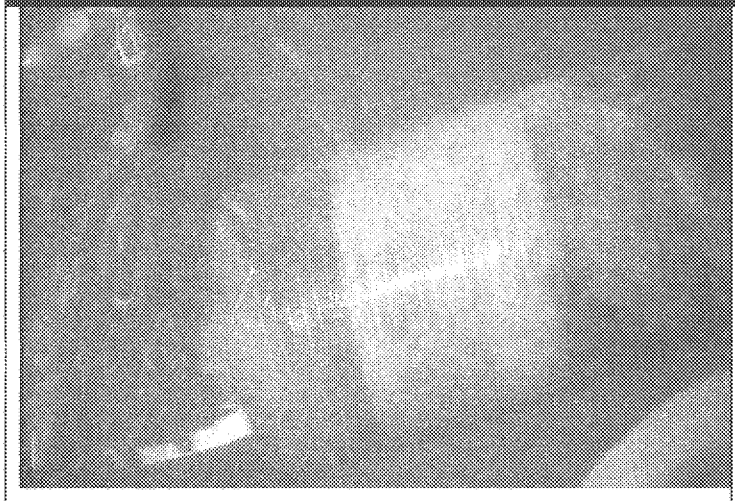
Surface of the pipe after Stricture Banding.



Date:	10/29/2017	Frame (HH:MM:SS)	12:34:35

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ENBRIDGE	Coating Repair Form for L5 Straits of Mackinac

Surface of the pipe after cure and removal of Stricture banding.	[Additional Photograph Caption]
	

Date:	12/15/2017	Frame (HH:MM:SS)	09:58:00	Date:	DD/MM/YY	Frame (HH:MM:SS)	

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Coating Repair Form for L5 Straits of Mackinac

General Information

Date:	08/08/2018 08/09/2018 08/20/2018 09/13/2018	**Diver:**	08/08 - Mackenzie Thompkins, Andy Walle, Troy Baskett 08/09 – George Palmer, Joe Reiman 08/20 - Chad Cantrell, Andrew Alber 09/13 – Chad Cantrell
AFE / W.O.#:	2008990	**Company Inspector:**	John Back
Segment:	EAS-4	**Water Depth (ft):**	136
Longitude:	-84.76113768	**Latitude:**	45.8162252

Material Information

BIO- DUR™ 563 SW Epoxy Base – Black	17T-717	**Expiration Date:**	11/06/19
BIO – DUR ™ 563SW Curing Agent – White	17T-715	**Expiration Date:**	11/06/19
X100 – UW Epoxy Base – Blue	18T-268	**Expiration Date:**	05/21/20
BIO-SEAL ™ X-100 Curing Agent – Clear	18T-269	**Expiration Date:**	05/21/20

Temperature (°F):	41, 40, 41, 43,	**Wall Thickness Measurements (mil):**	1	826, 820, 828, 832, 822
			2	812, 804, 810, 814, 818
			3	834, 832, 828, 824, 834
Location of the Coating Repair:	Feature 1: 12:00 Feature 2: 3:00 Feature 3: 12:00		**Coating Repair Method:**	Full Circumferential Composite Wrap Repair

Quaity Assurance During Application

☑	The steel surface was cleaned using scrapers, hydroblasting cleaning, wet abrasive blasting, or pneumatic power wire wheel brush. (3.1)
☑	Feathering removed the sharp edge at the transition from the parent coating. The parent coating was roughened (abraded) using a cup disk brush to remove the loosely adherent biota, coating and provide a surface for overcoating (3.2).
☑	Immediately prior to coating application, the Diver removed any flash rust and/or accumulated debris (silt, clay, etc.) using a wire brush or other method approved by the Manufacturer (4.1).
☑	The diver applied sufficient BIO-DUR epoxy filler so that the bare steel is completely covered and the repair area is flush with the adjacent parent coating (4.2.2 and 4.2.3).

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ENBRIDGE	Coating Repair Form for L5 Straits of Mackinac

☑	Full Circumferential Composite Wrap Repair (4.3) or Composite Patch Repair (4.4) applied in accordance with the coating procedure.
☑	Blue Stricture Banding® or alternative protective wraps/encasements allowed by the coating Manufacturer applied over the composite wrap or patch repair.

After Cure of Coating Repair			
Date:	09/13/2018	**Cure Time (days)**	24
Temperature (°F):	50	**Hardness Quaiity Check (4.5.2)**	PASS
Total thickness measurements of the Coating Repair (mil):		170, 170, 175, 180, 155	

Surface of pipe after surface preparation.				Surface of the pipe after filler application.			
Date:	08/08/2018	Frame (HH:MM:SS)	01:09:55	Date:	09/08/2018	Frame (HH:MM:SS)	00:41:15

Jeff Signature Digitally signed by Jeff Signature DN: cn=Jeff Signature Date: 2018.10.11 10:12:45 -04'00'	*Daniel R. Walsh* Daniel R. Walsh
Contractor Signature	**Company Inspector Signature**

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ENBRIDGE	Coating Repair Form for L5 Straits of Mackinac

Surface of pipe after surface preparation.				Surface of the pipe after filler application.			
							
Date:	08/08/2018	Frame (HH:MM:SS)	01:10:10	Date:	09/08/2018	Frame (HH:MM:SS)	00:58:02

Surface of the pipe after cure and removal of Stricture banding.				[Additional Photograph Caption]			
							
Date:	09/13/2018	Frame (HH:MM:SS)	00:13:15	Date:	MM/DD/YY	Frame (HH:MM:SS)	

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ENBRIDGE	Coating Repair Form for L5 Straits of Mackinac

Surface of the pipe after composite wrap.				Surface of the pipe after Stricture Banding.			
							
Date:	08/20/2018	Frame (HH:MM:SS)	00:12:03	Date:	09/13/2018	Frame (HH:MM:SS)	00:08:21

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Coating Repair Form for L5 Straits of Mackinac

General Information

Date:	09/22/2017 09/23/2017 09/24/2017 09/25/2017 09/26/2017 09/30/2017 11/1/2017	Diver:	9/22 - Joe Rieman, Chad Cantrell, George Palmer 9/23 – Shawn Binsfield, Craig Palmer, McKenzine Thompkins, Mike Rosette 9/24 – Troy Basket, Andrew Alber, Joe Rieman 9/25 – Chad Cantrell, Shawn Binsfield, George Palmer, McKenzie Thompkins 9/26 – Mike Rosette, Andrew Alber 9/30 – Craig Palmer, McKenzie Thompkins, Mike Rosette 11/01 – Mackenzie Tompkins
AFE / W.O.#:	BPI-1264792-17	Company Inspector:	Neil Pittman
Segment:	WAS-1	Water Depth (ft):	201
Longitude:	-84.7657657	Latitude:	45.81739681

Material Information

BIO- DUR™ 563 SW Epoxy Base – Black	17T-391	Expiration Date:	07/04/19
BIO – DUR ™ 563SW Curing Agent – White	17T-534	Expiration Date:	09/05/19
X100 – UW Epoxy Base – Blue	17T-535 17T-570	Expiration Date:	09/05/19 09/05/19
BIO-SEAL ™ X-100 Curing Agent – Clear	17T-537 17T-571	Expiration Date:	09/05/19 09/05/19

Temperature (°F):	42, 40, 42, 40, 46, 41, 40, 41, 40, 44, 49, 49, 41, 45, 49, 50	Wall Thickness Measurements (mil):	1	No bare steel at area
			1b	860, 860, 860, 862, 862
			2	830, 820, 830, 818, 820, 826, 822, 836
			3	820, 834, 832, 822, 824
			4	848, 836, 828, 840, 826
			4b	832, 832, 834, 832, 834
Location of the Coating Repair:	Top to side		Coating Repair Method:	Full Circumferential Composite Wrap Repair

Quaity Assurance During Application

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☑	The steel surface was cleaned using scarpers, hydroblasting cleaning, wet abrasive blasting, or pneumatic power wire wheel brush. (3.1)
☑	Feathering removed the sharp edge at the transition from the parent coating. The parent coating was roughened (abraded) using a cup disk brush to remove the loosely adherent biota, coating and provide a surface for overcoating (3.2).
☑	Immediately prior to coating application, the Diver removed any flash rust and/or accumulated debris (silt, clay, etc.) using a wire brush or other method approved by the Manufacturer (4.1).
☑	The diver applied sufficient BIO-DUR epoxy filler so that the bare steel is completely covered and the repair area is flush with the adjacent parent coating (4.2.2 and 4.2.3).
☑	Full Circumferential Composite Wrap Repair (4.3) or Composite Patch Repair (4.4) applied in accordance with the coating procedure.
☑	Blue Stricture Banding® or alternative protective wraps/encasements allowed by the coating Manufacturer applied over the composite wrap or patch repair.

After Cure of Coating Repair			
Date:	11/01/2017	Cure Time (days)	32
Temperature (°F):	50	Hardness Quality Check (4.5.2)	PASS
Total thickness measurements of the Coating Repair (mil):		250+, 250+, 250+, 250+, 250+, 250+, 250+, 250+, 250+, 250+	

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Coating Repair Form for L5 Straits of Mackinac

Comments/Issues/Discussion

- No external corrosion reported by diver.
- Additional bare metal exposed during surface preparation. No external corrosion reported by diver at these areas.
- After surface preparation, anchor profile was (1) 4.0, (1b) 2.7, (2) 3.3, (3) 3.9 and 3.0, (4) 3.3, and (4b) 3.3 mils.
- Epoxy filler transferred to diver within 16 minutes after initial mixing.

	Brandon Price
Contractor Signature	Company Inspector Signature

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Coating Repair Form for L5 Straits of Mackinac

Surface of pipe after surface preparation.



Date:	9/23/2017	Frame (HH:MM:SS)	11:53:43

Surface of the pipe after filler application.



Date:	9/23/2017	Frame (HH:MM:SS)	14:33:06

Surface of the pipe after composite wrap.



Date:	9/23/2017	Frame (HH:MM:SS)	16:56:12

Surface of the pipe after Stricture Banding.

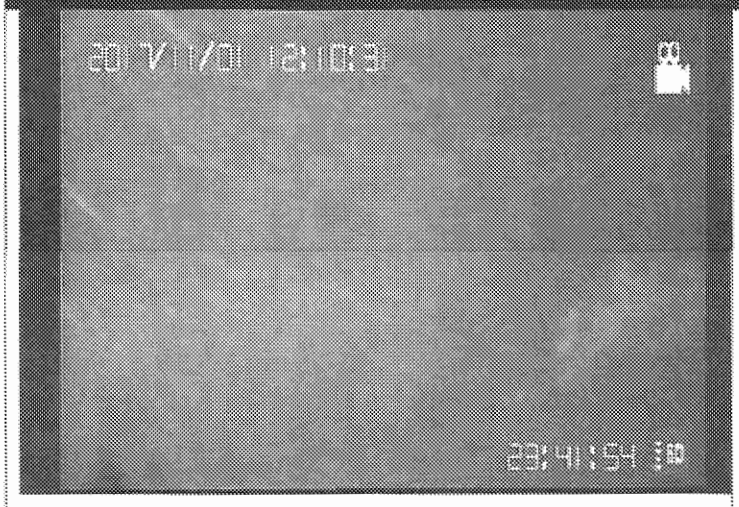


Date:	9/23/2017	Frame (HH:MM:SS)	17:03:06

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Coating Repair Form for L5 Straits of Mackinac

Surface of the pipe after cure and removal of Stricture banding.	[Additional Photograph Caption]
	

Date:	11/01/2017	Frame (HH:MM:SS)	12:10:31	Date:	DD/MM/YY	Frame (HH:MM:SS)	