APPENDIX F

Material Testing Geotextile

APPENDIX F.1

Geotextile Inventory Log

GEOSYNTHETIC INVENTORY CONTROL LOG

PROJECT NUMBER: 1788523 **PROJECT TITLE:** JRW Ash & Chemical Pond Clousure
OWNER: CEC **CONTRACTOR:** FLSI
LOCATION: Erie, Mi.

MATERIAL TYPE : GEOMEMBRANE GEONET (GEOTEXTILE) OTHER
DATE OF ARRIVAL: 7.22.19 **DATE OF INVENTORY:** 7.22.19
MATERIAL MANUFACTURER: AGRU **INVENTORY MONITOR:** DH
PRODUCT IDENTIFICATION: 8oz TEXTILE **CONDITION IN TRUCK:** GOOD
TRUCK TYPE: FLATBED TRAILER **UNLOADING METHOD:**

	ROLL NUMBER	BATCH OR LOT NO.	MATERIAL DIMENSIONS LENGTH	WIDTH	THICKNESS OR WEIGHT	QC CERT Y/N	CONF. SAMP. Y/N	OTHER	REMARKS
1	1Φ03029Φ112	NA	6ΦΦ'	15	8 oz	Y	NA	NA	
2	-0011	|	|	|	|	Y	|	|	
3	-0094	|	|	|	|	Y	|	|	
4	-ΦΦ1Φ	|	|	|	|	Y	|	|	
5	-ΦΦ35	NA	6ΦΦ'	15	8oz	Y	NA	NA	
* 6	-Φ135		6ΦΦ'			~~N~~ Y			~~NO CERT~~ *
7	1ΦΦ2341Φ146	NA	6ΦΦ'	15	8oz	Y	NA	NA	
8	1ΦΦ2341Φ173	NA	23Φ'	15	8oz	Y	NA	NA	
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									

Golder Form: G2
(July 2000)

REVIEWED BY: DS **DATE:** 12-2-19

GOLDER ASSOCIATES INC. HD 12/19/19

GEOSYNTHETIC INVENTORY CONTROL LOG

PROJECT NUMBER: 1788523
PROJECT TITLE: JRW Ash & Chemical Pond Closure
OWNER: CEC
CONTRACTOR: FLSI
LOCATION: Erie, Mi.

MATERIAL TYPE : GEOMEMBRANE GEONET (GEOTEXTILE) OTHER
DATE OF ARRIVAL: 6/28/19
MATERIAL MANUFACTURER: AGRU
PRODUCT IDENTIFICATION: 8 oz TEXTILE
TRUCK TYPE: SEMI - W/FLAT BED

DATE OF INVENTORY: 6/28/19
INVENTORY MONITOR: DH
CONDITION IN TRUCK: GOOD
UNLOADING METHOD: EXCAVATOR

	ROLL NUMBER	BATCH OR LOT NO.	MATERIAL DIMENSIONS LENGTH	WIDTH	THICKNESS OR WEIGHT	QC CERT Y / N	CONF. SAMP. Y / N	OTHER	REMARKS
1	ΦΦ3Φ29-ΦΦ34	NA	6ΦΦ'	15'	8oz	Y	NA	NA	
2	-ΦΦΦ8								
3	-ΦΦ29								
4	-ΦΦ3Φ								
5	-ΦΦ14								
6	-ΦΦ37								
7	-ΦΦ26								
8	-ΦΦ28								
9	-ΦΦ32								
10	-ΦΦ31								
11	-ΦΦ18								
12	-ΦΦ19								
13	ΦΦ2137-ΦΦ4Φ								
14	-ΦΦ45								
15	-ΦΦ41								
16	ΦΦ3Φ29-ΦΦ33								
17	-ΦΦ71								
18	-ΦΦ27								
19	-ΦΦ4Φ								
20	-ΦΦ39		6ΦΦ'	15'	8oz				
21									
22									
23									
24									
25									

Golder Form: G2
(July 2000)

REVIEWED BY: DS DATE: 12-2-19

GOLDER ASSOCIATES INC. HD 12/19/19

GEOSYNTHETIC INVENTORY CONTROL LOG

PROJECT NUMBER: 1788523 **PROJECT TITLE:** JRW Ash & Chemical Pond Clousure
OWNER: CEC **CONTRACTOR:** FLSI
LOCATION: Erie, Mi.

MATERIAL TYPE : GEOMEMBRANE GEONET (GEOTEXTILE) OTHER
DATE OF ARRIVAL: 6/28/19 **DATE OF INVENTORY:** 6/28/19
MATERIAL MANUFACTURER: AGRU **INVENTORY MONITOR:** DH
PRODUCT IDENTIFICATION: 8 oz GEO TEXTILE **CONDITION IN TRUCK:** Good
TRUCK TYPE: SEMI W/FLATBED **UNLOADING METHOD:** EXCAVATOR

	ROLL NUMBER	BATCH OR LOT NO.	MATERIAL DIMENSIONS LENGTH	WIDTH	THICKNESS OR WEIGHT	QC CERT Y / N	CONF. SAMP. Y / N	OTHER	REMARKS
1	10Φ2137-ΦΦ12	NA	600'	15'	8 oz	Y	NA	NA	
2	-ΦΦ52								
3	-ΦΦ46								
4	-ΦΦ48								
5	-ΦΦ51								
6	-ΦΦ44								
7	10Φ3Φ29-ΦΦ41								
8	-ΦΦ21								
9	-ΦΦ15								
10	-ΦΦ38								
11	-ΦΦ12								
12	-ΦΦΦ9								
13	-Φ125								
14	-ΦΦΦ2								
15	-ΦΦΦ3								
16	-ΦΦΦ7								
17	-ΦΦ13								
18	-ΦΦΦ5								
19	-ΦΦ16								
20	-ΦΦΦ4								
21	-ΦΦ17								
22	-ΦΦ2Φ								
23	-ΦΦΦ6								
24	-ΦΦ36		↓	↓					
25	10Φ2ΦΦ2-ΦΦΦ4	↓	600'	15'		↓			

Golder Form: G2
(July 2000)

REVIEWED BY: DS **DATE:** 12-2-19

GOLDER ASSOCIATES INC. HD 12/19/19

GEOSYNTHETIC INVENTORY CONTROL LOG

PROJECT NUMBER: 1788523 **PROJECT TITLE:** ASH PONDS 1 & 2, CHEMICAL PONDS CLOSURE
OWNER: CEC **CONTRACTOR:** RYAN
LOCATION: JRW

MATERIAL TYPE : GEOMEMBRANE GEONET (GEOTEXTILE) OTHER
DATE OF ARRIVAL: 6/27/19 **DATE OF INVENTORY:** 6/27/19
MATERIAL MANUFACTURER: AGRU **INVENTORY MONITOR:** DH
PRODUCT IDENTIFICATION: 8 oz TEXTILE **CONDITION IN TRUCK:** GOOD
TRUCK TYPE: SEMI W/ FLATBED **UNLOADING METHOD:** EXCAVATOR

	ROLL NUMBER	BATCH OR LOT NO.	MATERIAL DIMENSIONS LENGTH	WIDTH	THICKNESS OR WEIGHT	QC CERT Y/N	CONF. SAMP. Y/N	OTHER	REMARKS
1	10Φ2137-Φ039	—	6ΦΦ'	15'	8 oz.	Y	NA	NA	8 oz GEOTEXTILE
2	-ΦΦ43	—							
3	-ΦΦ47	—							
4	-ΦΦ49	—							
5	-ΦΦ5Φ	—							
6	10Φ3Φ29-ΦΦ72	—							
7	-ΦΦ73	—							
8	-ΦΦ9Φ	—							
9	-ΦΦ91	—							
10	-ΦΦ92	—							
11	-ΦΦ93	—							
12	-ΦΦ95	—							
13	-ΦΦ96	—							
14	-ΦΦ97	—							
15	-ΦΦ98	—							
16	-Φ1ΦΦ	—							
17	-Φ1Φ2	—							
18	-Φ1Φ3	—							
19	-Φ1Φ4	—							
20	-Φ1Φ5	—							
21	-Φ1Φ6	—							
22	-Φ1Φ7	—							
23	-Φ1Φ8	—							
24	-Φ1Φ9	—							
25	-Φ11Φ	—	6ΦΦ'	15'	8 oz.	Y	NA	NA	—

Golder Form: G2 (July 2000)

REVIEWED BY: DS **DATE:** 12-2-19

GOLDER ASSOCIATES INC.

TRUCK #1

GEOSYNTHETIC INVENTORY CONTROL LOG

PROJECT NUMBER: 1788523 **PROJECT TITLE:** ASH4 CHEMICAL POND CLOSURE
OWNER: CEC **CONTRACTOR:** RYAN
LOCATION: JRW

MATERIAL TYPE : GEOMEMBRANE GEONET (GEOTEXTILE) OTHER
DATE OF ARRIVAL: 6/27/19 **DATE OF INVENTORY:** 6/27/19
MATERIAL MANUFACTURER: AGRU **INVENTORY MONITOR:** DH
PRODUCT IDENTIFICATION: 8 OZ TEXTILE **CONDITION IN TRUCK:** GOOD
TRUCK TYPE: SEMI W/FLATBED **UNLOADING METHOD:** EXCAVATOR

	ROLL NUMBER	BATCH OR LOT NO.	MATERIAL DIMENSIONS LENGTH	WIDTH	THICKNESS OR WEIGHT	QC CERT Y/N	CONF. SAMP. Y/N	OTHER	REMARKS
1	1ΦΦ3Φ29-Φ111	—	6ΦΦ'	15'	8 OZ.	Y	NA	NA	8 OZ GEOTEXTILE
2	-Φ113	—							
3	-Φ114	—							
4	-Φ115	—							
5	-Φ116	—							
6	-Φ117	—							
7	-Φ118	—							
8	-Φ119	—							
9	-Φ12Φ	—							
10	-Φ121	—							
11	-Φ122	—							
12	-Φ123	—							
13	-Φ124	—							
14	-Φ126	—							
15	-Φ127	—							
16	-Φ129	—							
17	-Φ13Φ	—							
18	-Φ131	—							
19	-Φ132	—	6ΦΦ'	15'	8 OZ.	Y	NA		
20									
21									
22									
23									
24									
25									

4 FEET

Golder Form: G2
(July 2000)

REVIEWED BY: PJS **DATE:** 12-2-19

GOLDER ASSOCIATES INC.

TRUCK #1

APPENDIX F.2

8 oz/sy Geotextile QC Certificates

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

2690-D Salisbury Hwy
Statesville, NC 28677
P: 704.208.3440
www.ccsliners.com

SUBMITTAL COVER SHEET

DATE: 5/23/2019

SUBMITTAL NUMBER: 06 Rev A - Geotextile MQC Certs - Response to Golder Review Dated 5/16/19

PROJECT NUMBER:	I19-032
PROJECT NAME:	JR Whiting Ponds 1&2 Closure
ATTENTION TO:	Steve Ganong

OWNER: Consumers Energy J.R. Whiting Generating Facility 4525 E. Erie Road Erie, MI 48133	CONTRACTOR: Ryan Central Inc 2700 East Racine Street Janesville, WI 53545

MANUFACTURER: Agru America Agrutex 081 Revised to include requested certification letters per below sections

SPEC. SECTION	SUBMITTAL ITEM DESCRIPTION
313400	Geotextile Manufacturer Submittals
313400 1.04 A.4	Quality control certificates, signed by geotextile manufacturer. Each quality control certificate shall include roll identification numbers, testing procedures, and results of quality control tests.
313400 1.04 A.1	Resin Information
313400 1.04 A.2	Guaranteed material property certification
313400 1.04 A.3	Needle inspection certification

SUBCONTRACTOR REVIEW: *These are submitted as checked below:* For Approval: X For Your Use: As Requested: Signature of CCS Reviewer: Jennifer Battle	ENGINEER APPROVAL:

Geotextile Certification Package for

J.R. Whiting Ash Pond Closure

Erie, MI

Executive Offices: 500 Garrison Road, Georgetown, SC 29440 • 843 546-0600 • 800 321-1379
Sales Office: 700 Rockmead, Suite 103, Kingwood, TX 77339 • 281 358-4741 • 800 373-2478
Email: salesmkg@agruamerica.com

MATERIAL CERTIFICATIONS IN THIS PACKAGE:

- AGRUTEX 081

Executive Offices: 500 Garrison Road, Georgetown, SC 29440 • 843 546-0600 • 800 321-1379
Sales Office: 700 Rockmead, Suite 103, Kingwood, TX 77339 • 281 358-4741 • 800 373-2478
Email: salesmkg@agruamerica.com

16 May 2019

Jennifer Battle
Chesapeake Containment Systems, Inc.
2690D Salisbury Hwy
Statesville, NC 28677

RE: J.R. Whiting Generating Facility Ponds 1 & 2 Closure – Geotextile Resins

Dear Ms. Battle,

AGRU considers our specific geotextile resin/fiber formulation to be proprietary information and does not normally divulge this information. We can however guarantee that our non-woven geotextiles are of the following approximate composition: 98% polypropylene resin, 1% carbon black, 1% other additives/stabilizers essential to the manufacturing process.

Sincerely,

Anthony Johnson
Technical Review Specialist
AGRU America

1 March 2019

Jennifer Battle
Chesapeake Containment Systems, Inc.
2690 D Salisbury Hwy
Statesville, NC 28677

RE: J.R. Whiting Generating Facility Ponds 1 & 2 Closure – Geotextile Minimum Properties Certification

Dear Ms. Battle,

AGRU America certifies that all geotextile manufactured for this project shall achieve or surpass the material property values as noted in our material technical product data sheets.

Please do not hesitate to contact me directly via email at Ajohnson2@agruamerica.com or by phone at (843)-546-0600 ext. 1067 should you have any further questions or concerns.

Sincerely,

Anthony Johnson
Technical Review Specialist
AGRU America

1 March 2019

Jennifer Battle
Chesapeake Containment Systems, Inc.
2690 D Salisbury Hwy
Statesville, NC 28677

RE: J.R. Whiting Generating Facility Ponds 1 & 2 Closure – Geotextile Needle-Free Certification

Dear Ms. Battle,

AGRU America certifies that all geotextile manufactured for this project has been continuously inspected utilizing an in-line needle detection system and is certified to be essentially needle free.

Please do not hesitate to contact me directly via email at Ajohnson2@agruamerica.com or by phone at (843)-546-0600 ext. 1067 should you have any further questions or concerns.

Sincerely,

Anthony Johnson
Technical Review Specialist
AGRU America

Geotextile Quality Certification

OA # / PROJECT: 3022

Customer: JR WHITING ASH POND

Destination: ERIE MI

Item Code/Description AGRUTEX 081

DATE: 6/27/2019 REVISED

agru america quality control dept.

ASTM	D5261	D4632				D4533		D4491	D4491	D4491	D6241	D475	D4355	
Method	Average Weight	Average Grab Tensile(MD)	Average Grab Tensile(CD)	Average Elongation (MD)	Average Elongation (CD)	Average Trap Tear (MD)	Average TRAP Tear (CD)	Water Flow Rate	Permeability	Permttivity	Average CBR Puncture	Apparent Opening Size	UV Resist % Retained @ 500 hrs	Roll Length
Units	oz / yd^2	Lbs	Lbs	%	%	Lbs	Lbs	gpm / ft^2	cm/sec	sec -1	Units: Lbs	SIEVE	* % ret.	FT
ATNL10021370039	8.66	307.00	331.00	78	99	113.00	134.00	121.00	.38	1.61	736	80	70	600
ATNL10021370040	8.66	307.00	331.00	78	99	113.00	134.00	121.00	.38	1.61	736	80	70	600
ATNL10021370041	8.73	296.00	316.00	74	99	119.00	127.00	128.00	.40	1.71	736	80	70	600
ATNL10021370042	8.73	296.00	316.00	74	99	119.00	127.00	128.00	.40	1.71	736	80	70	600
ATNL10021370043	8.73	296.00	316.00	74	99	119.00	127.00	128.00	.40	1.71	736	80	70	600
ATNL10021370044	8.73	296.00	316.00	74	99	119.00	127.00	128.00	.40	1.71	736	80	70	600
ATNL10021370045	8.73	296.00	316.00	74	99	119.00	127.00	128.00	.40	1.71	736	80	70	600
ATNL10021370046	8.73	296.00	316.00	74	99	119.00	127.00	128.00	.40	1.71	736	80	70	600
ATNL10021370047	8.73	296.00	316.00	74	99	119.00	127.00	128.00	.40	1.71	736	80	70	600
ATNL10021370048	8.73	296.00	316.00	74	99	119.00	127.00	128.00	.40	1.71	736	80	70	600
ATNL10021370049	8.73	309.00	281.00	78	99	133.00	133.00	114.00	.34	1.54	736	80	70	600
ATNL10021370050	8.73	309.00	281.00	78	99	133.00	133.00	114.00	.34	1.54	736	80	70	600
ATNL10021370051	8.73	309.00	281.00	78	99	133.00	133.00	114.00	.34	1.54	736	80	70	600
ATNL10021370052	8.73	309.00	281.00	78	99	133.00	133.00	114.00	.34	1.54	736	80	70	600
ATNL10020020004	9.23	290.00	352.00	82	98	132.00	183.00	134.00	.54	1.80	757	80	70	426
ATNL10023410146	8.28	285.00	254.00	63	77	127.00	128.00	109.00	.30	1.46	746	80	70	600
ATNL10023410173	8.33	286.00	257.00	61	74	123.00	131.00	119.00	.34	1.59	842	80	70	230
ATNL10030290002	8.36	292.00	262.00	88	109	124.00	134.00	140.00	.46	1.88	778	80	70	600
ATNL10030290003	8.36	292.00	262.00	88	109	124.00	134.00	140.00	.46	1.88	778	80	70	600
ATNL10030290004	8.36	292.00	262.00	88	109	124.00	134.00	140.00	.46	1.88	778	80	70	600
ATNL10030290005	8.36	292.00	262.00	88	109	124.00	134.00	140.00	.46	1.88	778	80	70	600
ATNL10030290006	8.36	292.00	262.00	88	109	124.00	134.00	140.00	.46	1.88	778	80	70	600
ATNL10030290007	8.36	292.00	262.00	88	109	124.00	134.00	140.00	.46	1.88	778	80	70	600
ATNL10030290008	8.36	292.00	262.00	88	109	124.00	134.00	140.00	.46	1.88	778	80	70	600
ATNL10030290009	8.36	292.00	262.00	88	109	124.00	134.00	140.00	.46	1.88	778	80	70	600
ATNL10030290010	8.28	318.00	310.00	88	110	140.00	148.00	122.00	.40	1.64	778	80	70	600
ATNL10030290011	8.28	318.00	310.00	88	110	140.00	148.00	122.00	.40	1.64	778	80	70	600
ATNL10030290012	8.28	318.00	310.00	88	110	140.00	148.00	122.00	.40	1.64	778	80	70	600
ATNL10030290013	8.28	318.00	310.00	88	110	140.00	148.00	122.00	.40	1.64	778	80	70	600
ATNL10030290014	8.28	318.00	310.00	88	110	140.00	148.00	122.00	.40	1.64	778	80	70	600
ATNL10030290015	8.28	318.00	310.00	88	110	140.00	148.00	122.00	.40	1.64	778	80	70	600
ATNL10030290016	8.28	318.00	310.00	88	110	140.00	148.00	122.00	.40	1.64	778	80	70	600
ATNL10030290017	8.28	318.00	310.00	88	110	140.00	148.00	122.00	.40	1.64	778	80	70	600
ATNL10030290018	8.26	334.00	324.00	89	99	137.00	141.00	121.00	.40	1.62	778	80	70	600
ATNL10030290019	8.26	334.00	324.00	89	99	137.00	141.00	121.00	.40	1.62	778	80	70	600
ATNL10030290020	8.26	334.00	324.00	89	99	137.00	141.00	121.00	.40	1.62	778	80	70	600
ATNL10030290021	8.26	334.00	324.00	89	99	137.00	141.00	121.00	.40	1.62	778	80	70	600
ATNL10030290026	8.42	297.00	291.00	85	103	137.00	160.00	104.00	.34	1.40	778	80	70	600
ATNL10030290027	8.42	297.00	291.00	85	103	137.00	160.00	104.00	.34	1.40	778	80	70	600

OA # / PROJECT: 3022

Customer: JR W HITING ASH POND

Destination: ERIE MI

Item Code/Description AGRUTEX 081

DATE: 6/27/2019 REVISED

agru america quality control dept.

ASTM	D5261	D4632				D4533		D4491	D4491	D4491	D6241	D475	D4355	
Method	Average Weight	Average Grab Tensile(MD)	Average Grab Tensile(CD)	Average Elongation (MD)	Average Elongation (CD)	Average Trap Tear (MD)	Average TRAP Tear (CD)	Water Flow Rate	Permeability	Permttivity	Average CBR Puncture	Apparent Opening Size	UV Resist % Retained @ 500 hrs	Roll Length
Units	oz / yd^2	Lbs	Lbs	%	%	Lbs	Lbs	gpm / ft^2	cm/sec	sec -1	Units: Lbs	SIEVE	* % ret.	FT
ATNL10030290028	8.42	297.00	291.00	85	103	137.00	160.00	104.00	.34	1.40	778	80	70	600
ATNL10030290029	8.42	297.00	291.00	85	103	137.00	160.00	104.00	.34	1.40	778	80	70	600
ATNL10030290030	8.42	297.00	291.00	85	103	137.00	160.00	104.00	.34	1.40	778	80	70	600
ATNL10030290031	8.42	297.00	291.00	85	103	137.00	160.00	104.00	.34	1.40	778	80	70	600
ATNL10030290032	8.42	297.00	291.00	85	103	137.00	160.00	104.00	.34	1.40	778	80	70	600
ATNL10030290033	8.42	297.00	291.00	85	103	137.00	160.00	104.00	.34	1.40	778	80	70	600
ATNL10030290034	8.47	300.00	309.00	91	107	117.00	148.00	98.00	.33	1.32	778	80	70	600
ATNL10030290035	8.47	300.00	309.00	91	107	117.00	148.00	98.00	.33	1.32	778	80	70	600
ATNL10030290036	8.47	300.00	309.00	91	107	117.00	148.00	98.00	.33	1.32	778	80	70	600
ATNL10030290037	8.47	300.00	309.00	91	107	117.00	148.00	98.00	.33	1.32	778	80	70	600
ATNL10030290038	8.47	300.00	309.00	91	107	117.00	148.00	98.00	.33	1.32	778	80	70	600
ATNL10030290039	8.47	300.00	309.00	91	107	117.00	148.00	98.00	.33	1.32	778	80	70	600
ATNL10030290040	8.47	300.00	309.00	91	107	117.00	148.00	98.00	.33	1.32	778	80	70	600
ATNL10030290041	8.47	300.00	309.00	91	107	117.00	148.00	98.00	.33	1.32	778	80	70	600
ATNL10030290071	8.81	282.00	297.00	86	108	126.00	138.00	109.00	.37	1.46	830	80	70	600
ATNL10030290072	8.81	282.00	297.00	86	108	126.00	138.00	109.00	.37	1.46	830	80	70	600
ATNL10030290073	8.81	282.00	297.00	86	108	126.00	138.00	109.00	.37	1.46	830	80	70	600
ATNL10030290090	8.71	307.00	305.00	81	101	117.00	115.00	98.00	.31	1.31	830	80	70	600
ATNL10030290091	8.71	307.00	305.00	81	101	117.00	115.00	98.00	.31	1.31	830	80	70	600
ATNL10030290092	8.71	307.00	305.00	81	101	117.00	115.00	98.00	.31	1.31	830	80	70	600
ATNL10030290093	8.71	307.00	305.00	81	101	117.00	115.00	98.00	.31	1.31	830	80	70	600
ATNL10030290094	8.71	307.00	305.00	81	101	117.00	115.00	98.00	.31	1.31	830	80	70	600
ATNL10030290095	8.71	307.00	305.00	81	101	117.00	115.00	98.00	.31	1.31	830	80	70	600
ATNL10030290096	8.71	307.00	305.00	81	101	117.00	115.00	98.00	.31	1.31	830	80	70	600
ATNL10030290097	8.71	307.00	305.00	81	101	117.00	115.00	98.00	.31	1.31	830	80	70	600
ATNL10030290098	8.27	319.00	313.00	84	104	125.00	139.00	104.00	.31	1.39	830	80	70	600
ATNL10030290100	8.27	319.00	313.00	84	104	125.00	139.00	104.00	.31	1.39	830	80	70	600
ATNL10030290101	8.27	319.00	313.00	84	104	125.00	139.00	104.00	.31	1.39	830	80	70	600
ATNL10030290102	8.27	319.00	313.00	84	104	125.00	139.00	104.00	.31	1.39	830	80	70	600
ATNL10030290103	8.27	319.00	313.00	84	104	125.00	139.00	104.00	.31	1.39	830	80	70	600
ATNL10030290104	8.27	319.00	313.00	84	104	125.00	139.00	104.00	.31	1.39	830	80	70	600
ATNL10030290105	8.27	319.00	313.00	84	104	125.00	139.00	104.00	.31	1.39	830	80	70	641
ATNL10030290106	9.10	312.00	378.00	96	101	116.00	143.00	104.00	.33	1.39	822	80	70	600
ATNL10030290107	9.10	312.00	378.00	96	101	116.00	143.00	104.00	.33	1.39	822	80	70	600
ATNL10030290108	9.10	312.00	378.00	96	101	116.00	143.00	104.00	.33	1.39	822	80	70	600
ATNL10030290109	9.10	312.00	378.00	96	101	116.00	143.00	104.00	.33	1.39	822	80	70	600
ATNL10030290110	9.10	312.00	378.00	96	101	116.00	143.00	104.00	.33	1.39	822	80	70	600
ATNL10030290111	9.10	312.00	378.00	96	101	116.00	143.00	104.00	.33	1.39	822	80	70	600
ATNL10030290112	9.10	312.00	378.00	96	101	116.00	143.00	104.00	.33	1.39	822	80	70	600
ATNL10030290113	9.10	312.00	378.00	96	101	116.00	143.00	104.00	.33	1.39	822	80	70	600
ATNL10030290114	8.68	303.00	353.00	99	99	126.00	154.00	111.00	.33	1.48	822	80	70	600
ATNL10030290115	8.68	303.00	353.00	99	99	126.00	154.00	111.00	.33	1.48	822	80	70	600
ATNL10030290116	8.68	303.00	353.00	99	99	126.00	154.00	111.00	.33	1.48	822	80	70	600

OA # / PROJECT: 3022

Customer: JR WHITING ASH POND

Destination: ERIE MI

Item Code/Description AGRUTEX 081

DATE: 6/27/2019 REVISED

ASTM	D5261	D4632				D4533		D4491	D4491	D4491	D6241	D475	D4355	
Method	Average Weight	Average Grab Tensile(MD)	Average Grab Tensile(CD)	Average Elongation (MD)	Average Elongation (CD)	Average Trap Tear (MD)	Average TRAP Tear (CD)	Water Flow Rate	Permeability	Permttivity	Average CBR Puncture	Apparent Opening Size	UV Resist % Retained @ 500 hrs	Roll Length
Units	oz / yd^2	Lbs	Lbs	%	%	Lbs	Lbs	gpm / ft^2	cm/sec	sec -1	Units: Lbs	SIEVE	* % ret.	FT
ATNL10030290117	8.68	303.00	353.00	99	99	126.00	154.00	111.00	.33	1.48	822	80	70	600
ATNL10030290118	8.68	303.00	353.00	99	99	126.00	154.00	111.00	.33	1.48	822	80	70	600
ATNL10030290119	8.68	303.00	353.00	99	99	126.00	154.00	111.00	.33	1.48	822	80	70	600
ATNL10030290120	8.68	303.00	353.00	99	99	126.00	154.00	111.00	.33	1.48	822	80	70	600
ATNL10030290121	8.68	303.00	353.00	99	99	126.00	154.00	111.00	.33	1.48	822	80	70	600
ATNL10030290122	8.51	285.00	303.00	93	96	119.00	150.00	112.00	.33	1.49	822	80	70	600
ATNL10030290123	8.51	285.00	303.00	93	96	119.00	150.00	112.00	.33	1.49	822	80	70	600
ATNL10030290124	8.51	285.00	303.00	93	96	119.00	150.00	112.00	.33	1.49	822	80	70	600
ATNL10030290125	8.51	285.00	303.00	93	96	119.00	150.00	112.00	.33	1.49	822	80	70	600
ATNL10030290126	8.51	285.00	303.00	93	96	119.00	150.00	112.00	.33	1.49	822	80	70	600
ATNL10030290127	8.51	285.00	303.00	93	96	119.00	150.00	112.00	.33	1.49	822	80	70	507
ATNL10030290129	8.51	285.00	303.00	93	96	119.00	150.00	112.00	.33	1.49	822	80	70	600
ATNL10030290130	8.58	275.00	297.00	92	99	119.00	126.00	125.00	.39	1.68	822	80	70	600
ATNL10030290131	8.58	275.00	297.00	92	99	119.00	126.00	125.00	.39	1.68	822	80	70	600
ATNL10030290132	8.58	275.00	297.00	92	99	119.00	126.00	125.00	.39	1.68	822	80	70	600
ATNL10030290135	8.58	275.00	297.00	92	99	119.00	126.00	125.00	.39	1.68	822	80	70	600
MIN	8.26	275.00	254.00	61.00	74.00	113.00	115.00	98.00	.30	1.31	736.00	80.00	70.00	98rolls

Mark Lockliear

Mark Lockliear, Lab Manager, Agru Andrews

Date: 6/27/2019

For Questions, Please Contact: Lab Manager, Agru Andrews
Mark Lockliear

* UV test results are based on test performed at TRI Environmental Laboratory on similar weight products with the same raw material components per ASTM D-4355

APPENDIX F.3

10 oz/sy Geotextile QC Certificates

SKAPS GE-110

NON-WOVEN GEOTEXTILE

SKAPS INDUSTRIES
335 Athena Drive,
Athens, GA 30601
Ph: (706)-354-3700
Fax: (706)-354-3737
Email: contact@skaps.com

SKAPS GE-110 is a needle-punched nonwoven geotextile made of 100% virgin polypropylene staple fibers, which are formed into a random network for dimensional stability. SKAPS GE-110 resists ultraviolet deterioration, rotting, biological degradation, naturally encountered alkalis and acids. Polypropylene is stable within the pH range of 2 to 13.

SKAPS GE-110 conforms to the Minimum Average Roll Values (MARV) listed below:

PROPERTY	TEST METHOD	ENGLISH (MARV[2])	METRIC (MARV[2])
Weight	ASTM D-5261	10 oz/yd^2	339 g/m^2
Grab Tensile Strength	ASTM D 4632	270 lbs	1.2 kN
Grab Elongation	ASTM D 4632	50%	50%
Trapezoid Tear Strength	ASTM D 4533	100 lbs	0.44 kN
Thickness[4]	ASTM D-5199	110 mils	2.79 mm
CBR Puncture Resistance	ASTM D 6241	725 lbs	3.22 kN
Permittivity[4]	ASTM D 4491	0.94 sec^{-1}	0.94 sec^{-1}
Permeability[4]	ASTM D 4491	0.30 cm/sec	0.30 cm/sec
Water Flow[4]	ASTM D 4491	75 gpm/ft^2	3055 l/min/m^2
Apparent Opening Size (AOS)[3&4]	ASTM D 4751	100 US Sieve	0.15 mm
UV Resistance	ASTM D 4355	70%/500 hrs.	70%/500 hrs.

PACKAGING

Roll Dimensions (W x L)	15 ft. x 570 ft.	4.58 m x 173.74 m
Area Per Roll	950 Yd^2	795.73 m^2
Estimated Roll Weight - lbs	620 lbs.	282 kg

NOTES:

1. The property values listed above are subject to change without notice.
2. Minimum Average Roll Values (MARV) is calculated as the average minus two standard deviations. Statistically, it yields approximately 97.5% degree of confidence that any samples taken from quality assurance testing will meet or exceed the values described above.
3. Maximum Average Roll Value (MaxARV)
4. At time of manufacturing. Handling may change these properties.

SKAPS Industries (Nonwoven Division)
335, Athena Drive
Athens, GA 30601 (U.S.A.)
Phone (706) 354-3700 Fax (706) 354-3737
E-mail: contact@skaps.com

Sales Office:
Engineered Synthetic Product Inc.
Phone: (770)564-1857
Fax: (770)564-1818

September 6, 2019
JMD Company
5401 Progress Blvd, P.O. Box 173
Bethel Park, PA, 15102
PO : HQ1-080219-029
BOL : 071906

Dear Sir/Madam:

This is to certify that SKAPS GE110 is a high quality needle-punched nonwoven geotextile made of 100% polypropylene staple fibers, randomly networked to form a high strength dimensionally stable fabric. SKAPS GE110 resists ultraviolet deterioration, rotting, biological degradation. The fabric is inert to commonly encountered soil chemicals. Polypropylene is stable within a pH range of 2 to 13. SKAPS GE110 conforms to the property values listed below:

PROPERTY	TEST METHOD	UNITS	M.A.R.V. Minimum Average Roll Value
Weight	ASTM D 5261	oz/sy (g/m^2)	10.00 (339)
Grab Tensile	ASTM D 4632	lbs (kN)	270 (1.20)
Grab Elongation	ASTM D 4632	%	50
Trapezoidal Tear	ASTM D 4533	lbs (kN)	100 (0.44)
CBR Puncture	ASTM D 6241	lbs (kN)	725 (3.22)
Permittivity*	ASTM D 4491	sec^{-1}	0.94
Water Flow*	ASTM D 4491	gpm/ft^2($l/min/m^2$)	75 (3056)
AOS*	ASTM D 4751	US Sieve (mm)	100 (0.15)
UV Resistance	ASTM D 4355	%/hrs	70/500

Notes:
* At the time of manufacturing. Handling may change these properties.

KOUROSH SABZEVARI
QUALITY CONTROL MANAGER

Product : GE110-180

ROLL #	WEIGHT	MD TENSILE	MD ELONG	XMD TENSILE	XMD ELONG	MD TRAP	XMD TRAP	CBR PUNCTURE	AOS	WATER FLOW	PERMITTIVITY
ASTM METHOD	D5261	D4632	D4632	D4632	D4632	D4533	D4533	D6241	D4751	D4491	D4491
UNITS	oz/sq yd	lbs.	%	lbs	%	lbs.	lbs	lbs.	US Sieve	gpm/ft2	sec-1
TARGET	10.00	270	50	270	50	100	100	725	100	75	0.94
030642661	10.18	335	79	324	112	139	163	801	100	97	1.29
030654994	10.05	289	61	270	96	153	171	801	100	131	1.75
030657500	10.10	309	67	272	115	132	137	908	100	128	1.71
030657501	10.10	309	67	272	115	132	137	908	100	128	1.71
030657505	10.10	309	67	272	115	132	137	908	100	128	1.71
030657506	10.10	309	67	272	115	132	137	908	100	128	1.71
030657507	10.10	309	67	272	115	132	137	908	100	128	1.71
030657508	10.10	309	67	272	115	132	137	908	100	128	1.71
030657509	10.10	309	67	272	115	132	137	908	100	128	1.71
030657510	10.10	309	67	272	115	132	137	908	100	128	1.71
030657511	10.10	309	67	272	115	132	137	908	100	128	1.71
050556890	10.10	281	68	298	98	129	153	914	100	112	1.49
050556891	10.10	281	68	298	98	129	153	914	100	112	1.49
050556892	10.10	281	68	298	98	129	153	914	100	112	1.49
050556893	10.10	281	68	298	98	129	153	914	100	112	1.49
050556894	10.10	281	68	298	98	129	153	914	100	112	1.49
050556895	10.10	281	68	298	98	129	153	914	100	112	1.49
050556896	10.10	281	68	298	98	129	153	914	100	112	1.49
050556897	10.10	281	68	298	98	129	153	914	100	112	1.49
050556898	10.10	281	68	298	98	129	153	914	100	112	1.49
050556900	10.10	281	68	298	98	129	153	914	100	112	1.49
050556901	10.10	281	68	298	98	129	153	914	100	112	1.49
050556902	10.10	281	68	298	98	129	153	914	100	112	1.49
050556903	10.10	281	68	298	98	129	153	914	100	112	1.49
050556904	10.10	281	68	298	98	129	153	914	100	112	1.49
050556908	10.10	281	68	298	98	129	153	914	100	112	1.49
050557105	10.76	321	87	350	109	179	236	899	100	126	1.68

* All values are MARV.

SKAPS Industries (Nonwoven Division)
335 Athena Drive
Athens, GA 30601 (U.S.A.)
Phone (706) 354-3700 Fax (706) 354-3737
E-mail: info @skaps.com

Sales Office:
Engineered Synthetics Products Inc.
Phone: (770) 564-1857
Fax: (770) 564-1818

Date: September 10th, 2019

SUBJECT: Needle-Free Letter for SKAPS Industries Non-Woven Needle-Punched Geotextiles

To whom it may concern,

This letter is to reference to SKAPS Industries non-woven geotextiles manufactured in Pendergrass, Georgia and in Athens, Georgia. SKAPS Industries maintains strict quality control over its products using the best and state of the art latest testing equipment and techniques.

On-line metal detectors are found on all of SKAPS Industries production lines to detect needles and other metal contaminations. Routine checks are performed continuously throughout the manufacturing process. If needs are detected, the production line automatically shuts down and the needles and its fragments are located and removed. Additionally, the quality control inspectors and production line workers are trained to continuously monitoring the non-woven material for defects, if any. The geotextile manufactured is free of needles or other metal objects that could potentially damage other geosynthetic layers.

SKAPS Industries has continuously inspected the geotextile for the presence of needles and found the geotextile to be needle-free.

Please feel free to contact SKAPS Industries if you have any questions.

Regards,

Kourosh Sabzevari
Quality Control Manager

AMERICAN SYNTHETIC FIBER, LLC

312 South Holland Drive | Pendergrass, GA 30567
Phone: (706) 693-2422 | Fax: (706) 693-2601 | www.asfiber.com

April 10, 2019

SKAPS Industries
335 Athena Drive
Athens, GA 30601

Resin Information

Polypropylene homopolymer PP-H Natural resin, lot 2857154, sourced by Muehlstein was used to produce merge 11025, lot 32165, sales orders SO02842 and SO02843.

PP-H lot 2857154 has a 10.0 melt flow index.

PP-H resin is recommended for staple fiber extrusion.

American Synthetic Fiber, LLC performs acceptance testing for melt flow and verifies certificate of analysis specifications to ensure parameters and consistency for all polypropylene resin materials.

The typical density of polypropylene is 0.91 g/cc.

Merge 11025 is produced with 99% pure, uncontaminated, polypropylene resin with the addition of 1% carbon black color and does not contain plasticizers, fillers, extenders, or post consumer resins.

Sincerely,

Greg Crane
Quality Manager

American Synthetic Fiber, LLC

312 South Holland Drive
Pendergrass, GA 30567

Certificate of Analysis

Customer:	SKAPS Industries		
Merge Number:	11025	**Description:**	6 x 4 Black
Lot Number:	32165	**Production Date:**	4/16/18
Sales Order:	SO02842, SO02843		

Parameter	Unit	Average	Standard Deviation
DENIER	g/9000 m	6.4	.38
TENACITY	g/den	4.8	.18
ELONGATION	%	98	16.7
FIBER LENGTH	inch	3.95	.03
SPIN FINISH	%	.81	.05
MELT FLOW	g/10 min	13.0	.52
CRIMP	#/inch	9.0	.03

The above information has been based on production lot averages. If you have any questions or concerns, please, contact the Quality Department.

Quality Assurance Department

Roll Allocation List

Sales Order SO-079776
Customer Name Consumers Energy Company
Project Name Consumers Energy/ Whiting Project - Geotextile

Serial number	Item Number	Manufacturing date	Length
130507006	GEO-100E-EBC-E-00	10/13/2016	500.00
130507007	GEO-100E-EBC-E-00	10/13/2016	500.00
130507008	GEO-100E-EBC-E-00	10/13/2016	500.00
130507009	GEO-100E-EBC-E-00	10/13/2016	500.00
130507010	GEO-100E-EBC-E-00	10/13/2016	500.00
130507011	GEO-100E-EBC-E-00	10/13/2016	500.00
130507012	GEO-100E-EBC-E-00	10/13/2016	500.00
130507013	GEO-100E-EBC-E-00	10/13/2016	500.00
130507014	GEO-100E-EBC-E-00	10/13/2016	500.00
130507015	GEO-100E-EBC-E-00	10/13/2016	500.00
130507016	GEO-100E-EBC-E-00	10/13/2016	500.00
130507017	GEO-100E-EBC-E-00	10/13/2016	500.00
130507018	GEO-100E-EBC-E-00	10/13/2016	500.00
130507019	GEO-100E-EBC-E-00	10/13/2016	500.00
130507020	GEO-100E-EBC-E-00	10/13/2016	500.00
130507021	GEO-100E-EBC-E-00	10/13/2016	500.00
130507022	GEO-100E-EBC-E-00	10/13/2016	500.00
130507023	GEO-100E-EBC-E-00	10/13/2016	500.00
130507024	GEO-100E-EBC-E-00	10/13/2016	500.00
130507025	GEO-100E-EBC-E-00	10/13/2016	500.00
130507026	GEO-100E-EBC-E-00	10/13/2016	500.00
130507027	GEO-100E-EBC-E-00	10/13/2016	500.00
130507028	GEO-100E-EBC-E-00	10/13/2016	500.00
130507029	GEO-100E-EBC-E-00	10/13/2016	500.00
130507030	GEO-100E-EBC-E-00	10/13/2016	500.00
130507031	GEO-100E-EBC-E-00	10/13/2016	500.00
130507032	GEO-100E-EBC-E-00	10/13/2016	500.00
130507033	GEO-100E-EBC-E-00	10/13/2016	500.00
130507034	GEO-100E-EBC-E-00	10/13/2016	500.00
130507035	GEO-100E-EBC-E-00	10/13/2016	500.00
130507036	GEO-100E-EBC-E-00	10/13/2016	500.00
130507037	GEO-100E-EBC-E-00	10/13/2016	500.00
130507038	GEO-100E-EBC-E-00	10/13/2016	500.00
130507039	GEO-100E-EBC-E-00	10/13/2016	500.00
130507040	GEO-100E-EBC-E-00	10/13/2016	500.00
130507041	GEO-100E-EBC-E-00	10/13/2016	500.00
130507042	GEO-100E-EBC-E-00	10/13/2016	500.00
130507043	GEO-100E-EBC-E-00	10/13/2016	500.00
130507044	GEO-100E-EBC-E-00	10/13/2016	500.00
130507045	GEO-100E-EBC-E-00	10/13/2016	500.00
130507046	GEO-100E-EBC-E-00	10/13/2016	500.00
130507047	GEO-100E-EBC-E-00	10/13/2016	500.00
130507048	GEO-100E-EBC-E-00	10/13/2016	500.00
130507049	GEO-100E-EBC-E-00	10/13/2016	500.00
130507050	GEO-100E-EBC-E-00	10/13/2016	500.00
130507051	GEO-100E-EBC-E-00	10/13/2016	500.00
130507052	GEO-100E-EBC-E-00	10/13/2016	500.00
130507053	GEO-100E-EBC-E-00	10/13/2016	500.00
130507054	GEO-100E-EBC-E-00	10/13/2016	500.00
130507055	GEO-100E-EBC-E-00	10/13/2016	500.00
130507056	GEO-100E-EBC-E-00	10/13/2016	500.00
130507057	GEO-100E-EBC-E-00	10/13/2016	500.00
130507058	GEO-100E-EBC-E-00	10/13/2016	500.00
130507059	GEO-100E-EBC-E-00	10/14/2016	500.00
130507060	GEO-100E-EBC-E-00	10/14/2016	500.00
130507061	GEO-100E-EBC-E-00	10/14/2016	500.00
130507062	GEO-100E-EBC-E-00	10/14/2016	500.00
130507063	GEO-100E-EBC-E-00	10/14/2016	500.00
130507064	GEO-100E-EBC-E-00	10/14/2016	500.00
130507065	GEO-100E-EBC-E-00	10/14/2016	500.00

Roll Allocation List

Sales Order SO-079776
Customer Name Consumers Energy Company
Project Name Consumers Energy/ Whiting Project - Geotextile

Serial number	Item Number	Manufacturing date	Length
130507066	GEO-100E-EBC-E-00	10/14/2016	500.00
130507067	GEO-100E-EBC-E-00	10/14/2016	500.00
130507068	GEO-100E-EBC-E-00	10/14/2016	500.00
130507069	GEO-100E-EBC-E-00	10/14/2016	500.00
130507070	GEO-100E-EBC-E-00	10/14/2016	500.00
130507071	GEO-100E-EBC-E-00	10/14/2016	500.00
130507072	GEO-100E-EBC-E-00	10/14/2016	500.00
130507073	GEO-100E-EBC-E-00	10/14/2016	500.00
130507074	GEO-100E-EBC-E-00	10/14/2016	500.00
130507075	GEO-100E-EBC-E-00	10/14/2016	500.00
130507076	GEO-100E-EBC-E-00	10/14/2016	500.00
130507077	GEO-100E-EBC-E-00	10/14/2016	500.00
130507078	GEO-100E-EBC-E-00	10/14/2016	500.00
130507079	GEO-100E-EBC-E-00	10/14/2016	500.00
130507080	GEO-100E-EBC-E-00	10/14/2016	500.00
130507081	GEO-100E-EBC-E-00	10/14/2016	500.00
130507082	GEO-100E-EBC-E-00	10/14/2016	500.00
130507083	GEO-100E-EBC-E-00	10/14/2016	500.00
130507084	GEO-100E-EBC-E-00	10/14/2016	500.00
130507085	GEO-100E-EBC-E-00	10/14/2016	500.00
130507086	GEO-100E-EBC-E-00	10/14/2016	500.00
130507087	GEO-100E-EBC-E-00	10/14/2016	500.00
130507088	GEO-100E-EBC-E-00	10/14/2016	500.00
130507089	GEO-100E-EBC-E-00	10/14/2016	500.00
130507090	GEO-100E-EBC-E-00	10/14/2016	500.00
130507091	GEO-100E-EBC-E-00	10/14/2016	500.00
130507092	GEO-100E-EBC-E-00	10/14/2016	500.00
130507093	GEO-100E-EBC-E-00	10/14/2016	500.00
130507094	GEO-100E-EBC-E-00	10/14/2016	500.00
130507095	GEO-100E-EBC-E-00	10/14/2016	500.00
130507096	GEO-100E-EBC-E-00	10/14/2016	500.00
130507097	GEO-100E-EBC-E-00	10/14/2016	500.00
130507098	GEO-100E-EBC-E-00	10/14/2016	500.00
130507099	GEO-100E-EBC-E-00	10/14/2016	500.00
130507100	GEO-100E-EBC-E-00	10/14/2016	500.00
130507101	GEO-100E-EBC-E-00	10/14/2016	500.00
130507102	GEO-100E-EBC-E-00	10/14/2016	500.00
130507103	GEO-100E-EBC-E-00	10/14/2016	500.00
130507104	GEO-100E-EBC-E-00	10/14/2016	500.00
130507105	GEO-100E-EBC-E-00	10/14/2016	500.00
130507106	GEO-100E-EBC-E-00	10/14/2016	500.00
130507107	GEO-100E-EBC-E-00	10/14/2016	500.00
130507108	GEO-100E-EBC-E-00	10/14/2016	500.00
130507109	GEO-100E-EBC-E-00	10/14/2016	500.00
130507110	GEO-100E-EBC-E-00	10/14/2016	500.00
130507111	GEO-100E-EBC-E-00	10/14/2016	500.00
130507112	GEO-100E-EBC-E-00	10/14/2016	500.00
130507113	GEO-100E-EBC-E-00	10/14/2016	500.00
130507114	GEO-100E-EBC-E-00	10/14/2016	500.00
130507115	GEO-100E-EBC-E-00	10/14/2016	500.00
130507116	GEO-100E-EBC-E-00	10/14/2016	500.00
130507117	GEO-100E-EBC-E-00	10/14/2016	500.00
130507118	GEO-100E-EBC-E-00	10/14/2016	500.00
130507119	GEO-100E-EBC-E-00	10/14/2016	500.00
130507120	GEO-100E-EBC-E-00	10/14/2016	500.00
130507121	GEO-100E-EBC-E-00	10/14/2016	500.00
130507122	GEO-100E-EBC-E-00	10/14/2016	500.00
130507123	GEO-100E-EBC-E-00	10/14/2016	500.00

GSE Environmental, LLC

ROLL TEST DATA REPORT

GSE QC APPROVED

Report Date: Oct/21/2016

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO−079776	Consumers Energy Company	Erie MI US	GEO−100E−EBC−E−00	

Roll Number	Mass per Unit Area ASTM D5261 (oz/yd²)	ASTM D4491 Water Flow Rate (gpm/ft²)	ASTM D4491 Permittivity (sec−1)	ASTM D4751 AOS (mm)	ASTM D4632 Grab Strength (lbs) MD	ASTM D4632 Grab Strength (lbs) TD	ASTM D4632 Grab Elongation (%) MD	ASTM D4632 Grab Elongation (%) TD	ASTM D4533 Trapezoidal Tear (lbs) MD	ASTM D4533 Trapezoidal Tear (lbs) TD	ASTM D6241 CBR Puncture (lbs)
130507006	10.5	106	1.42	0.150	320	420	146	237	146	237	873
130507007	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507008	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507009	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507010	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507011	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507012	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507013	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507014	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507015	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507016	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507017	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507018	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507019	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507020	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507021	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507022	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507023	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507024	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507025	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507026	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507027	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507028	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507029	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507030	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507031	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507032	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507033	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507034	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507035	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507036	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507037	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507038	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507039	10.5	119	1.59	0.150	305	368	86	91	220	346	891

GSE Environmental, LLC

ROLL TEST DATA REPORT

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Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO−079776	Consumers Energy Company	Erie MI US	GEO−100E−EBC−E−00	

Roll Number	Mass per Unit Area ASTM D5261 (oz/yd²)	ASTM D4491 Water Flow Rate (gpm/ft²)	ASTM D4491 Permittivity (sec−1)	ASTM D4751 AOS (mm)	ASTM D4632 Grab Strength (lbs) MD	ASTM D4632 Grab Strength (lbs) TD	ASTM D4632 Grab Elongation (%) MD	ASTM D4632 Grab Elongation (%) TD	ASTM D4533 Trapezoidal Tear (lbs) MD	ASTM D4533 Trapezoidal Tear (lbs) TD	ASTM D6241 CBR Puncture (lbs)
130507040	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507041	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507042	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507043	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507044	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507045	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507046	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507047	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507048	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507049	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507050	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507051	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507052	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507053	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507054	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507055	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507056	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507057	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507058	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507059	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507060	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507061	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507062	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507063	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507064	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507065	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507066	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507067	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507068	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507069	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507070	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507071	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507072	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507073	10.5	119	1.59	0.150	305	368	86	91	220	346	891

GSE Environmental, LLC

ROLL TEST DATA REPORT

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SO−079776	Consumers Energy Company	Erie MI US	GEO−100E−EBC−E−00	

Roll Number	Mass per Unit Area ASTM D5261 (oz/yd²)	ASTM D4491 Water Flow Rate (gpm/ft²)	ASTM D4491 Permittivity (sec−1)	ASTM D4751 AOS (mm)	ASTM D4632 Grab Strength (lbs) MD	ASTM D4632 Grab Strength (lbs) TD	ASTM D4632 Grab Elongation (%) MD	ASTM D4632 Grab Elongation (%) TD	ASTM D4533 Trapezoidal Tear (lbs) MD	ASTM D4533 Trapezoidal Tear (lbs) TD	ASTM D6241 CBR Puncture (lbs)
130507074	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507075	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507076	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507077	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507078	10.5	119	1.59	0.150	305	368	86	91	220	346	891
130507079	10.6	118	1.58	0.150	299	326	90	88	237	334	797
130507080	10.6	118	1.58	0.150	299	326	90	88	237	334	797
130507081	10.6	118	1.58	0.150	299	326	90	88	237	334	797
130507082	10.6	118	1.58	0.150	299	326	90	88	237	334	797
130507083	10.6	118	1.58	0.150	299	326	90	88	237	334	797
130507084	10.6	118	1.58	0.150	299	326	90	88	237	334	797
130507085	10.6	118	1.58	0.150	299	326	90	88	237	334	797
130507086	10.6	118	1.58	0.150	299	326	90	88	237	334	797
130507087	10.6	118	1.58	0.150	299	326	90	88	237	334	797
130507088	10.6	118	1.58	0.150	299	326	90	88	237	334	797
130507089	10.6	118	1.58	0.150	299	326	90	88	237	334	797
130507090	10.6	118	1.58	0.150	299	326	90	88	237	334	797
130507091	10.8	118	1.58	0.150	310	368	94	93	157	147	797
130507092	10.8	118	1.58	0.150	310	368	94	93	157	147	797
130507093	10.8	118	1.58	0.150	310	368	94	93	157	147	797
130507094	10.8	118	1.58	0.150	310	368	94	93	157	147	797
130507095	10.8	118	1.58	0.150	310	368	94	93	157	147	797
130507096	10.8	118	1.58	0.150	310	368	94	93	157	147	797
130507097	10.8	118	1.58	0.150	310	368	94	93	157	147	797
130507098	10.8	118	1.58	0.150	310	368	94	93	157	147	797
130507099	10.8	118	1.58	0.150	310	368	94	93	157	147	797
130507100	10.8	118	1.58	0.150	310	368	94	93	157	147	797
130507101	10.8	118	1.58	0.150	310	368	94	93	157	147	797
130507102	10.8	118	1.58	0.150	310	368	94	93	157	147	797
130507103	10.8	118	1.58	0.150	310	368	94	93	157	147	797
130507104	10.8	118	1.58	0.150	310	368	94	93	157	147	797
130507105	10.8	118	1.58	0.150	310	368	94	93	157	147	797
130507106	10.8	118	1.58	0.150	310	368	94	93	157	147	797
130507107	10.8	118	1.58	0.150	310	368	94	93	157	147	797

GSE Environmental, LLC

ROLL TEST DATA REPORT

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Roll Number	Mass per Unit Area ASTM D5261 (oz/yd²)	ASTM D4491 Water Flow Rate (gpm/ft²)	ASTM D4491 Permittivity (sec−1)	ASTM D4751 AOS (mm)	ASTM D4632 Grab Strength (lbs) MD	ASTM D4632 Grab Strength (lbs) TD	ASTM D4632 Grab Elongation (%) MD	ASTM D4632 Grab Elongation (%) TD	ASTM D4533 Trapezoidal Tear (lbs) MD	ASTM D4533 Trapezoidal Tear (lbs) TD	ASTM D6241 CBR Puncture (lbs)
130507108	10.8	118	1.58	0.150	310	368	94	93	157	147	797
130507109	10.8	118	1.58	0.150	310	368	94	93	157	147	797
130507110	10.8	118	1.58	0.150	310	368	94	93	157	147	797
130507111	10.8	118	1.58	0.150	310	368	94	93	157	147	797
130507112	10.8	118	1.58	0.150	310	368	94	93	157	147	797
130507113	10.8	118	1.58	0.150	310	368	94	93	157	147	797
130507114	10.8	118	1.58	0.150	310	368	94	93	157	147	797
130507115	10.8	118	1.58	0.150	310	368	94	93	157	147	797
130507116	10.8	118	1.58	0.150	310	368	94	93	157	147	797
130507117	10.8	118	1.58	0.150	310	368	94	93	157	147	797
130507118	10.8	118	1.58	0.150	310	368	94	93	157	147	797
130507119	10.8	118	1.58	0.150	310	368	94	93	157	147	797
130507120	10.8	118	1.58	0.150	310	368	94	93	157	147	797
130507121	10.8	118	1.58	0.150	310	368	94	93	157	147	797
130507122	10.8	118	1.58	0.150	310	368	94	93	157	147	797
130507123	10.8	118	1.58	0.150	310	368	94	93	157	147	797

Laboratory Manager Mauricio Ossa

1245 Eastland Avenue
Kingstree, SC 29556
Phone 843-382-4603
Fax 843-382-4604

Date: October 21, 2016

Project: # 79776

Ref: Ultraviolet (UV) Resistance

To Whom It May Concern:

The resistance of nonwoven needle punched geotextiles to ultraviolet light depends primarily on antioxident and carbon black package mixed with resin to prepare a formulation for fiber extrusion. As long as this formulation remains the same the UV resistance of a geotextiles does not change. Therefore, GSE performs UV testing only once per resin formulation. The testing is performed according to ASTM Test Method D 4355 and results are included on GSE geotextile specification sheet. Currently, all GSE geotextiles meet or exceed a value of 70% strength retained after 500 hours of UV exposure. GSE will meet or exceed this value for the referenced project.

Although GSE geotextiles are manufactured using one of the best available antioxident packages, we recommend covering the geotextiles within 30 days of exposure to direct Sunlight. This period does not include time during which geotextiles rolls remain on site covered in black shrink-wrap. Our recommendation is based on UV performance data published in technical literature indicating geotextile strength can decrease sharply after prolonged exposure to Sunlight.

Mauricio Ossa

Mauricio Ossa
Director of Global Quality

APPENDIX F.4

Bridge Lift Geotextile QC Certificates

TENCATE Mirafi

Mirafi® HP570

Mirafi® HP570 geotextile is composed of high-tenacity polypropylene yarns, which are woven into a network such that the yarns retain their relative position. Mirafi® HP570 geotextile is inert to biological degradation and resistant to naturally encountered chemicals, alkalis, and acids.

Mechanical Properties	Test Method	Unit	Minimum Average Roll Value	
			MD	CD
Tensile Strength (at ultimate)	ASTM D 4595	kN/m (lbs/ft)	70.0(4800)	70.0 (4800)
Tensile Strength (at 2% strain)	ASTM D 4595	kN/m (lbs/ft)	14.0 (960)	19.3 (1320)
Tensile Strength (at 5% strain)	ASTM D 4595	kN/m (lbs/ft)	35.0 (2400)	39.4 (2700)
Tensile Strength (at 10% strain)	ASTM D 4595	kN/m (lbs/ft)	70.0 (4800)	70.0 (4800)
Factory Seam Strength	ASTM D 4884	kN/m (lbs/ft)	43.8 (3000)	
Flow Rate	ASTM D 4491	l/min/m^2 (gal/min/ft^2)	1222 (30)	
Permeability	ASTM D 4491	cm/sec	0.05	
Permittivity	ASTM D 4491	sec^{-1}	0.40	
Apparent Opening Size (AOS)[1]	ASTM D 4751	mm (U.S. Sieve)	0.60 (30)	
UV Resistance (at 500 hours)	ASTM D 4355	% strength retained	80	

[1] ASTM D 4751: AOS is a Maximum Opening Diameter Value
NOTE: To obtain Secant Modulus, divide tensile strength by the appropriate strain level
(i.e. Secant Modulus at 5% = 2400/0.05 = 48000 lb/ft)

Physical Properties	Test Method	Unit	Typical Value
Mass/Unit Area	ASTM D 5261	g/m^2 (oz/yd^2)	475 (14.0)
Roll Dimensions (length x width)	--	m (ft)	4.5 (15) x 91 (300)
Roll Area	--	m^2 (yd^2)	418 (500)
Estimated Roll Weight	---	kg (lbs)	215 (475)

TENCATE
materials that make a difference

FGS000049
ETQR10

HANES® GEO COMPONENTS™
A Leggett & Platt® COMPANY

815 Buxton Street | Winston Salem, NC | 27101
PH: 888.239.4539 | FAX: 336.747.1652
www.HanesGeo.com

TerraTex® HPG-57

TerraTex® HPG-57 is a polypropylene woven fabric. This engineered geotextile is stabilized to resist degradation due to ultraviolet exposure. It is resistant to commonly encountered soil chemicals, mildew and insects, and is non-biodegradable. Polypropylene is stable within a pH range of 2 to 13, making it one of the most stable polymers available for geotextiles today. TerraTex® HPG-57 is manufactured to meet the following minimum average roll values:

PROPERTY	TEST METHOD	ENGLISH	METRIC
Wide Width Tensile (Ultimate)	ASTM D4595	**4,800 x 4,800** lbs/ft	**70.0 x 70.0** kN/m
Wide Width Tensile (2% Strain)	ASTM D4595	**960 x 1,320** lbs/ft	**14.0 x 19.3** kN/m
Wide Width Tensile (5% Strain)	ASTM D4595	**2,400 x 2,700** lbs/ft	**35.0 x 39.4** kN/m
Permittivity [1]	ASTM D4491	**0.400** sec^{-1}	**0.400** sec^{-1}
Water Flow Rate [1]	ASTM D4491	**30** gpm/ft^2	**1,222** Lpm/m^2
AOS [1,2]	ASTM D4751	**30** US Std. Sieve	**0.600** mm
UV Resistance	ASTM D4355	**80** % @ 500 hrs	**80** % @ 500 hrs

1 At the time of manufacturing. Handling, storage, and shipping may change these properties.
2 Value represents maximum average roll value.

11/20/2018

Appendix A: Needle-Free Statement

19103 Gundle Road
Houston, Texas 77073
[o] 281.443.8564
[f] 281.875.6010

GSE ENVIRONMENTAL™

May 11, 2009

To Whom it May Concern:

RE: "Needle-Free" Statement for GSE Nonwoven Geotextiles

GSE takes intensive process and quality control measures to ensure that our nonwoven needlepunched geotextiles are free from broken needles and other metal objects. We have two metal detection systems working in series to achieve this objective.

The first metal detector is placed between the fiber supply and the card. At this point any metal in the fiber supply is detected and prevented from passing on to the production line. The second detector is located after the needle looms. This industrial strength magnetic system spans the entire width of the geotextile. Should a metal piece or a broken needle be detected by the system, an alarm alerts the operator. The contaminated part of the geotextile is eliminated by the operator.

With the above system in place, GSE is confident that all our nonwovens are needle-free.

Sincerely,

Dino Heathcott
Plant Manager

APPENDIX G

Density Testing

Curve No.	Max. Dry Dens. (pcf)	Opt. Mois. (%)
SF-01	128.6	8.2
SF-02	133.0	8.3
SF-03	128.2	9.8
SF-04	131.9	9.1
CS-01	112.4	8.9
RB-01	139.0	8.4

SF=Structural Fill
CS=Class IIA/IIIA
RB=Road Base

SUMMARY OF FIELD MOISTURE-DENSITY TEST RESULTS
Culvert Sand
CEC J.R. Whiting Ponds 1 and 2 Closure

Test No.	Date Tested	Test Location	Lift No.	Test Type*	Additional Test(s)*	Modified Proctor Compaction Data			In-Situ Values			Relative Compaction	Variance From Optimum Moisture (%)	Pass/ Fail	Remarks
						Reference Curve Number	Maximum Dry Density (pcf)	Optimum Moisture Content (%)	Wet Density (pcf)	Moisture Content (%)	Dry Density (pcf)				
											Specification:	**90% (Min.)**	**-2 to +3%**		
CSDT-1	6/24/2019	Access Culvert	1	N	NA	CS-01	112.4	8.9	112.2	10.2	101.8	90.6%	1.3	Pass	See Daily Field Form
					--										
					--										
					--										
					--										
								Average (passing tests only):	**112.2**	**10.2**	**101.8**	**90.6%**	**1.3**		

*N = in-situ nuclear moisture-density test per ASTM D6938
MC = in-situ moisture content test per ASTM D2216

SUMMARY OF FIELD MOISTURE-DENSITY TEST RESULTS
Structural Fill
CEC J.R. Whiting Ponds 1 and 2 Closure

Test No.	Date Tested	Test Location	Lift No.	Test Type*	Additional Test(s)*	Modified Proctor Compaction Data			In-Situ Values			Relative Compaction	Variance From Optimum Moisture (%)	Pass/ Fail	Remarks
						Reference Curve Number	Maximum Dry Density (pcf)	Optimum Moisture Content (%)	Wet Density (pcf)	Moisture Content (%)	Dry Density (pcf)				
											Specification:	90% (Min.)	-3 to +3%		
SFDT-1	7/18/2019	Pond 1	1	N	NA	SF-3	128.2	9.8	132.7	12.8	117.6	91.8%	3.0	Pass	See Daily Field Form
SFDT-2	7/18/2019	Pond 1	1	N	NA	SF-3	128.2	9.8	135.8	12.4	120.8	94.2%	2.6	Pass	See Daily Field Form
SFDT-3	7/18/2019	Pond 1	1	N	NA	SF-3	128.2	9.8	135.8	11.0	122.3	95.4%	1.2	Pass	See Daily Field Form
SFDT-4	7/19/2019	Pond 1	1	N	NA	SF-3	128.2	9.8	137.9	10.4	124.9	97.4%	0.6	Pass	See Daily Field Form
SFDT-5	7/19/2019	Pond 1	1	N	NA	SF-3	128.2	9.8	139.3	10.9	125.6	98.0%	1.1	Pass	See Daily Field Form
SFDT-6	7/19/2019	Pond 1	1	N	NA	SF-3	128.2	9.8	138.8	9.5	126.8	98.9%	-0.3	Pass	See Daily Field Form
SFDT-7	7/19/2019	Pond 1	1	N	NA	SF-3	128.2	9.8	137.0	11.1	123.3	96.2%	1.3	Pass	See Daily Field Form
SFDT-10	7/23/2019	Pond 1	2	N	NA	SF-1	128.6	8.2	131.1	10.8	118.3	92.0%	2.6	Pass	See Daily Field Form
SFDT-11	7/23/2019	Pond 1	2	N	NA	SF-2	133.0	8.3	144.2	11.0	129.9	97.7%	2.7	Pass	See Daily Field Form
SFDT-12	7/23/2019	Pond 1	2	N	NA	SF-2	133.0	8.3	142.6	11.0	128.5	96.6%	2.7	Pass	See Daily Field Form
SFDT-13	7/24/2019	Pond 1	1	N	NA	SF-2	133.0	8.3	140.7	10.5	127.3	95.7%	2.2	Pass	See Daily Field Form
SFDT-14	7/24/2019	Pond 1	1	N	NA	SF-2	133.0	8.3	142.1	11.0	128.0	96.3%	2.7	Pass	See Daily Field Form
SFDT-15	7/24/2019	Pond 1	1	N	NA	SF-2	133.0	8.3	138.5	10.6	125.2	94.2%	2.3	Pass	See Daily Field Form
SFDT-16	7/24/2019	Pond 1	2	N	NA	SF-3	128.2	9.8	136.6	11.6	122.4	95.5%	1.8	Pass	See Daily Field Form
SFDT-17	7/24/2019	Pond 1	2	N	NA	SF-3	128.2	9.8	133.2	12.1	118.8	92.7%	2.3	Pass	See Daily Field Form
SFDT-18	7/24/2019	Pond 1	2	N	NA	SF-3	128.2	9.8	137.9	11.9	123.2	96.1%	2.1	Pass	See Daily Field Form
SFDT-19	7/25/2019	Pond 1	1	N	NA	SF-2	133.0	8.3	136.9	9.8	124.7	93.7%	1.5	Pass	See Daily Field Form
SFDT-20	7/25/2019	Pond 1	1	N	NA	SF-2	133.0	8.3	138.4	10.0	125.8	94.6%	1.7	Pass	See Daily Field Form
SFDT-21	7/26/2019	Pond 1	1	N	NA	SF-2	133.0	8.3	139.3	9.4	127.3	95.7%	1.1	Pass	See Daily Field Form
SFDT-22	7/26/2019	Pond 1	3	N	NA	SF-2	133.0	8.3	137.8	9.9	125.4	94.3%	1.6	Pass	See Daily Field Form
SFDT-24	7/29/2019	Pond 1	3	N	NA	SF-2	133.0	8.3	139.3	5.8	131.7	99.0%	-2.5	Pass	See Daily Field Form
SFDT-25	7/30/2019	Pond 1	4	N	NA	SF-2	133.0	8.3	142.0	8.9	130.4	98.0%	0.6	Pass	See Daily Field Form
SFDT-26	7/30/2019	Pond 1	4	N	NA	SF-2	133.0	8.3	139.3	9.4	127.3	95.7%	1.1	Pass	See Daily Field Form
SFDT-28	7/31/2019	Pond 1	2	N	NA	SF-4	131.9	9.1	138.5	9.2	126.8	96.2%	0.1	Pass	See Daily Field Form
SFDT-29	7/31/2019	Pond 1	2	N	NA	SF-4	131.9	9.1	139.9	11.3	125.7	95.3%	2.2	Pass	See Daily Field Form
SFDT-30	7/31/2019	Pond 1	2	N	NA	SF-4	131.9	9.1	140.8	11.6	126.2	95.7%	2.5	Pass	See Daily Field Form
SFDT-31	8/1/2019	Pond 1	3	N	NA	SF-4	131.9	9.1	138.7	9.6	126.6	95.9%	0.5	Pass	See Daily Field Form
SFDT-32	8/1/2019	Pond 1	3	N	NA	SF-4	131.9	9.1	136.5	9.1	125.1	94.9%	0.0	Pass	See Daily Field Form
SFDT-33	8/1/2019	Pond 1	3	N	NA	SF-4	131.9	9.1	139.1	8.7	128.0	97.0%	-0.4	Pass	See Daily Field Form
SFDT-34	8/2/2019	Pond 1	4	N	NA	SF-4	131.9	9.1	132.7	9.2	121.5	92.1%	0.1	Pass	See Daily Field Form
SFDT-35	8/2/2019	Pond 1	4	N	NA	SF-3	128.2	9.8	137.6	12.3	122.5	95.6%	2.5	Pass	See Daily Field Form
SFDT-36	8/2/2019	Pond 1	4	N	NA	SF-4	131.9	9.1	134.6	11.9	120.3	91.2%	2.8	Pass	See Daily Field Form
SFDT-37	8/3/2019	Pond 1	5	N	NA	SF-4	131.9	9.1	137.2	10.1	124.6	94.5%	1.0	Pass	See Daily Field Form
SFDT-38	8/3/2019	Pond 1	5	N	NA	SF-4	131.9	9.1	140.1	9.0	128.5	97.4%	-0.1	Pass	See Daily Field Form

SUMMARY OF FIELD MOISTURE-DENSITY TEST RESULTS
Structural Fill
CEC J.R. Whiting Ponds 1 and 2 Closure

Test No.	Date Tested	Test Location	Lift No.	Test Type*	Additional Test(s)*	Modified Proctor Compaction Data			In-Situ Values			Relative Compaction	Variance From Optimum Moisture (%)	Pass/ Fail	Remarks
						Reference Curve Number	Maximum Dry Density (pcf)	Optimum Moisture Content (%)	Wet Density (pcf)	Moisture Content (%)	Dry Density (pcf)				
											Specification:	90% (Min.)	-3 to +3%		
SFDT-39	8/3/2019	Pond 1	5	N	NA	SF-4	131.9	9.1	134.9	9.5	123.2	93.4%	0.4	Pass	See Daily Field Form
SFDT-40	8/5/2019	Pond 1	5	N	NA	SF-2	133.0	8.3	144.5	10.9	130.3	98.0%	2.6	Pass	See Daily Field Form
SFDT-41	8/5/2019	Pond 1	5	N	NA	SF-2	133.0	8.3	139.9	11.2	125.8	94.6%	2.9	Pass	See Daily Field Form
SFDT-42	8/5/2019	Pond 1	5	N	NA	SF-4	131.9	9.1	141.2	10.8	127.4	96.6%	1.7	Pass	See Daily Field Form
SFDT-43	8/5/2019	Pond 1	5	N	NA	SF-4	131.9	9.1	143.7	9.6	131.1	99.4%	0.5	Pass	See Daily Field Form
SFDT-44	8/7/2019	Pond 1	6	N	NA	SF-3	128.2	9.8	136.4	12.5	121.2	94.6%	2.7	Pass	See Daily Field Form
SFDT-45	8/7/2019	Pond 1	6	N	NA	SF-3	128.2	9.8	135.6	12.2	120.9	94.3%	2.4	Pass	See Daily Field Form
SFDT-46	8/7/2019	Pond 1	6	N	NA	SF-3	128.2	9.8	138.1	11.9	123.4	96.3%	2.1	Pass	See Daily Field Form
SFDT-47	8/7/2019	Pond 1	6	N	NA	SF-3	128.2	9.8	139.4	12.7	123.7	96.5%	2.9	Pass	See Daily Field Form
SFDT-48	8/7/2019	Pond 1	6	N	NA	SF-3	128.2	9.8	131.8	12.3	117.4	91.5%	2.5	Pass	See Daily Field Form
SFDT-49	8/7/2019	Pond 1	6	N	NA	SF-3	128.2	9.8	133.3	11.8	119.2	93.0%	2.0	Pass	See Daily Field Form
SFDT-50	8/8/2019	Pond 2	1	N	NA	SF-4	131.9	9.1	141.6	9.2	129.7	98.3%	0.1	Pass	See Daily Field Form
SFDT-51	8/8/2019	Pond 2	1	N	NA	SF-4	131.9	9.1	141.2	9.8	128.6	97.5%	0.7	Pass	See Daily Field Form
SFDT-52	8/9/2019	Pond 2	1	N	NA	SF-3	128.2	9.8	126.0	9.2	115.4	90.0%	-0.6	Pass	See Daily Field Form
SFDT-53	8/12/2019	Pond 2	1	N	NA	SF-3	128.2	9.8	130.4	10.0	118.5	92.5%	0.2	Pass	See Daily Field Form
SFDT-54	8/12/2019	Pond 2	1	N	NA	SF-3	128.2	9.8	129.5	9.8	117.9	92.0%	0.0	Pass	See Daily Field Form
SFDT-55	8/16/2019	Pond 2	1	N	NA	SF-4	131.9	9.1	141.9	9.0	130.2	98.7%	-0.1	Pass	See Daily Field Form
SFDT-56	8/16/2019	Pond 2	1	N	NA	SF-4	131.9	9.1	138.7	9.9	126.2	95.7%	0.8	Pass	See Daily Field Form
SFDT-57	8/16/2019	Pond 2	1	N	NA	SF-4	131.9	9.1	142.3	10.5	128.8	97.6%	1.4	Pass	See Daily Field Form
SFDT-58	8/16/2019	Pond 2	2	N	NA	SF-4	131.9	9.1	140.6	10.1	127.7	96.8%	1.0	Pass	See Daily Field Form
SFDT-59	8/16/2019	Pond 2	2	N	NA	SF-4	131.9	9.1	139.8	9.8	127.3	96.5%	0.7	Pass	See Daily Field Form
SFDT-60	8/16/2019	Pond 2	3	N	NA	SF-3	128.2	9.8	129.3	11.0	116.5	90.9%	1.2	Pass	See Daily Field Form
SFDT-61	8/16/2019	Pond 2	3	N	NA	SF-3	128.2	9.8	129.1	10.6	116.7	91.1%	0.8	Pass	See Daily Field Form
SFDT-62	8/17/2019	Pond 2	2	N	NA	SF-4	131.9	9.1	141.3	8.9	129.8	98.4%	-0.2	Pass	See Daily Field Form
SFDT-63	8/17/2019	Pond 2	2	N	NA	SF-4	131.9	9.1	140.1	9.2	128.3	97.3%	0.1	Pass	See Daily Field Form
SFDT-64	8/17/2019	Pond 2	3	N	NA	SF-4	131.9	9.1	139.6	8.8	128.3	97.3%	-0.3	Pass	See Daily Field Form
SFDT-65	8/17/2019	Pond 2	3	N	NA	SF-4	131.9	9.1	140.8	10.0	128.0	97.0%	0.9	Pass	See Daily Field Form
SFDT-66	8/20/2019	Pond 2	1	N	NA	SF-4	131.9	9.1	132.6	10.8	119.7	90.7%	1.7	Pass	See Daily Field Form
SFDT-67	8/20/2019	Pond 2	1	N	NA	SF-4	131.9	9.1	132.8	10.2	120.5	91.4%	1.1	Pass	See Daily Field Form
SFDT-68	8/20/2019	Pond 2	1	N	NA	SF-4	131.9	9.1	132.2	9.8	120.4	91.3%	0.7	Pass	See Daily Field Form
SFDT-69	8/20/2019	Pond 2	1	N	NA	SF-4	131.9	9.1	131.3	9.3	120.1	91.1%	0.2	Pass	See Daily Field Form
SFDT-70	8/23/2019	Pond 2	2	N	NA	SF-4	131.9	9.1	134.8	10.6	121.9	92.4%	1.5	Pass	See Daily Field Form
SFDT-71	8/23/2019	Pond 2	2	N	NA	SF-4	131.9	9.1	133.8	10.2	121.4	92.1%	1.1	Pass	See Daily Field Form
SFDT-72	8/26/2019	Pond 2	2	N	NA	SF-4	131.9	9.1	139.4	10.4	126.3	95.7%	1.3	Pass	See Daily Field Form

SUMMARY OF FIELD MOISTURE-DENSITY TEST RESULTS
Structural Fill
CEC J.R. Whiting Ponds 1 and 2 Closure

Test No.	Date Tested	Test Location	Lift No.	Test Type*	Additional Test(s)*	Modified Proctor Compaction Data			In-Situ Values			Relative Compaction	Variance From Optimum Moisture (%)	Pass/ Fail	Remarks
						Reference Curve Number	Maximum Dry Density (pcf)	Optimum Moisture Content (%)	Wet Density (pcf)	Moisture Content (%)	Dry Density (pcf)				
											Specification:	**90% (Min.)**	**-3 to +3%**		
SFDT-73	8/26/2019	Pond 2	2	N	NA	SF-4	131.9	9.1	141.6	10.8	127.8	96.9%	1.7	Pass	See Daily Field Form
SFDT-74	8/26/2019	Pond 2	2	N	NA	SF-4	131.9	9.1	140.9	10.3	127.7	96.8%	1.2	Pass	See Daily Field Form
SFDT-75	8/26/2019	Pond 2	2	N	NA	SF-4	131.9	9.1	139.2	11.0	125.4	95.1%	1.9	Pass	See Daily Field Form
SFDT-76	8/29/2019	Pond 2	1	N	NA	SF-4	131.9	9.1	140.3	11.1	126.3	95.7%	2.0	Pass	See Daily Field Form
SFDT-77	8/29/2019	Pond 2	2	N	NA	SF-4	131.9	9.1	141.1	10.8	127.3	96.5%	1.7	Pass	See Daily Field Form
SFDT-78	8/29/2019	Pond 2	3	N	NA	SF-2	133.0	8.3	144.3	8.7	132.8	99.8%	0.4	Pass	See Daily Field Form
SFDT-79	8/29/2019	Pond 2	3	N	NA	SF-2	133.0	8.3	139.4	9.7	127.1	95.5%	1.4	Pass	See Daily Field Form
SFDT-80	8/29/2019	Pond 2	3	N	NA	SF-2	133.0	8.3	140.7	10.6	127.2	95.7%	2.3	Pass	See Daily Field Form
SFDT-81	8/29/2019	Pond 2	3	N	NA	SF-2	133.0	8.3	139.5	9.9	126.9	95.4%	1.6	Pass	See Daily Field Form
SFDT-82	8/29/2019	Pond 2	3	N	NA	SF-2	133.0	8.3	138.8	9.3	127.0	95.5%	1.0	Pass	See Daily Field Form
SFDT-83	8/29/2019	Pond 2	3	N	NA	SF-2	133.0	8.3	139.8	11.0	125.9	94.7%	2.7	Pass	See Daily Field Form
SFDT-84	8/29/2019	Pond 2	2	N	NA	SF-4	131.9	9.1	139.2	12.0	124.3	94.2%	2.9	Pass	See Daily Field Form
SFDT-85	8/29/2019	Pond 2	3	N	NA	SF-4	131.9	9.1	141.6	11.3	127.2	96.5%	2.2	Pass	See Daily Field Form
SFDT-86	8/29/2019	Pond 2	4	N	NA	SF-4	131.9	9.1	139.7	10.1	126.9	96.2%	1.0	Pass	See Daily Field Form
SFDT-87	8/29/2019	Pond 2	4	N	NA	SF-4	131.9	9.1	140.2	10.2	127.2	96.5%	1.1	Pass	See Daily Field Form
SFDT-88	8/29/2019	Pond 2	4	N	NA	SF-4	131.9	9.1	139.8	11.8	125.0	94.8%	2.7	Pass	See Daily Field Form
SFDT-89	8/29/2019	Pond 2	4	N	NA	SF-4	131.9	9.1	139.2	9.2	127.5	96.6%	0.1	Pass	See Daily Field Form
SFDT-90	8/30/2019	Pond 2	4	N	NA	SF-4	131.9	9.1	140.9	10.1	128.0	97.0%	1.0	Pass	See Daily Field Form
SFDT-91	8/30/2019	Pond 2	4	N	NA	SF-4	131.9	9.1	139.2	9.5	127.1	96.4%	0.4	Pass	See Daily Field Form
SFDT-92	8/30/2019	Pond 2	5	N	NA	SF-4	131.9	9.1	141.7	11.6	127.0	96.3%	2.5	Pass	See Daily Field Form
SFDT-93	8/30/2019	Pond 2	5	N	NA	SF-4	131.9	9.1	138.3	10.8	124.8	94.6%	1.7	Pass	See Daily Field Form
SFDT-94	8/30/2019	Pond 2	5	N	NA	SF-4	131.9	9.1	138.7	10.4	125.6	95.2%	1.3	Pass	See Daily Field Form
SFDT-95	9/11/2019	Pond 2	6	N	NA	SF-4	131.9	9.1	139.8	11.0	125.9	95.5%	1.9	Pass	See Daily Field Form
SFDT-96	9/11/2019	Pond 2	6	N	NA	SF-4	131.9	9.1	138.6	12.0	123.8	93.8%	2.9	Pass	See Daily Field Form
SFDT-97	9/23/2019	Pond 2	1	N	NA	SF-4	131.9	9.1	137.3	11.5	123.1	93.4%	2.4	Pass	See Daily Field Form
								Average (passing tests only):	**138.1**	**10.4**	**125.0**	**95.3%**	**1.4**		
								Maximum (passing tests only):	**144.5**	**12.8**	**132.8**	**99.8%**	**3.0**		
								Minimum (passing tests only):	**126.0**	**5.8**	**115.4**	**90.0%**	**-2.5**		

*N = in-situ nuclear moisture-density test per ASTM D6938
MC = in-situ moisture content test per ASTM D2216

SUMMARY OF FIELD MOISTURE-DENSITY TEST RESULTS

Sub-Base Material

CEC J.R. Whiting Ponds 1 and 2 Closure

Test No.	Date Tested	Test Location	Lift No.	Test Type*	Additional Test(s)*	Modified Proctor Compaction Data			In-Situ Values			Relative Compaction	Variance From Optimum Moisture (%)	Pass/ Fail	Remarks
						Reference Curve Number	Maximum Dry Density (pcf)	Optimum Moisture Content (%)	Wet Density (pcf)	Moisture Content (%)	Dry Density (pcf)				
											Specification:	90% (Min.)	-3 to +3%		
SBDT-1	10/17/2019	East Access Road	1	N	NA	CS-01	112.4	8.9	116.4	7.4	108.4	96.4%	-1.5	Pass	See Daily Field Form
SBDT-2	10/17/2019	East Access Road	1	N	NA	CS-01	112.4	8.9	115.2	7.4	107.3	95.4%	-1.5	Pass	See Daily Field Form
SBDT-3	10/17/2019	East Access Road	1	N	NA	CS-01	112.4	8.9	113.3	9.3	103.7	92.2%	0.4	Pass	See Daily Field Form
SBDT-4	10/18/2019	East Access Road	1	N	NA	CS-01	112.4	8.9	120.4	11.9	107.6	95.7%	3.0	Pass	See Daily Field Form
SBDT-5	10/18/2019	East Access Road	1	N	NA	CS-01	112.4	8.9	111.7	10.3	101.3	90.1%	1.4	Pass	See Daily Field Form
SBDT-6	10/21/2019	East Access Road	1	N	NA	CS-01	112.4	8.9	121.5	11.4	109.1	97.0%	2.5	Pass	See Daily Field Form
SBDT-9	10/24/2019	East Access Road	1	N	NA	CS-01	112.4	8.9	115.2	11.0	103.8	92.3%	2.1	Pass	See Daily Field Form
SBDT-10	10/24/2019	East Access Road	1	N	NA	CS-01	112.4	8.9	119.8	10.7	108.2	96.3%	1.8	Pass	See Daily Field Form
SBDT-11	10/25/2019	East Access Road	1	N	NA	CS-01	112.4	8.9	118.6	9.9	107.9	96.0%	1.0	Pass	See Daily Field Form
SBDT-12	10/25/2019	East Access Road	1	N	NA	CS-01	112.4	8.9	117.8	10.6	106.5	94.8%	1.7	Pass	See Daily Field Form
SBDT-13	10/25/2019	East Access Road	1	N	NA	CS-01	112.4	8.9	120.3	11.1	108.3	96.3%	2.2	Pass	See Daily Field Form
SBDT-14	11/5/2019	North Access Road	1	N	NA	CS-01	112.4	8.9	114.9	10.3	104.2	92.7%	1.4	Pass	See Daily Field Form
SBDT-15	11/5/2019	North Access Road	1	N	NA	CS-01	112.4	8.9	123.5	10.3	112.0	99.6%	1.4	Pass	See Daily Field Form
SBDT-16	11/5/2019	North Access Road	1	N	NA	CS-01	112.4	8.9	123.0	10.7	111.1	98.9%	1.8	Pass	See Daily Field Form
SBDT-17	11/5/2019	North Access Road	1	N	NA	CS-01	112.4	8.9	115.4	10.1	104.8	93.3%	1.2	Pass	See Daily Field Form
SBDT-18	11/5/2019	North Access Road	1	N	NA	CS-01	112.4	8.9	110.9	7.4	103.3	91.9%	-1.5	Pass	See Daily Field Form
SBDT-19	11/5/2019	North Access Road	1	N	NA	CS-01	112.4	8.9	111.7	7.0	104.4	92.9%	-1.9	Pass	See Daily Field Form
SBDT-20	11/5/2019	North Access Road	1	N	NA	CS-01	112.4	8.9	114.3	6.8	107.0	95.2%	-2.1	Pass	See Daily Field Form
SBDT-21	11/5/2019	North Access Road	1	N	NA	CS-01	112.4	8.9	110.8	8.5	102.1	90.9%	-0.4	Pass	See Daily Field Form
					--										
					--										
					--										
								Average (passing tests only):	**116.6**	**9.6**	**106.4**	**94.6%**	**0.7**		
								Maximum (passing tests only):	**123.5**	**11.9**	**112.0**	**99.6%**	**3.0**		
								Minimum (passing tests only):	**110.8**	**6.8**	**101.3**	**90.1%**	**-2.1**		

*N = in-situ nuclear moisture-density test per ASTM D6938
MC = in-situ moisture content test per ASTM D2216

SUMMARY OF FIELD MOISTURE-DENSITY TEST RESULTS

Road Base Material

CEC J.R. Whiting Ponds 1 and 2 Closure

Test No.	Date Tested	Test Location	Lift No.	Test Type*	Additional Test(s)*	Modified Proctor Compaction Data			In-Situ Values			Relative Compaction	Variance From Optimum Moisture (%)	Pass/ Fail	Remarks
						Reference Curve Number	Maximum Dry Density (pcf)	Optimum Moisture Content (%)	Wet Density (pcf)	Moisture Content (%)	Dry Density (pcf)				
											Specification:	90% (Min.)	-3 to +3%		
RBDT-1	10/29/2019	East Access Road	1	N	NA	RB-1	139.0	8.4	136.7	8.6	125.9	90.6%	0.2	Pass	See Daily Field Form
RBDT-2	10/29/2019	East Access Road	1	N	NA	RB-1	139.0	8.4	139.2	7.1	130.0	93.5%	-1.3	Pass	See Daily Field Form
RBDT-3	10/29/2019	East Access Road	1	N	NA	RB-1	139.0	8.4	136.0	8.6	125.2	90.1%	0.2	Pass	See Daily Field Form
RBDT-4	10/29/2019	East Access Road	1	N	NA	RB-1	139.0	8.4	133.0	5.5	126.1	90.7%	-2.9	Pass	See Daily Field Form
RBDT-5	10/29/2019	East Access Road	1	N	NA	RB-1	139.0	8.4	138.8	7.8	128.8	92.6%	-0.6	Pass	See Daily Field Form
RBDT-6	10/29/2019	East Access Road	1	N	NA	RB-1	139.0	8.4	136.4	9.0	125.1	90.0%	0.6	Pass	See Daily Field Form
RBDT-9	10/29/2019	East Access Road	1	N	NA	RB-1	139.0	8.4	138.8	7.2	129.5	93.1%	-1.2	Pass	See Daily Field Form
RBDT-10	11/13/2019	East Access Road	1	N	NA	RB-1	139.0	8.4	137.0	6.6	128.5	92.5%	-1.8	Pass	See Daily Field Form
RBDT-11	11/13/2019	East Access Road	1	N	NA	RB-1	139.0	8.4	137.3	6.1	129.4	93.1%	-2.3	Pass	See Daily Field Form
RBDT-12	11/13/2019	East Access Road	1	N	NA	RB-1	139.0	8.4	136.1	5.6	128.9	92.7%	-2.8	Pass	See Daily Field Form
RBDT-13	11/13/2019	North Access Road	1	N	NA	RB-1	139.0	8.4	137.0	5.9	129.4	93.1%	-2.5	Pass	See Daily Field Form
RBDT-14	11/13/2019	North Access Road	1	N	NA	RB-1	139.0	8.4	136.8	5.4	129.8	93.4%	-3.0	Pass	See Daily Field Form
RBDT-15	11/13/2019	North Access Road	1	N	NA	RB-1	139.0	8.4	135.9	5.7	128.6	92.5%	-2.7	Pass	See Daily Field Form
RBDT-16	11/13/2019	North Access Road	1	N	NA	RB-1	139.0	8.4	135.3	6.0	127.6	91.8%	-2.4	Pass	See Daily Field Form
RBDT-17	11/13/2019	North Access Road	1	N	NA	RB-1	139.0	8.4	136.6	5.5	129.5	93.2%	-2.9	Pass	See Daily Field Form
RBDT-18	11/13/2019	North Access Road	1	N	NA	RB-1	139.0	8.4	137.1	5.4	130.1	93.6%	-3.0	Pass	See Daily Field Form
RBDT-19	11/13/2019	North Access Road	1	N	NA	RB-1	139.0	8.4	134.8	5.8	127.4	91.7%	-2.6	Pass	See Daily Field Form
RBDT-20	11/13/2019	North Access Road	1	N	NA	RB-1	139.0	8.4	133.5	5.6	126.4	90.9%	-2.8	Pass	See Daily Field Form
RBDT-21	11/13/2019	North Access Road	1	N	NA	RB-1	139.0	8.4	133.8	5.5	126.8	91.2%	-2.9	Pass	See Daily Field Form
RBDT-23	11/13/2019	North Access Road	1	N	NA	RB-1	139.0	8.4	132.7	5.9	125.3	90.1%	-2.5	Pass	See Daily Field Form
RBDT-24	11/13/2019	North Access Road	1	N	NA	RB-1	139.0	8.4	132.2	5.4	125.4	90.2%	-3.0	Pass	See Daily Field Form
RBDT-25	11/13/2019	North Access Road	1	N	NA	RB-1	139.0	8.4	133.7	6.0	126.1	90.7%	-2.4	Pass	See Daily Field Form
					--										
					--										
								Average (passing tests only):	**135.9**	**6.4**	**127.7**	**91.9%**	**-2.0**		
								Maximum (passing tests only):	**139.2**	**9.0**	**130.1**	**93.6%**	**0.6**		
								Minimum (passing tests only):	**132.2**	**5.4**	**125.1**	**90.0%**	**-3.0**		

*N = in-situ nuclear moisture-density test per ASTM D6938
MC = in-situ moisture content test per ASTM D2216

APPENDIX H

HDPE Liner Deployment

APPENDIX H.1

Subgrade Acceptance Certificates

CERTIFICATE OF ACCEPTANCE OF SOIL SURFACE

GEOSYNTHETIC INSTALLER		PROJECT	
COMPANY	Chesapeake	LOCATION	Erie, Mi
ADDRESS		PROJECT	JRW Ash & Chemical Pond Clousure
		OWNER	CEC

I, the Undersigned, the duly authorized representative of CHESAPEAKE

do hereby accept the area of soil surface bounded by PANELS P-1 THRU P-8 DEPLOYED ON 8.15.19.

and shall be responsible for maintaining its integrity and suitability in accordance with the project specifications from this date to the completion of the installation.

NAME	SIGNATURE	TITLE	DATE
Emiliano Saenz	Emiliano Saenz		8.16.19

CERTIFICATE OF ACCEPTANCE RECEIVED BY QA / QC MANAGER

NAME	SIGNATURE	TITLE	DATE
DAVID HUTCHINSON		CQA	8.16.19

CERTIFICATE OF ACCEPTANCE RECEIVED BY OWNER

NAME	SIGNATURE	TITLE	DATE
JEFF YUCHASZ		CM	8-21-19

GOLDER FORM: G4-0699

(JUNE 1999)

GOLDER ASSOCIATES INC.

The subgrade areas were visually inspected and approved by the above personnel before the panels were deployed. This document was subsequently prepared / signed after panel deployment when time allowed.

CERTIFICATE OF ACCEPTANCE OF SOIL SURFACE

GEOSYNTHETIC INSTALLER		PROJECT	
COMPANY	Chesapeake	LOCATION	Erie, Mi
ADDRESS		PROJECT	JRW Ash & Chemical Pond Clousure
		OWNER	CEC

I, the Undersigned, the duly authorized representative of CHESAPEAKE

do hereby accept the area of soil surface bounded by PANES P-9 THRU P-17 DEPLOYED ON 8.16.19.

and shall be responsible for maintaining its integrity and suitability in accordance with the project specifications from this date to the completion of the installation.

NAME	SIGNATURE	TITLE	DATE
Emiliano Saenz	Emiliano Saenz		8.17.19

CERTIFICATE OF ACCEPTANCE RECEIVED BY QA / QC MANAGER

NAME	SIGNATURE	TITLE	DATE
DAVID HUTCHINSON		CQA	8.16.19

CERTIFICATE OF ACCEPTANCE RECEIVED BY OWNER

NAME	SIGNATURE	TITLE	DATE
Jeff Yuchasz		CM	8-21-19

GOLDER FORM: G4-0699

(JUNE 1999)

14

GOLDER ASSOCIATES INC.

The subgrade areas were visually inspected and approved by the above personnel before the panels were deployed. This document was subsequently prepared / signed after panel deployment when time allowed.

CERTIFICATE OF ACCEPTANCE OF SOIL SURFACE

GEOSYNTHETIC INSTALLER		PROJECT	
COMPANY	Chesapeake	LOCATION	Erie, Mi
ADDRESS		PROJECT	JRW Ash & Chemical Pond Clousure
		OWNER	CEC

I, the Undersigned, the duly authorized representative of CHESAPEAKE

do hereby accept the area of soil surface bounded by PANELS P-18 THRU P-22 DEPLOYED ON 8.17.19

and shall be responsible for maintaining its integrity and suitability in accordance with the project specifications from this date to the completion of the installation.

NAME	SIGNATURE	TITLE	DATE
Emiliano Saenz	Emiliano Saenz		8,17,19

CERTIFICATE OF ACCEPTANCE RECEIVED BY QA / QC MANAGER

NAME	SIGNATURE	TITLE	DATE
DAVID HUTCHINSON		CQA	8.17.19

CERTIFICATE OF ACCEPTANCE RECEIVED BY OWNER

NAME	SIGNATURE	TITLE	DATE
Jeff Yuchasz		CM	8-21-19

GOLDER FORM: G4-0699

(JUNE 1999)

GOLDER ASSOCIATES INC.

The subgrade areas were visually inspected and approved by the above personnel before the panels were deployed. This document was subsequently prepared / signed after panel deployment when time allowed.

CERTIFICATE OF ACCEPTANCE OF SOIL SURFACE

	GEOSYNTHETIC INSTALLER		PROJECT
COMPANY	Chesapeake	LOCATION	Erie, Mi
ADDRESS		PROJECT	JRW Ash & Chemical Pond Closure
		OWNER	CEC

I, the Undersigned, the duly authorized representative of CHESAPEAKE

do hereby accept the area of soil surface bounded by PANELS P-23 THRU P-25 DEPLOYED ON 8.20.19.

and shall be responsible for maintaining its integrity and suitability in accordance with the project specifications from this date to the completion of the installation.

NAME	SIGNATURE	TITLE	DATE
DAVID HUTCHINSON		QA	8.20.19

CERTIFICATE OF ACCEPTANCE RECEIVED BY QA / QC MANAGER

NAME	SIGNATURE	TITLE	DATE
Emiliano Saenz	Emiliano Saenz		8/20/19

CERTIFICATE OF ACCEPTANCE RECEIVED BY OWNER

NAME	SIGNATURE	TITLE	DATE
Jeff Yuchasz		CM	8-21-19

GOLDER FORM: G4-0699

(JUNE 1999)

GOLDER ASSOCIATES INC.

The subgrade areas were visually inspected and approved by the above personnel before the panels were deployed. This document was subsequently prepared / signed after panel deployment when time allowed.

CERTIFICATE OF ACCEPTANCE OF SOIL SURFACE

	GEOSYNTHETIC INSTALLER		PROJECT
COMPANY	Chesapeake	LOCATION	Erie, Mi
ADDRESS		PROJECT	JRW Ash & Chemical Pond Clousure
		OWNER	CEC

I, the Undersigned, the duly authorized representative of CHESAPEAKE

do hereby accept the area of soil surface bounded by PANELS P-26 THRU P-32 DEPLOYED ON 9.27.19.

and shall be responsible for maintaining its integrity and suitability in accordance with the project specifications from this date to the completion of the installation.

NAME	SIGNATURE	TITLE	DATE
Greg Parrott		SUPT	9-27-19

CERTIFICATE OF ACCEPTANCE RECEIVED BY QA / QC MANAGER

NAME	SIGNATURE	TITLE	DATE
DAVID HUTCHINSON		CQA	9.27.19

CERTIFICATE OF ACCEPTANCE RECEIVED BY OWNER

NAME	SIGNATURE	TITLE	DATE
JEFF YUCHASZ		CM	10/8/19

GOLDER FORM: G4-0699

(JUNE 1999)

GOLDER ASSOCIATES INC.

The subgrade areas were visually inspected and approved by the above personnel before the panels were deployed. This document was subsequently prepared / signed after panel deployment when time allowed.

CERTIFICATE OF ACCEPTANCE OF SOIL SURFACE

GEOSYNTHETIC INSTALLER		PROJECT	
COMPANY	Chesapeake	LOCATION	Erie, Mi
ADDRESS		PROJECT	JRW Ash & Chemical Pond Clousure
		OWNER	CEC

I, the Undersigned, the duly authorized representative of CHESAPEAKE

do hereby accept the area of soil surface bounded by PANELS P-33 THRU P-38 DEPLOYED ON 10.2.19

and shall be responsible for maintaining its integrity and suitability in accordance with the project specifications from this date to the completion of the installation.

NAME	SIGNATURE	TITLE	DATE
Greg Parrett	Greg Parrett	Supt	10-2-19

CERTIFICATE OF ACCEPTANCE RECEIVED BY QA / QC MANAGER

NAME	SIGNATURE	TITLE	DATE
DAVID HUTCHINSON	D[illegible]	CQA	10.2.19

CERTIFICATE OF ACCEPTANCE RECEIVED BY OWNER

NAME	SIGNATURE	TITLE	DATE
JEFF YUCHASZ	[signature]	CM	10/8/19

GOLDER FORM: G4-0699

(JUNE 1999)

GOLDER ASSOCIATES INC.

The subgrade areas were visually inspected and approved by the above personnel before the panels were deployed. This document was subsequently prepared / signed after panel deployment when time allowed.

CERTIFICATE OF ACCEPTANCE OF SOIL SURFACE

	GEOSYNTHETIC INSTALLER		PROJECT
COMPANY	Chesapeake	LOCATION	Erie, Mi
ADDRESS		PROJECT	JRW Ash & Chemical Pond Clousure
		OWNER	CEC

I, the Undersigned, the duly authorized representative of CHESAPEAKE

do hereby accept the area of soil surface bounded by PANELS P-39 THRU P-44 DEPLOYED ON 10.4.19.

and shall be responsible for maintaining its integrity and suitability in accordance with the project specifications from this date to the completion of the installation.

NAME	SIGNATURE	TITLE	DATE
Greg Parrott		SCOT	10-4-19

CERTIFICATE OF ACCEPTANCE RECEIVED BY QA / QC MANAGER

NAME	SIGNATURE	TITLE	DATE
DAVID HUTCHINSON		GQA	10.4.19

CERTIFICATE OF ACCEPTANCE RECEIVED BY OWNER

NAME	SIGNATURE	TITLE	DATE
Jeff Yuchasz		CM	10/8/19

GOLDER FORM: G4-0699

(JUNE 1999)

GOLDER ASSOCIATES INC.

The subgrade areas were visually inspected and approved by the above personnel before the panels were deployed. This document was subsequently prepared / signed after panel deployment when time allowed.

CERTIFICATE OF ACCEPTANCE OF SOIL SURFACE

	GEOSYNTHETIC INSTALLER		PROJECT
COMPANY	Chesapeake	LOCATION	Erie, Mi
ADDRESS		PROJECT	JRW Ash & Chemical Pond Clousure
		OWNER	CEC

I, the Undersigned, the duly authorized representative of CHESAPEAKE

do hereby accept the area of soil surface bounded by PANELS P-45 THRU P-52 DEPLOYED ON 10.5.19.

and shall be responsible for maintaining its integrity and suitability in accordance with the project specifications from this date to the completion of the installation.

NAME	SIGNATURE	TITLE	DATE
Greg Parrott		SCDT	10-5-19

CERTIFICATE OF ACCEPTANCE RECEIVED BY QA / QC MANAGER

NAME	SIGNATURE	TITLE	DATE
DAVID HUTCHINSON		CQA	10.5.19

CERTIFICATE OF ACCEPTANCE RECEIVED BY OWNER

NAME	SIGNATURE	TITLE	DATE
Jeff Yuchasz		CM	10/8/19

GOLDER FORM: G4-0699

(JUNE 1999)

GOLDER ASSOCIATES INC.

The subgrade areas were visually inspected and approved by the above personnel before the panels were deployed. This document was subsequently prepared / signed after panel deployment when time allowed.

APPENDIX H.2

Panel Placement Summary

Panel Number	Roll Number (Last 4 Digits)	Deployed Length (Ft.)	Monitor	Condition	Manufact. Length (ft)
P29	0002	730	DH	Good	740
P28	0004	730	DH	Good	740
P27	0007	730	DH	Good	740
P37	0008	730	DH	Good	740
P26	0009	730	DH	Good	740
P47	0011	730	DH	Good	740
P33	0012	730	DH	Good	740
P39	0016	730	DH	Good	740
P36	0018	730	DH	Good	740
P30	0019	730	DH	Good	740
P34	0028	730	DH	Good	740
P49	0030	730	DH	Good	740
P50	0031	7' x 354'	DH	Good	740*
P51	0031	1' x 133'	DH	Good	740*
P52	0031	10' x 506'	DH	Good	740*
P31	0032	730	DH	Good	740
P48	0033	730	DH	Good	740
P35	0034	730	DH	Good	740
P44	0035	730	DH	Good	740
P38	0037	730	DH	Good	740
P43	0038	730	DH	Good	740
P41	0042	730	DH	Good	740
P45	0043	730	DH	Good	740
P46	0045	730	DH	Good	740
P32	0049	730	DH	Good	740
P42	0050	730	DH	Good	740
P40	0052	730	DH	Good	740
P9	40001	720	DH	Good	740
P1	40003	725	DH	Good	740
P20	40005	720	DH	Good	740
P3	40006	725	DH	Good	740
P14	40010	720	DH	Good	740
P15	40013	720	DH	Good	740
P16	40014	720	DH	Good	740
P4	40015	725	DH	Good	740
P23	40017	720	DH	Good	740
P21	40020	720	DH	Good	740
P13	40021	720	DH	Good	740
P7	40024	720	DH	Good	740
P25	40025	720	DH	Good	740
P5	40027	725	DH	Good	740
P24	40029	720	DH	Good	740

Panel Number	Roll Number (Last 4 Digits)	Deployed Length (Ft.)	Monitor	Condition	Manufact. Length (ft)
P10	40036	720	DH	Good	740
P19	40039	720	DH	Good	740
P6	40040	720	DH	Good	740
P18	40041	720	DH	Good	740
P11	40044	720	DH	Good	740
P17	40047	720	DH	Good	740
P12	40048	720	DH	Good	740
P22	40051	720	DH	Good	740
P2	840023	725	DH	Good	740
P8	4000046	720	DH	Good	740
	TOTAL	36051	**TOTAL**		37000 linear feet

Notes:

* Panels 50, 51, and 52 total 506 feet given 22-foot width. Manufactured roll length is 740 feet which is acceptable.

1. The CQA Monitor performed random checks on each roll to ensure the nominal material thickness (40 mils) was met.
2. For the full roll number, please see the inventory in Appendix F and match the last 4 digits as shown above.

GEOSYNTHETIC PANEL DEPLOYMENT LOG

PROJECT NUMBER: 1788523 PROJECT TITLE: JRW Ash & Chemical Pond Clousure
OWNER: CEC CONTRACTOR: Chesapeake
LOCATION: Erie, Mi

GEOMEMBRANE: Secondary (Primary) Closure Other: _____
SUBGRADE CONDITION: (Surface Compaction Protrusions Dessiccation Excessive Moisture)
REMARKS: 40 mil micro-spike

TRANSPORT EQUIPMENT: skid steer w/ spreader bak

PANEL #	ROLL NUMBER	DEPLY'D LENGTH	AMBIENT AIR TEMP	OBS'D OVERLAP	MONITOR	THICKNESS MEASUREMENTS LEAD	THICKNESS MEASUREMENTS SIDE	DATE DEPLOYED ~~REMARKS~~
1	4000 3	725	73°	Y	DH	40 - 140 - 1 -	39 140 140 - 1 - 4 -	8.15.19
2	840023	725	73°	Y	DH	40/40	39/39/39	
3	4000 6	725	73°	Y	DH	39/39	40/40/40	
4	4015	725	74°	Y	DH	40/40	40/40/39	
5	4027	725	74°	Y	DH	40/40	40/40/41	
6	4040	720	78°	Y	DH	39/39	40/40/40	
7	4024	720	78°	Y	DH	39/39	39/40/39	
8.	4046	720	78°	Y	DH	40/39	39/40/40	8.15.19
9	4001	720	76°	Y	DH	40/40	41/40/40	8.16.19
10	4036	720	76°	Y	DH	41/40	40/39/40	
11	4044	720	76°	Y	DH	39/39	40/40/39	
12	4048	720	76°	Y	DH	39/39	40/40/40	
13	4021	720	78°	Y	DH	40/40	40/40/40	
14	4010	720	78°	Y	DH	40/40	39/39/39	
15	4013	720	78°	Y	DH	40/41	40/41/41	
16	4014	720	78°	Y	DH	40/40	40/40/40	
17	4047	720	78°	Y	DH	39/39	40/40/40	8.16.19
18	4041	720	72°	Y	DH	39/39	39/39/40	8.17.19
19	4039	720	72°	Y	DH	40/40	40/39/40	
20	4005	720	72°	Y	DH	40/40	41/40/40	
21	4020	720	72°	Y	DH	40/40	39/39/40	
22	4051	720	72°	Y	DH	39/40	39/40/39	8.17.19
23	4017	720	80°	Y	DH	39/39	40/40/40	8.20.19
24	4029	720	80°	Y	DH	40/40	40/40/39	
25	4025	720	80°	Y	DH	40/40	40/40/40	8.20.19

Golder Form: G2-TSS
(August 2000)

REVIEWED BY: RS DATE: 12-2-19

GOLDER ASSOCIATES INC.

GEOSYNTHETIC PANEL DEPLOYMENT LOG

PROJECT NUMBER: 1788523 **PROJECT TITLE:** JRW Ash & Chemical Pond Closure
OWNER: CEC **CONTRACTOR:** Chesapeake
LOCATION: Erie, Mi

GEOMEMBRANE: Secondary (Primary) Closure Other: _____
SUBGRADE CONDITION: (Surface Compaction Protrusions Dessiccation Excessive Moisture)
REMARKS: 40 mil MICRO-SPIKE

TRANSPORT EQUIPMENT: SKID STEER W/ SPREADER BAR

PANEL #	ROLL NUMBER	DEPLY'D LENGTH	AMBIENT AIR TEMP	OBS'D OVERLAP	MONITOR	THICKNESS MEASUREMENTS LEAD	THICKNESS MEASUREMENTS SIDE	DATE DEPLOYED ~~REMARKS~~
26	0009	730	72°	Y	DH	40/40/-/-/-	40/40/40/-/-	9.27.19
27	0007	730				40/39	39/40/40	
28	0004	730				40/40	40/40/40	
29	0002	730				39/39	39/40/40	
30	0019	730				40/40	40/40/39	
31	0032	730				40/40	40/40/40	
32	0049	730				39/39	39/40/40	
33	0012	730	73°	Y	DH	40/39	40/40/40	10.2.19
34	0028	730				41/40	41/40/40	
35	0034	730				39/39	39/40/40	
36	0018	730				40/40	40/40/40	
37	0008	730				40/40	40/40/39	
38	0037	730	72°	Y	DH	39/40	39/40/40	10.2.19
39	0016	730	68°	Y	DH	40/40	40/40/40	10.4.19
40	0052	730				40/40	40/39/39	
41	0042	730				40/40	40/40/39	
42	0050	730				40/40	40/40/40	
43	0038	730				40/40	40/40/40	
44	0035	730	66°	Y	DH	40/40	40/40/40	10.4.19
45	0043	730	58°	Y	DH	40/40	40/40/40	10.5.19
46	0045	730				40/40	40/40/40	
47	0011	730				40/39	40/40/40	
48	0033	730				40/40	40/40/39	
49	0030	730				39/40	40/40/40	
50	0031	7'x354'	58°	Y	DH	40/40	40/40/40	10.5.19

Golder Form: G2-TSS
(August 2000)

354'
7' 2'

REVIEWED BY: PJS DATE: 10-2-19

GOLDER ASSOCIATES INC.

GEOSYNTHETIC PANEL DEPLOYMENT LOG

PROJECT NUMBER: 1788523 **PROJECT TITLE:** JRW Ash & Chemical Pond Clousure
OWNER: CEC **CONTRACTOR:** Chesapeake
LOCATION: Erie, Mi

GEOMEMBRANE: Secondary (Primary) Closure Other: _____
SUBGRADE CONDITION: (Surface Compaction Protrusions Dessiccation Excessive Moisture)
REMARKS: 40 MIL MICRO-SPIKE

TRANSPORT EQUIPMENT: SKID STEER W/SPREADER BAR

PANEL #	ROLL NUMBER	DEPLY'D LENGTH	AMBIENT AIR TEMP	OBS'D OVERLAP	MONITOR	THICKNESS MEASUREMENTS LEAD	THICKNESS MEASUREMENTS SIDE	DATE DEPLOYED ~~REMARKS~~
51	ΦΦ31	1x133	58	Y	DH	40/40/40	40/40/40/40	10, 5, 19
52	ΦΦ31	10x506	58	Y	DH	40/40	40/40/40	10, 5, 19

Golder Form: G2-TSS
(August 2000)

REVIEWED BY: PJS DATE: 12-2-19

GOLDER ASSOCIATES INC.

APPENDIX I

Liner Trial Seam Logs

APPENDIX I.1

Fusion Trial Seam Logs

GEOMEMBRANE TRIAL SEAM LOG

PROJECT NUMBER: 1788523 **PROJECT TITLE:** JRW Ash & Chemical Pond Clousure
OWNER: CEC **CONTRACTOR:** Chesapeake
LOCATION: Erie, Mi

[X] **TF - # = FUSION** **DATE** 8.15.19
[ ] **TX - # = EXTRUSION** **SHEET NUMBER** 1 OF 1

SAMPLE NUMBER	APPROX. TIME	WELDING MACHINE NUMBER	WELD TECH.	TEMPERATURES: AMBIENT AIR TEMP.	TEMPERATURES: PREHEAT OR MACHINE SPEED	TEMPERATURES: EXTRUDER	TEMPERATURES: NOZZLE OR WEDGE	TEST RESULTS: INSIDE PEEL STRENGTH	TEST RESULTS: OUTSIDE PEEL STRENGTH	TEST RESULTS: SHEAR STRENGTH	PASS OR FAIL	MON.	REMARKS **
TF-1	Φ846	58	AR	72°	5.5	—	86Φ	8Φ 18Φ 187	88 182 167	11Φ 19Φ	113 P	DH	40 MIL
TF-2	Φ849	1734	AMJR	72°	7.Φ	—	86Φ	87 189 185	77 175 176	1Φ4 199	108 P	DH	40 MIL
TF-3	13Φ6	58	AR	75°	7.5	—	86Φ	1Φ2 184 11Φ1	83 187 193	1Φ8 11Φ1	1Φ1 P	DH	"
TF-4	1311	1734	AMJR	75°	7.Φ	—	86Φ	92 199 167	79 184 179	1Φ6 1Φ5	107 P	DH	"
TF-5	15ΦΦ	58	AR	80°	7.5	—	86Φ	79 161 165	71 173 193	1Φ2 1104	102 P	DH	"
TF-6	153Φ	1734	AMJR	8Φ°	7.Φ	—	86Φ	81 181 187	75 178 193	96 192	97 P	DH	"
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NOTE: ADHESION FAILURE OF TRIAL SEAM SAMPLES SHALL BE NOTED IN THE REMARKS COLUMN
FOR JOBS IN MICHIGAN, PUT DESTRUCTIVE SAMPLE NUMBER CORRESPONDING TO EACH MACHINE

GOLDER FORM: G12-TSS
(August 2000)

REVIEWED BY: BS **DATE:** 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE TRIAL SEAM LOG

PROJECT NUMBER: 1788523 **PROJECT TITLE:** JRW Ash & Chemical Pond Clousure
OWNER: CEC **CONTRACTOR:** Chesapeake
LOCATION: Erie, Mi

[X] **TF - # = FUSION** **DATE** 8.16.19
[ ] **TX - # = EXTRUSION** **SHEET NUMBER** 1 OF 1

SAMPLE NUMBER	APPROX. TIME	WELDING MACHINE NUMBER	WELD TECH.	TEMPERATURES: AMBIENT AIR TEMP.	TEMPERATURES: PREHEAT OR MACHINE SPEED	TEMPERATURES: EXTRUDER	TEMPERATURES: NOZZLE OR WEDGE	TEST RESULTS: INSIDE PEEL STRENGTH	TEST RESULTS: OUTSIDE PEEL STRENGTH	TEST RESULTS: SHEAR STRENGTH	PASS OR FAIL	MON.	REMARKS **
TF-1	1338	58	AR	74°	7.0	—	860	78 180 187	91 185 190	102 105	103 P	DH	40 MIL
TF-2	1340	1734	AMJR	74°	7.5	—	880	79 180 183	74 181 173	96 199	97 P	DH	
TF-3	1450	1741	ML	77°	7.0	—	860	68 169 180	89 185 178	100 101	99 P	DH	
TF-4	1757	58	AR	78°	7.0	—	860	93 194 195	83 180 195	108 107	106 P	DH	
TF-5	1800	1734	AMJR	78°	7.0	—	860	95 178 191	89 181 192	110 100	107 P	DH	
TF-6	1910	1741	ML	78°	7.0	—	860	79 175 195	93 189 174	98 198	98 P	DH	
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NOTE: ADHESION FAILURE OF TRIAL SEAM SAMPLES SHALL BE NOTED IN THE REMARKS COLUMN
FOR JOBS IN MICHIGAN, PUT DESTRUCTIVE SAMPLE NUMBER CORRESPONDING TO EACH MACHINE

GOLDER FORM: G12-TSS
(August 2000)

REVIEWED BY: TPS **DATE:** 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE TRIAL SEAM LOG

PROJECT NUMBER: 1788523 **PROJECT TITLE:** JRW Ash & Chemical Pond Clousure
OWNER: CEC **CONTRACTOR:** Chesapeake
LOCATION: Erie, Mi

[X] **TF - # = FUSION** **DATE** 8.17.19
[ ] **TX - # = EXTRUSION** **SHEET NUMBER** 1 of 1

SAMPLE NUMBER	APPROX. TIME	WELDING MACHINE NUMBER	WELD TECH.	TEMPERATURES: AMBIENT AIR TEMP.	TEMPERATURES: PREHEAT OR MACHINE SPEED	TEMPERATURES: EXTRUDER	TEMPERATURES: NOZZLE OR WEDGE	TEST RESULTS: INSIDE PEEL STRENGTH	TEST RESULTS: OUTSIDE PEEL STRENGTH	TEST RESULTS: SHEAR STRENGTH	PASS OR FAIL	MON.	REMARKS **
TF-1	0801	58	AR	71°	7.5	—	86Φ	8Φ 185 188	8Φ 183 18Φ	94 197	99 P	DH	4Φ min L
TF-2	0805	1734	AMJR	71°	7.Φ	—	86Φ	79 182 179	89 178 188	1Φ6 198	92 P	DH	"
TF-3	0810	1741	ML	71°	6.5	—	86Φ	77 175 174	82 181 177	1Φ6 1Φ6	1Φ6 P	DH	"
TF-4	1115	1734	AMJR	72°	8.Φ	—	86Φ	83 183 177	74 182 173	1Φ1 11Φ2	95 P	DH	"
TF-5	1108	58	AR	8Φ°	7.5	—	86Φ	77 191 179	88 174 184	89 192	95 P	DH	"
TF-6	13ΦΦ	1741	ML	8Φ°	6.5	—	86Φ	81 186 18Φ	85 191 176	1Φ1 11Φ1	109 P	DH	"
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NOTE: ADHESION FAILURE OF TRIAL SEAM SAMPLES SHALL BE NOTED IN THE REMARKS COLUMN
FOR JOBS IN MICHIGAN, PUT DESTRUCTIVE SAMPLE NUMBER CORRESPONDING TO EACH MACHINE

GOLDER FORM: G12-TSS
(August 2000)

REVIEWED BY: TRS **DATE:** 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE TRIAL SEAM LOG

PROJECT NUMBER: 1788523 **PROJECT TITLE:** JRW Ash & Chemical Pond Clousure
OWNER: CEC **CONTRACTOR:** Chesapeake
LOCATION: Erie, Mi

[X] **TF - # = FUSION** **DATE** 8.20.19
[ ] **TX - # = EXTRUSION** **SHEET NUMBER** 1 of 1

SAMPLE NUMBER	APPROX. TIME	WELDING MACHINE NUMBER	WELD TECH.	TEMPERATURES: AMBIENT AIR TEMP.	TEMPERATURES: PREHEAT OR MACHINE SPEED	TEMPERATURES: EXTRUDER	TEMPERATURES: NOZZLE OR WEDGE	TEST RESULTS: INSIDE PEEL STRENGTH	TEST RESULTS: OUTSIDE PEEL STRENGTH	TEST RESULTS: SHEAR STRENGTH	PASS OR FAIL	MON.	REMARKS **
TF-1	1243	58-	AR	83°	7.5	—	86Φ	77 181 176	83 186 185	1Φ4 1Φ2/1Φ3	P	DH	4Φ mic
TF-2	1256	1741	ML	83°	7.5	—	86Φ	81 176 179	9Φ 191 185	1Φ4 1Φ3/1Φ3	P	DH	"
TF-3	1256	1734	AMJR	83°	7.5	—	86Φ	83 176 181	8Φ 174 185	98 199/9Φ	P	DH	"
TF-4	1417	58-	AR	83°	7.5	—	86Φ	87 186 179	86 187 181	97 196/1Φ1	P	DH	"
TF-5	1416	1734	AMJR	83°	7.5	—	86Φ	78 188 172	82 195 185	99 198/1ΦΦ	P	DH	"
TF-6	1420	1741	ML	83°	7.5	—	86Φ	77 17Φ 179	73 175 189	95 195/96	P	DH	"
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NOTE: ADHESION FAILURE OF TRIAL SEAM SAMPLES SHALL BE NOTED IN THE REMARKS COLUMN
FOR JOBS IN MICHIGAN, PUT DESTRUCTIVE SAMPLE NUMBER CORRESPONDING TO EACH MACHINE

GOLDER FORM: G12-TSS
(August 2000)

REVIEWED BY: TBS **DATE:** 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE TRIAL SEAM LOG

PROJECT NUMBER: 1788523 **PROJECT TITLE:** JRW Ash & Chemical Pond Clousure
OWNER: CEC **CONTRACTOR:** Chesapeake
LOCATION: Erie, Mi

[X] **TF - # = FUSION** **DATE** 9.27.19
[ ] **TX - # = EXTRUSION** **SHEET NUMBER** 1 OF 1

SAMPLE NUMBER	APPROX. TIME	WELDING MACHINE NUMBER	WELD TECH.	TEMPERATURES: AMBIENT AIR TEMP.	TEMPERATURES: PREHEAT OR MACHINE (SPEED)	TEMPERATURES: EXTRUDER	TEMPERATURES: NOZZLE OR WEDGE	TEST RESULTS: INSIDE PEEL STRENGTH	TEST RESULTS: OUTSIDE PEEL STRENGTH	TEST RESULTS: SHEAR STRENGTH	PASS OR FAIL	MON.	REMARKS **
TF-1	1344	M-1743	PF	80°	7	—	860	83 194 189	76 182 181	114 111/	110 P	DH	40 mil
TF-2	1345	M-1707	SD	80°	7.5	—	860	87 189 180	88 188 187	122 114/	118 P	DH	〃
TF-3	1345	M-65	RH	80°	7	—	860	81 179 183	79 178 192	112 110/	110 P	DH	〃
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NOTE: ADHESION FAILURE OF TRIAL SEAM SAMPLES SHALL BE NOTED IN THE REMARKS COLUMN
FOR JOBS IN MICHIGAN, PUT DESTRUCTIVE SAMPLE NUMBER CORRESPONDING TO EACH MACHINE

GOLDER FORM: G12-TSS
(August 2000)

REVIEWED BY: TJS **DATE:** 12-2-19

* NO END OF DAY TRIALS DUE TO BEING SHUT DOWN FOR RAIN. NO PLACE TO COMPLETE TRIAL WELDS.

GOLDER ASSOCIATES INC.

GEOMEMBRANE TRIAL SEAM LOG

PROJECT NUMBER: 1788523
OWNER: CEC
LOCATION: Erie, Mi
PROJECT TITLE: JRW Ash & Chemical Pond Clousure
CONTRACTOR: Chesapeake

[X] **TF - # = FUSION**
[ ] **TX - # = EXTRUSION**

DATE 10.1.19
SHEET NUMBER 1 OF 1

SAMPLE NUMBER	APPROX. TIME	WELDING MACHINE NUMBER	WELD TECH.	TEMPERATURES: AMBIENT AIR TEMP.	PREHEAT OR MACHINE SPEED	EXTRUDER	NOZZLE OR WEDGE	TEST RESULTS: INSIDE PEEL STRENGTH	OUTSIDE PEEL STRENGTH	SHEAR STRENGTH	PASS OR FAIL	MON.	REMARKS **
TF-1	1400	M65	RH	86	7	—	860	95 / 106 / 102	94 / 106 / 101	96 / 92 / 95	P	DH	T/T
TF-2	1435	M1707	SD	87	7.5	—	860	78 / 68 / 86	68 / 78 / 85	99 / 101 / 104	P	DH	S/S
TF-3	1644	M1707	SD	87	7.5	—	860	85 / 73 / 81	73 / 76 / 79	97 / 99 / 101	P	DH	S/S
TF-4	1735	M65	RH	87	7	—	860	76 / 90 / 88	91 / 81 / 78	100 / 101 / 101	P	DH	T/T
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NOTE: ADHESION FAILURE OF TRIAL SEAM SAMPLES SHALL BE NOTED IN THE REMARKS COLUMN
FOR JOBS IN MICHIGAN, PUT DESTRUCTIVE SAMPLE NUMBER CORRESPONDING TO EACH MACHINE

GOLDER FORM: G12-TSS
(August 2000)

REVIEWED BY: TBS **DATE:** 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE TRIAL SEAM LOG

PROJECT NUMBER: 1788523 **PROJECT TITLE:** JRW Ash & Chemical Pond Clousure
OWNER: CEC **CONTRACTOR:** Chesapeake
LOCATION: Erie, Mi

[X] TF - # = FUSION
[ ] TX - # = EXTRUSION

DATE 10,2,19
SHEET NUMBER 1

SAMPLE NUMBER	APPROX. TIME	WELDING MACHINE NUMBER	WELD TECH.	TEMPERATURES: AMBIENT AIR TEMP.	TEMPERATURES: PREHEAT OR MACHINE (SPEED)	TEMPERATURES: EXTRUDER	TEMPERATURES: NOZZLE OR (WEDGE)	TEST RESULTS: INSIDE PEEL STRENGTH	TEST RESULTS: OUTSIDE PEEL STRENGTH	TEST RESULTS: SHEAR STRENGTH	PASS OR FAIL	MON.	REMARKS **
TF-1	0815	M-65	RH	71	7	—	86	78 / 79 / 188	79 / 181 / 178	107 / 108 /	106 P	DH	S/S
TF-2	0821	M-1707	SD	71	7.5	—		81 / 82 / 185	81 / 87 / 191	114 / 105 /	108 P	DH	S/S
TF-3	0825	M-1743	PF	71	7.5	—		74 / 90 / 184	90 / 83 / 190	99 / 106 /	113 P	DH	S/S
TF-4	1222	M-1707	SD	69	7.5	—		78 / 87 / 181	76 / 84 / 182	95 / 103 /	105 P	DH	S/S
TF-5	1225	M-65	RH	69	7	—		79 / 83 / 178	70 / 84 / 175	105 / 105 /	107 P	DH	S/S
TF-6	1230	M-1743	PF	69	7.5	—	86	86 / 82 / 185	79 / 82 / 189	100 / 106 /	108 P	DH	S/S
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NOTE: ADHESION FAILURE OF TRIAL SEAM SAMPLES SHALL BE NOTED IN THE REMARKS COLUMN
FOR JOBS IN MICHIGAN, PUT DESTRUCTIVE SAMPLE NUMBER CORRESPONDING TO EACH MACHINE

GOLDER FORM: G12-TSS
(August 2000)

REVIEWED BY: [illegible] **DATE:** 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE TRIAL SEAM LOG

PROJECT NUMBER: 1788523 **PROJECT TITLE:** JRW Ash & Chemical Pond Clousure
OWNER: CEC **CONTRACTOR:** Chesapeake
LOCATION: Erie, Mi

[X] TF - # = FUSION **DATE** 10.4.19
[ ] TX - # = EXTRUSION **SHEET NUMBER** 1

SAMPLE NUMBER	APPROX. TIME	WELDING MACHINE NUMBER	WELD TECH.	TEMPERATURES: AMBIENT AIR TEMP.	TEMPERATURES: PREHEAT OR MACHINE SPEED	TEMPERATURES: EXTRUDER	TEMPERATURES: NOZZLE OR WEDGE	TEST RESULTS: INSIDE PEEL STRENGTH	TEST RESULTS: OUTSIDE PEEL STRENGTH	TEST RESULTS: SHEAR STRENGTH	PASS OR FAIL	MON.	REMARKS **
TF-1	1353	M-1707	SD	59	7.5	—	86Φ	85 186 179	81 176 174	103 / 103	107 P	DH	S/S
TF-2	1353	M-1743	PF	59	7.5	—		98 180 188	86 191 181	117 / 116	119 P	DH	S/S
TF-3	1405	M-65	RH	59	7	—		81 178 182	78 178 180	113 / 112	117 P	DH	S/S
TF-4	1700	M-1707	SD	58	7.5	—		90 185 191	80 191 183	117 / 116	119 P	DH	S/S
TF-5	1717	M-1743	PF	58	7.5	—		101 187 196	90 188 188	118 / 115	112 P	DH	S/S
TF-6	1735	M-65	RH	58	7	—	86Φ	84 183 186	84 188 182	127 / 127	125 P	DH	S/S
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NOTE: ADHESION FAILURE OF TRIAL SEAM SAMPLES SHALL BE NOTED IN THE REMARKS COLUMN
FOR JOBS IN MICHIGAN, PUT DESTRUCTIVE SAMPLE NUMBER CORRESPONDING TO EACH MACHINE

GOLDER FORM: G12-TSS
(August 2000)

REVIEWED BY: PJ **DATE:** 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE TRIAL SEAM LOG

PROJECT NUMBER: 1788523 **PROJECT TITLE:** JRW Ash & Chemical Pond Clousure
OWNER: CEC **CONTRACTOR:** Chesapeake
LOCATION: Erie, Mi

[X] **TF - # = FUSION** **DATE** 10.5.19

[ ] **TX - # = EXTRUSION** **SHEET NUMBER** 1

SAMPLE NUMBER	APPROX. TIME	WELDING MACHINE NUMBER	WELD TECH.	TEMPERATURES: AMBIENT AIR TEMP.	TEMPERATURES: PREHEAT OR MACHINE (SPEED)	TEMPERATURES: EXTRUDER	TEMPERATURES: NOZZLE OR (WEDGE)	TEST RESULTS: INSIDE PEEL STRENGTH	TEST RESULTS: OUTSIDE PEEL STRENGTH	TEST RESULTS: SHEAR STRENGTH	PASS OR FAIL	MON.	REMARKS **
TF-1	0818	M-1743	PF	49	7.5	—	86Φ	89/94/94	89/82/89	134/133/	119 P	DH	S/S
TF-2	0828	M-65	RH	49	7	—	86Φ	81/88/88	91/84/82	126/127/	125 P	DH	S/S
TF-3	0832	M-17Φ7	SD	49	7.5	—	86Φ	89/86/81	86/80/80	125/127/	127 P	DH	S/S
TF-4	1215	M-65	RH	57	7	—	86Φ	88/86/99	87/77/83	112/115/	115 P	DH	S/S
TF-5	121Φ	M-17Φ7	SD	57	7.5	—	86Φ	83/82/87	83/79/86	117/115/	111 P	DH	S/S
TF-6	1215	M-1743	PF	57	7.5	—	86Φ	85/71/78	74/89/89	10Φ/11Φ/	107 P	DH	S/S
TF-7	1336	M-1743	PF	58	6.5	—	86Φ	81/91/82	87/91/88	102/10Φ/	106 P	DH	T/T
TF-8	1338	M-17Φ7	SD	58	7	—	86Φ	99/97/97	9Φ/81/93	123/122/	123 P	DH	T/T
TF-9	161Φ	M-17Φ7	SD	6Φ	7	—	86Φ	97/96/96	10Φ/83/92	93/94/	101 P	DH	T/T
TF-10	16Φ3	M-1743	PF	6Φ	6.5	—	86Φ	99/88/87	98/88/10Φ5	113/113/	123 P	DH	T/T
TF-11	16Φ4	M-1743	PF	6Φ	7.5	—	86Φ	93/87/83	83/84/92	121/127/	129 P	DH	S/S
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NOTE: ADHESION FAILURE OF TRIAL SEAM SAMPLES SHALL BE NOTED IN THE REMARKS COLUMN
FOR JOBS IN MICHIGAN, PUT DESTRUCTIVE SAMPLE NUMBER CORRESPONDING TO EACH MACHINE

GOLDER FORM: G12-TSS
(August 2000)

REVIEWED BY: PS **DATE:** 12-2-19

GOLDER ASSOCIATES INC.

APPENDIX I.2

Extrusion Trial Seam Logs

GEOMEMBRANE TRIAL SEAM LOG

PROJECT NUMBER: 1788523 **PROJECT TITLE:** JRW Ash & Chemical Pond Clousure
OWNER: CEC **CONTRACTOR:** Chesapeake
LOCATION: Erie, Mi

[ ] TF - # = FUSION
[X] TX - # = EXTRUSION

DATE 8.15.19

SHEET NUMBER 1 OF 1

SAMPLE NUMBER	APPROX. TIME	WELDING MACHINE NUMBER	WELD TECH.	TEMPERATURES: AMBIENT AIR TEMP.	TEMPERATURES: PREHEAT OR MACHINE SPEED	TEMPERATURES: EXTRUDER	TEMPERATURES: NOZZLE OR WEDGE	TEST RESULTS: INSIDE PEEL STRENGTH	TEST RESULTS: OUTSIDE PEEL STRENGTH	TEST RESULTS: SHEAR STRENGTH	PASS OR FAIL	MON.	REMARKS **
TX-1	1124	x1715	ML	75°	5Φ	55Φ	—	73 / 81 / 82	- / - / -	100 / 105 /	109 P	DH	Y Φ mil
TX-2	1536	x1715	ML	78°	5Φ	55Φ	—	94 / 93 / 96	- / - / -	99 / 94 /	102 P	DH	"
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NOTE: ADHESION FAILURE OF TRIAL SEAM SAMPLES SHALL BE NOTED IN THE REMARKS COLUMN
FOR JOBS IN MICHIGAN, PUT DESTRUCTIVE SAMPLE NUMBER CORRESPONDING TO EACH MACHINE

GOLDER FORM: G12-TSS
(August 2000)

REVIEWED BY: PS **DATE:** 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE TRIAL SEAM LOG

PROJECT NUMBER: 1788523 **PROJECT TITLE:** JRW Ash & Chemical Pond Clousure
OWNER: CEC **CONTRACTOR:** Chesapeake
LOCATION: Erie, Mi

[ ] TF - # = FUSION **DATE** 8.17.19
[X] TX - # = EXTRUSION **SHEET NUMBER** 1 of

SAMPLE NUMBER	APPROX. TIME	WELDING MACHINE NUMBER	WELD TECH.	TEMPERATURES: AMBIENT AIR TEMP.	TEMPERATURES: PREHEAT OR MACHINE SPEED	TEMPERATURES: EXTRUDER	TEMPERATURES: NOZZLE OR WEDGE	TEST RESULTS: INSIDE PEEL STRENGTH	TEST RESULTS: OUTSIDE PEEL STRENGTH	TEST RESULTS: SHEAR STRENGTH	PASS OR FAIL	MON.	REMARKS **
TX-1	1050	X1715	ML	72°	550	500	—	85 195 187	— 1 — 1 —	102 196	99 P	DH	4@ mil
TX-2	1135	X40	AR	72°	550	550	—	74 170 189	— 1 — 1 —	86 188	90 P	DH	10
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NOTE: ADHESION FAILURE OF TRIAL SEAM SAMPLES SHALL BE NOTED IN THE REMARKS COLUMN
FOR JOBS IN MICHIGAN, PUT DESTRUCTIVE SAMPLE NUMBER CORRESPONDING TO EACH MACHINE

GOLDER FORM: G12-TSS
(August 2000)

REVIEWED BY: BS **DATE:** 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE TRIAL SEAM LOG

PROJECT NUMBER: 1788523 **PROJECT TITLE:** JRW Ash & Chemical Pond Clousure
OWNER: CEC **CONTRACTOR:** Chesapeake
LOCATION: Erie, Mi

[ ] TF - # = FUSION **DATE** 8.20.19
[X] TX - # = EXTRUSION **SHEET NUMBER** 1 OF 1

SAMPLE NUMBER	APPROX. TIME	WELDING MACHINE NUMBER	WELD TECH.	TEMPERATURES: AMBIENT AIR TEMP.	TEMPERATURES: PREHEAT OR MACHINE SPEED	TEMPERATURES: EXTRUDER	TEMPERATURES: NOZZLE OR WEDGE	TEST RESULTS: INSIDE PEEL STRENGTH	TEST RESULTS: OUTSIDE PEEL STRENGTH	TEST RESULTS: SHEAR STRENGTH	PASS OR FAIL	MON.	REMARKS **
TX-1	1502	X40	AR	83°	500	550	—	84 / 82 / 85	— / — / —	91 / 87 / 86	P	DH	40 mil
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NOTE: ADHESION FAILURE OF TRIAL SEAM SAMPLES SHALL BE NOTED IN THE REMARKS COLUMN
FOR JOBS IN MICHIGAN, PUT DESTRUCTIVE SAMPLE NUMBER CORRESPONDING TO EACH MACHINE

GOLDER FORM: G12-TSS
(August 2000)

REVIEWED BY: RS **DATE:** 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE TRIAL SEAM LOG

PROJECT NUMBER: 1788523 **PROJECT TITLE:** JRW Ash & Chemical Pond Clousure
OWNER: CEC **CONTRACTOR:** Chesapeake
LOCATION: Erie, Mi

[ ] **TF - # = FUSION** **DATE** 9.30.19

[X] **TX - # = EXTRUSION** **SHEET NUMBER** 1 OF 1

SAMPLE NUMBER	APPROX. TIME	WELDING MACHINE NUMBER	WELD TECH.	TEMPERATURES: AMBIENT AIR TEMP.	TEMPERATURES: PREHEAT OR MACHINE SPEED	TEMPERATURES: EXTRUDER	TEMPERATURES: NOZZLE OR WEDGE	TEST RESULTS: INSIDE PEEL STRENGTH	TEST RESULTS: OUTSIDE PEEL STRENGTH	TEST RESULTS: SHEAR STRENGTH	PASS OR FAIL	MON.	REMARKS **
TX-1	1300	X50	JJ	68°	500	500	—	87 192 189	– 1 – 1 –	102 197/100	P	DH	40 mil
TX-2	1305	X35	RH	68°	450	500	—	88 187 188	– 1 – 1 –	95 188/95	P	DH	40 mil
TX-3	1527	X50	JJ	72°	500	500	—	80 185 188	– 1 – 1 –	97 100/100	P	DH	40 mil
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NOTE: ADHESION FAILURE OF TRIAL SEAM SAMPLES SHALL BE NOTED IN THE REMARKS COLUMN
FOR JOBS IN MICHIGAN, PUT DESTRUCTIVE SAMPLE NUMBER CORRESPONDING TO EACH MACHINE

GOLDER FORM: G12-TSS
(August 2000)

REVIEWED BY: PS **DATE:** 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE TRIAL SEAM LOG

PROJECT NUMBER: 1788523 **PROJECT TITLE:** JRW Ash & Chemical Pond Clousure
OWNER: CEC **CONTRACTOR:** Chesapeake
LOCATION: Erie, Mi

[ ] **TF - # = FUSION**
[X] **TX - # = EXTRUSION**

DATE 10.1.19
SHEET NUMBER 1 of 1

SAMPLE NUMBER	APPROX. TIME	WELDING MACHINE NUMBER	WELD TECH.	TEMPERATURES: AMBIENT AIR TEMP.	TEMPERATURES: PREHEAT OR MACHINE SPEED	TEMPERATURES: EXTRUDER	TEMPERATURES: NOZZLE OR WEDGE	TEST RESULTS: INSIDE PEEL STRENGTH	TEST RESULTS: OUTSIDE PEEL STRENGTH	TEST RESULTS: SHEAR STRENGTH	PASS OR FAIL	MON.	REMARKS **
TX-1	1635	X5Φ	JJ	87	5ΦΦ	5ΦΦ	—	8Φ182183	-1-1-	88 191/94	P	DH	40 mil
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NOTE: ADHESION FAILURE OF TRIAL SEAM SAMPLES SHALL BE NOTED IN THE REMARKS COLUMN
FOR JOBS IN MICHIGAN, PUT DESTRUCTIVE SAMPLE NUMBER CORRESPONDING TO EACH MACHINE

GOLDER FORM: G12-TSS
(August 2000)

REVIEWED BY: TBS **DATE:** 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE TRIAL SEAM LOG

PROJECT NUMBER: 1788523 **PROJECT TITLE:** JRW Ash & Chemical Pond Clousure
OWNER: CEC **CONTRACTOR:** Chesapeake
LOCATION: Erie, Mi

[ ] TF - # = FUSION **DATE** 10.4.19
[X] TX - # = EXTRUSION **SHEET NUMBER** 1

SAMPLE NUMBER	APPROX. TIME	WELDING MACHINE NUMBER	WELD TECH.	TEMPERATURES: AMBIENT AIR TEMP.	TEMPERATURES: PREHEAT OR MACHINE SPEED	TEMPERATURES: EXTRUDER	TEMPERATURES: NOZZLE OR WEDGE	TEST RESULTS: INSIDE PEEL STRENGTH	TEST RESULTS: OUTSIDE PEEL STRENGTH	TEST RESULTS: SHEAR STRENGTH	PASS OR FAIL	MON.	REMARKS **
TX-1	0800	X50	JJ	52	550	550	—	95 / 80 / 80	— / — / —	124 / 124 /	119 P	DA	40 mil
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NOTE: ADHESION FAILURE OF TRIAL SEAM SAMPLES SHALL BE NOTED IN THE REMARKS COLUMN
FOR JOBS IN MICHIGAN, PUT DESTRUCTIVE SAMPLE NUMBER CORRESPONDING TO EACH MACHINE

GOLDER FORM: G12-TSS
(August 2000)

REVIEWED BY: [signature] **DATE:** 11-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE TRIAL SEAM LOG

PROJECT NUMBER: 1788523
OWNER: CEC
LOCATION: Erie, Mi
PROJECT TITLE: JRW Ash & Chemical Pond Clousure
CONTRACTOR: Chesapeake

[ ] TF - # = FUSION
[X] TX - # = EXTRUSION

DATE 10.5.19
SHEET NUMBER 1

SAMPLE NUMBER	APPROX. TIME	WELDING MACHINE NUMBER	WELD TECH.	TEMPERATURES: AMBIENT AIR TEMP.	TEMPERATURES: PREHEAT (circled) OR MACHINE SPEED	TEMPERATURES: EXTRUDER	TEMPERATURES: NOZZLE OR WEDGE	TEST RESULTS: INSIDE PEEL STRENGTH	TEST RESULTS: OUTSIDE PEEL STRENGTH	TEST RESULTS: SHEAR STRENGTH	PASS OR FAIL	MON.	REMARKS **
TX-1	1403	X50	JJ	58°	550	550	—	102/96/188	-/-/-	120/121/117	P	DH	40 mil
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NOTE: ADHESION FAILURE OF TRIAL SEAM SAMPLES SHALL BE NOTED IN THE REMARKS COLUMN
FOR JOBS IN MICHIGAN, PUT DESTRUCTIVE SAMPLE NUMBER CORRESPONDING TO EACH MACHINE

REVIEWED BY: TPS **DATE:** 12-2-15

GEOMEMBRANE TRIAL SEAM LOG

PROJECT NUMBER: 1788523 **PROJECT TITLE:** JRW Ash & Chemical Pond Clousure
OWNER: CEC **CONTRACTOR:** Chesapeake
LOCATION: Erie, Mi

[ ] TF - # = FUSION
[X] TX - # = EXTRUSION

DATE 10.7.19
SHEET NUMBER 1

SAMPLE NUMBER	APPROX. TIME	WELDING MACHINE NUMBER	WELD TECH.	TEMPERATURES: AMBIENT AIR TEMP.	TEMPERATURES: PREHEAT OR MACHINE SPEED	TEMPERATURES: EXTRUDER	TEMPERATURES: NOZZLE OR WEDGE	TEST RESULTS: INSIDE PEEL STRENGTH	TEST RESULTS: OUTSIDE PEEL STRENGTH	TEST RESULTS: SHEAR STRENGTH	PASS OR FAIL	MON.	REMARKS **
TX-1	0846	X35	RH	55	450	500	—	96 / 102 / 105	- / - / -	101 / 107 / 107	P	DH	
TX-2	0909	X50	JJ	55	500	500	—	96 / 99 / 96	— / - / -	104 / 114 / 112	P	DH	
TX-3	1314	X50	JJ	68	500	500	—	89 / 84 / 89	- / - / -	97 / 100 / 103	P	DH	
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NOTE: ADHESION FAILURE OF TRIAL SEAM SAMPLES SHALL BE NOTED IN THE REMARKS COLUMN
FOR JOBS IN MICHIGAN, PUT DESTRUCTIVE SAMPLE NUMBER CORRESPONDING TO EACH MACHINE

GOLDER FORM: G12-TSS
(August 2000)

REVIEWED BY: TSS **DATE:** 12-2-19

GOLDER ASSOCIATES INC.

APPENDIX I.3

Tensiometer Certifications

T13

Demtech Services, Inc.

Placerville, California, USA

CALIBRATION CERTIFICATE

Tensiometer Model: Pro-Tester T-0100

Device Calibrated: S-Type load cell
Range: 0 - 750 lbs. Tension
Model No: M2405-750#
Serial No: 51890

Calibration Apparatus: Pro-Cal unit, model TC-0100/A

A/D Module Model No: T-029
A/D Module Serial No: 4518051890
Channel No: N/A

Dead Weight:

W1	2
W2	152
W3	302

Reference Cell:

R1	2
R2	152
R3	302

Indicator reading with no load: 0

Offset: 4.267795 Scale: 3.322867

Applied Force lbs.	Cell Response:	Deviation Error:
2	2	0.00
52	52	0.00
102	102	0.00
152	152	0.00
202	202	0.00
252	252	0.00
302	302	0.00

Total Deviation Error (%): 0.00%

Temperature at time of calibration: 73 degrees F
Exitation Voltage: 5 V DC

This calibration conforms to the standards set by ASTM E4 and is traceable to NIST standards

Note: A/D Module and load cell above have been systems calibrated and are considered a matched pair. In general, calibrated A/D Modules and load cells are not interchangeable.

MH

Matt Harrison

Date: 12/17/18

T13

Demtech Services, Inc.

Placerville, California, USA

CALIBRATION CERTIFICATE

Tensiometer Model: Pro-Tester T-0100

Device Calibrated: S-Type load cell
Range: 0 - 750 lbs. Tension
Model No: M2405,750#
Serial No: **51783**

Calibration Apparatus:
Pro-Cal unit, model TC-0100/A

A/D Module Model No: T-029
A/D Module Serial No: **4518051783**
Channel No: N/A

Dead Weight:

W1	2
W2	152
W3	302

Reference Cell:

R1	2
R2	152
R3	302

Indicator reading with no load: 0

Offset: **5.942075** Scale: **3.323745**

Applied Force lbs.	Cell Response:	Deviation Error:
2	2	0.00
52	52	0.00
102	102	0.00
152	152	0.00
202	202	0.00
252	252	0.00
302	302	0.00

Total Deviation Error (%): 0.00%

Temperature at time of calibration: 73 degrees F
Exitation Voltage: 5 V DC.

This calibration conforms to the standards set by ASTM E4 and is traceable to NIST standards

Note: A/D Module and load cell above have been systems calibrated and are considered a matched pair. In general, calibrated A/D Modules and load cells are not interchangeable.

MH

Matt Harrison

Date: 12/17/18

T28

DEMTECH Services Inc.®

CALIBRATION CERTIFICATE

Tensiometer Model: Pro-Tester [T-0100/A or T-0100SE/A]

Device Calibrated: S-Type load cell

Range: 0 - 750 lbs. Tension

Model No: M2405-750#

Serial No: **22397**

Calibration Apparatus: Pro-Cal unit, model TC-0100/A

A/D Module Model No: T-029

A/D Module Serial No: **315022397**

Channel No: N/A

Dead Weight:

W1	2
W2	152
W3	302

Reference Cell:

R1	2
R2	152
R3	302

Indicator reading with no load: 0

Offset: **-2.608117** Scale: **3.328195**

Applied Force lbs.	Cell Response:	Deviation Error:
2	2	0.00
52	52	0.00
102	102	0.00
152	152	0.00
202	202	0.00
252	252	0.00
302	302	0.00

Total Deviation Error (%): 0.00%

Temperature at time of calibration: 73 degrees F

Exitation Voltage: 5 V DC

This calibration conforms to the standards set by ASTM E4 and is traceable to NIST standards

Note: A/D Module and load cell above have been systems calibrated and are considered a matched pair. In general, calibrated A/D Modules and load cells are not interchangeable.

Calibration Technician: Brandon Ousley Date: 07/01/19

Signature: Brandon Ousley

T28

DEMTECH Services Inc.®

CALIBRATION CERTIFICATE

Tensiometer Model: Pro-Tester [T-0100/A or T-0100SE/A]

Device Calibrated: S-Type load cell

Range: 0 - 750 lbs. Tension

Model No: M2405-750#

Serial No: **29973**

Calibration Apparatus:

Pro-Cal unit, model TC-0100/A

A/D Module Model No: T-029

A/D Module Serial No: **1415029973**

Channel No: N/A

Dead Weight:

W1	2
W2	152
W3	302

Reference Cell:

R1	2
R2	152
R3	302

Indicator reading with no load: 0

Offset: **-4.282765** Scale: **3.329314**

Applied Force lbs.	Cell Response:	Deviation Error:
2	2	0.00
52	52	0.00
102	102	0.00
152	152	0.00
202	202	0.00
252	252	0.00
302	302	0.00

Total Deviation Error (%): 0.00%

Temperature at time of calibration: 73 degrees F

Exitation Voltage: 5 V DC

This calibration conforms to the standards set by ASTM E4 and is traceable to NIST standards

Note: A/D Module and load cell above have been systems calibrated and are considered a matched pair. In general, calibrated A/D Modules and load cells are not interchangeable.

Calibration Technician: Brandon Ousley

Signature: Brandon Ousley

Date: 07/01/19

T22

DEMTECH Services Inc.®

CALIBRATION CERTIFICATE

Tensiometer Model: Pro-Tester [T-0100/A or T-0100SE/A]

Device Calibrated: S-Type load cell

Range: 0 - 750 lbs. Tension

Model No: M2405-750#

Serial No: **11811**

Calibration Apparatus: Pro-Cal unit, model TC-0100/A

A/D Module Model No: T-029

A/D Module Serial No: **3616011811**

Channel No: N/A

Dead Weight: W1 2, W2 152, W3 302

Reference Cell: R1 2, R2 152, R3 302

Indicator reading with no load: 0

Offset: **-6.083781** Scale: **3.335116**

Applied Force lbs.	Cell Response:	Deviation Error:
2	2	0.00
52	52	0.00
102	102	0.00
152	152	0.00
202	202	0.00
252	252	0.00
302	302	0.00

Total Deviation Error (%): 0.00%

Temperature at time of calibration: 73 degrees F

Exitation Voltage: 5 V DC

This calibration conforms to the standards set by ASTM E4 and is traceable to NIST standards

Note: A/D Module and load cell above have been systems calibrated and are considered a matched pair. In general, calibrated A/D Modules and load cells are not interchangeable.

Calibration Technician: Brandon Ousley

Signature: Brandon Ousley

Date: 07/25/19

T22

DEMTECH Services Inc.®

CALIBRATION CERTIFICATE

Tensiometer Model: Pro-Tester [T-0100/A or T-0100SE/A]

Device Calibrated: S-Type load cell

Range: 0 - 750 lbs. Tension

Model No: M2405-750#

Serial No: **66004**

Calibration Apparatus: Pro-Cal unit, model TC-0100/A

A/D Module Model No: T-029

A/D Module Serial No: **2618066004**

Channel No: N/A

Dead Weight:

W1	2
W2	152
W3	302

Reference Cell:

R1	2
R2	152
R3	302

Indicator reading with no load: 0

Offset: **-5.725034** Scale: **3.323652**

Applied Force lbs.	Cell Response:	Deviation Error:
2	2	0.00
52	52	0.00
102	102	0.00
152	152	0.00
202	202	0.00
252	252	0.00
302	302	0.00

Total Deviation Error (%): 0.00%

Temperature at time of calibration: 73 degrees F

Exitation Voltage: 5 V DC

This calibration conforms to the standards set by ASTM E4 and is traceable to NIST standards

Note: A/D Module and load cell above have been systems calibrated and are considered a matched pair. In general, calibrated A/D Modules and load cells are not interchangeable.

Calibration Technician: Brandon Ousley Date: 07/25/19

Signature:

T26

DEMTECH Services Inc.®

CALIBRATION CERTIFICATE

Tensiometer Model:	Pro-Tester [T-0100/A or T-0100SE/A]
Device Calibrated:	S-Type load cell
Range:	0 - 750 lbs. Tension
Model No:	M2405-750#
Serial No:	**65836**

Calibration Apparatus:

Pro-Cal unit, model TC-0100/A

A/D Module Model No:	T-029
A/D Module Serial No:	**2618065836**
Channel No:	N/A

Dead Weight:

W1	2
W2	152
W3	302

Reference Cell:

R1	2
R2	152
R3	302

Indicator reading with no load: 0

Offset: **-3.474239** Scale: **3.333945**

Applied Force lbs.	Cell Response:	Deviation Error:
2	2	0.00
52	52	0.00
102	102	0.00
152	152	0.00
202	202	0.00
252	252	0.00
302	302	0.00

Total Deviation Error (%): 0.00%

Temperature at time of calibration: 73 degrees F

Exitation Voltage: 5 V DC

This calibration conforms to the standards set by ASTM E4 and is traceable to NIST standards

Note: A/D Module and load cell above have been systems calibrated and are considered a matched pair. In general, calibrated A/D Modules and load cells are not interchangeable.

Calibration Technician: Brandon Ousley Date: 07/25/19

Signature: Brandon Ousley

T26

DEMTECH Services Inc.®

CALIBRATION CERTIFICATE

Tensiometer Model: Pro-Tester [T-0100/A or T-0100SE/A]

Device Calibrated: S-Type load cell

Range: 0 - 750 lbs. Tension

Model No: M2405-750#

Serial No: **29970**

Calibration Apparatus: Pro-Cal unit, model TC-0100/A

A/D Module Model No: T-029

A/D Module Serial No: **1415029970**

Channel No: N/A

Dead Weight:

W1	2
W2	152
W3	302

Reference Cell:

R1	2
R2	152
R3	302

Indicator reading with no load: 0

Offset: **-5.727075** Scale: **3.327492**

Applied Force lbs.	Cell Response:	Deviation Error:
2	2	0.00
52	52	0.00
102	102	0.00
152	152	0.00
202	202	0.00
252	252	0.00
302	302	0.00

Total Deviation Error (%): 0.00%

Temperature at time of calibration: 73 degrees F

Exitation Voltage: 5 V DC

This calibration conforms to the standards set by ASTM E4 and is traceable to NIST standards

Note: A/D Module and load cell above have been systems calibrated and are considered a matched pair. In general, calibrated A/D Modules and load cells are not interchangeable.

Calibration Technician: Brandon Ousley Date: 07/25/19

Signature: Brandon Ousley

APPENDIX J

Fusion Seaming Logs

1788523

JR Whiting - Ponds 1 and 2
Fusion Footage

12/19/2019

Date	Machine No.	Weld Tech.	Total Length	Samples Taken	Daily Average	Destructive Samples
8/15/2019	58	AR	2163	5	433	DS-2, DS-4, DS-6, DS-9, DS-10
8/16/2019	58	AR	2160	5	432	DS-13, DS-14, DS-18, DS-22, DS-23
8/17/2019	58	AR	1440	3	480	DS-29. DS-32, DS-33
8/20/2019	58	AR	720	1	720	DS-34
		Total	6483	14		
					Machine average for project:	**463**
10/1/2019	65	RH	1460	3	487	DS-43, DS-44, DS-47
10/2/2019	65	RH	1460	3	487	DS-51, DS-52, DS-57
10/4/2019	65	RH	1460	3	487	DS-62, DS-63, DS-67
10/5/2019	65	RH	1084	3	361	DS-71, DS-72, DS-75
		Total	5464	12		
					Machine average for project:	**455**
9/27/2019	1707	SD	1420	3	473	DS-41, DS-42, DS-46
10/1/2019	1707	SD	770	2	385	DS-48, DS-49
10/2/2019	1707	SD	1460	3	487	DS-50, DS-55, DS-56
10/4/2019	1707	SD	1460	3	487	DS-59, DS-64, DS-65
10/5/2019	1707	SD	1782	3	594	DS-70, DS-74, DS76
		Total	6892	14		
					Machine average for project:	**492**
8/15/2019	1734	AMJR	2883	7	412	DS-1, DS-3, DS-5, DS-7. DS-8, DS-11, DS-12
8/16/2019	1734	AMJR	2160	4	540	DS-15, DS-19, DS-20, DS-24
8/17/2019	1734	AMJR	1440	3	480	DS-27. DS-28, DS-31
8/20/2019	1734	AMJR	720	1	720	DS-37
		Total	7203	15		
					Machine average for project:	**480**
8/16/2019	1741	ML	2160	5	432	DS-16, DS-17, DS-21, DS-25, DS-26
8/17/2019	1741	ML	720	1	720	DS-30
8/20/2019	1741	ML	720	3	240	DS-35, DS-36, DS-38
		Total	3600	9		
					Machine average for project:	**400**
9/27/2019	1743	PF	1460	3	487	DS-39, DS-40, DS-45
10/2/2019	1743	PF	1460	3	487	DS-53, DS-54, DS-58
10/4/2019	1743	Pf	1460	3	487	DS-60, DS-61, DS-66
10/5/2019	1743	PF	1777	4	444	DS-68, DS-69, DS-73, DS-77
		Total	6157	13		
					Machine average for project:	**474**

Total Seaming in Feet	**35,799**
Total Number of Destructives	**77**

Overall Sampling Average (Fusion): 1 test per 465 Feet

Note:

1.) The overall sampling average is under the required 1 per 500 feet.

GEOMEMBRANE SEAM LOG

PROJECT NUMBER: 1788523
OWNER: CEC
LOCATION: Erie, Mi.

PROJECT TITLE: JRW Ash & Chemical Pond Clousure
CONTRACTOR: Chesapeake

[X] FUSION
[ ] EXTRUSION

MACHINE # 1734

PASSING TRIAL SEAMS

NO.	TIME	TECH ID
TF-2	0849	AMJR
TF-4	1311	AMJR
TF-6	1534	AMJR

DESTRUCTIVE LENGTH CARRY-OVER FROM PREVIOUS LOG: 0

DATE: 8.15.19

SHEET NUMBER: 1 OF 1

	SEAM NUMBER	SEAM SECTION* START POINT	SEAM SECTION* FINISH POINT	APPROX. START TIME	AMB. AIR TEMP.	WELD TECH.	PREHEAT OR MACH. (SPEED)	MACHINE TEMPERATURES DIGITAL SET (WEDGE) OR BARREL NOZZLE	MACHINE TEMPERATURES INDICATOR WEDGE OR BARREL NOZZLE	APPROX. LENGTH WELDED	LENGTH FROM PREVIOUS DESTR.	DESTR. NUMBER	MON.	REMARKS	** NON-DESTRUCTIVE TEST DATE	** NON-DESTRUCTIVE MON.
1	1 / 2	E	W	0900	73°	AMJR	7.0	860 - —	— - —	723	1000/623	DS-1	DH	1A/100'W	8.15	DH
2	1 / 2	—	—	—	—	—	—	— - —	— - —	0	500/123	DS-3	DH	1C/123'E	8.15	DH
3	3 / 4	E	W	1022	74°	AMJR	7.0	860 - —	— - —	720	500/343	DS-5	DH	1E/377'W	8.15	DH
4	5 / 6	E	W	1315	78°	"	7.0	860 - —	— - —	720	~~500~~/~~496~~	DS-7	DH	1G/157'W	8.15	DH
5	5 / 6	—	—	—	—	—	—	— - —	— - —	—	500/~~496~~	DS-8	DH	1H/63'E	8.15	DH
6	7 / 8	E	W	1442	78°	AMJR	7.0	860 - —	— - —	720	500/626	DS-11	DH	1N/94'W	8.15	DH
7	7 / 8	—	—	—	—	—	—	— - —	— - —	—	500/126	DS-12	DH	1P/126'E	8.15	DH
8	/	-						-	-							
9	/	-						-	- RS	Line 4	500/563					
10	/	-						-	- RS	Line 5	500/63					
11	/	-						-	-							
12	/	-						-	-							
13	/	-						-	-							
14	/	-						-	-							
15	/	-						-	-							
16	/	-						-	-							
17	/	-						-	-							
								DAILY TOTAL		2,883						
								DESTRUCTIVE LENGTH CARRY-OVER			126					

* REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT LOCATION ON THE SEAM.

** COLUMNS TO BE USED BY THE DATA REVIEWER ONLY

GOLDER FORM: G13-0699
(JUNE 1999)

REVIEWED BY: RS DATE: 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM LOG

PROJECT NUMBER: 1788523
OWNER: CEC
LOCATION: Erie, Mi.

PROJECT TITLE: JRW Ash & Chemical Pond Clousure
CONTRACTOR: Chesapeake

[X] FUSION
[ ] EXTRUSION

MACHINE # 1734

PASSING TRIAL SEAMS

NO.	TIME	TECH ID
TF-2	1340	AMJR
TF-5	1800	AMJR

DESTRUCTIVE LENGTH CARRY-OVER FROM PREVIOUS LOG 126

DATE 8.16.19

SHEET NUMBER 1 OF 1

	SEAM NUMBER	SEAM SECTION* START POINT	SEAM SECTION* FINISH POINT	APPROX. START TIME	AMB. AIR TEMP.	WELD TECH.	PREHEAT OR MACH. SPEED	MACHINE TEMPERATURES DIGITAL SET WEDGE OR BARREL NOZZLE	MACHINE TEMPERATURES INDICATOR WEDGE OR BARREL NOZZLE	APPROX. LENGTH WELDED	LENGTH FROM PREVIOUS DESTR.	DESTR. NUMBER	MON.	REMARKS	** NON-DESTRUCTIVE TEST DATE	** NON-DESTRUCTIVE MON.
1	9 / 10	E	W	1423	76°	AMJR	7.5	860 - -	- - -	720	500/346	DS-15	DH	15/374 W	8.16.19	DH
2	12 / 13	E	W	1543	77°	AMJR	7.5	860 - -	- - -	720	500/566	DS-19	DH	28/154 W	8.16.19	DH
3	12 / 13	—	—	—	—	—	—	- - -	- - -	—	500/66	DS-24	DH	20/66 E	8.16.19	DH
4	15 / 16	E	W	1659	78°	AMJR	7.5	860 - -	- - -	720	500/286	DS-24	DH	25/286 E	8.16.19	DH
5	/	-						-	-							
6	/	-						-	-							
7	/	-						-	-							
8	/	-						-	-							
9	/	-						-	-							
10	/	-						-	-							
11	/	-						-	-							
12	/	-						-	-							
13	/	-						-	-							
14	/	-						-	-							
15	/	-						-	-							
16	/	-						-	-							
17	/	-						-	-							
								DAILY TOTAL		2,160						
								DESTRUCTIVE LENGTH CARRY-OVER			286					

* REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT LOCATION ON THE SEAM.

** COLUMNS TO BE USED BY THE DATA REVIEWER ONLY

GOLDER FORM: G13-0699
(JUNE 1999)

REVIEWED BY: BS DATE: 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM LOG

PROJECT NUMBER: 1788523
OWNER: CEC
LOCATION: Erie, Mi.

PROJECT TITLE: JRW Ash & Chemical Pond Closure
CONTRACTOR: Chesapeake

[X] FUSION
[ ] EXTRUSION

MACHINE # 1734

PASSING TRIAL SEAMS

NO.	TIME	TECH ID
TF-2	0805	AMJR
TF-4	1115	AMJR

DESTRUCTIVE LENGTH CARRY-OVER FROM PREVIOUS LOG 286

DATE 8.17.19

SHEET NUMBER 1 OF

	SEAM NUMBER	SEAM SECTION* START POINT	SEAM SECTION* FINISH POINT	APPROX. START TIME	AMB. AIR TEMP.	WELD TECH.	PREHEAT OR MACH. SPEED	MACHINE TEMPERATURES DIGITAL SET WEDGE OR BARREL NOZZLE	MACHINE TEMPERATURES INDICATOR WEDGE OR BARREL NOZZLE	APPROX. LENGTH WELDED	LENGTH FROM PREVIOUS DESTR.	DESTR. NUMBER	MON.	REMARKS	** NON-DESTRUCTIVE TEST DATE	** NON-DESTRUCTIVE MON.
1	17 / 18	E	W	0820	72°	AMJR	8	860 - —	— - —	720	500/506	DS-27	DH	2P/214'W	8.17.19	DH
2	17 / 18	—	—	—	—	—	—	— - —	— - —	—	500/6	DS-28	DH	2Q/6'E	8.17.19	DH
3	20 / 21	E	W	0936	72°	AMJR	8.0	860 - —	— - —	720	500/226	DS-31	DH	2T/226'E	8.17.19	DH
4	/	-						-	-							
5	/	-						-	-							
6	/	-						-	-							
7	/	-						-	-							
8	/	-						-	-							
9	/	-						-	-							
10	/	-						-	-							
11	/	-						-	-							
12	/	-						-	-							
13	/	-						-	-							
14	/	-						-	-							
15	/	-						-	-							
16	/	-						-	-							
17	/	-						-	-							
								DAILY TOTAL		144	226					

* REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT LOCATION ON THE SEAM.

DESTRUCTIVE LENGTH CARRY-OVER

** COLUMNS TO BE USED BY THE DATA REVIEWER ONLY

GOLDER FORM: G13-0699
(JUNE 1999)

REVIEWED BY: PS DATE: 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM LOG

PROJECT NUMBER: 1788523
OWNER: CEC
LOCATION: Erie, Mi.

PROJECT TITLE: JRW Ash & Chemical Pond Clousure
CONTRACTOR: Chesapeake

[X] FUSION
[ ] EXTRUSION

MACHINE # 1734

PASSING TRIAL SEAMS

NO.	TIME	TECH ID
TF-3	1256	AMJR
~~TF-4~~	~~1417~~	~~AMJR~~
TF-5	1416	AMJR

DESTRUCTIVE LENGTH CARRY-OVER FROM PREVIOUS LOG 226

DATE 8.20.19

SHEET NUMBER 1 OF 1

	SEAM NUMBER	SEAM SECTION* START POINT	SEAM SECTION* FINISH POINT	APPROX. START TIME	AMB. AIR TEMP.	WELD TECH.	PREHEAT OR MACH. SPEED	MACHINE TEMPERATURES DIGITAL SET WEDGE OR BARREL NOZZLE	MACHINE TEMPERATURES INDICATOR WEDGE OR BARREL NOZZLE	APPROX. LENGTH WELDED	LENGTH FROM PREVIOUS DESTR.	DESTR. NUMBER	MON.	REMARKS	** NON-DESTRUCTIVE TEST DATE	** NON-DESTRUCTIVE MON.
1	24 / 25	E	W	1308	80°	AMJR	7.5	860 - —	— - —	724	500/446	DS-37	DH	30/274 W	8.20.19	DH
2	/	-						-	-							
3	/	-						-	-							
4	/	-						-	-							
5	/	-						-	-							
6	/	-						-	-							
7	/	-						-	-							
8	/	-						-	-							
9	/	-						-	-							
10	/	-						-	-							
11	/	-						-	-							
12	/	-						-	-							
13	/	-						-	-							
14	/	-						-	-							
15	/	-						-	-							
16	/	-						-	-							
17	/	-						-	-							
								DAILY TOTAL		724						
								DESTRUCTIVE LENGTH CARRY-OVER			446					

* REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT LOCATION ON THE SEAM.

** COLUMNS TO BE USED BY THE DATA REVIEWER ONLY

GOLDER FORM: G13-0699
(JUNE 1999)

REVIEWED BY: PS DATE: 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM LOG

PROJECT NUMBER: 1788523
OWNER: CEC
LOCATION: Erie, Mi.

PROJECT TITLE: JRW Ash & Chemical Pond Closure
CONTRACTOR: Chesapeake

[X] FUSION
[ ] EXTRUSION

MACHINE # 58

PASSING TRIAL SEAMS

NO.	TIME	TECH ID
TF-1	0846	AR
TF-3	1346	AR
TF-5	1500	AR

DESTRUCTIVE LENGTH CARRY-OVER FROM PREVIOUS LOG 0

DATE 8.15.19

SHEET NUMBER 1 OF 1

	SEAM NUMBER	SEAM SECTION* START POINT	SEAM SECTION* FINISH POINT	APPROX. START TIME	AMB. AIR TEMP.	WELD TECH.	PREHEAT OR MACH. (SPEED)	MACHINE TEMPERATURES DIGITAL SET WEDGE OR BARREL NOZZLE	MACHINE TEMPERATURES INDICATOR WEDGE OR BARREL NOZZLE	APPROX. LENGTH WELDED	LENGTH FROM PREVIOUS DESTR.	DESTR. NUMBER	MON.	REMARKS	** NON-DESTRUCTIVE TEST DATE	** NON-DESTRUCTIVE MON.
1	2 1 3	E	W	0807	73°	AR	5.5	860 - —	— - —	723	100/623	DS-2	DH	1B/100'W	8.15	DH
2	2 1 3	—	—	—	—	—	—	— - —	— - —	0	500/123	DS-4	DH	1D/~~123~~ 377'E	8.15	DH
3	4 1 5	E	W	1033	74°	AR	5.5	860 - —	— - —	720	500/343	DS-6	DH	1F/377'W	8.15	DH
4	6 1 7	E	W	1326	78°	AR	7.5	860 - —	— - —	720	~~500~~/~~406~~	DS-9	DH	1J/157'W	8.15	DH
5	6 1 7	—	—	—	—	—	—	— - —	— - —	0	500/~~406~~	DS-10	DH	1K/63'E	8.15	DH
6	1	-						-	-							
7	1	-						-	-							
8	1	-						-	- TS	Line 4	500/563					
9	1	-						-	- TS	Line 5	500/63					
10	1	-						-	-							
11	1	-						-	-							
12	1	-						-	-							
13	1	-						-	-							
14	1	-						-	-							
15	1	-						-	-							
16	1	-						-	-							
17	1	-						-	-							
								DAILY TOTAL		2,163						
								DESTRUCTIVE LENGTH CARRY-OVER			~~406~~ 63					

* REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT LOCATION ON THE SEAM.

** COLUMNS TO BE USED BY THE DATA REVIEWER ONLY

GOLDER FORM: G13-0699
(JUNE 1999)

REVIEWED BY: TJS **DATE:** 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM LOG

PROJECT NUMBER: 1788523
OWNER: CEC
LOCATION: Erie, Mi.

PROJECT TITLE: JRW Ash & Chemical Pond Clousure
CONTRACTOR: Chesapeake

[X] FUSION
[ ] EXTRUSION

MACHINE # 58

PASSING TRIAL SEAMS

NO.	TIME	TECH ID
TF-1	1338	AR
TF-4	1757	AR

DESTRUCTIVE LENGTH CARRY-OVER FROM PREVIOUS LOG ~~466~~ 63

DATE 8.16.19

SHEET NUMBER 1 OF 1

	SEAM NUMBER	SEAM SECTION* START POINT	SEAM SECTION* FINISH POINT	APPROX. START TIME	AMB. AIR TEMP.	WELD TECH.	PREHEAT OR MACH. SPEED	MACHINE TEMPERATURES DIGITAL SET WEDGE OR BARREL NOZZLE	MACHINE TEMPERATURES INDICATOR WEDGE OR BARREL NOZZLE	APPROX. LENGTH WELDED	LENGTH FROM PREVIOUS DESTR.	DESTR. NUMBER	MON.	REMARKS	** NON-DESTRUCTIVE TEST DATE	** NON-DESTRUCTIVE MON.
1	8 / 9	E	W	1407	76°	AR	7	86Φ - —	— - —	72Φ	~~500~~ 626	DS-13	DH	1Q/94'W	8.16.19	DH
2	8 / 9	—	—	—	—	—	—	— - —	— - —	—	500 126	DS-14	DH	1R/126'E	8.16.19	DH
3	11 / 12	E	W	1523	77°	AR	7	86Φ - —	— - —	72Φ	500 346	DS-18	DH	2A/346'E	8.16.19	DH
4	14 / 15	E	W	1654	78°	AR	7	86Φ - —	— - —	72Φ	500 566	DS-22	DH	2H/154'W	8.16.19	DH
5	14 / 15	—	—	—	—	—	—	— - —	— - —	—	500 66	DS-23	DH	2I/66'E	8.16.19	DH
6	/	-						-	-							
7	/	-						-	-							
8	/	-						-	-							
9	/	-						-	-							
10	/	-						-	-							
11	/	-						-	-							
12	/	-						-	-							
13	/	-						-	-							
14	/	-						-	-							
15	/	-						-	-							
16	/	-						-	-							
17	/	-						-	-							

DAILY TOTAL: 2,160

DESTRUCTIVE LENGTH CARRY-OVER: 66

* REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT LOCATION ON THE SEAM.

** COLUMNS TO BE USED BY THE DATA REVIEWER ONLY

GOLDER FORM: G13-0699
(JUNE 1999)

REVIEWED BY: [signature] DATE: 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM LOG

PROJECT NUMBER: 1788523
OWNER: CEC
LOCATION: Erie, MI

PROJECT TITLE: JRW Ash + Chemical Pond Closure
CONTRACTOR: Chesapeake

[X] FUSION
[ ] EXTRUSION

MACHINE # 58

PASSING TRIAL SEAMS

NO.	TIME	TECH ID
TF-1	0846	~~AR~~
TF-3	1306	~~AR~~
TF-5	1500	AR

DESTRUCTIVE LENGTH CARRY-OVER FROM PREVIOUS LOG: Ø

DATE 8-15-19

SHEET NUMBER 1 of 1

	SEAM NUMBER	SEAM SECTION* START POINT	SEAM SECTION* FINISH POINT	APPROX. START TIME	AMB. AIR TEMP.	WELD TECH.	PREHEAT OR MACH. SPEED	MACHINE TEMPERATURES DIGITAL SET WEDGE OR BARREL NOZZLE	MACHINE TEMPERATURES INDICATOR WEDGE OR BARREL NOZZLE	APPROX. LENGTH WELDED	LENGTH FROM PREVIOUS DESTR.	DESTR. NUMBER	MON.	REMARKS	** NON-DESTRUCTIVE TEST DATE	** NON-DESTRUCTIVE MON.
1	2 / 3	E	W	0907	73°	~~AR~~	5.5	860 - -	- - -	723	220/503	DS-2	DH	1B/220'W	8.15	DH
2	2 / 3	-	-	-	-	~~AR~~	-	- - -	- - -	Ø	500/3	DS-4	DH	1D/3'E	8.15	DH
3	4 / 5	E	W	1033	74°	AR	5.5	860 - -	- - -	720	500/223	DS-6	DH	1F/223'E	8.15	DH
4	6 / 7	E	W	1326	78°	~~AR~~	7.5	860 - -	- - -	720	500/443	DS-9	DH	1J/277'W	8.15	DH
5	6 / 7	-	-	-	-	~~AR~~	-	- - -	- - -	Ø	183/260	DS-10	DH	1K/266'E	8.15	DH
6	/	-						-	-							
7	/	-						-	-							
8	/	-						-	-							
9	/	-						-	-							
10	/	-						-	-							
11	/	-						-	-							
12	/	-						-	-							
13	/	-						-	-							
14	/	-						-	-							
15	/	-						-	-							
16	/	-						-	-							
17	/	-						-	-							
18	/	-						-	-							
19	/	-						-	-							
20	/	-						-	-							
									DAILY TOTAL	2163	260					

* REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT LOCATION ON THE SEAM.

DESTRUCTIVE LENGTH CARRY-OVER

** COLUMNS TO BE USED BY THE DATA REVIEWER ONLY

GOLDER FORM: G13-0699
(January 2005)

REVIEWED BY: PS DATE: 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM LOG

PROJECT NUMBER: 1788523
OWNER: CEC
LOCATION: Erie, Mi.

PROJECT TITLE: JRW Ash & Chemical Pond Closure
CONTRACTOR: Chesapeake

[X] FUSION
[ ] EXTRUSION

MACHINE # 58

PASSING TRIAL SEAMS

NO.	TIME	TECH ID
TF-1	0801	AR
TF-5	1108	AR

DESTRUCTIVE LENGTH CARRY-OVER FROM PREVIOUS LOG: 66

DATE: 8.17.19

SHEET NUMBER: 1 OF 1

	SEAM NUMBER	SEAM SECTION* START POINT	SEAM SECTION* FINISH POINT	APPROX. START TIME	AMB. AIR TEMP.	WELD TECH.	PREHEAT OR MACH. SPEED	MACHINE TEMPERATURES DIGITAL SET WEDGE OR BARREL NOZZLE	MACHINE TEMPERATURES INDICATOR WEDGE OR BARREL NOZZLE	APPROX. LENGTH WELDED	LENGTH FROM PREVIOUS DESTR.	DESTR. NUMBER	MON.	REMARKS	** NON-DESTRUCTIVE TEST DATE	** NON-DESTRUCTIVE MON.
1	18 / 19	E	W	0828	72°	AR	7.5	860 - —	— - —	720	500/286	DS-29	DH	2R/286'E	8.17.19	DH
2	21 / 22	E	W	1000	72°	AR	7.5	860 - —	— - —	720	500/506	DS-32	DH	2W/214'W	8.17.19	DH
3	21 / 22	—	—	—	—	—	—	— - —	— - —	—	500/6	DS-33	DH	2X/6'E	8.17.19	DH
4	/	-						-	-							
5	/	-						-	-							
6	/	-						-	-							
7	/	-						-	-							
8	/	-						-	-							
9	/	-						-	-							
10	/	-						-	-							
11	/	-						-	-							
12	/	-						-	-							
13	/	-						-	-							
14	/	-						-	-							
15	/	-						-	-							
16	/	-						-	-							
17	/	-						-	-							
								DAILY TOTAL		1440						
								DESTRUCTIVE LENGTH CARRY-OVER			6					

* REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT LOCATION ON THE SEAM.

** COLUMNS TO BE USED BY THE DATA REVIEWER ONLY

GOLDER FORM: G13-0699
(JUNE 1999)

REVIEWED BY: PS DATE: 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM LOG

PROJECT NUMBER: 1788523
OWNER: CEC
LOCATION: Erie, Mi.

PROJECT TITLE: JRW Ash & Chemical Pond Closure
CONTRACTOR: Chesapeake

[X] FUSION
[ ] EXTRUSION

MACHINE # 58

PASSING TRIAL SEAMS

NO.	TIME	TECH ID
TF-1	1243	AR
TF-4	1417	AR

DESTRUCTIVE LENGTH CARRY-OVER FROM PREVIOUS LOG: 6

DATE 8.20.19

SHEET NUMBER 1 OF 1

	SEAM NUMBER	SEAM SECTION* START POINT	SEAM SECTION* FINISH POINT	APPROX. START TIME	AMB. AIR TEMP.	WELD TECH.	PREHEAT OR MACH. SPEED	MACHINE TEMPERATURES DIGITAL SET WEDGE OR BARREL NOZZLE	MACHINE TEMPERATURES INDICATOR WEDGE OR BARREL NOZZLE	APPROX. LENGTH WELDED	LENGTH FROM PREVIOUS DESTR.	DESTR. NUMBER	MON.	REMARKS	** NON-DESTRUCTIVE TEST DATE	** NON-DESTRUCTIVE MON.
1	22 / 23	E	W	1257	80°	AR	7.5	860 - —	— - —	720	500/226	DS-34	DH	3A/226 E	8.20.19	DH
2	/	-						-	-							
3	/	-						-	-							
4	/	-						-	-							
5	/	-						-	-							
6	/	-						-	-							
7	/	-						-	-							
8	/	-						-	-							
9	/	-						-	-							
10	/	-						-	-							
11	/	-						-	-							
12	/	-						-	-							
13	/	-						-	-							
14	/	-						-	-							
15	/	-						-	-							
16	/	-						-	-							
17	/	-						-	-							
								DAILY TOTAL		720						
								DESTRUCTIVE LENGTH CARRY-OVER			226					

* REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT LOCATION ON THE SEAM.

** COLUMNS TO BE USED BY THE DATA REVIEWER ONLY

GOLDER FORM: G13-0699
(JUNE 1999)

REVIEWED BY: BS DATE: 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM LOG

PROJECT NUMBER: 1788523
OWNER: CEC
LOCATION: Erie, Mi.

PROJECT TITLE: JRW Ash & Chemical Pond Clousure
CONTRACTOR: Chesapeake

[X] FUSION
[ ] EXTRUSION

MACHINE # M-1707

PASSING TRIAL SEAMS

NO.	TIME	TECH ID
TF-2	1345	S. D.

DESTRUCTIVE LENGTH CARRY-OVER FROM PREVIOUS LOG: Ø

DATE 9.27.19

SHEET NUMBER 1 OF 1

	SEAM NUMBER	SEAM SECTION* START POINT	SEAM SECTION* FINISH POINT	APPROX. START TIME	AMB. AIR TEMP.	WELD TECH.	PREHEAT OR MACH. SPEED	MACHINE TEMPERATURES DIGITAL SET WEDGE OR BARREL NOZZLE	MACHINE TEMPERATURES INDICATOR WEDGE OR BARREL NOZZLE	APPROX. LENGTH WELDED	LENGTH FROM PREVIOUS DESTR.	DESTR. NUMBER	MON.	REMARKS	** NON-DESTRUCTIVE TEST DATE	** NON-DESTRUCTIVE MON.
1	26 / 27	W	E	1411	72°	S.D.	7.5	86Ø - —	— - —	73Ø	100Ø/63Ø	DS-41	DH	31/100'E	9.30.19	DH
2	26 / 27	—	—	—	—	—	—	— - —	— - —	—	500Ø/132Ø	DS-42	DH	35/130'W	9.30.19	DH
3	29 / 30	W	3T	1550	72°	S.D.	~~7.5~~	86Ø - —	— - —	69Ø	500Ø/320Ø	DS-46	DH	30/320'W	9.30.19	DH
4	/	-						-	-							
5	/	-						-	-							
6	/	-						-	-							
7	/	-						-	-							
8	/	-						-	-							
9	/	-						-	-							
10	/	-						-	-							
11	/	-						-	-							
12	/	-						-	-							
13	/	-						-	-							
14	/	-						-	-							
15	/	-						-	-							
16	/	-						-	-							
17	/	-						-	-							
								DAILY TOTAL		142Ø						
								DESTRUCTIVE LENGTH CARRY-OVER			32Ø					

* REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT LOCATION ON THE SEAM.

** COLUMNS TO BE USED BY THE DATA REVIEWER ONLY

GOLDER FORM: G13-0699
(JUNE 1999)

REVIEWED BY: TDS DATE: 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM LOG

PROJECT NUMBER: 1788523
OWNER: CEC
LOCATION: Erie, Mi.

PROJECT TITLE: JRW Ash & Chemical Pond Closure
CONTRACTOR: Chesapeake

[X] FUSION
[ ] EXTRUSION

MACHINE # M-17Φ7

PASSING TRIAL SEAMS

NO.	TIME	TECH ID
TF-2	1435	SD
TF-3	1644	SD

DESTRUCTIVE LENGTH CARRY-OVER FROM PREVIOUS LOG: 32Φ

DATE: 10.1.19

SHEET NUMBER: 1 OF 1

	SEAM NUMBER	SEAM SECTION* START POINT	SEAM SECTION* FINISH POINT	APPROX. START TIME	AMB. AIR TEMP.	WELD TECH.	PREHEAT OR MACH. SPEED	MACHINE TEMPERATURES DIGITAL SET WEDGE OR BARREL NOZZLE	MACHINE TEMPERATURES INDICATOR WEDGE OR BARREL NOZZLE	APPROX. LENGTH WELDED	LENGTH FROM PREVIOUS DESTR.	DESTR. NUMBER	MON.	REMARKS	** NON-DESTRUCTIVE TEST DATE	** NON-DESTRUCTIVE MON.
1	29 / 30Φ	3T	E	1456	82°	S.D.	7,5	86Φ - -	- - -	4Φ	36Φ	—	DH	—	10.1.19	DH
2	31 / 32	W	E	1510Φ	82°	S.D.	7,5	86Φ - —	- - -	73Φ	500Φ/59Φ	DS-48	DH	35/14Φ'E	10.1.19	DH
3	31 / 32	—	—	—	—	—	—	— - —	— - —	—	500Φ/9Φ	DS-49	DH	3w/9Φ'w	10.1.19	DH
4	/	-						-	-							
5	/	-						-	-							
6	/	-						-	-							
7	/	-						-	-							
8	/	-						-	-							
9	/	-						-	-							
10	/	-						-	-							
11	/	-						-	-							
12	/	-						-	-							
13	/	-						-	-							
14	/	-						-	-							
15	/	-						-	-							
16	/	-						-	-							
17	/	-						-	-							
								DAILY TOTAL		77Φ						
								DESTRUCTIVE LENGTH CARRY-OVER			9Φ					

Panels 26, 27, 28, 29, 30, 31, and 32 were deployed on 9/27/2019. Storms / precipitation caused an early shutdown on 9/27/2019 and, as a result, seaming of the deployed panels could not be finished on the same day the panels were deployed. Fusion seaming of these panels was completed on 10/1/2019 after cleaning the panel seam edges.

* REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT LOCATION ON THE SEAM.

** COLUMNS TO BE USED BY THE DATA REVIEWER ONLY

GOLDER FORM: G13-0699
(JUNE 1999)

REVIEWED BY: RS DATE: 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM LOG

PROJECT NUMBER: 1788523
OWNER: CEC
LOCATION: Erie, Mi

PROJECT TITLE: JRW Ash & Chemical Pond Closure
CONTRACTOR: Chesapeake

[X] FUSION
[ ] EXTRUSION

MACHINE # 1707

PASSING TRIAL SEAMS

NO.	TIME	TECH ID
TF-2	0821	SD
TF-4	1222	SD

DESTRUCTIVE LENGTH CARRY-OVER FROM PREVIOUS LOG 90

DATE 10.2.19

SHEET NUMBER 1

	SEAM NUMBER	SEAM SECTION* START POINT	SEAM SECTION* FINISH POINT	APPROX. START TIME	AMB. AIR TEMP.	WELD TECH.	PREHEAT OR MACH. SPEED	MACHINE TEMPERATURES DIGITAL SET WEDGE OR BARREL NOZZLE	MACHINE TEMPERATURES INDICATOR WEDGE OR BARREL NOZZLE	APPROX. LENGTH WELDED	LENGTH FROM PREVIOUS DESTR.	DESTR. NUMBER	MON.	REMARKS	** NON-DESTRUCTIVE TEST DATE	** NON-DESTRUCTIVE MON.
1	32 / 33	W	E	0905	72°	SD	7.5	860 - -	- - -	730	500/320	DS-54	DH	4C/320' W	10.2.19	DH
2	35 / 36	W	E	1054	72°	SD	7.5	860 - -	- - -	730	500/550	DS-55	DH	4H/180' E	10/4/19	DH
3	35 / 36	-	-	-	-	-	-	- - -	- - -	-	500/50	DS-56	DH	4I/30' W	10/4/19	DH
4	/	-						-	-							
5	/	-						-	-							
6	/	-						-	-							
7	/	-						-	-							
8	/	-						-	-							
9	/	-						-	-							
10	/	-						-	-							
11	/	-						-	-							
12	/	-						-	-							
13	/	-						-	-							
14	/	-						-	-							
15	/	-						-	-							
16	/	-						-	-							
17	/	-						-	-							
								DAILY TOTAL		1460						
								DESTRUCTIVE LENGTH CARRY-OVER			50					

* REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT LOCATION ON THE SEAM.

** COLUMNS TO BE USED BY THE DATA REVIEWER ONLY

GOLDER FORM: G13-0699
(JUNE 1999)

REVIEWED BY: PS DATE: 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM LOG

PROJECT NUMBER: 1788523
OWNER: CEC
LOCATION: Erie, Mi.

PROJECT TITLE: JRW Ash & Chemical Pond Closure
CONTRACTOR: Chesapeake

[X] FUSION
[ ] EXTRUSION

MACHINE # M-1747

PASSING TRIAL SEAMS

NO.	TIME	TECH ID
TF-1	1353	SD
TF-4	1760	SD

DESTRUCTIVE LENGTH CARRY-OVER FROM PREVIOUS LOG: 50

DATE 10.4.19

SHEET NUMBER 1

	SEAM NUMBER	SEAM SECTION* START POINT	SEAM SECTION* FINISH POINT	APPROX. START TIME	AMB. AIR TEMP.	WELD TECH.	PREHEAT OR MACH. SPEED	MACHINE TEMPERATURES DIGITAL SET WEDGE OR BARREL NOZZLE	MACHINE TEMPERATURES INDICATOR WEDGE OR BARREL NOZZLE	APPROX. LENGTH WELDED	LENGTH FROM PREVIOUS DESTR.	DESTR. NUMBER	MON.	REMARKS	** NON-DESTRUCTIVE TEST DATE	** NON-DESTRUCTIVE MON.
1	39 to 40	E	W	1411	68°	SD	7.5	860 - -	- - -	730	500/280	DS-59	DH	4P/280'E	10.5.19	DH
2	42 to 43	E	W	1533	65°	SD	7.5	860 - -	- - -	730	500/510	DS-64	DH	4W/220'W	10.7.19	DH
3	42 to 43	—	—	—	—	—	—	— - —	— - —	—	500/10	DS-65	DH	4x/10'E	10.7.19	DH
4	/	-						-	-							
5	/	-						-	-							
6	/	-						-	-							
7	/	-						-	-							
8	/	-						-	-							
9	/	-						-	-							
10	/	-						-	-							
11	/	-						-	-							
12	/	-						-	-							
13	/	-						-	-							
14	/	-						-	-							
15	/	-						-	-							
16	/	-						-	-							
17	/	-						-	-							
								DAILY TOTAL		1460						
								DESTRUCTIVE LENGTH CARRY-OVER			10					

* REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT LOCATION ON THE SEAM.

** COLUMNS TO BE USED BY THE DATA REVIEWER ONLY

GOLDER FORM: G13-0699
(JUNE 1999)

REVIEWED BY: PS DATE: 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM LOG

PROJECT NUMBER: 1788523
OWNER: CEC
LOCATION: Erie, Mi.

PROJECT TITLE: JRW Ash & Chemical Pond Closure
CONTRACTOR: Chesapeake

[X] FUSION
[ ] EXTRUSION

MACHINE # M-1707

PASSING TRIAL SEAMS

NO.	TIME	TECH ID
TF-3	0832	SD
TF-5	1210	SD
TF-8	1338	SD
TF-9	1610	SD

DESTRUCTIVE LENGTH CARRY-OVER FROM PREVIOUS LOG: 10

DATE: 10,5,19

SHEET NUMBER: 1

	SEAM NUMBER	SEAM SECTION* START POINT	SEAM SECTION* FINISH POINT	APPROX. START TIME	AMB. AIR TEMP.	WELD TECH.	PREHEAT OR MACH. SPEED	MACHINE TEMPERATURES DIGITAL SET WEDGE OR BARREL NOZZLE	MACHINE TEMPERATURES INDICATOR WEDGE OR BARREL NOZZLE	APPROX. LENGTH WELDED	LENGTH FROM PREVIOUS DESTR.	DESTR. NUMBER	MON.	REMARKS	** NON-DESTRUCTIVE TEST DATE	** NON-DESTRUCTIVE MON.
1	45 / 46	W	E	0925	58	SD	7.5	860 - —	— - —	730	500/240	DS-74	DH	5F/240 W	10.7.19	DH
2	48 / 49	W	E	1057	58	SD	7.5	860 - —	— - —	730	500/470	DS-74	DH	5J/260 E	10.7.19	DH
3	28 / 52	N	S	1520	58	SD	7	860 - —	— - —	23	493	—	DH	—	10.7	DH
4	29 / 52	N		1523				- —	— - —	23	500/16	DS-76	DH	5T/7'S	10.7	DH
5	30 / 52	N		1525				- —	— - —	23	39	—	—	—	10.7	DH
6	31 / 52	N		1527				- —	— - —	23	62	—	—	—	10.7	DH
7	32 / 52	N		1530				- —	— - —	23	85	—	—	—	10.7	DH
8	33 / 52	N		1532				- —	— - —	23	108	—	—	—	10.7	DH
9	34 / 52	N		1535				- —	— - —	23	131	—	—	—	10.7	DH
10	35 / 52	N		1537				- —	— - —	23	154	—	—	—	10.7	DH
11	36 / 52	N		1539				- —	— - —	23	177	—	—	—	10.7	DH
12	37 / 52	N		1542				- —	— - —	23	200	—	—	—	10.7	DH
13	38 / 52	N		1544				- —	— - —	23	223	—	—	—	10.7	DH
14	39 / 52	N		1546				- —	— - —	23	246	—	—	—	10.7	DH
15	40 / 52	N		1549				- —	— - —	23	269	—	—	—	10.7	DH
16	41 / 52	N	S	1551	58	SD	7	860 - —	— - —	23	292	—	—	—	10.7	DH
17	/							-	-							
								DAILY TOTAL		1782						
								DESTRUCTIVE LENGTH CARRY-OVER			292					

* REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT LOCATION ON THE SEAM.

** COLUMNS TO BE USED BY THE DATA REVIEWER ONLY

GOLDER FORM: G13-0699
(JUNE 1999)

REVIEWED BY: PS DATE: 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM LOG

PROJECT NUMBER: 1788523
OWNER: CEC
LOCATION: Erie, Mi.

PROJECT TITLE: JRW Ash & Chemical Pond Closure
CONTRACTOR: Chesapeake

[X] FUSION
[ ] EXTRUSION

MACHINE # M-65

PASSING TRIAL SEAMS

NO.	TIME	TECH ID
TF-1	1400	RH
TF-4	1735	RH

DESTRUCTIVE LENGTH CARRY-OVER FROM PREVIOUS LOG: 0

DATE 10.1.19

SHEET NUMBER 1 OF 1

	SEAM NUMBER	SEAM SECTION* START POINT	SEAM SECTION* FINISH POINT	APPROX. START TIME	AMB. AIR TEMP.	WELD TECH.	PREHEAT OR MACH. SPEED	MACHINE TEMPERATURES DIGITAL SET WEDGE OR BARREL NOZZLE	MACHINE TEMPERATURES INDICATOR WEDGE OR BARREL NOZZLE	APPROX. LENGTH WELDED	LENGTH FROM PREVIOUS DESTR.	DESTR. NUMBER	MON.	REMARKS	** NON-DESTRUCTIVE TEST DATE	** NON-DESTRUCTIVE MON.
1	27 / 28	W	E	1425	82°	RH	7.0	860 - -	- - -	730	1400/630	DS-43	DH	3K/1400'E	10.1.19	DH
2	27 / 28	-	-	-	-	-	-	- - -	- - -	-	540/130	DS-44	DH	3K/130'W	10.1.19	DH
3	30 / 31	W	E	1614	82°	RH	7.0	860 - -	- - -	730	500/360	DS-47	DH	3R/360'W	10.1.19	DH
4	/	-						-	-							
5	/	-						-	-							
6	/	-						-	-							
7	/	-						-	-							
8	/	-						-	-							
9	/	-						-	-							
10	/	-						-	-							
11	/	-						-	-							
12	/	-						-	-							
13	/	-						-	-							
14	/	-						-	-							
15	/	-						-	-							
16	/	-						-	-							
17	/	-						-	-							
								DAILY TOTAL		1460						
								DESTRUCTIVE LENGTH CARRY-OVER			360					

Panels 26, 27, 28, 29, 30, 31, and 32 were deployed on 9/27/2019. Storms / precipitation caused an early shutdown on 9/27/2019 and, as a result, seaming of the deployed panels could not be finished on the same day the panels were deployed. Fusion seaming of these panels was completed on 10/1/2019 after cleaning the panel seam edges.

* REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT LOCATION ON THE SEAM.

** COLUMNS TO BE USED BY THE DATA REVIEWER ONLY

GOLDER FORM: G13-0699
(JUNE 1999)

REVIEWED BY: PS DATE: 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM LOG

PROJECT NUMBER: 1788523
OWNER: CEC
LOCATION: Erie, Mi

PROJECT TITLE: JRW Ash & Chemical Pond Closure
CONTRACTOR: Chesapeake

[X] FUSION
[ ] EXTRUSION

MACHINE # M65

PASSING TRIAL SEAMS

NO.	TIME	TECH ID
TF-1	Φ815	RH
TF-5	1225	RH

DESTRUCTIVE LENGTH CARRY-OVER FROM PREVIOUS LOG: 36Φ

DATE: 10.2.19

SHEET NUMBER: 1

	SEAM NUMBER	SEAM SECTION* START POINT	SEAM SECTION* FINISH POINT	APPROX. START TIME	AMB. AIR TEMP.	WELD TECH.	PREHEAT OR MACH. (SPEED)	MACHINE TEMPERATURES DIGITAL SET (WEDGE) OR BARREL NOZZLE	MACHINE TEMPERATURES INDICATOR WEDGE OR BARREL NOZZLE	APPROX. LENGTH WELDED	LENGTH FROM PREVIOUS DESTR.	DESTR. NUMBER	MON.	REMARKS	** NON-DESTRUCTIVE TEST DATE	** NON-DESTRUCTIVE MON.
1	33 / 34	W	E	Φ92Φ	72°	RH	7	86Φ - —	— - —	73Φ	50Φ/59Φ	DS-51	DH	4D/140'E	10/2/19	DH
2	33 / 34	—	—	—	—	—	—	— - —	— - —	—	50Φ/9Φ	DS-52	DH	4E/9Φ'W	10.2.19	DH
3	36 / 37	W	E	10Φ55	72°	RH	7	86Φ - —	— - —	73Φ	50Φ/32Φ	DS-57	DH	4J/32Φ'W	10/4/19	DH
4	/	-						-	-							
5	/	-						-	-							
6	/	-						-	-							
7	/	-						-	-							
8	/	-						-	-							
9	/	-						-	-							
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12	/	-						-	-							
13	/	-						-	-							
14	/	-						-	-							
15	/	-						-	-							
16	/	-						-	-							
17	/	-						-	-							
								DAILY TOTAL		1,46Φ						
								DESTRUCTIVE LENGTH CARRY-OVER			32Φ					

* REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT LOCATION ON THE SEAM.

** COLUMNS TO BE USED BY THE DATA REVIEWER ONLY

GOLDER FORM: G13-0699
(JUNE 1999)

REVIEWED BY: PS DATE: 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM LOG

PROJECT NUMBER: 1788523
OWNER: CEC
LOCATION: Erie, Mi

PROJECT TITLE: JRW Ash & Chemical Pond Closure
CONTRACTOR: Chesapeake

[X] FUSION
[ ] EXTRUSION

MACHINE # M-65

PASSING TRIAL SEAMS

NO.	TIME	TECH ID
TF-3	1405	RH
TF-6	1735	RH

DESTRUCTIVE LENGTH CARRY-OVER FROM PREVIOUS LOG: 32Φ

DATE 10.4.19

SHEET NUMBER 1

	SEAM NUMBER	SEAM SECTION* START POINT	SEAM SECTION* FINISH POINT	APPROX. START TIME	AMB. AIR TEMP.	WELD TECH.	PREHEAT OR MACH. SPEED	MACHINE TEMPERATURES DIGITAL SET WEDGE OR BARREL NOZZLE	MACHINE TEMPERATURES INDICATOR WEDGE OR BARREL NOZZLE	APPROX. LENGTH WELDED	LENGTH FROM PREVIOUS DESTR.	DESTR. NUMBER	MON.	REMARKS	** NON-DESTRUCTIVE TEST DATE	** NON-DESTRUCTIVE MON.
1	41 / 42	E	-	1432	68°	RH	7	86Φ - —	— - —	73Φ	50Φ/55Φ	DS-62	DH	4S/180'W	10.5.19	DH
2	41 / 42	—	- —	—	—	—	—	— - —	— - —	—	50Φ/50Φ	DS-63	DH	4T/50'E	10.5.19	DH
3	38 / 39	E	- W	1623	65°	RH	7	86Φ - —	— - —	73Φ	50Φ/28Φ	DS-67	DH	5B/280'E	10.5.19	DH
4	/		-					-	-							
5	/		-					-	-							
6	/		-					-	-							
7	/		-					-	-							
8	/		-					-	-							
9	/		-					-	-							
10	/		-					-	-							
11	/		-					-	-							
12	/		-					-	-							
13	/		-					-	-							
14	/		-					-	-							
15	/		-					-	-							
16	/		-					-	-							
17	/		-					-	-							
								DAILY TOTAL		146Φ						
								DESTRUCTIVE LENGTH CARRY-OVER			28Φ					

* REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT LOCATION ON THE SEAM.

** COLUMNS TO BE USED BY THE DATA REVIEWER ONLY

GOLDER FORM: G13-0699
(JUNE 1999)

REVIEWED BY: PS DATE: 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM LOG

PROJECT NUMBER: 1788523
OWNER: CEC
LOCATION: Erie, Mi.

PROJECT TITLE: JRW Ash & Chemical Pond Closure
CONTRACTOR: Chesapeake

[X] FUSION
[ ] EXTRUSION

MACHINE # M-65

PASSING TRIAL SEAMS

NO.	TIME	TECH ID
TF-2	0828	RH
TF-4	1215	RH

DESTRUCTIVE LENGTH CARRY-OVER FROM PREVIOUS LOG: 28Φ

DATE: 10.5.19

SHEET NUMBER: 1

	SEAM NUMBER	SEAM SECTION* START POINT	SEAM SECTION* FINISH POINT	APPROX. START TIME	AMB. AIR TEMP.	WELD TECH.	PREHEAT OR MACH. (SPEED)	MACHINE TEMPERATURES DIGITAL SET (WEDGE) OR BARREL NOZZLE	MACHINE TEMPERATURES INDICATOR WEDGE OR BARREL NOZZLE	APPROX. LENGTH WELDED	LENGTH FROM PREVIOUS DESTR.	DESTR. NUMBER	MON.	REMARKS	** NON-DESTRUCTIVE TEST DATE	** NON-DESTRUCTIVE MON.
1	461 47	W	E	0950	58	RH	7	860 - —	— - —	730	500/510	DS-71	DH	5G/220 E	10.7.19	DH
2	461 47	—	—	—	—	—	—	— - —	— - —	—	540/10	DS-72	DH	5H/10 W	10.7.19	DH
3	491 50	W	E	1133	58	RH	7	860 - —	— - —	354	360/0	DS-75	DH	5K/EBOS	10.7.19	DH
4	/	-						-	-							
5	/	-						-	-							
6	/	-						-	-							
7	/	-						-	-							
8	/	-						-	-							
9	/	-						-	-							
10	/	-						-	-							
11	/	-						-	-							
12	/	-						-	-							
13	/	-						-	-							
14	/	-						-	-							
15	/	-						-	-							
16	/	-						-	-							
17	/	-						-	-							
								DAILY TOTAL DESTRUCTIVE LENGTH CARRY-OVER		1084	0					

* REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT LOCATION ON THE SEAM.

** COLUMNS TO BE USED BY THE DATA REVIEWER ONLY

GOLDER FORM: G13-0699
(JUNE 1999)

REVIEWED BY: PS DATE: 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM LOG

PROJECT NUMBER: 1788523
OWNER: CEC
LOCATION: Erie, Mi.

PROJECT TITLE: JRW Ash & Chemical Pond Closure
CONTRACTOR: Chesapeake

[x] FUSION
[ ] EXTRUSION

MACHINE # 1741

PASSING TRIAL SEAMS

NO.	TIME	TECH ID
TF-3	1450	ML
TF-6	1910	ML

DESTRUCTIVE LENGTH CARRY-OVER FROM PREVIOUS LOG: 0

DATE 8.16.19

SHEET NUMBER 1 OF 1

	SEAM NUMBER	SEAM SECTION* START POINT	SEAM SECTION* FINISH POINT	APPROX. START TIME	AMB. AIR TEMP.	WELD TECH.	PREHEAT OR MACH. SPEED	MACHINE TEMPERATURES DIGITAL SET WEDGE OR BARREL NOZZLE	MACHINE TEMPERATURES INDICATOR WEDGE OR BARREL NOZZLE	APPROX. LENGTH WELDED	LENGTH FROM PREVIOUS DESTR.	DESTR. NUMBER	MON.	REMARKS	** NON-DESTRUCTIVE TEST DATE	** NON-DESTRUCTIVE MON.
1	1Φ / 11	E	W	1507	77°	ML	7	860 - —	— - —	720	1000/620	DS-16	DH	1W/100W	8.16.19	DH
2	1Φ / 11	—	—	—	—	—	—	— - —	— - —	—	500/120	DS-17	DH	1X/120 E	8.16.19	DH
3	13 / 14	E	W	1631	78°	ML	7	860 - —	— - —	720	500/340	DS-21	DH	2G/380W	8.16.19	DH
4	16 / 17	E	W	1754	78°	ML	7	860 - —	— - —	720	500/560	DS-25	DH	2M/160W	8.16.19	DH
5	16 / 17	—	—	—	—	—	—	— - —	— - —	—	540/60	DS-26	DH	2N/60 E	8.16.19	DH
6	/	-						-	-							
7	/	-						-	-							
8	/	-						-	-							
9	/	-						-	-							
10	/	-						-	-							
11	/	-						-	-							
12	/	-						-	-							
13	/	-						-	-							
14	/	-						-	-							
15	/	-						-	-							
16	/	-						-	-							
17	/	-						-	-							
								DAILY TOTAL		2,160						
								DESTRUCTIVE LENGTH CARRY-OVER			60					

* REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT LOCATION ON THE SEAM.

** COLUMNS TO BE USED BY THE DATA REVIEWER ONLY

GOLDER FORM: G13-0699
(JUNE 1999)

REVIEWED BY: [signature] DATE: 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM LOG

PROJECT NUMBER: 1788523
OWNER: CEC
LOCATION: Erie, Mi.

PROJECT TITLE: JRW Ash & Chemical Pond Closure
CONTRACTOR: Chesapeake

[X] FUSION
[ ] EXTRUSION

MACHINE # 1741

PASSING TRIAL SEAMS

NO.	TIME	TECH ID
TF-3	0810	ML
TF-6	1300	ML

DESTRUCTIVE LENGTH CARRY-OVER FROM PREVIOUS LOG 60

DATE 8.17.19

SHEET NUMBER 1 OF 1

	SEAM NUMBER	SEAM SECTION* START POINT	SEAM SECTION* FINISH POINT	APPROX. START TIME	AMB. AIR TEMP.	WELD TECH.	PREHEAT OR MACH. SPEED	MACHINE TEMPERATURES DIGITAL SET WEDGE OR BARREL NOZZLE	MACHINE TEMPERATURES INDICATOR WEDGE OR BARREL NOZZLE	APPROX. LENGTH WELDED	LENGTH FROM PREVIOUS DESTR.	DESTR. NUMBER	MON.	REMARKS	** NON-DESTRUCTIVE TEST DATE	** NON-DESTRUCTIVE MON.
1	191 20	E	W	0842	72°	ML	6.5	860 - —	— - —	720	500/280	DS-30	DH	25/280'E	8.17.19	DH
2	/	-						-	-							
3	/	-						-	-							
4	/	-						-	-							
5	/	-						-	-							
6	/	-						-	-							
7	/	-						-	-							
8	/	-						-	-							
9	/	-						-	-							
10	/	-						-	-							
11	/	-						-	-							
12	/	-						-	-							
13	/	-						-	-							
14	/	-						-	-							
15	/	-						-	-							
16	/	-						-	-							
17	/	-						-	-							
								DAILY TOTAL		720						
								DESTRUCTIVE LENGTH CARRY-OVER			280					

* REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT LOCATION ON THE SEAM.

** COLUMNS TO BE USED BY THE DATA REVIEWER ONLY

GOLDER FORM: G13-0699
(JUNE 1999)

REVIEWED BY: RPS DATE: 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM LOG

PROJECT NUMBER: 1788523
OWNER: CEC
LOCATION: Erie, Mi.

PROJECT TITLE: JRW Ash & Chemical Pond Closure
CONTRACTOR: Chesapeake

[X] FUSION
[ ] EXTRUSION

MACHINE # 1741

PASSING TRIAL SEAMS

NO.	TIME	TECH ID
TF-2	1256	ML
TF-6	1420	ML

DESTRUCTIVE LENGTH CARRY-OVER FROM PREVIOUS LOG 280

DATE 8.20.19

SHEET NUMBER 1 OF 1

	SEAM NUMBER	SEAM SECTION* START POINT	SEAM SECTION* FINISH POINT	APPROX. START TIME	AMB. AIR TEMP.	WELD TECH.	PREHEAT OR MACH. (SPEED)	MACHINE TEMPERATURES DIGITAL SET (WEDGE) OR BARREL NOZZLE	MACHINE TEMPERATURES INDICATOR WEDGE OR BARREL NOZZLE	APPROX. LENGTH WELDED	LENGTH FROM PREVIOUS DESTR.	DESTR. NUMBER	MON.	REMARKS	** NON-DESTRUCTIVE TEST DATE	** NON-DESTRUCTIVE MON.
1	23 / 24	E	W	1303	80°	ML	7.5	860 - —	— - —	720	300/700	DS-35	DH	3B/200'W	8.20.19	DH
2	23 / 24	—	—	—	—	—	—	— - —	— - —	—	500/200	DS-36	DH	3C/200'E	8.20.19	DH
3	23 / 24	—	—	—	—	—	—	— - —	— - —	—	200/0	DS-38	DH	3E/WEOS	8.20.19	DH
4	/	-						-	-							
5	/	-						-	-							
6	/	-						-	-							
7	/	-						-	-							
8	/	-						-	-							
9	/	-						-	-							
10	/	-						-	-							
11	/	-						-	-							
12	/	-						-	-							
13	/	-						-	-							
14	/	-						-	-							
15	/	-						-	-							
16	/	-						-	-							
17	/	-						-	-							
								DAILY TOTAL		720						
								DESTRUCTIVE LENGTH CARRY-OVER			0					

* REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT LOCATION ON THE SEAM.

** COLUMNS TO BE USED BY THE DATA REVIEWER ONLY

GOLDER FORM: G13-0699
(JUNE 1999)

REVIEWED BY: PS DATE: 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM LOG

PROJECT NUMBER: 1788523
OWNER: CEC
LOCATION: Erie, Mi.

PROJECT TITLE: JRW Ash & Chemical Pond Closure
CONTRACTOR: Chesapeake

[X] FUSION
[ ] EXTRUSION

MACHINE # M-1743

PASSING TRIAL SEAMS

NO.	TIME	TECH ID
7F-1	1344	PF

DESTRUCTIVE LENGTH CARRY-OVER FROM PREVIOUS LOG: Φ

DATE: 9.27.19

SHEET NUMBER: 1 OF 1

	SEAM NUMBER	SEAM SECTION* START POINT	SEAM SECTION* FINISH POINT	APPROX. START TIME	AMB. AIR TEMP.	WELD TECH.	PREHEAT OR MACH. SPEED	MACHINE TEMPERATURES DIGITAL SET WEDGE OR BARREL NOZZLE	MACHINE TEMPERATURES INDICATOR WEDGE OR BARREL NOZZLE	APPROX. LENGTH WELDED	LENGTH FROM PREVIOUS DESTR.	DESTR. NUMBER	MON.	REMARKS	** NON-DESTRUCTIVE TEST DATE	** NON-DESTRUCTIVE MON.
1	25 / 26	E	W	1403	72°	PF	7.0	86Φ - —	— - —	73Φ	100 / 63Φ	DS-39	DH	36/100'W	9.30.19	DH
2	25 / 26	—	—	—	—	—	—	— - —	— - —	—	500 / 13Φ	DS-40	DH	3H/130'E	9.30.19	DH
3	28 / 29	W	E	1534	72°	PF	7.0	86Φ - —	— - —	73Φ	50Φ/36Φ	DS-45	DH	3P/36Φ'W	9.30.19	DH
4	/	-						-	-							
5	/	-						-	-							
6	/	-						-	-							
7	/	-						-	-							
8	/	-						-	-							
9	/	-						-	-							
10	/	-						-	-							
11	/	-						-	-							
12	/	-						-	-							
13	/	-						-	-							
14	/	-						-	-							
15	/	-						-	-							
16	/	-						-	-							
17	/	-						-	-							
								DAILY TOTAL		146Φ						
								DESTRUCTIVE LENGTH CARRY-OVER			36Φ					

* REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT LOCATION ON THE SEAM.

** COLUMNS TO BE USED BY THE DATA REVIEWER ONLY

GOLDER FORM: G13-0699
(JUNE 1999)

REVIEWED BY: PS DATE: 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM LOG

PROJECT NUMBER: 1788523
OWNER: CEC
LOCATION: Erie, Mi

PROJECT TITLE: JRW Ash & Chemical Pond Closure
CONTRACTOR: Chesapeake

[X] FUSION
[ ] EXTRUSION

MACHINE # M-1743

PASSING TRIAL SEAMS

NO.	TIME	TECH ID
TF-3	0825	PF
TF-6	1230	PF

DESTRUCTIVE LENGTH CARRY-OVER FROM PREVIOUS LOG: 360

DATE: 10.2.19

SHEET NUMBER: 1

	SEAM NUMBER	SEAM SECTION* START POINT	SEAM SECTION* FINISH POINT	APPROX. START TIME	AMB. AIR TEMP.	WELD TECH.	PREHEAT OR MACH. SPEED	MACHINE TEMPERATURES DIGITAL SET WEDGE OR BARREL NOZZLE	MACHINE TEMPERATURES INDICATOR WEDGE OR BARREL NOZZLE	APPROX. LENGTH WELDED	LENGTH FROM PREVIOUS DESTR.	DESTR. NUMBER	MON.	REMARKS	** NON-DESTRUCTIVE TEST DATE	** NON-DESTRUCTIVE MON.
1	34 / 35	W	E	0925	72°	PF	7.5	860 - —	— - —	730	500/590	DS-53	DH	4F/140'E	10.2.19	DH
2	34 / 35	—	—	—	—	—	—	—, - —	— - —	—	500/90	DS-54	DH	4G/90'W	10.2.19	DH
3	37 / 38	W	E	1057	72°	PF	7	860 - —	— - —	730	500/320	DS-58	DH	4K/320'W	10/4/19	DH
4	/	-						-	-							
5	/	-						-	-							
6	/	-						-	-							
7	/	-						-	-							
8	/	-						-	-							
9	/	-						-	-							
10	/	-						-	-							
11	/	-						-	-							
12	/	-						-	-							
13	/	-						-	-							
14	/	-						-	-							
15	/	-						-	-							
16	/	-						-	-							
17	/	-						-	-							
								DAILY TOTAL		1,460	320					

* REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT LOCATION ON THE SEAM.

DESTRUCTIVE LENGTH CARRY-OVER

** COLUMNS TO BE USED BY THE DATA REVIEWER ONLY

GOLDER FORM: G13-0699
(JUNE 1999)

REVIEWED BY: PJ DATE: 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM LOG

PROJECT NUMBER: 1788523
OWNER: CEC
LOCATION: Erie, Mi.

PROJECT TITLE: JRW Ash & Chemical Pond Closure
CONTRACTOR: Chesapeake

[X] FUSION
[ ] EXTRUSION

MACHINE # M-1743

PASSING TRIAL SEAMS

NO.	TIME	TECH ID
TF-2	1353	PF
TF-5	1717	PF

DESTRUCTIVE LENGTH CARRY-OVER FROM PREVIOUS LOG: 32Φ

DATE: 10.4.19

SHEET NUMBER: 1

	SEAM NUMBER	SEAM SECTION* START POINT	SEAM SECTION* FINISH POINT	APPROX. START TIME	AMB. AIR TEMP.	WELD TECH.	PREHEAT OR MACH. SPEED	MACHINE TEMPERATURES DIGITAL SET WEDGE OR BARREL NOZZLE	MACHINE TEMPERATURES INDICATOR WEDGE OR BARREL NOZZLE	APPROX. LENGTH WELDED	LENGTH FROM PREVIOUS DESTR.	DESTR. NUMBER	MON.	REMARKS	** NON-DESTRUCTIVE TEST DATE	** NON-DESTRUCTIVE MON.
1	4Φ / 41	E	W	1432	68°	PF	7.5	86Φ - —	— - —	73Φ	50Φ/55Φ	DS-6Φ	DH	4R/180'W	10.5.19	DH
2	4Φ / 41	—	—	—	—	—	—	— - —	— - —	—	50Φ/5Φ	DS-61	DH	4R/60'E	10.5.19	DH
3	43 / 44	E	W	1549	65°	PF	7.5	86Φ - —	— - —	73Φ	50Φ/28Φ	DS-66	DH	5A/28Φ'E	10.7.19	DH
4	/	-						-	-							
5	/	-						-	-							
6	/	-						-	-							
7	/	-						-	-							
8	/	-						-	-							
9	/	-						-	-							
10	/	-						-	-							
11	/	-						-	-							
12	/	-						-	-							
13	/	-						-	-							
14	/	-						-	-							
15	/	-						-	-							
16	/	-						-	-							
17	/	-						-	-							
								DAILY TOTAL		146Φ						
								DESTRUCTIVE LENGTH CARRY-OVER			28Φ					

* REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT LOCATION ON THE SEAM.

** COLUMNS TO BE USED BY THE DATA REVIEWER ONLY

GOLDER FORM: G13-0699
(JUNE 1999)

REVIEWED BY: TPS DATE: 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM LOG

PROJECT NUMBER: 1788523
OWNER: CEC
LOCATION: Erie, Mi.

PROJECT TITLE: JRW Ash & Chemical Pond Clousure
CONTRACTOR: Chesapeake

[X] FUSION
[ ] EXTRUSION

MACHINE # M-1743

PASSING TRIAL SEAMS

NO.	TIME	TECH ID
TF-1	0818	PF
TF-6	1215	PF
TF-7	1336	PF
TF-10	1603	PF
TF-11	1604	PF

DESTRUCTIVE LENGTH CARRY-OVER FROM PREVIOUS LOG 280

DATE 10.5.19

SHEET NUMBER 1

	SEAM NUMBER	SEAM SECTION* START POINT	SEAM SECTION* FINISH POINT	APPROX. START TIME	AMB. AIR TEMP.	WELD TECH.	PREHEAT OR MACH. SPEED	MACHINE TEMPERATURES DIGITAL SET WEDGE OR BARREL NOZZLE	MACHINE TEMPERATURES INDICATOR WEDGE OR BARREL NOZZLE	APPROX. LENGTH WELDED	LENGTH FROM PREVIOUS DESTR.	DESTR. NUMBER	MON.	REMARKS	** NON-DESTRUCTIVE TEST DATE	** NON-DESTRUCTIVE MON.
1	44 1 45	W	E	~~0814~~	58	PF	7.5	860 - —	— - —	730	500/510	DS-68	DH	5D/224E	10.7.19	DH
2	44 1 45	—	—	0912 DS	—	—	—	— - —	— - —	—	500/10	DS-69	DH	5E/10W	10.7.19	DH
3	47 1 48	W	E	1053	58	PF	7.5	860 - —	— - —	730	600/240	DS-73	DH	5I/240W	10.7.19	DH
4	42 1 52	N	S	1503	58	PF	6.5	860 - —	— - —	23	263	—	DH	—	10.7	DH
5	43 1 52	N	S	1507				- —	— - —	23	286	—	DH	—	10.7	DH
6	44 1 52	N	S	1509				- —	— - —	23	309	—	DH	—	10.7	DH
7	45 1 52	N	S	1511				- —	— - —	23	332	—	DH	—	10.7	DH
8	46 1 52	N	S	1514				- —	— - —	23	355	—	DH	—	10.7	DH
9	47 1 52	N	S	1516				- —	— - —	23	378	—	DH	—	10.7	DH
10	48 1 52	N	S	1519				- —	— - —	23	401	—	DH	—	10.7	DH
11	49 1 52	N	S	1521			6.5	- —	— - —	23	424	—	DH	—	10.7	DH
12	49 1 51	E	W	1539	58	PF	7.5	860 - —	— - —	133	500/57	DS-77	DH	5W/57E	10.7.19	DH
13	1	-						-	-							
14	1	-						-	-							
15	1	-						-	-							
16	1	-						-	-							
17	1	-						-	-							
								DAILY TOTAL		1,777						
								DESTRUCTIVE LENGTH CARRY-OVER			57					

* REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT LOCATION ON THE SEAM.

** COLUMNS TO BE USED BY THE DATA REVIEWER ONLY

GOLDER FORM: G13-0699
(JUNE 1999)

REVIEWED BY: PS **DATE:** 12-2-19

GOLDER ASSOCIATES INC.

APPENDIX K

Liner Repair Summary

APPENDIX K.1

Defect Logs

GEOMEMBRANE DEFECT LOG

PROJECT NUMBER: 1788523 **PROJECT TITLE:** JRW Ash & Chemical Pond Clousure
OWNER: CEC **CONTRACTOR:** Chesapeake
LOCATION: Erie, Mi

SHEET NUMBER 1

DEFECT CODE	DEFECT LOCATION: SEAM, PANEL OR REPAIR NO.	DEFECT LOCATION: DESCRIPTION	DEFECT TYPE	LOG DATE	MON.	REMARKS	** REPAIR DATE	** TEST DATE
A	1/2	100' WEOS	DS-1	8.15.19	DH		8.15.19	8.15.19
B	2/3	100' WEOS	DS-2		DH		8.15.19	8.15.19
C	1/2	123' EEOS	DS-3		DH		8.15.19	8.15.19
D	2/3	123 EEOS	DS-4		DH		8.15.19	8.16.19
E	3/4	377 WEOS	DS-5		DH		8.15.19	8.15.19
F	4/5	377' WEOS	DS-6		DH		8.15.19	8.15.19
G	5/6	157' WEOS	DS-7		DH		8.15.19	8.15.19
H	5/6	63' EEOS	DS-8		DH		8.15.19	8.15.19
I	6/7	162' EEOS	IO		DH		8.15.19	8.15.19
J	6/7	157' WEOS	DS-9		DH		8.15.19	8.15.19
K	6/7	63' EEOS	DS-10		DH		8.15.19	8.15.19
M	6/7	256' WEOS	PT		DH		8.15.19	8.15.19
N	7/8	94' WEOS	DS-11		DH		8.15.19	8.15.19
P	7/8	126' EEOS	DS-12	8.15.19	DH		8.15.19	8.15.19
Q	8/9	94' WEOS	DS-13	8.16.19	DH		8.17.19	8.17.19
R	8/9	126' EEOS	DS-14		DH		8.17.19	8.17.19
S	9/10	374' WEOS	DS-15		DH		8.17.19	8.17.19
T	9/10	348' WEOS	BO		DH		8.17.19	8.17.19
W	10/11	100' WEOS	DS-16		DH		8.17.19	8.17.19
X	10/11	120' EEOS	DS-17	8.16.19	DH		8.17.19	8.17.19

AD - ANIMAL RELATED DAMAGE
B - UNDISPERSED RESIN BEAD
BO - FUSION WELDER BURN
BS - BOOT/SKIRT FOR FML PENETRATION
CO - CHANGE OF OVERLAP
CR - CREASE
D - INSTALLATION DAMAGE
DS-# - DESTRUCTIVE TEST NUMBER
EE - EARTHWORK EQUIPMENT DAMAGE
EXT - EXTENSION
FM - FISHMOUTH
FS - FAILED SEAM LENGTH
FTS - FIELD TEST STRIP
HT - HEAT TACK BURN
IO - INSUFFICIENT OVERLAY (UNDER SPEC.)
MD - MANUFACTURER/DELIVERY DAMAGE
PT - PRESSURE TEST CUT
SI - SOIL SURFACE IRREGULARITY
SL - SLAG ON TEXTURED SHEET
T - THREE PANEL INTERSECTION
VL - VACUUM TEST LEAK
WR - WRINKLE
WS - WELDER RESTART
OTHER _____

** COLUMNS TO BE USED BY THE DATA REVIEWER ONLY.

REVIEWED BY: MD **DATE:** 12/9/19

GOLDER FORM: G18-0699
(JUNE 1999)

GOLDER ASSOCIATES INC.

GEOMEMBRANE DEFECT LOG

PROJECT NUMBER: 1788523 | PROJECT TITLE: JRW Ash & Chemical Pond Clousure
OWNER: CEC | CONTRACTOR: Chesapeake
LOCATION: Erie, Mi

SHEET NUMBER 2

DEFECT CODE	DEFECT LOCATION: SEAM, PANEL OR REPAIR NO.	DEFECT LOCATION: DEFECT LOCATION DESCRIPTION	DEFECT TYPE	LOG DATE	MON.	REMARKS	** REPAIR DATE	** TEST DATE
A	11/12	346' EEOS	DS-18	8.16.19	DH		8.17.19	8.17.19
B	12/13	154' WEOS	DS-19		DH		8.17.19	8.17.19
C	12/13	66' EEOS	DS-2Φ		DH		8.17.19	8.17.19
D	1Φ/11	136' EEOS	IO		DH		8.17.19	8.17.19
E	1Φ/11	WEOS	IO		DH		8.17.19	8.17.19
F	11/12	331' EEOS	IO		DH		8.17.19	8.17.19
G	13/14	38Φ' WEOS	DS-21		DH	COVERS 2K	8.17.19	8.17.19
H	14/15	154' WEOS	DS-22		DH		8.17.19	8.17.19
I	14/15	66' EEOS	DS-23		DH		8.17.19	8.17.19
J	15/16	286' EEOS	DS-24		DH		8.17.19	8.17.19
K	13	38Φ'W/2'N	SI		DH	CAPPED BY 2G	8.17.19	8.17.19
M	16/17	16Φ' WEOS	DS-25		DH		8.17.19	8.17.19
N	16/17	6Φ' EEOS	DS-26	8.16.19	DH		8.17.19	8.17.19
P	17/18	214' WEOS	DS-27	8.17.19	DH		8.17.19	8.17.19
Q	17/18	6' EEOS	DS-28		DH		8.17.19	8.17.19
R	18/19	286' EEOS	DS-29		DH		8.17.19	8.17.19
S	19/2Φ	28Φ' EEOS	DS-3Φ		DH		8.17.19	8.17.19
T	2Φ/21	226' EEOS	DS-31		DH		8.17.19	8.17.19
W	21/22	214' WEOS	DS-32		DH		8.17.19	8.17.19
X	21/22	6' EEOS	DS-33	8.17.19	DH		8.17.19	8.17.19

AD - ANIMAL RELATED DAMAGE
B - UNDISPERSED RESIN BEAD
BO - FUSION WELDER BURN
BS - BOOT/SKIRT FOR FML PENETRATION
CO - CHANGE OF OVERLAP
CR - CREASE
D - INSTALLATION DAMAGE
DS-# - DESTRUCTIVE TEST NUMBER
EE - EARTHWORK EQUIPMENT DAMAGE
EXT - EXTENSION
FM - FISHMOUTH
FS - FAILED SEAM LENGTH
FTS - FIELD TEST STRIP
HT - HEAT TACK BURN
IO - INSUFFICIENT OVERLAY (UNDER SPEC.)
MD - MANUFACTURER/DELIVERY DAMAGE
PT - PRESSURE TEST CUT
SI - SOIL SURFACE IRREGULARITY
SL - SLAG ON TEXTURED SHEET
T - THREE PANEL INTERSECTION
VL - VACUUM TEST LEAK
WR - WRINKLE
WS - WELDER RESTART
OTHER _____

** COLUMNS TO BE USED BY THE DATA REVIEWER ONLY.

REVIEWED BY: MP DATE: 12/9/19

GOLDER FORM: G18-0699
(JUNE 1999)

GOLDER ASSOCIATES INC.

GEOMEMBRANE DEFECT LOG

PROJECT NUMBER: 1788523 **PROJECT TITLE:** JRW Ash & Chemical Pond Clousure
OWNER: CEC **CONTRACTOR:** Chesapeake
LOCATION: Erie, Mi

SHEET NUMBER 3

DEFECT CODE	DEFECT LOCATION: SEAM, PANEL OR REPAIR NO.	DEFECT LOCATION: DEFECT LOCATION DESCRIPTION	DEFECT TYPE	LOG DATE	MON.	REMARKS	** REPAIR DATE	** TEST DATE
A	22/23	226' EEOS	DS-34	8.2Φ.19	DH		8.2Φ.19	8.2Φ.19
B	23/24	2Φ' WEOS	DS-35	|	DH		8.2Φ.19	8.2Φ.19
C	23/24	2ΦΦ' EEOS	DS-36	|	DH		8.2Φ.19	8.2Φ.19
D	24/25	274' WEOS	DS-37	|	DH		8.2Φ.19	8.2Φ.19
E	23/24	WEOS	DS-38	|	DH		8.2Φ.19	8.2Φ.19
F	17	174' WEOS	D	8.2Φ.19	DH		8.17.19	8.17.19
G	25/26	1ΦΦ' WEOS	DS-39	9.27.19	DH		9.3Φ.19	9.3Φ.19
H	25/26	13Φ' EEOS	DS-4Φ	|	DH		9.3Φ.19	9.3Φ.19
I	26/27	1ΦΦ' EEOS	DS-41	|	DH		9.3Φ.19	9.3Φ.19
J	26/27	13Φ' WEOS	DS-42	9.27.19	DH		9.3Φ.19	9.3Φ.19
K	27/28	1ΦΦ' EEOS	DS-43	1.Φ.1.19	DH		1Φ.1.19	1Φ2.19
M	27/28	13Φ' WEOS	DS-44	1Φ.1.19	DH		1Φ.1.19	1Φ.1.19
N	31/32	177' WEOS	PT	1Φ.1.19	DH		1Φ.1.19	1Φ2.19
P	28/29	36Φ' WEOS	DS-45	9.27.19	DH		9.3Φ.19	1Φ.1.19
Q	29/3Φ	36Φ' WEOS	DS-46	9.27.19	DH		9.3Φ.19	9.3Φ.19
R	3Φ/31	36Φ' WEOS	DS-47	1Φ.1.19	DH	CAPS 3X	1Φ.1.19	1Φ.1.19
S	31/32	14Φ' EEOS	DS-48	1Φ.1.19	DH		1Φ.1.19	1Φ.1.19
T	29/3Φ	4Φ' WEOS	WS	9.27.19	DH		1Φ.1.19	1Φ.1.19
W	31/32	9Φ' WEOS	DS-49	1Φ.1.19	DH		1Φ.1.19	1Φ.2.19
X	3Φ/31	358' WEOS	BO	1Φ.1.19	DH	CAPPED BY 3R	1Φ.1.19	—

AD - ANIMAL RELATED DAMAGE
B - UNDISPERSED RESIN BEAD
BO - FUSION WELDER BURN
BS - BOOT/SKIRT FOR FML PENETRATION
CO - CHANGE OF OVERLAP
CR - CREASE
D - INSTALLATION DAMAGE
DS-# - DESTRUCTIVE TEST NUMBER
EE - EARTHWORK EQUIPMENT DAMAGE
EXT - EXTENSION
FM - FISHMOUTH
FS - FAILED SEAM LENGTH
FTS - FIELD TEST STRIP
HT - HEAT TACK BURN
IO - INSUFFICIENT OVERLAY (UNDER SPEC.)
MD - MANUFACTURER/DELIVERY DAMAGE
PT - PRESSURE TEST CUT
SI - SOIL SURFACE IRREGULARITY
SL - SLAG ON TEXTURED SHEET
T - THREE PANEL INTERSECTION
VL - VACUUM TEST LEAK
WR - WRINKLE
WS - WELDER RESTART
OTHER _____

** COLUMNS TO BE USED BY THE DATA REVIEWER ONLY.

REVIEWED BY: TAM **DATE:** 12/9/19

GOLDER FORM: G18-0699
(JUNE 1999)

GOLDER ASSOCIATES INC.

GEOMEMBRANE DEFECT LOG

PROJECT NUMBER: 1788523 **PROJECT TITLE:** JRW Ash & Chemical Pond Clousure
OWNER: CEC **CONTRACTOR:** Chesapeake
LOCATION: Erie, Mi

SHEET NUMBER 4

DEFECT CODE	DEFECT LOCATION: SEAM, PANEL OR REPAIR NO.	DEFECT LOCATION: DEFECT LOCATION DESCRIPTION	DEFECT TYPE	LOG DATE	MON.	REMARKS	** REPAIR DATE	** TEST DATE
A	32/33	125' WEOS	BO	10.2.19	DH		10/4	10/4
B	32/33	24Φ' EEOS	BO		DH		10/4	10/4
C	32/33	32Φ' WEOS	DS-5Φ		DH		10/4	10/4
D	33/34	14Φ' EEOS	DS-51		DH		10/4	10/4
E	33/34	9Φ' WEOS	DS-52		DH		10/4	10/4
F	34/35	14Φ' EEOS	DS-53		DH		10/4	10/4
G	34/35	9Φ' WEOS	DS-54		DH		10/4	10/4
H	35/36	18Φ' EEOS	DS-55		DH		10/4	10/4
I	35/36	5Φ' WEOS	DS-56		DH		10/4	10/4
J	36/37	32Φ' WEOS	DS-57		DH		10/4	10/4
K	37/38	32Φ' WEOS	DS-58	10.2.19	DH		10/4	10/4
M	27/28	14Φ' WEOS	DS-44P	10.4.19	DH	PREVIOUS TO FAILED DS-44, 10 LF OF DS-44	10/7	10/7
N	30/31	12' EEOS	DS-44N	10.4.19	DH	NEXT TO FAILED DS-44, 12' WEOS	10.7	10/7
P	39/40	28Φ' EEOS	DS-59		DH		10.7	10/7
Q	40/41	18Φ' WEOS	DS-6Φ		DH		10.7	10/7
R	40/41	5Φ' EEOS	DS-61		DH		10.7	10/7
S	41/42	18Φ' WEOS	DS-62		DH		10.7	10/7
T	41/42	5Φ' EEOS	DS-63		DH		10.7	10/7
W	42/43	22Φ' WEOS	DS-64		DH		10.7	10/7
X	42/43	10' EEOS	DS-65	10.4.19	DH		10.7	10/7

AD - ANIMAL RELATED DAMAGE
B - UNDISPERSED RESIN BEAD
BO - FUSION WELDER BURN
BS - BOOT/SKIRT FOR FML PENETRATION
CO - CHANGE OF OVERLAP
CR - CREASE
D - INSTALLATION DAMAGE
DS-# - DESTRUCTIVE TEST NUMBER
EE - EARTHWORK EQUIPMENT DAMAGE
EXT - EXTENSION
FM - FISHMOUTH
FS - FAILED SEAM LENGTH
FTS - FIELD TEST STRIP
HT - HEAT TACK BURN
IO - INSUFFICIENT OVERLAY (UNDER SPEC.)
MD - MANUFACTURER/DELIVERY DAMAGE
PT - PRESSURE TEST CUT
SI - SOIL SURFACE IRREGULARITY
SL - SLAG ON TEXTURED SHEET
T - THREE PANEL INTERSECTION
VL - VACUUM TEST LEAK
WR - WRINKLE
WS - WELDER RESTART
OTHER _____

** COLUMNS TO BE USED BY THE DATA REVIEWER ONLY.

REVIEWED BY: MD **DATE:** 12/9/19

GOLDER FORM: G18-0699
(JUNE 1999)

GOLDER ASSOCIATES INC.

GEOMEMBRANE DEFECT LOG

PROJECT NUMBER: 1788523 **PROJECT TITLE:** JRW Ash & Chemical Pond Clousure
OWNER: CEC **CONTRACTOR:** Chesapeake
LOCATION: Erie, Mi

SHEET NUMBER 5

DEFECT CODE	DEFECT LOCATION: SEAM, PANEL OR REPAIR NO.	DEFECT LOCATION: DESCRIPTION	DEFECT TYPE	LOG DATE	MON.	REMARKS	** REPAIR DATE	** TEST DATE
A	43/44	280' EEOS	DS-66	10.4.19	DH		10.7	10.7
B	38/39	280' EEOS	DS-67	10.4.19	DH		10.7	10.7
C	38/39	20' EEOS	BO	10.4.19	DH		10.7	10.8
D	44/45	220' EEOS	DS-68	10.5.19	DH		10.7	10.7
E	44/45	10' WEOS	DS-69		DH		10.7	10.7
F	45/46	240' WEOS	DS-70		DH		10.7	10.7
G	46/47	220' EEOS	DS-71		DH		10.7	10.7
H	46/47	10' WEOS	DS-72		DH		10.7	10.7
I	47/48	240' WEOS	DS-73		DH		10.7	10.7
J	48/49	260' EEOS	DS-74		DH		10.7	10.7
K	49/50	EEOS	DS-75		DH		10.7	10.7
M	27/28	EEOS TO 4M/DS-44P	FS		DH	CAP FROM EEOS TO DS-44P, COVERS 3M & 4M	10.5.19	10.7
N	28/5M	20' EEOS	DX2		DH		10.5.19	10.7
P	32/52	9' SEOS	IO		DH		10.7	10.7
Q	37/52	6' NEOS	IO		DH		10.7	10.7
R	39/52	8' SEOS	IO		DH		10.7	10.7
S	41/52	8' NEOS	BO		DH		10.7	10.7
T	29/52	7' SEOS	DS-76		DH	CAPPED BY 6C	10.7	10.7
W	49/51	57' EEOS	DS-77		DH		10.7	10.7
X	49/50/51	INT	T	10.5.19	DH		10.7	10.7

AD - ANIMAL RELATED DAMAGE
B - UNDISPERSED RESIN BEAD
BO - FUSION WELDER BURN
BS - BOOT/SKIRT FOR FML PENETRATION
CO - CHANGE OF OVERLAP
CR - CREASE
D - INSTALLATION DAMAGE
DS-# - DESTRUCTIVE TEST NUMBER
EE - EARTHWORK EQUIPMENT DAMAGE
EXT - EXTENSION
FM - FISHMOUTH
FS - FAILED SEAM LENGTH
FTS - FIELD TEST STRIP
HT - HEAT TACK BURN
IO - INSUFFICIENT OVERLAY (UNDER SPEC.)
MD - MANUFACTURER/DELIVERY DAMAGE
PT - PRESSURE TEST CUT
SI - SOIL SURFACE IRREGULARITY
SL - SLAG ON TEXTURED SHEET
T - THREE PANEL INTERSECTION
VL - VACUUM TEST LEAK
WR - WRINKLE
WS - WELDER RESTART
OTHER _____

** COLUMNS TO BE USED BY THE DATA REVIEWER ONLY.

REVIEWED BY: HD **DATE:** 12/9/19

GOLDER FORM: G18-0699
(JUNE 1999)

GOLDER ASSOCIATES INC.

GEOMEMBRANE DEFECT LOG

PROJECT NUMBER: 1788523 **PROJECT TITLE:** JRW Ash & Chemical Pond Clousure
OWNER: CEC **CONTRACTOR:** Chesapeake
LOCATION: Erie, Mi

SHEET NUMBER 6

DEFECT CODE	DEFECT LOCATION: SEAM, PANEL OR REPAIR NO.	DEFECT LOCATION: DEFECT LOCATION DESCRIPTION	DEFECT TYPE	LOG DATE	MON.	REMARKS	** REPAIR DATE	** TEST DATE
A	31/52	10' SEOS	IO	10.7.19	DH		10.7	10.7
B	27/28/52/SM	INT	UP		DH	CAPS SEAM 27/52	10.7	10.7
C	28/29/52	INT	T		DH	CAPS ST/DS-76	10.7	10.7
D	29/30/52	INT	T		DH		10.7	10.7
E	30/31/52	INT	T		DH		10.7	10.7
F	31/32/52	INT	T		DH		10.7	10.7
G	32/33/52	INT	T		DH		10.7	10.7
H	33/34/52	INT	T		DH		10.7	10.7
I	34/35/52	INT	T		DH		10.7	10.7
J	35/36/52	INT	T		DH		10.7	10.7
K	36/37/52	INT	T		DH		10.7	10.7
M	37/38/52	INT	T		DH		10.7	10.7
N	38/52	5' NEOS	IO		DH	COVERED BY 6P	10.7	10.7
P	38/39/52	INT	T		DH	COVERS 6N	10.7	10.7
Q	39/40/52	INT	T		DH	COVERED BY 7E	10.7	10.7
R	40/41/52	INT	T		DH		10.7	10.7
S	41/42/52	INT	T		DH		10.7	10.7
T	42/43/52	INT	T		DH		10.7	10.7
W	43/44/52	INT	T		DH		10.7	10.7
X	44/45/52	INT	T	10.7.19	DH	CAPS SEAM 5P/51	10.7	10.7

AD - ANIMAL RELATED DAMAGE
B - UNDISPERSED RESIN BEAD
BO - FUSION WELDER BURN
BS - BOOT/SKIRT FOR FML PENETRATION
CO - CHANGE OF OVERLAP
CR - CREASE
D - INSTALLATION DAMAGE
DS-# - DESTRUCTIVE TEST NUMBER
EE - EARTHWORK EQUIPMENT DAMAGE
EXT - EXTENSION
FM - FISHMOUTH
FS - FAILED SEAM LENGTH
FTS - FIELD TEST STRIP
HT - HEAT TACK BURN
IO - INSUFFICIENT OVERLAY (UNDER SPEC.)
MD - MANUFACTURER/DELIVERY DAMAGE
PT - PRESSURE TEST CUT
SI - SOIL SURFACE IRREGULARITY
SL - SLAG ON TEXTURED SHEET
T - THREE PANEL INTERSECTION
VL - VACUUM TEST LEAK
WR - WRINKLE
WS - WELDER RESTART
OTHER _____

** COLUMNS TO BE USED BY THE DATA REVIEWER ONLY.

REVIEWED BY: MD **DATE:** 12/9/19

GOLDER FORM: G18-0699
(JUNE 1999)

GOLDER ASSOCIATES INC.

GEOMEMBRANE DEFECT LOG

PROJECT NUMBER: 1788523
OWNER: CEC
LOCATION: Erie, Mi

PROJECT TITLE: JRW Ash & Chemical Pond Closure
CONTRACTOR: Chesapeake

SHEET NUMBER 7

DEFECT CODE	DEFECT LOCATION: SEAM, PANEL OR REPAIR NO.	DEFECT LOCATION: DESCRIPTION	DEFECT TYPE	LOG DATE	MON.	REMARKS	** REPAIR DATE	** TEST DATE
A	45/46/52	INT	T	10.7.19	DH		10.7	10.7
B	46/47/52	INT	T		DH		10.7	10.7
C	47/48/52	INT	T		DH		10.7	10.7
D	48/49/52	INT	T		DH		10.7	10.7
E	49/52	6' SEOS	BO		DH	CAPS 6Q	10.7	10.7
F	30/31	WEOS TO DS-44N	FS		DH	CAPS 4N / DS-44N 20' CAP STRIP	10.7	10.7
G	31/7F	WEOS	DX-3		DH		10.7	10.7
H	33	5'E, 6'N	D		DH		10.7	10.7
I	47	10'S, 6'W	D	10.7.19	DH		10.7	10.7
J								
K								
M								
N								
P								
Q								
R								
S								
T								
W								
X								

AD - ANIMAL RELATED DAMAGE
B - UNDISPERSED RESIN BEAD
BO - FUSION WELDER BURN
BS - BOOT/SKIRT FOR FML PENETRATION
CO - CHANGE OF OVERLAP
CR - CREASE
D - INSTALLATION DAMAGE
DS-# - DESTRUCTIVE TEST NUMBER
EE - EARTHWORK EQUIPMENT DAMAGE
EXT - EXTENSION
FM - FISHMOUTH
FS - FAILED SEAM LENGTH
FTS - FIELD TEST STRIP
HT - HEAT TACK BURN
IO - INSUFFICIENT OVERLAY (UNDER SPEC.)
MD - MANUFACTURER/DELIVERY DAMAGE
PT - PRESSURE TEST CUT
SI - SOIL SURFACE IRREGULARITY
SL - SLAG ON TEXTURED SHEET
T - THREE PANEL INTERSECTION
VL - VACUUM TEST LEAK
WR - WRINKLE
WS - WELDER RESTART
OTHER _____

** COLUMNS TO BE USED BY THE DATA REVIEWER ONLY.

REVIEWED BY: HD DATE: 12/5/19

GOLDER FORM: G18-0699
(JUNE 1999)

GOLDER ASSOCIATES INC.

APPENDIX K.2

Repair Logs

GEOMEMBRANE REPAIR LOG

PROJECT NUMBER 1788523
OWNER: CEC
LOCATION: Erie, Mi

PROJECT TITLE: JRW Ash & Chemical Pond Clousure
CONTRACTOR: Chesapeake

PASSING TRIAL SEAMS

NO.	TIME	TECH	NO.	TIME	TECH
TX-1	1124	ML			
TX-2	1304	ML			

MACHINE NUMBER: X 1715

DATE: 8.15.19

SHEET NO: 1 OF 1

	DEFECT CODE	REPAIR DATE	APPRX. TIME	REPAIR TYPE	APPRX. DIM.	WELD TECH.	MON.	REMARKS
1	1A	8.15	1142	P	2x5	ML	DH	DS-1
2	1B	"	1146	P	2x5	"	"	DS-2
3	1C	"	1315	P	2x5	"	"	DS-3
4	1D	"	1328	P	2x5	"	"	DS-4
5	1E	"	1345	P	2x5	"	"	DS-5
6	1F	"	1407	P	2x5	"	"	DS-6
7	1G	"	1504	P	2x5	"	"	DS-7
8	1H	"	1547	P	2x5	"	"	DS-8
9	1I	"	1532	P	2x3	"	"	—
10	1J	"	1522	P	2x5	"	"	DS-9
11	1K	"	1553	P	2x5	"	"	DS-10
12	1M	"	1511	P	2x2	"	"	—
13	1N	"	1642	P	2x5	"	"	DS-11
14	1P	8.15	1636	P	2x5	ML	DH	DS-12
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								

	DEFECT CODE	REPAIR DATE	APPRX. TIME	REPAIR TYPE	APPRX. DIM.	WELD TECH.	MON.	REMARKS
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								
41								
42								
43								
44								
45								
46								
47								
48								
49								
50								

REPAIR TYPE: P - PATCH, C - CAP, RS - RECONSTRUCTED SEAM, G&W - GRIND WELD

REVIEWED BY: MD **DATE** 12/9/19

GOLDER FORM: G19-tss
(August 2000)

GOLDER ASSOCIATES INC.

GEOMEMBRANE REPAIR LOG

PROJECT NUMBER 1788523
OWNER: CEC
LOCATION: Erie, Mi

PROJECT TITLE: JRW Ash & Chemical Pond Clousure
CONTRACTOR: Chesapeake

PASSING TRIAL SEAMS

NO.	TIME	TECH	NO.	TIME	TECH
TX-2	1135	AR			

MACHINE NUMBER: X40

DATE: 8.17.19

SHEET NO: 1 OF 1

	DEFECT CODE	REPAIR DATE	APPRX. TIME	REPAIR TYPE	APPRX. DIM.	WELD TECH.	MON.	REMARKS
1	1Q	8.17	1157	P	2x5	AR	DH	DS-13
2	1W	"	1313	P	2x5	"	DH	DS-16
3	1T	"	1441	P	2X2	"	DH	—
4	2F	"	1437	P	2x6	"	DH	—
5	2A	"	1417	P	2x5	"	DH	DS-18
6	2G	"	1429	P	2x5	"	DH	DS-21 COVERS 2K
7	2B	"	1318	P	2x5	"	DH	DS-19
8	2H	"	1331	P	2x5	"	DH	DS-22
9	2P	"	1349	P	2x5	"	DH	DS-27
10	2M	"	1343	P	2x5	"	DH	DS-25
11	2X	"	1517	P	2x5	"	DH	DS-33
12	2W	8.17	1501	P	2x5	AR	DH	DS-32
13	3F	8.17	1405	P	2x2	AR	DH	—
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								

	DEFECT CODE	REPAIR DATE	APPRX. TIME	REPAIR TYPE	APPRX. DIM.	WELD TECH.	MON.	REMARKS
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								
41								
42								
43								
44								
45								
46								
47								
48								
49								
50								

REPAIR TYPE: P - PATCH, C - CAP, RS - RECONSTRUCTED SEAM, G&W - GRIND WELD

REVIEWED BY: MD **DATE** 12/9/19

GOLDER FORM: G19-tss
(August 2000)

GOLDER ASSOCIATES INC.

GEOMEMBRANE REPAIR LOG

PROJECT NUMBER 1788523
OWNER: CEC
LOCATION: Erie, Mi

PROJECT TITLE: JRW Ash & Chemical Pond Clousure
CONTRACTOR: Chesapeake

PASSING TRIAL SEAMS

NO.	TIME	TECH	NO.	TIME	TECH
TX-1	1050	ML			

MACHINE NUMBER: X1715

DATE: 8.17.19

SHEET NO: 1 OF 1

	DEFECT CODE	REPAIR DATE	APPRX. TIME	REPAIR TYPE	APPRX. DIM.	WELD TECH.	MON.	REMARKS
1	1S	8.17	1130	P	2x5	ML	DH	DS-15
2	1R	"	1121	P	2x5	"	DH	DS-14
3	2D	"	1111	P	2x3	"	DH	—
4	1X	"	1107	P	2x5	"	DH	DS-17
5	2E	"	1134	P	2x4	"	DH	—
6	2C	"	1140	P	2x5	"	DH	DS-20
7	2S	"	1351	P	2x5	"	DH	DS-24
8	2I	"	1145	P	2x5	"	DH	DS-23
9	2Q	"	1316	P	2x5	"	DH	DS-28
10	2N	"	1157	P	2x5	"	DH	DS-26
11	2R	"	1344	P	2x5	"	DH	DS-29
12	2S	"	1338	P	2x5	"	DH	DS-30
13	2T	8.17	1331	P	2x5	ML	DH	DS-31
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								

	DEFECT CODE	REPAIR DATE	APPRX. TIME	REPAIR TYPE	APPRX. DIM.	WELD TECH.	MON.	REMARKS
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								
41								
42								
43								
44								
45								
46								
47								
48								
49								
50								

REPAIR TYPE: P - PATCH, C - CAP, RS - RECONSTRUCTED SEAM, G&W - GRIND WELD

REVIEWED BY: MD **DATE** 12/9/19

GOLDER FORM: G19-tss
(August 2000)

GOLDER ASSOCIATES INC.

GEOMEMBRANE REPAIR LOG

PROJECT NUMBER 1788523
OWNER: CEC
LOCATION: Erie, Mi

PROJECT TITLE: JRW Ash & Chemical Pond Clousure
CONTRACTOR: Chesapeake

PASSING TRIAL SEAMS

NO.	TIME	TECH	NO.	TIME	TECH
TX-1	1502	AR			

MACHINE NUMBER: X40

DATE: 8.20.19

SHEET NO: 1 OF 1

	DEFECT CODE	REPAIR DATE	APPRX. TIME	REPAIR TYPE	APPRX. DIM.	WELD TECH.	MON.	REMARKS
1	3B	8.20	1555	P	2x5	AR	DH	DS-35
2	3A	"	1545	"	2x5	"	DH	DS-34
3	3C	"	1522	"	2x5	"	DH	DS-36
4	3E	"	1510	"	2x5	"	DH	DS-38
5	3D	8.20	1554	P	2x5	AR	DH	DS-37
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								

	DEFECT CODE	REPAIR DATE	APPRX. TIME	REPAIR TYPE	APPRX. DIM.	WELD TECH.	MON.	REMARKS
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								
41								
42								
43								
44								
45								
46								
47								
48								
49								
50								

REPAIR TYPE: P - PATCH, C - CAP, RS - RECONSTRUCTED SEAM, G&W - GRIND WELD

REVIEWED BY: MD **DATE** 12/9/19

GOLDER FORM: G19-tss
(August 2000)

GOLDER ASSOCIATES INC.

GEOMEMBRANE REPAIR LOG

PROJECT NUMBER 1788523
OWNER: CEC
LOCATION: Erie, Mi

PROJECT TITLE: JRW Ash & Chemical Pond Closure
CONTRACTOR: Chesapeake

PASSING TRIAL SEAMS

NO.	TIME	TECH	NO.	TIME	TECH
Tx-1	1300	JJ			
Tx-3	1527	JJ			

MACHINE NUMBER: X50

DATE: 9.30.19

SHEET NO: 1 OF 1

	DEFECT CODE	REPAIR DATE	APPRX. TIME	REPAIR TYPE	APPRX. DIM.	WELD TECH.	MON.	REMARKS
1	3I	9/30	1325	P	2x5	JJ	DH	DS-41
2	3H	1	1316	P	2x5	1	DH	DS-40
3	3Q	1	1347	P	2x5	1	DH	DS-46
4	3P	9/30	1341	P	2x5	JJ	DH	DS-45
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								

	DEFECT CODE	REPAIR DATE	APPRX. TIME	REPAIR TYPE	APPRX. DIM.	WELD TECH.	MON.	REMARKS
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								
41								
42								
43								
44								
45								
46								
47								
48								
49								
50								

REPAIR TYPE: P - PATCH, C - CAP, RS - RECONSTRUCTED SEAM, G&W - GRIND WELD

REVIEWED BY: MD **DATE** 12/9/19

GOLDER FORM: G19-tss
(August 2000)

GOLDER ASSOCIATES INC.

GEOMEMBRANE REPAIR LOG

PROJECT NUMBER 1788523
OWNER: CEC
LOCATION: Erie, Mi

PROJECT TITLE: JRW Ash & Chemical Pond Clousure
CONTRACTOR: Chesapeake

PASSING TRIAL SEAMS

NO.	TIME	TECH	NO.	TIME	TECH
TX-2	1305	RH			

MACHINE NUMBER: X35

DATE: 9.30.19

SHEET NO: 1 OF 1

	DEFECT CODE	REPAIR DATE	APPRX. TIME	REPAIR TYPE	APPRX. DIM.	WELD TECH.	MON.	REMARKS
1	BG	9/30	1326	P	2X5	RH	DH	DS-39
2	BJ	9/30	1336	P	2X5	RH	DH	DS-42
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								

	DEFECT CODE	REPAIR DATE	APPRX. TIME	REPAIR TYPE	APPRX. DIM.	WELD TECH.	MON.	REMARKS
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								
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39								
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41								
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43								
44								
45								
46								
47								
48								
49								
50								

REPAIR TYPE: P - PATCH, C - CAP, RS - RECONSTRUCTED SEAM, G&W - GRIND WELD

REVIEWED BY: MD **DATE** 12/9/19

GOLDER FORM: G19-tss
(August 2000)

GOLDER ASSOCIATES INC.

GEOMEMBRANE REPAIR LOG

PROJECT NUMBER 1788523
OWNER: CEC
LOCATION: Erie, Mi

PROJECT TITLE: JRW Ash & Chemical Pond Clousure
CONTRACTOR: Chesapeake

PASSING TRIAL SEAMS

NO.	TIME	TECH	NO.	TIME	TECH
Tx-1	1635	JJ			

MACHINE NUMBER: X5Φ

DATE: 10.1.19

SHEET NO: 1 OF 1

	DEFECT CODE	REPAIR DATE	APPRX. TIME	REPAIR TYPE	APPRX. DIM.	WELD TECH.	MON.	REMARKS
1	3K	10.1	1655	P	2x5	JJ	DH	DS-43
2	3T		1738	P	2x3	JJ	DH	
3	3W		1746	P	2x5	JJ	DH	DS-49
4	3N		1754	P	2x2	JJ	DH	
5	3R		18Φ3	P	2x6	JJ	DH	DS-47
6	3X		—	—	—	—	DH	COVERED BY 3R
7	3S		1823	P	2x5	JJ	DH	DS-48
8	3M	10.1	165Φ	P	2x5	JJ	DH	DS-44
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								

	DEFECT CODE	REPAIR DATE	APPRX. TIME	REPAIR TYPE	APPRX. DIM.	WELD TECH.	MON.	REMARKS
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								
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46								
47								
48								
49								
50								

REPAIR TYPE: P - PATCH, C - CAP, RS - RECONSTRUCTED SEAM, G&W - GRIND WELD

REVIEWED BY: MD **DATE** 12/9/19

GOLDER FORM: G19-tss
(August 2000)

GOLDER ASSOCIATES INC.

GEOMEMBRANE REPAIR LOG

PROJECT NUMBER 1788523
OWNER: CEC
LOCATION: Erie, Mi

PROJECT TITLE: JRW Ash & Chemical Pond Clousure
CONTRACTOR: Chesapeake

PASSING TRIAL SEAMS

NO.	TIME	TECH	NO.	TIME	TECH
TX-1	0800	SS			

MACHINE NUMBER: X50

DATE: 10.4.19

SHEET NO: 1

	DEFECT CODE	REPAIR DATE	APPRX. TIME	REPAIR TYPE	APPRX. DIM.	WELD TECH.	MON.	REMARKS
1	4C	10/4	0832	P	2x5	SS	DH	DS-50
2	4E	"	0845	"	2x5	"	DH	DS-52
3	4G	"	0854	"	2x5	"	DH	DS-54
4	4I	"	0859	"	2x5	"	DH	DS-56
5	4J	"	0904	"	2x5	"	DH	DS-57
6	4A	"	0850	"	2x2	"	DH	—
7	4B	"	0839	"	2x2	"	DH	—
8	4K	"	0910	"	2x5	"	DH	DS-58
9	4D	"	0922	"	2x5	"	DH	DS-51
10	4F	"	0930	"	2x5	"	DH	DS-53
11	4H	10/4	0943	P	2x5	SS	DH	DS-55
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								

	DEFECT CODE	REPAIR DATE	APPRX. TIME	REPAIR TYPE	APPRX. DIM.	WELD TECH.	MON.	REMARKS
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								
38								
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40								
41								
42								
43								
44								
45								
46								
47								
48								
49								
50								

REPAIR TYPE: P - PATCH, C - CAP, RS - RECONSTRUCTED SEAM, G&W - GRIND WELD

REVIEWED BY: MD **DATE** 12/9/19

GOLDER FORM: G19-tss
(August 2000)

GOLDER ASSOCIATES INC.

GEOMEMBRANE REPAIR LOG

PROJECT NUMBER 1788523
OWNER: CEC
LOCATION: Erie, Mi

PROJECT TITLE: JRW Ash & Chemical Pond Closure
CONTRACTOR: Chesapeake

PASSING TRIAL SEAMS

NO.	TIME	TECH	NO.	TIME	TECH
TX-1	1403	JJ			

MACHINE NUMBER: X5Φ

DATE: 10,5,19

SHEET NO: 1

	DEFECT CODE	REPAIR DATE	APPRX. TIME	REPAIR TYPE	APPRX. DIM.	WELD TECH.	MON.	REMARKS
1	5M	10,5	1547	C	2x14Φ	JJ	DH	cover s 3M, 4M
2	5N	10,5	1607	P	2x5	JJ	DH	DX-2
3								
4								
5								
6								
7								
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9								
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11								
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18								
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20								
21								
22								
23								
24								
25								

	DEFECT CODE	REPAIR DATE	APPRX. TIME	REPAIR TYPE	APPRX. DIM.	WELD TECH.	MON.	REMARKS
26								
27								
28								
29								
30								
31								
32								
33								
34								
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36								
37								
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39								
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42								
43								
44								
45								
46								
47								
48								
49								
50								

REPAIR TYPE: P - PATCH, C - CAP, RS - RECONSTRUCTED SEAM, G&W - GRIND WELD

REVIEWED BY: MD **DATE** 12/9/19

GOLDER FORM: G19-tss
(August 2000)

GOLDER ASSOCIATES INC.

GEOMEMBRANE REPAIR LOG

PROJECT NUMBER 1788523
OWNER: CEC
LOCATION: Erie, Mi

PROJECT TITLE: JRW Ash & Chemical Pond Closure
CONTRACTOR: Chesapeake

PASSING TRIAL SEAMS

NO.	TIME	TECH	NO.	TIME	TECH
Tx-1	0846	RH			

MACHINE NUMBER: X35

DATE: 10.7.19

SHEET NO: 1

	DEFECT CODE	REPAIR DATE	APPRX. TIME	REPAIR TYPE	APPRX. DIM.	WELD TECH.	MON.	REMARKS
1	4R	10/7	0933	P	2x5	RH	DH	DS-61
2	4X		0954	P	2x5		DH	DS-65
3	4T		0944	P	2x5		DH	DS-63
4	5C		0924	P	2x3		DH	—
5	5J		1018	P	2x5		DH	DS-74
6	5G		1010	P	2x5		DH	DS-71
7	5D		1002	P	2x5		DH	DS-68
8	7F		1136	C	2x24		DH	CAPS 4N DS-44E
9	7G		1146	P	2x5		DH	DX-3
10	4P		1034	P	2x5		DH	DS-59
11	5B		1040	P	2x5		DH	DS-67
12	5A		1026	P	2x5		DH	DS-66
13	7H	10/7	1154	P	2x2	RH	DH	—
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								

	DEFECT CODE	REPAIR DATE	APPRX. TIME	REPAIR TYPE	APPRX. DIM.	WELD TECH.	MON.	REMARKS
26								
27								
28								
29								
30								
31								
32								
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49								
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REPAIR TYPE: P - PATCH, C - CAP, RS - RECONSTRUCTED SEAM, G&W - GRIND WELD

REVIEWED BY: MD **DATE** 12/9/19

GOLDER FORM: G19-tss
(August 2000)

GOLDER ASSOCIATES INC.

GEOMEMBRANE REPAIR LOG

PROJECT NUMBER 1788523
OWNER: CEC
LOCATION: Erie, Mi

PROJECT TITLE: JRW Ash & Chemical Pond Clousure
CONTRACTOR: Chesapeake

PASSING TRIAL SEAMS

NO.	TIME	TECH	NO.	TIME	TECH
TX-2	0909	JJ			
TX-3	1314	JJ			

MACHINE NUMBER: X 5Φ

DATE: 10.7.19

SHEET NO: 1

	DEFECT CODE	REPAIR DATE	APPRX. TIME	REPAIR TYPE	APPRX. DIM.	WELD TECH.	MON.	REMARKS
1	4S	10.7	0928	P	2x5	JJ	DH	DS-62
2	4Q		0914	P	2x5		DH	DS-64
3	4W		0934	P	2x5		DH	DS-64
4	5E		0947	P	2x5		DH	DS-69
5	5H		0953	P	2x5		DH	DS-72
6	5I		1014	P	2x5		DH	DS-73
7	5W		1023	P	2x5		DH	DS-77
8	5K		1034	P	—		DH	COVER BY 5X, DS-75
9	5X		1034	P	2x8		DH	CAPS 5K
10	6M		1109	P	2x2		DH	—
11	5R		1113	P	2x2		DH	—
12	6P		1120	P	2x6	JJ	DH	CAPS 6N
13	6N		—	—	—	—	DH	CAPPED BY 6P
14	7E		1133	P	2x8	JJ	DH	CAPS 6Q
15	6Q		—	—	—	—	DH	COVERED BY 7E
16	6R		1137	P	2x2	JJ	DH	—
17	5S		1142	P	2x2		DH	—
18	6S		1146	P	2x2		DH	—
19	6T		1149	P	2x2		DH	—
20	6W		1153	P	2x2		DH	—
21	5F		1016	P	2x5		DH	DS-74
22	6X		1315	P	2x2		DH	
23	7A		1323	P	2x2		DH	
24	7B		1328	P	2x2		DH	
25	7C	10.7	1330	P	2x2	JJ	DH	

	DEFECT CODE	REPAIR DATE	APPRX. TIME	REPAIR TYPE	APPRX. DIM.	WELD TECH.	MON.	REMARKS
26	7D	10.7	1334	P	2x2	JJ	DH	
27	6B		1348	P	2x6	JJ	DH	
28	6C		1358	P	2x8	JJ	DH	CAPS 5T
29	5T		—	—	—	—	DH	DS-76 CAPPED BY 6C
30	6D		1403	P	2x2	JJ	DH	
31	6E		1409	P	2x2		DH	
32	6A		1418	P	2x4		DH	
33	6F		1422	P	2x2		DH	
34	5P		1427	P	2x4		DH	
35	6G		1430	P	2x2		DH	
36	6H		1434	P	2x2		DH	
37	6I		1438	P	2x2		DH	
38	6J		1443	P	2x2		DH	
39	6K		1450	P	2x2		DH	
40	5Q		1456	P	2x2		DH	
41	7I	10.7	1551	P	2x2	JJ	DH	
42								
43								
44								
45								
46								
47								
48								
49								
50								

REPAIR TYPE: P - PATCH, C - CAP, RS - RECONSTRUCTED SEAM, G&W - GRIND WELD

REVIEWED BY: MD **DATE** 12/9/19

GOLDER FORM: G19-tss
(August 2000)

GOLDER ASSOCIATES INC.

APPENDIX K.3

Non-Destructive Air Testing Logs

GEOMEMBRANE SEAM NON-DESTRUCTIVE TEST LOG

PROJECT NUMBER: 1788523
OWNER: CEC
LOCATION: Erie, Mi

PROJECT TITLE: JRW Ash & Chemical Pond Clousure
CONTRACTOR: Chesapeake

DATE: 8.15.19
SHEET NUMBER: 1 OF

	SEAM NUMBER	SEAM SECTION * FROM	TO	VACUUM OR (PRESSURE)	TECH ID	TIME START	FINISH	PRESSURE INITIAL	FINAL	OBS. TEST	RESULTS PASS/ FAIL	SEAM COMPLETE NO	YES	MON.	REMARKS
1	112	E	W	P	ML	1447	1452	3Φ	3Φ	Y	P		X	DH	
2	213	E	W	P	ML	1448	1453	3Φ	3Φ	Y	P		X	DH	
3	314	E	W	P	FP	1134	1139	3Φ	29	Y	P		X	DH	
4	415	E	W	P	FP	1142	1147	3Φ	3Φ	Y	P		X	DH	
5	516	E	W	P	ML	1425	1430	3Φ	29	Y	P		X	DH	
6	617	E	IM	P	ML	1449	1454	3Φ	3Φ	Y	P	X		DH	
7	617	II	IM	P	ML	1503	1508	3Φ	3Φ	Y	P	X		DH	
8	617	II	W	P	ML	1500	1505	3Φ	3Φ	Y	P		X	DH	
9	718	E	W	P	ML	1550	1555	3Φ	3Φ	Y	P		X	DH	
10	/	-				:		:							
11	/	-				:		:							
12	/	-				:		:							
13	/	-				:		:							
14	/	-				:		:							
15	/	-				:		:							
16	/	-				:		:							
17	/	-				:		:							
18	/	-				:		:							
19	/	-				:		:							
20	/	-				:		:							

* REFERENCE SEAM ENDPOINTS FROM AND END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT LOCATION ON THE SEAM (i e, REFERENCE POINT, DISTANCE, DIRECTION FROM REF. PT.)

GOLDER FORM: G16-tss
(August 2000)

REVIEWED BY: TPS DATE: 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM NON-DESTRUCTIVE TEST LOG

PROJECT NUMBER: 1788523
PROJECT TITLE: JRW Ash & Chemical Pond Clousure
OWNER: CEC
CONTRACTOR: Chesapeake
LOCATION: Erie, Mi
DATE: 8.16.19
SHEET NUMBER: 1 OF 1

	SEAM NUMBER	SEAM SECTION * FROM		TO	VACUUM OR (PRESSURE)	TECH ID	TIME START	TIME FINISH	PRESSURE INITIAL	PRESSURE FINAL	OBS. TEST	RESULTS PASS/ FAIL	SEAM COMPLETE NO	SEAM COMPLETE YES	MON.	REMARKS
1	8 1 9	E	-	W	P	AR	1817	:1822	3Φ	:3Φ	Y	P		X	DH	
2	9 1 10	E	-	IT	P	AR	1818	:1823	3Φ	:3Φ			X		DH	
3	10 1 11	E	-	W	P	AR	1819	:1824	3Φ	:3Φ				X	DH	
4	11 1 12	E	-	W	P	AR	1820	:1825	3Φ	:3Φ				X	DH	
5	12 1 13	E	-	W	P	AR	1838	:1843	3Φ	:3Φ				X	DH	
6	13 1 14	E	-	W	P	AR	1839	:1844	3Φ	:3Φ				X	DH	
7	14 1 15	E	-	W	P	AR	1840	:1845	3Φ	:3Φ				X	DH	
8	15 1 16	E	-	W	P	AR	1846	:1851	3Φ	:3Φ				X	DH	
9	16 1 17	E	-	W	P	AR	1908	:1913	3Φ	:3Φ				X	DH	
10	9 1 10	IT	-	W	P	AR	1827	:1832	3Φ	:3Φ	Y	P		X	DH	
11	/		-					:		:						
12	/		-					:		:						
13	/		-					:		:						
14	/		-					:		:						
15	/		-					:		:						
16	/		-					:		:						
17	/		-					:		:						
18	/		-					:		:						
19	/		-					:		:						
20	/		-					:		:						

* REFERENCE SEAM ENDPOINTS FROM AND END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT LOCATION ON THE SEAM (i e, REFERENCE POINT, DISTANCE, DIRECTION FROM REF. PT.)

GOLDER FORM: G16-tss
(August 2000)

REVIEWED BY: TDS DATE: 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM NON-DESTRUCTIVE TEST LOG

PROJECT NUMBER: 1788523
PROJECT TITLE: JRW Ash & Chemical Pond Closure
OWNER: CEC
CONTRACTOR: Chesapeake
LOCATION: Erie, Mi

DATE: 8.17.19
SHEET NUMBER: 1 OF 1

	SEAM NUMBER	SEAM SECTION * FROM	TO	VACUUM OR (PRESSURE)	TECH ID	TIME START	FINISH	PRESSURE INITIAL	FINAL	OBS. TEST	RESULTS PASS/ FAIL	SEAM COMPLETE NO	YES	MON.	REMARKS
1	17 | 18	E	W	P	CM	1111	1116	3Φ	3Φ	Y	P		X	DH	
2	18 | 19	E	W	P	CM	1113	1118	3Φ	3Φ	Y	P		X	DH	
3	19 | 20	E	W	P	CM	1115	1120	3Φ	3Φ	Y	P		X	DH	
4	20 | 21	E	W	P	CM	1117	1122	3Φ	3Φ	Y	P		X	DH	
5	21 | 22	E	W	P	FR	1126	1131	3Φ	3Φ	Y	P		X	DH	
6	/		-			:		:							
7	/		-			:		:							
8	/		-			:		:							
9	/		-			:		:							
10	/		-			:		:							
11	/		-			:		:							
12	/		-			:		:							
13	/		-			:		:							
14	/		-			:		:							
15	/		-			:		:							
16	/		-			:		:							
17	/		-			:		:							
18	/		-			:		:							
19	/		-			:		:							
20	/		-			:		:							

* REFERENCE SEAM ENDPOINTS FROM AND END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT LOCATION ON THE SEAM (ie, REFERENCE POINT, DISTANCE, DIRECTION FROM REF. PT.)

GOLDER FORM: G16-tss
(August 2000)

REVIEWED BY: TS **DATE:** 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM NON-DESTRUCTIVE TEST LOG

PROJECT NUMBER: 1788523
PROJECT TITLE: JRW Ash & Chemical Pond Clousure
OWNER: CEC
CONTRACTOR: Chesapeake
LOCATION: Erie, Mi

DATE: 8.20.19
SHEET NUMBER: 1 OF 1

	SEAM NUMBER	SEAM SECTION * FROM	TO	VACUUM OR ~~PRESSURE~~	TECH ID	TIME START	FINISH	PRESSURE INITIAL	FINAL	OBS. TEST	RESULTS PASS/ FAIL	SEAM COMPLETE NO	YES	MON.	REMARKS
1	22 123	W	- 3A	P	JR	1449	: 1454	32	: 30	Y	P	X		DH	
2	23 124	W	- E	P	JR	1420	: 1425	30	: 30	Y	P		X	DH	
3	24 125	W	- E	P	JR	1420	: 1425	30	: 30	Y	P		X	DH	
4	22 123	3A	- E	P	JR	1522	: 1527	30	: 29	Y	P		X	DH	
5	/		-				:		:						
6	/		-				:		:						
7	/		-				:		:						
8	/		-				:		:						
9	/		-				:		:						
10	/		-				:		:						
11	/		-				:		:						
12	/		-				:		:						
13	/		-				:		:						
14	/		-				:		:						
15	/		-				:		:						
16	/		-				:		:						
17	/		-				:		:						
18	/		-				:		:						
19	/		-				:		:						
20	/		-				:		:						

* REFERENCE SEAM ENDPOINTS FROM AND END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT LOCATION ON THE SEAM (i e, REFERENCE POINT, DISTANCE, DIRECTION FROM REF. PT.)

GOLDER FORM: G16-tss
(August 2000)

REVIEWED BY: PS **DATE:** 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM NON-DESTRUCTIVE TEST LOG

PROJECT NUMBER: 1788523
PROJECT TITLE: JRW Ash & Chemical Pond Clousure
OWNER: CEC
CONTRACTOR: Chesapeake
LOCATION: Erie, Mi

DATE: 9.30.19
SHEET NUMBER: 1 of

	SEAM NUMBER	SEAM SECTION * FROM	TO	VACUUM OR (PRESSURE)	TECH ID	TIME START	FINISH	PRESSURE INITIAL	FINAL	OBS. TEST	RESULTS PASS/ FAIL	SEAM COMPLETE NO	YES	MON.	REMARKS
1	25 126	W	E	P	IM	1228	1233	30	30	Y	P		X	DH	
2	26 127	W	E	"	"	1235	1240	30	30	Y	P		X	DH	
3	28 129	W	E	"	"	1245	1250	30	30	Y	P		X	DH	
4	29 130	W	3T	P	Im	1253	1258	30	30	Y	P	X		DH	
5	/	-				:		:							
6	/	-				:		:							
7	/	-				:		:							
8	/	-				:		:							
9	/	-				:		:							
10	/	-				:		:							
11	/	-				:		:							
12	/	-				:		:							
13	/	-				:		:							
14	/	-				:		:							
15	/	-				:		:							
16	/	-				:		:							
17	/	-				:		:							
18	/	-				:		:							
19	/	-				:		:							
20	/	-				:		:							

* REFERENCE SEAM ENDPOINTS FROM AND END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT LOCATION ON THE SEAM (i e, REFERENCE POINT, DISTANCE, DIRECTION FROM REF. PT.)

GOLDER FORM: G16-tss
(August 2000)

REVIEWED BY: RDS **DATE:** 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM NON-DESTRUCTIVE TEST LOG

PROJECT NUMBER: 1788523
PROJECT TITLE: JRW Ash & Chemical Pond Closure
OWNER: CEC
CONTRACTOR: Chesapeake
LOCATION: Erie, Mi

DATE: 10.1.19
SHEET NUMBER: 1 OF 1

	SEAM NUMBER	SEAM SECTION * FROM	TO	VACUUM OR PRESSURE	TECH ID	TIME START	FINISH	PRESSURE INITIAL	FINAL	OBS. TEST	RESULTS PASS/ FAIL	SEAM COMPLETE NO	YES	MON.	REMARKS
1	27 / 28	W	E	P	PF	1540	1545	30	30	Y	P		X	DH	
2	29 / 30	3T	E	P	PF	1554	1559	30	29	Y	P		X	DH	
3	31 / 32	W	3N	P	PF	1625	1630	30	30	Y	P	X		DH	
4	31 / 32	3N	E	P	PF	1635	1640	30	30	Y	P		X	DH	
5	30 / 31	W	3X	P	PF	1659	1704	30	30	Y	P	X		DH	
6	30 / 31	3X	E	P	PF	1724	1729	30	30	Y	P		X	DH	
7	/	-				:		:							
8	/	-				:		:							
9	/	-				:		:							
10	/	-				:		:							
11	/	-				:		:							
12	/	-				:		:							
13	/	-				:		:							
14	/	-				:		:							
15	/	-				:		:							
16	/	-				:		:							
17	/	-				:		:							
18	/	-				:		:							
19	/	-				:		:							
20	/	-				:		:							

* REFERENCE SEAM ENDPOINTS FROM AND END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT LOCATION ON THE SEAM (i e, REFERENCE POINT, DISTANCE, DIRECTION FROM REF. PT.)

GOLDER FORM: G16-tss
(August 2000)

REVIEWED BY: TDJ **DATE:** 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM NON-DESTRUCTIVE TEST LOG

PROJECT NUMBER: 1788523
PROJECT TITLE: JRW Ash & Chemical Pond Clousure
OWNER: CEC
CONTRACTOR: Chesapeake
LOCATION: Erie, Mi

DATE: 10.2.19
SHEET NUMBER: 1 OF 1

	SEAM NUMBER	SEAM SECTION * FROM	TO	VACUUM OR PRESSURE	TECH ID	TIME START	FINISH	PRESSURE INITIAL	FINAL	OBS. TEST	RESULTS PASS/ FAIL	SEAM COMPLETE NO	YES	MON.	REMARKS
1	34 / 35	W	E	P	I, M	1355	1400	3Φ	3Φ	Y	P		X	DH	
2	33 / 34	W	E			1355	1400	3Φ	3Φ	Y	P		X	DH	
3	32 / 33	4B	W			1346	1345	3Φ	3Φ	Y	P	X		DH	
4	32 / 33	4B	4A			1346	1345	3Φ	3Φ	Y	P	X		DH	
5	32 / 33	4A	E			1346	1351	3Φ	3Φ	Y	P		X	DH	
6	/	-				:		:							
7	/	-				:		:							
8	/	-				:		:							
9	/	-				:		:							
10	/	-				:		:							
11	/	-				:		:							
12	/	-				:		:							
13	/	-				:		:							
14	/	-				:		:							
15	/	-				:		:							
16	/	-				:		:							
17	/	-				:		:							
18	/	-				:		:							
19	/	-				:		:							
20	/	-				:		:							

* REFERENCE SEAM ENDPOINTS FROM AND END OF SEAM (EOS), A REPAIR NUMBER,
OR A POINT LOCATION ON THE SEAM (i e, REFERENCE POINT, DISTANCE, DIRECTION FROM REF. PT.)

GOLDER FORM: G16-tss
(August 2000)

REVIEWED BY: PPS **DATE:** 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM NON-DESTRUCTIVE TEST LOG

PROJECT NUMBER: 1788523
PROJECT TITLE: JRW Ash & Chemical Pond Clousure
OWNER: CEC
CONTRACTOR: Chesapeake
LOCATION: Erie, Mi

DATE: 10.4.19
SHEET NUMBER: 1

	SEAM NUMBER	SEAM SECTION * FROM	TO	VACUUM OR PRESSURE	TECH ID	TIME START	FINISH	PRESSURE INITIAL	FINAL	OBS. TEST	RESULTS PASS/ FAIL	SEAM COMPLETE NO	YES	MON.	REMARKS
1	35 / 36	W	E	P	IM	0744	0745	30	30	Y	P		X	DH	
2	36 / 37	W	E	P	IM	0752	0757	30	30	Y	P		X	DH	
3	37 / 38	W	E	P	IM	0801	0806	30	30	Y	P		X	DH	
4	/	-				:		:							
5	/	-				:		:							
6	/	-				:		:							
7	/	-				:		:							
8	/	-				:		:							
9	/	-				:		:							
10	/	-				:		:							
11	/	-				:		:							
12	/	-				:		:							
13	/	-				:		:							
14	/	-				:		:							
15	/	-				:		:							
16	/	-				:		:							
17	/	-				:		:							
18	/	-				:		:							
19	/	-				:		:							
20	/	-				:		:							

* REFERENCE SEAM ENDPOINTS FROM AND END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT LOCATION ON THE SEAM (ie, REFERENCE POINT, DISTANCE, DIRECTION FROM REF. PT.)

GOLDER FORM: G16-tss
(August 2000)

REVIEWED BY: PS **DATE:** 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM NON-DESTRUCTIVE TEST LOG

PROJECT NUMBER: 1788523
PROJECT TITLE: JRW Ash & Chemical Pond Clousure
OWNER: CEC
CONTRACTOR: Chesapeake
LOCATION: Erie, Mi

DATE: 10.5.19
SHEET NUMBER: 1

	SEAM NUMBER	SEAM SECTION * FROM	TO	VACUUM OR PRESSURE	TECH ID	TIME START	FINISH	PRESSURE INITIAL	FINAL	OBS. TEST	RESULTS PASS/ FAIL	SEAM COMPLETE NO	YES	MON.	REMARKS
1	38 I 39	5C	- W	P	JM	1151	: 1156	3Φ	: 3Φ	Y	P	X		DH	
2	38 I 39	5C	- E	|	|	1154	: 1159	3Φ	: 3Φ	|	|		X	DH	
3	39 I 4Φ	W	- E	|	|	12Φ1	: 12Φ6	3Φ	: 3Φ	|	|		X	DH	
4	4Φ I 41	W	- E	|	|	12Φ2	: 12Φ7	3Φ	: 3Φ	|	|		X	DH	
5	41 I 42	W	- E	P	JM	1212	: 1217	3Φ	: 3Φ	Y	P		X	DH	
6	/		-				:		:						
7	/		-				:		:						
8	/		-				:		:						
9	/		-				:		:						
10	/		-				:		:						
11	/		-				:		:						
12	/		-				:		:						
13	/		-				:		:						
14	/		-				:		:						
15	/		-				:		:						
16	/		-				:		:						
17	/		-				:		:						
18	/		-				:		:						
19	/		-				:		:						
20	/		-				:		:						

* REFERENCE SEAM ENDPOINTS FROM AND END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT LOCATION ON THE SEAM (i e, REFERENCE POINT, DISTANCE, DIRECTION FROM REF. PT.)

GOLDER FORM: G16-tss
(August 2000)

REVIEWED BY: TDS **DATE:** 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM NON-DESTRUCTIVE TEST LOG

PROJECT NUMBER: 1788523
OWNER: CEC
LOCATION: Erie, Mi

PROJECT TITLE: JRW Ash & Chemical Pond Clousure
CONTRACTOR: Chesapeake

DATE: 10.7.19
SHEET NUMBER: 1

	SEAM NUMBER	SEAM SECTION * FROM	TO	VACUUM OR (PRESSURE)	TECH ID	TIME START	FINISH	PRESSURE INITIAL	FINAL	OBS. TEST	RESULTS PASS/ FAIL	SEAM COMPLETE NO	YES	MON.	REMARKS
1	42 / 43	W	E	P	IM	0805	0810	30	30	Y	P		X	DH	
2	43 / 44	W	E			0808	0813	30	30	Y	P		X	DH	
3	44 / 45	W	E			0815	0820	30	30	Y	P		X	DH	
4	45 / 46	W	E			0818	0823	30	30	Y	P		X	DH	
5	46 / 47	W	E			0828	0833	30	30	Y	P		X	DH	
6	47 / 48	W	E			0848	0853	30	30	Y	P		X	DH	
7	48 / 49	W	E			0846	0851	30	30	Y	P		X	DH	
8	49 / 50	W	E			0858	0903	30	30	Y	P		X	DH	
9	49 / 51	W	E	P	IM	0905	0910	30	30	Y	P		X	DH	
10	50 / 51	—	—	—	—	—	—	—	—	—	—	—	—	—	CAPPED BY 51
11	28 / 52	S	N	P	IM	0915	0920	30	30	Y	P		X	DH	
12	29 / 52	N	S			0919	0924	30	30	Y	P		X	DH	
13	30 / 52	S	N			0926	0931	30	30	Y	P		X	DH	
14	31 / 52	N	S			0926	0931	30	30	Y	P		X	DH	
15	32 / 52	S	N			0935	0940	30	30	Y	P		X	DH	
16	33 / 52	N	S			0935	0940	30	30	Y	P		X	DH	
17	34 / 52	S	N			0943	0947	30	30	Y	P		X	DH	
18	35 / 52	N	S			0943	0947	30	30	Y	P		X	DH	
19	36 / 52	S	N			0952	0957	30	30	Y	P		X	DH	
20	37 / 52	N	S	P	IM	0952	0957	30	30	Y	P		X	DH	

* REFERENCE SEAM ENDPOINTS FROM AND END OF SEAM (EOS), A REPAIR NUMBER,
OR A POINT LOCATION ON THE SEAM (i e, REFERENCE POINT, DISTANCE, DIRECTION FROM REF. PT.)

GOLDER FORM: G16-tss
(August 2000)

REVIEWED BY: TPS DATE: 12-2-19

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM NON-DESTRUCTIVE TEST LOG

PROJECT NUMBER: 1788523
PROJECT TITLE: JRW Ash & Chemical Pond Clousure
OWNER: CEC
CONTRACTOR: Chesapeake
LOCATION: Erie, Mi

DATE: 10.7.19
SHEET NUMBER: 2

	SEAM NUMBER	SEAM SECTION * FROM	TO	VACUUM OR PRESSURE	TECH ID	TIME START	FINISH	PRESSURE INITIAL	FINAL	OBS. TEST	RESULTS PASS/ FAIL	SEAM COMPLETE NO	YES	MON.	REMARKS
1	38 / 52	S	N	P	IM	10:02	10:07	3Φ	3Φ	Y	P		X	DH	
2	39 / 52	N	S			10:02	10:07	3Φ	3Φ	Y	P		X	DH	
3	40 / 52	S	N			10:14	10:19	3Φ	3Φ	Y	P		X	DH	
4	41 / 52	N	55			10:14	10:19	3Φ	3Φ	Y	P	X		DH	
5	41 / 52	55	S			10:15	10:20	3Φ	3Φ	Y	P		X	DH	
6	42 / 52	S	N			10:24	10:29	3Φ	3Φ	Y	P		X	DH	
7	43 / 52	N	S			10:24	10:29	3Φ	3Φ	Y	P		X	DH	
8	44 / 52	N	S			10:25	10:30	3Φ	3Φ	Y	P		X	DH	
9	45 / 52	S	N			10:35	10:40	3Φ	3Φ	Y	P		X	DH	
10	46 / 52	N	S			10:35	10:40	3Φ	3Φ	Y	P		X	DH	
11	47 / 52	N	S			10:36	10:41	3Φ	3Φ	Y	P		X	DH	
12	48 / 52	S	N			10:53	10:58	3Φ	3Φ	Y	P		X	DH	
13	49 / 52	N	S	P	IM	10:42	10:47	3Φ	3Φ	Y	P		X	DH	
14	/		-			:		:							
15	/		-			:		:							
16	/		-			:		:							
17	/		-			:		:							
18	/		-			:		:							
19	/		-			:		:							
20	/		-			:		:							

* REFERENCE SEAM ENDPOINTS FROM AND END OF SEAM (EOS), A REPAIR NUMBER,
OR A POINT LOCATION ON THE SEAM (ie, REFERENCE POINT, DISTANCE, DIRECTION FROM REF. PT.)

GOLDER FORM: G16-tss
(August 2000)

REVIEWED BY: RS **DATE:** 12-2-19

GOLDER ASSOCIATES INC.

APPENDIX K.4

Vacuum Testing Logs

GEOMEMBRANE VACUUM TEST LOG

PROJECT NUMBER: 1788523
PROJECT TITLE: JRW Ash & Chemical Pond Closure
OWNER: CEC
CONTRACTOR: Chesapeake
LOCATION: Erie, Mi

REPAIRS

	DEFECT CODE	TEST DATE	TECH ID	DEFECTS **	OBS. TEST	MON.	REMARKS
1	1A	8.15	JF	Φ	Y	DH	DS-1
2	1B			Φ			DS-2
3	1C			Φ			DS-3
4	1D	8.16		Φ			DS-4
5	1E	8.15		Φ			DS-5
6	1F			Φ			DS-6
7	1G			Φ			DS-7
8	1H			Φ			DS-8
9	1I			Φ			—
10	1J			Φ			DS-9
11	1K			Φ			DS-1Φ
12	1M			Φ			—
13	1N			Φ			DS-11
14	1P		JF	Φ	Y	DH	DS-12
15	1Q	8.17	FP	Φ	Y	DH	DS-13
16	1R			Φ		DH	DS-14
17	1S			Φ		DH	DS-15
18	1T			Φ		DH	—
19	1W			Φ		DH	DS-16
20	1X			Φ		DH	DS-17
21	2A			Φ			DS-18
22	2B			Φ			DS-19
23	2C			Φ			DS-2Φ
24	2D			Φ			—
25	2E			Φ			—
26	2F			Φ			—
27	2G			Φ			DS-21 / 2K CAPS
28	2H			Φ			DS-22
29	2I			Φ			DS-23
30	2J			Φ			DS-24
31	2K			Φ			CAPPED BY 2G
32	2M			Φ			DS-25
33	2N			Φ			DS-26
34	2P			Φ			DS-27
35	2Q			Φ			DS-28
36	2R			Φ			DS-29
37	2S			Φ			DS-3Φ
38	2T			Φ			DS-31
39	2W			Φ			DS-32
40	2X	8.17	FP	Φ	Y	DH	DS-33

REPAIRS

	DEFECT CODE	TEST DATE	TECH ID	DEFECTS **	OBS. TEST	MON.	REMARKS
41	3A	8.2Φ	JC	Φ	Y	DH	DS-34
42	3B	8.2Φ	JC	Φ	Y	DH	DS-35
43	3C	8.2Φ	JC	Φ	Y		DS-36
44	3D	8.2Φ	JC	Φ	Y		DS-37
45	3E	8.2Φ	JC	Φ	Y	DH	DS-38
46	3F	8.17	FP	Φ	Y	DH	—
47	3G	9/3Φ	IM	Φ	Y	DH	DS-39
48	3H	9/3Φ	IM	Φ	Y		DS-4Φ
49	3I	9/3Φ	IM	Φ	Y		DS-41
50	3J	9/3Φ	IM	Φ	Y	DH	DS-42
51	3K	1Φ/2	IM	Φ	Y	DH	DS-43
52	3M	1Φ/1	IM	Φ	Y	DH	DS-44
53	3N	1Φ/2	IM	Φ	Y	DH	—
54	3P	1Φ/1	IM	Φ	Y	DH	DS-45
55	3Q	9/3Φ	IM	Φ	Y	DH	DS-46
56	3R	1Φ/1	IM	Φ	Y	DH	DS-47
57	3S	1Φ/1	IM	Φ	Y	DH	DS-48
58	3T	1Φ/1	IM	Φ	Y	DH	—
59	3W	1Φ.2	IM	Φ	Y	DH	DS-49
60	3X	—	—	—	—	—	CAPPED BY 3R
61	4A	1Φ/4	IM	Φ	Y	DH	—
62	4B	1Φ/4	IM	Φ	Y	DH	—
63	4C	1Φ/4	IM	Φ	Y	DH	DS-5Φ
64	4D	1Φ/4	IM	Φ	Y	DH	DS-51
65	4E	1Φ/4	IM	Φ	Y	DH	DS-52
66	4F	1Φ/4	IM	Φ	Y	DH	DS-53
67	4G	1Φ/4	IM	Φ	Y	DH	DS-54
68	4H	1Φ/4	IM	Φ	Y	DH	DS-55
69	4I	1Φ/4	IM	Φ	Y	DH	DS-56
70	4J	1Φ/4	IM	Φ	Y	DH	DS-57
71	4K	1Φ/4	IM	Φ	Y	DH	DS-58
72	4M	1Φ/7	LR	Φ	Y	DH	DS-44P
73	4N	1Φ/7	LR	Φ	Y	DH	DS-44N
74	4P	1Φ/7	LR	Φ	Y	DH	DS-59
75	4Q	1Φ/7	LR	Φ	Y	DH	DS-6Φ
76	4R	1Φ.7	LR	Φ	Y	DH	DS-61
77	4S	1Φ.7	LR	Φ	Y	DH	DS-62
78	4T	1Φ/7	LR	Φ	Y	DH	DS-63
79	4W	1Φ/7	LR	Φ	Y	DH	DS-64
80	4X	1Φ/7	LR	Φ	Y	DH	DS-65

** RECORD QUANTITY OF LEAKS DETECTED AND REFERENCE NEW DEFECT CODE IN REMARKS.

GOLDER FORM: G17-tss
(August 2000)

REVIEWED BY: MD DATE 12/9/19

GOLDER ASSOCIATES INC.

GEOMEMBRANE VACUUM TEST LOG

PROJECT NUMBER: 1788523
PROJECT TITLE: JRW Ash & Chemical Pond Closusure
OWNER: CEC
CONTRACTOR: Chesapeake
LOCATION: Erie, Mi

REPAIRS

	DEFECT CODE	TEST DATE	TECH ID	DEFECTS **	OBS. TEST	MON.	REMARKS
1	5A	10/7	LR	Φ	Y	DH	DS-66
2	5B	10/7	LR	Φ	Y	DH	DS-67
3	5C	10/8	LR	Φ	Y	DH	
4	5D	10.7	LR	Φ	Y	DH	DS-68
5	5E	10.7	IM	Φ	Y	DH	DS-69
6	5F	10.7	LR	Φ	Y	DH	DS-70
7	5G	10.7	LR	Φ	Y	DH	DS-71
8	5H	10.7	IM	Φ	Y	DH	DS-72
9	5I	10.7	LR	Φ	Y	DH	DS-73
10	5J	10.7	LR	Φ	Y	DH	DS-74
11	5K	10/7	LR	Φ	Y	DH	DS-75
12	5M	10/7	LR	Φ	Y	DH	COVERS 3M & 4M
13	5N	10/7	LR	Φ	Y	DH	DX-2
14	5P	10.7	IM	Φ	Y	DH	
15	5Q	10.7	IM	Φ	Y	DH	
16	5R	10.7	IM	Φ	Y	DH	
17	5S	10.7	IM	Φ	Y	DH	
18	5T	10.7	IM	Φ	Y	DH	DS-76
19	5W	10.7	LR	Φ	Y	DH	DS-77
20	5X	10.7	LR	Φ	Y	DH	—
21	6A	10.7	IM	Φ	Y	DH	
22	6B	10.7	IM	Φ	Y	DH	
23	6C	10.7	IM	Φ	Y	DH	CAPS 5T
24	6D	10.7	IM	Φ	Y	DH	
25	6E	10.7	IM	Φ	Y	DH	
26	6F	10.7	IM	Φ	Y	DH	
27	6G	10.7	IM	Φ	Y	DH	
28	6H	10.7	IM	Φ	Y	DH	
29	6I	10.7	IM	Φ	Y	DH	
30	6J	10.7	IM	Φ	Y	DH	
31	6K	10.7	IM	Φ	Y	DH	
32	6M	10.7	IM	Φ	Y	DH	
33	6N	10.7	IM	Φ	Y	DH	CAPPED 6P
34	6P	10.7	IM	Φ	Y	DH	CAPS 6N
35	6Q	10.7	IM	Φ	Y	DH	
36	6R	10.7	IM	Φ	Y	DH	
37	6S	10.7	IM	Φ	Y	DH	
38	6T	10.7	IM	Φ	Y	DH	
39	6W	10.7	IM	Φ	Y	DH	
40	6X	10.7	IM	Φ	Y	DH	

REPAIRS

	DEFECT CODE	TEST DATE	TECH ID	DEFECTS **	OBS. TEST	MON.	REMARKS
41	7A	10.7	IM	Φ	Y	DH	
42	7B	10.7	IM	Φ	Y	DH	
43	7C	10.7	IM	Φ	Y	DH	
44	7D	10.7	IM	Φ	Y	DH	
45	7E	10.7	IM	Φ	Y	DH	CAPS 6Q
46	7F	10.7	LR	Φ	Y	DH	CAPS 4N DS-44N
47	7G	10.7	LR	Φ	Y	DH	DX-3
48	7H	10.7	LR	Φ	Y	DH	
49	7I	10.7	IM	Φ	Y	DH	
50							
51							
52							
53							
54							
55							
56							
57							
58							
59							
60							
61							
62							
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** RECORD QUANTITY OF LEAKS DETECTED AND REFERENCE NEW DEFECT CODE IN REMARKS.

GOLDER FORM: G17-tss
(August 2000)

REVIEWED BY: MD DATE 12/9/19

GOLDER ASSOCIATES INC.

APPENDIX L

Seam Destructive Test Results

APPENDIX L.1

Fusion Results

1788523

JR Whiting - Ponds 1 and 2
Fusion Footage

12/19/2019

Date	Machine No.	Weld Tech.	Total Length	Samples Taken	Daily Average	Destructive Samples
8/15/2019	58	AR	2163	5	433	DS-2, DS-4, DS-6, DS-9, DS-10
8/16/2019	58	AR	2160	5	432	DS-13, DS-14, DS-18, DS-22, DS-23
8/17/2019	58	AR	1440	3	480	DS-29. DS-32, DS-33
8/20/2019	58	AR	720	1	720	DS-34
		Total	6483	14		
					Machine average for project:	**463**
10/1/2019	65	RH	1460	3	487	DS-43, DS-44, DS-47
10/2/2019	65	RH	1460	3	487	DS-51, DS-52, DS-57
10/4/2019	65	RH	1460	3	487	DS-62, DS-63, DS-67
10/5/2019	65	RH	1084	3	361	DS-71, DS-72, DS-75
		Total	5464	12		
					Machine average for project:	**455**
9/27/2019	1707	SD	1420	3	473	DS-41, DS-42, DS-46
10/1/2019	1707	SD	770	2	385	DS-48, DS-49
10/2/2019	1707	SD	1460	3	487	DS-50, DS-55, DS-56
10/4/2019	1707	SD	1460	3	487	DS-59, DS-64, DS-65
10/5/2019	1707	SD	1782	3	594	DS-70, DS-74, DS76
		Total	6892	14		
					Machine average for project:	**492**
8/15/2019	1734	AMJR	2883	7	412	DS-1, DS-3, DS-5, DS-7. DS-8, DS-11, DS-12
8/16/2019	1734	AMJR	2160	4	540	DS-15, DS-19, DS-20, DS-24
8/17/2019	1734	AMJR	1440	3	480	DS-27. DS-28, DS-31
8/20/2019	1734	AMJR	720	1	720	DS-37
		Total	7203	15		
					Machine average for project:	**480**
8/16/2019	1741	ML	2160	5	432	DS-16, DS-17, DS-21, DS-25, DS-26
8/17/2019	1741	ML	720	1	720	DS-30
8/20/2019	1741	ML	720	3	240	DS-35, DS-36, DS-38
		Total	3600	9		
					Machine average for project:	**400**
9/27/2019	1743	PF	1460	3	487	DS-39, DS-40, DS-45
10/2/2019	1743	PF	1460	3	487	DS-53, DS-54, DS-58
10/4/2019	1743	Pf	1460	3	487	DS-60, DS-61, DS-66
10/5/2019	1743	PF	1777	4	444	DS-68, DS-69, DS-73, DS-77
		Total	6157	13		
					Machine average for project:	**474**

Total Seaming in Feet	**35,799**
Total Number of Destructives	**77**

Overall Sampling Average (Fusion): 1 test per 465 Feet

Note:

1.) The overall sampling average is under the required 1 per 500 feet.

GEOMEMBRANE SEAM DESTRUCTIVE SAMPLE LOG

PROJECT NUMBER: 1788523 **PROJECT TITLE:** JRW Ash & Chemical Pond Clousure
OWNER: CEC **CONTRACTOR:** Chesapeake
LOCATION: Erie, Mi.

SHEET NUMBER 1 OF

	DESTRUCTIVE SAMPLE NUMBER	DESTRUCTIVE SEAM NUMBER	MACHINE NUMBER	DATE REMOVED	FIELD TEST RESULTS PEEL (PASS/FAIL)	FIELD TEST RESULTS SHEAR (PASS/FAIL)	MON.	DATE SHIPPED	LAB TEST STATUS (PASS/FAIL)	DATE OF NOTIFICATION	REMARKS
1	DS-1	1 1 2	734	8 1151 19	P	P	DH	8 1151 19	P	8 1191 19	
2	DS-2	2 1 3	58	8 1151 19	P	P	DH	8 1151 19	P	8 1191 19	
3	DS-3	1 1 2	734	8 1151 19	P	P	DH	8 1151 19	P	8 1191 19	
4	DS-4	2 1 3	58	8 1151 19	P	P	DH	8 1151 19	P	8 1191 19	
5	DS-5	3 1 4	734	8 1151 19	P	P	DH	8 1151 19	P	8 1191 19	
6	DS-6	4 1 5	58	8 1151 19	P	P	DH	8 1151 19	P	8 1191 19	
7	DS-7	5 1 6	734	8 1151 19	P	P	DH	8 1151 19	P	8 1191 19	
8	DS-8	5 1 6	734	8 1151 19	P	P	DH	8 1151 19	P	8 1191 19	
9	DS-9	6 1 7	58	8 1151 19	P	P	DH	8 1151 19	P	8 1191 19	
10	DS-10	6 1 7	58	8 1151 19	P	P	DH	8 1151 19	P	8 1191 19	
11	DS-11	7 1 8	734	8 1151 19	P	P	DH	8 1151 19	P	8 1191 19	
12	DS-12	7 1 8	734	8 1151 19	P	P	DH	8 1151 19	P	8 1191 19	
13	DS-13	8 1 9	58	8 1171 19	P	P	DH	8 1171 19	P	8 1221 19	
14	DS-14	8 1 9	58	8 1171 19	P	P	DH	8 1171 19	P	8 1221 19	
15	DS-15	9 1 10	1734	8 1171 19	P	P	DH	8 1171 19	P	8 1221 19	
16	DS-16	10 1 11	1741	8 1171 19	P	P	DH	8 1171 19	P	8 1221 19	
17	DS-17	10 1 11	1741	8 1171 19	P	P	DH	8 1171 19	P	8 1221 19	
18	DS-18	11 1 12	58	8 1171 19	P	P	DH	8 1171 19	P	8 1221 19	
19	DS-19	12 1 13	1734	8 1171 19	P	P	DH	8 1171 19	P	8 1221 19	
20	DS-20	12 1 13	1734	8 1171 19	P	P	DH	8 1171 19	P	8 1221 19	

REVIEWED BY: [illegible] **DATE:** 12-2-19

GOLDER FORM: G20-0699
(JUNE 1999)

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM DESTRUCTIVE SAMPLE LOG

PROJECT NUMBER: 1788523
PROJECT TITLE: JRW Ash & Chemical Pond Clousure
OWNER: CEC
CONTRACTOR: Chesapeake
LOCATION: Erie, Mi.

SHEET NUMBER 2

	DESTRUCTIVE SAMPLE NUMBER	DESTRUCTIVE SEAM NUMBER	MACHINE NUMBER	DATE REMOVED	FIELD TEST RESULTS PEEL (PASS/FAIL)	FIELD TEST RESULTS SHEAR (PASS/FAIL)	MON.	DATE SHIPPED	LAB TEST STATUS (PASS/FAIL)	DATE OF NOTIFICATION	REMARKS
1	DS-21	13 114	1741	8 1171 19	P	P	DH	8 1171 19	P	8 1221 19	
2	DS-22	14 115	58	8 1171 19	P	P	DH	8 1171 19	P	8 1221 19	
3	DS-23	14 115	58	8 1171 19	P	P	DH	8 1171 19	P	8 1221 19	
4	DS-24	15 116	1734	8 1171 19	P	P	DH	8 1171 19	P	8 1221 19	
5	DS-25	16 117	1741	8 1171 19	P	P	DH	8 1171 19	P	8 1221 19	
6	DS-26	16 117	1741	8 1171 19	P	P	DH	8 1171 19	P	8 1221 19	
7	DS-27	17 118	1734	8 1171 19	P	P	DH	8 1171 19	P	8 1221 19	
8	DS-28	17 118	1734	8 1171 19	P	P	DH	8 1171 19	P	8 1221 19	
9	DS-29	18 119	58	8 1171 19	P	P	DH	8 1171 19	P	8 1221 19	
10	DS-30	19 120	1741	8 1171 19	P	P	DH	8 1171 19	P	8 1221 19	
11	DS-31	20 121	1734	8 1171 19	P	P	DH	8 1171 19	P	8 1221 19	
12	DS-32	21 122	58	8 1171 19	P	P	DH	8 1171 19	P	8 1221 19	
13	DS-33	21 122	58	8 1171 19	P	P	DH	8 1171 19	P	8 1221 19	
14	DS-34	22 123	58	8 1201 19	P	P	DH	8 1201 19	P	8 1221 19	
15	DS-35	23 124	1741	8 1201 19	P	P	DH	8 1201 19	P	8 1221 19	
16	DS-36	23 124	1741	8 1201 19	P	P	DH	8 1201 19	P	8 1221 19	
17	DS-37	24 125	1734	8 1201 19	P	P	DH	8 1201 19	P	8 1221 19	
18	DS-38	23 124	1741	8 1201 19	P	P	DH	8 1201 19	P	8 1221 19	
19	~~DS-1~~	~~1~~	~~1741~~	~~8 1171 19~~	~~P~~	~~P~~	~~DH~~	~~8 1171 19~~	~~P~~	~~8 1221 19~~	FAIL WELD
20	DS-39	25 126	1743	9 1301 19	P	P	DH	9 1301 19	P	10 11 19	

REVIEWED BY: [signature] **DATE:** 12-2-15

GOLDER FORM: G20-0699
(JUNE 1999)

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM DESTRUCTIVE SAMPLE LOG

PROJECT NUMBER: 1788523 **PROJECT TITLE:** JRW Ash & Chemical Pond Clousure
OWNER: CEC **CONTRACTOR:** Chesapeake
LOCATION: Erie, Mi.

SHEET NUMBER 3

	DESTRUCTIVE SAMPLE NUMBER	DESTRUCTIVE SEAM NUMBER	MACHINE NUMBER	DATE REMOVED	FIELD TEST RESULTS PEEL (PASS/FAIL)	FIELD TEST RESULTS SHEAR (PASS/FAIL)	MON.	DATE SHIPPED	LAB TEST STATUS (PASS/FAIL)	DATE OF NOTIFICATION	REMARKS
1	DS-40	25 126	1743	9 13 19	P	P	DH	9 13 19	P	10 1 19	
2	DS-41	26 127	1707	9 13 19	P	P	DH	9 13 19	P	10 1 19	
3	DS-42	26 127	1707	9 13 19	P	P	DH	9 13 19	P	10 1 19	
4	DS-43	27 128	65	10 1 19	P	P	DH	10 1 19	P	10 1 19	
5	DS-44	27 128	65	10 1 19	P	P	DH	10 1 19	F	10 1 19	
6	DS-45	28 129	1743	9 13 19	P	P	DH	9 13 19	P	10 1 19	
7	DS-46	29 130	1707	9 13 19	P	P	DH	9 13 19	P	10 1 19	
8	DS-47	30 131	65	10 1 19	P	P	DH	10 1 19	P	10 13 19	
9	DS-48	31 132	1707	10 1 19	P	P	DH	10 1 19	P	10 13 19	
10	DS-49	31 132	1707	10 1 19	P	P	DH	10 1 19	P	10 13 19	
11	DS-50	32 133	1707	10 14 19	P	P	DH	10 14 19	P	10 17 19	
12	DS-51	33 134	65	10 14 19	P	P	DH	10 14 19	P	10 17 19	
13	DS-52	33 134	65	10 14 19	P	P	DH	10 14 19	P	10 17 19	
14	DS-53	34 135	1743	10 14 19	P	P	DH	10 14 19	P	10 17 19	
15	DS-54	34 135	1743	10 14 19	P	P	DH	10 14 19	P	10 17 19	
16	DS-55	35 136	1707	10 14 19	P	P	DH	10 14 19	P	10 17 19	
17	DS-56	35 136	1707	10 14 19	P	P	DH	10 14 19	P	10 17 19	
18	DS-57	36 137	65	10 14 19	P	P	DH	10 14 19	P	10 17 19	
19	DS-58	37 138	1743	10 14 19	P	P	DH	10 14 19	P	10 17 19	
20	DS-44P	27 128	65	10 14 19	P	P	DH	10 14 19	P	10 17 19	

REVIEWED BY: TPS **DATE:** 12-2-15

GOLDER FORM: G20-0699
(JUNE 1999)

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM DESTRUCTIVE SAMPLE LOG

PROJECT NUMBER: 1788523 **PROJECT TITLE:** JRW Ash & Chemical Pond Clousure
OWNER: CEC **CONTRACTOR:** Chesapeake
LOCATION: Erie, Mi.

SHEET NUMBER 4

	DESTRUCTIVE				FIELD TEST RESULTS							
	SAMPLE NUMBER	SEAM NUMBER	MACHINE NUMBER	DATE REMOVED	PEEL (PASS/FAIL)	SHEAR (PASS/FAIL)	MON.	DATE SHIPPED	LAB TEST STATUS (PASS/FAIL)	DATE OF NOTIFICATION	REMARKS
1	DS-44N	30131	65	10/5/19	P	P	DH	10/7/19	P	10/9/19	
2	DS-59	39140	1707	10/7/19	P	P	DH	10/7/19	P	10/9/19	
3	DS-60	40141	1743	10/7/19	P	P	DH	10/7/19	P	10/9/19	
4	DS-61	40141	1743	10/7/19	P	P	DH	10/7/19	P	10/9/19	
5	DS-62	41142	65	10/7/19	P	P	DH	10/7/19	P	10/9/19	
6	DS-63	41142	65	10/7/19	P	P	DH	10/7/19	P	10/9/19	
7	DS-64	42143	1707	10/7/19	P	P	DH	10/7/19	P	10/9/19	
8	DS-65	42143	1707	10/7/19	P	P	DH	10/7/19	P	10/9/19	
9	DS-66	43144	1743	10/7/19	P	P	DH	10/7/19	P	10/9/19	
10	DS-67	38139	65	10/7/19	P	P	DH	10/7/19	P	10/9/19	
11	DS-68	44145	1743	10/7/19	P	P	DH	10/7/19	P	10/9/19	
12	DS-69	44145	1743	10/7/19	P	P	DH	10/7/19	P	10/9/19	
13	DS-70	45146	1707	10/7/19	P	P	DH	10/7/19	P	10/9/19	
14	DS-71	46147	65	10/7/19	P	P	DH	10/7/19	P	10/9/19	
15	DS-72	46147	65	10/7/19	P	P	DH	10/7/19	P	10/9/19	
16	DS-73	47148	1743	10/7/19	P	P	DH	10/7/19	P	10/9/19	
17	DS-74	48149	1707	10/7/19	P	P	DH	10/7/19	P	10/9/19	
18	DS-75	49150	65	10/7/19	P	P	DH	10/7/19	P	10/9/19	
19	DS-76	29152	1707	10/7/19	P	P	DH	10/7/19	P	10/9/19	
20	DS-77	49151	1743	10/7/19	P	P	DH	10/7/19	P	10/9/19	

REVIEWED BY: PS **DATE:** 12-2-19

GOLDER FORM: G20-0699
(JUNE 1999)

GOLDER ASSOCIATES INC.

SUMMARY OF DESTRUCTIVE TEST RESULTS
FUSION METHOD
ASTM D6392

CEC
Whiting Ponds 1 & 2 CQA
Michigan

SAMPLE NUMBER	SHEAR STRENGTH (ppi)	SHEAR BREAK CODE (3)	PEEL (1) STRENGTH (ppi)	PEEL (1) BREAK CODE (3)	PEEL (2) STRENGTH (ppi)	PEEL (2) BREAK CODE (3)	REMARKS
DS-1	117.1	BRK	84.9	SE 1	98.7	SE 1	PASS
	119.6	BRK	87.6	SE 1	95.4	SE 1	
	119.7	BRK	87.5	SE 1	100.3	SE 1	
	120.8	BRK	84.3	SE 1	100.9	SE 1	
	119.0	BRK	82.2	SE 1	101.0	SE 1	
DS-2	117.2	BRK	82.7	SE 1	88.7	SE 1	PASS
	115.0	BRK	82.0	SE 1	94.8	SE 1	
	112.9	BRK	81.2	SE 1	92.4	SE 1	
	106.3	BRK	82.5	SE 1	92.5	SE 1	
	112.3	BRK	84.4	SE 1	95.1	SE 1	
DS-3	118.8	BRK	84.5	SE 1	103.7	SE 1	PASS
	117.9	BRK	89.3	SE 1	95.8	SE 1	
	117.2	BRK	85.4	SE 1	90.2	SE 1	
	109.7	BRK	80.5	SE 1	92.3	SE 1	
	116.4	BRK	80.3	SE 1	92.7	SE 1	
DS-4	117.8	BRK	84.3	SE 1	100.9	SE 1	PASS
	118.9	BRK	83.6	SE 1	96.1	SE 1	
	118.4	BRK	82.7	SE 1	82.5	SE 1	
	114.5	BRK	89.3	SE 1	86.1	SE 1	
	118.2	BRK	85.3	SE 1	92.1	SE 1	
DS-5	118.4	BRK	96.3	SE 1	94.3	SE 1	PASS
	118.7	BRK	98.3	SE 1	93.9	SE 1	
	117.4	BRK	84.8	SE 1	98.5	SE 1	
	106.3	BRK	88.5	SE 1	94.4	SE 1	
	115.1	BRK	87.7	SE 1	94.5	SE 1	
DS-6	114.6	BRK	107.0	SE 1	95.1	SE 1	PASS
	115.3	BRK	104.0	SE 1	92.5	SE 1	
	115.1	BRK	107.6	SE 1	92.1	SE 1	
	110.0	BRK	83.8	SE 1	92.9	SE 1	
	114.2	BRK	104.4	SE 1	93.1	SE 1	
DS-7	117.9	BRK	90.8	SE 1	104.5	SE 1	PASS
	118.5	BRK	88.7	SE 1	102.8	SE 1	
	118.3	BRK	86.8	SE 1	100.7	SE 1	
	114.2	BRK	89.0	SE 1	105.3	SE 1	
	118.3	BRK	92.1	SE 1	103.1	SE 1	

(1) PEEL (1) represents outer track or top flap.

(2) PEEL (2) represents inner track or bottom flap.

(3) BREAK CODES BASED ON MODES ILLUSTRATED IN ASTM D6392.

DFSUM

SUMMARY OF DESTRUCTIVE TEST RESULTS
FUSION METHOD
ASTM D6392

CEC
Whiting Ponds 1 & 2 CQA
Michigan

SAMPLE NUMBER	SHEAR STRENGTH (ppi)	SHEAR BREAK CODE (3)	PEEL (1) STRENGTH (ppi)	PEEL (1) BREAK CODE (3)	PEEL (2) STRENGTH (ppi)	PEEL (2) BREAK CODE (3)	REMARKS
DS-8	116.2	BRK	88.1	SE 1	86.6	SE 1	PASS
	117.8	BRK	98.1	SE 1	97.5	SE 1	
	117.0	BRK	91.1	SE 1	104.7	SE 1	
	113.2	BRK	81.8	SE 1	105.0	SE 1	
	115.9	BRK	91.3	SE 1	104.0	SE 1	
DS-9	118.6	BRK	111.7	SE 1	92.0	SE 1	PASS
	118.4	BRK	110.8	SE 1	97.3	SE 1	
	118.0	BRK	108.2	SE 1	98.0	SE 1	
	117.3	BRK	95.6	SE 1	98.4	SE 1	
	118.6	BRK	98.5	SE 1	100.4	SE 1	
DS-10	118.8	BRK	111.8	SE 1	94.5	SE 1	PASS
	118.4	BRK	110.2	SE 1	89.6	SE 1	
	118.2	BRK	94.3	SE 1	80.2	SE 1	
	113.3	BRK	85.2	SE 1	96.1	SE 1	
	117.6	BRK	98.8	SE 1	100.9	SE 1	
DS-11	116.1	BRK	86.5	SE 1	103.4	SE 1	PASS
	116.4	BRK	88.4	SE 1	101.9	SE 1	
	116.0	BRK	86.8	SE 1	95.4	SE 1	
	112.5	BRK	91.9	SE 1	98.2	SE 1	
	113.8	BRK	88.8	SE 1	104.0	SE 1	
DS-12	113.9	BRK	83.6	SE 1	91.0	SE 1	PASS
	113.7	BRK	86.3	SE 1	95.2	SE 1	
	114.7	BRK	90.2	SE 1	99.7	SE 1	
	114..3	BRK	85.3	SE 1	102.0	SE 1	
	115.6	BRK	83.9	SE 1	100.6	SE 1	
DS-13	113.0	BRK	83.6	SE 1	91.2	SE 1	PASS
	115.4	BRK	89.3	SE 1	84.2	SE 1	
	118.2	BRK	101.8	SE 1	89.4	SE 1	
	118.3	BRK	105.0	SE 1	87.5	SE 1	
	117.5	BRK	103.0	SE 1	92.9	SE 1	
DS-14	111.1	BRK	89.6	SE 1	98.9	SE 1	PASS
	113.0	BRK	93.9	SE 1	89.6	SE 1	
	114.2	BRK	86.7	SE 1	80.9	SE 1	
	112.9	BRK	88.1	SE 1	87.5	SE 1	
	111.8	BRK	85.3	SE 1	84.5	SE 1	

(1) PEEL (1) represents outer track or top flap.

DFSUM

(2) PEEL (2) represents inner track or bottom flap.

(3) BREAK CODES BASED ON MODES ILLUSTRATED IN ASTM D6392.

SUMMARY OF DESTRUCTIVE TEST RESULTS
FUSION METHOD
ASTM D6392

CEC
Whiting Ponds 1 & 2 CQA
Michigan

SAMPLE NUMBER	SHEAR STRENGTH (ppi)	SHEAR BREAK CODE (3)	PEEL (1) STRENGTH (ppi)	PEEL (1) BREAK CODE (3)	PEEL (2) STRENGTH (ppi)	PEEL (2) BREAK CODE (3)	REMARKS
DS-15	112.7	BRK	82.9	SE 1	88.0	SE 1	PASS
	112.8	BRK	86.0	SE 1	87.6	SE 1	
	113.6	BRK	83.5	SE 1	101.5	SE 1	
	114.6	BRK	85.3	SE 1	107.0	SE 1	
	114.7	BRK	82.0	SE 1	91.6	SE 1	
DS-16	116.9	BRK	90.7	SE 1	85.4	SE 1	PASS
	117.9	BRK	97.7	SE 1	96.2	SE 1	
	117.6	BRK	84.1	SE 1	91.7	SE 1	
	117.7	BRK	88.4	SE 1	86.0	SE 1	
	115.3	BRK	79.9	SE 1	87.9	SE 1	
DS-17	115.5	BRK	101.0	SE 1	91.2	SE 1	PASS
	116.0	BRK	88.3	SE 1	90.5	SE 1	
	116.0	BRK	94.6	SE 1	92.7	SE 1	
	113.9	BRK	92.2	SE 1	92.2	SE 1	
	114.7	BRK	93.9	SE 1	93.6	SE 1	
DS-18	113.4	BRK	88.0	SE 1	97.5	SE 1	PASS
	114.0	BRK	84.7	SE 1	99.1	SE 1	
	113.9	BRK	83.3	SE 1	106.2	SE 1	
	115.1	BRK	83.4	SE 1	102.2	SE 1	
	113.7	BRK	83.0	SE 1	97.1	SE 1	
DS-19	115.6	BRK	79.7	SE 1	102.3	SE 1	PASS
	116.5	BRK	80.9	SE 1	87.7	SE 1	
	116.3	BRK	83.6	SE 1	101.6	SE 1	
	116.0	BRK	82.6	SE 1	107.0	SE 1	
	114.5	BRK	82.0	SE 1	103.6	SE 1	
DS-20	114.1	BRK	87.0	SE 1	75.4	SE 1	PASS
	112.8	BRK	87.4	SE 1	75.2	SE 1	
	113.4	BRK	87.6	SE 1	78.5	SE 1	
	115.4	BRK	88.5	SE 1	75.5	SE 1	
	113.2	BRK	83.2	SE 1	103.2	SE 1	
DS-21	112.4	BRK	97.1	SE 1	93.2	SE 1	PASS
	111.6	BRK	96.9	SE 1	97.4	SE 1	
	111.3	BRK	97.8	SE 1	90.9	SE 1	
	109.4	BRK	104.3	SE 1	95.8	SE 1	
	109.6	BRK	102.6	SE 1	90.1	SE 1	

(1) PEEL (1) represents outer track or top flap.

DFSUM

(2) PEEL (2) represents inner track or bottom flap.

(3) BREAK CODES BASED ON MODES ILLUSTRATED IN ASTM D6392.

SUMMARY OF DESTRUCTIVE TEST RESULTS
FUSION METHOD
ASTM D6392

CEC
Whiting Ponds 1 & 2 CQA
Michigan

SAMPLE NUMBER	SHEAR STRENGTH (ppi)	SHEAR BREAK CODE (3)	PEEL (1) STRENGTH (ppi)	PEEL (1) BREAK CODE (3)	PEEL (2) STRENGTH (ppi)	PEEL (2) BREAK CODE (3)	REMARKS
DS-22	114.4	BRK	97.9	SE 1	88.4	SE 1	PASS
	114.5	BRK	93.7	SE 1	92.6	SE 1	
	112.4	BRK	87.9	SE 1	87.8	SE 1	
	110.8	BRK	89.8	SE 1	93.7	SE 1	
	110.7	BRK	82.9	SE 1	91.8	SE 1	
DS-23	113.5	BRK	82.3	SE 1	98.8	SE 1	PASS
	114.6	BRK	88.3	SE 1	89.6	SE 1	
	113.6	BRK	82.4	SE 1	86.8	SE 1	
	112.3	BRK	82.7	SE 1	85.8	SE 1	
	110.9	BRK	83.2	SE 1	82.7	SE 1	
DS-24	113.0	BRK	84.2	SE 1	80.3	SE 1	PASS
	113.7	BRK	91.1	SE 1	79.4	SE 1	
	113.6	BRK	94.5	SE 1	79.9	SE 1	
	114.4	BRK	87.8	SE 1	94.8	SE 1	
	113.1	BRK	87.3	SE 1	82.9	SE 1	
DS-25	115.0	BRK	94.2	SE 1	100.4	SE 1	PASS
	115.4	BRK	93.4	SE 1	97.3	SE 1	
	115.6	BRK	94.6	SE 1	98.3	SE 1	
	115.7	BRK	90.4	SE 1	97.4	SE 1	
	115.0	BRK	91.9	SE 1	93.5	SE 1	
DS-26	110.9	BRK	90.0	SE 1	99.9	SE 1	PASS
	109.5	BRK	96.9	SE 1	94.4	SE 1	
	108.7	BRK	89.0	SE 1	99.2	SE 1	
	107.8	BRK	89.7	SE 1	96.1	SE 1	
	109.4	BRK	88.1	SE 1	90.5	SE 1	
DS-27	110.1	BRK	86.3	SE 1	89.5	SE 1	PASS
	109.5	BRK	85.9	SE 1	92.1	SE 1	
	111.3	BRK	88.3	SE 1	94.5	SE 1	
	114.2	BRK	90.6	SE 1	96.8	SE 1	
	114.2	BRK	93.2	SE 1	98.2	SE 1	
DS-28	111.5	BRK	92.0	SE 1	90.6	SE 1	PASS
	111.5	BRK	80.3	SE 1	79.8	SE 1	
	113.2	BRK	84.2	SE 1	87.2	SE 1	
	109.0	BRK	86.0	SE 1	88.5	SE 1	
	111.9	BRK	88.7	SE 1	81.3	SE 1	

(1) PEEL (1) represents outer track or top flap.

DFSUM

(2) PEEL (2) represents inner track or bottom flap.

(3) BREAK CODES BASED ON MODES ILLUSTRATED IN ASTM D6392.

SUMMARY OF DESTRUCTIVE TEST RESULTS
FUSION METHOD
ASTM D6392

CEC
Whiting Ponds 1 & 2 CQA
Michigan

SAMPLE NUMBER	SHEAR STRENGTH (ppi)	SHEAR BREAK CODE (3)	PEEL (1) STRENGTH (ppi)	PEEL (1) BREAK CODE (3)	PEEL (2) STRENGTH (ppi)	PEEL (2) BREAK CODE (3)	REMARKS
DS-29	113.3	BRK	84.5	SE 1	77.8	SE 1	PASS
	114.6	BRK	99.2	SE 1	81.8	SE 1	
	115.0	BRK	100.5	SE 1	84.3	SE 1	
	113.8	BRK	97.1	SE 1	87.2	SE 1	
	110.8	BRK	93.9	SE 1	90.7	SE 1	
DS-30	113.4	BRK	94.4	SE 1	89.7	SE 1	PASS
	113.8	BRK	95.6	SE 1	92.3	SE 1	
	113.5	BRK	84.3	SE 1	96.2	SE 1	
	113.7	BRK	84.7	SE 1	88.7	SE 1	
	111.1	BRK	97.2	SE 1	91.2	SE 1	
DS-31	115.5	BRK	81.2	SE 1	90.6	SE 1	PASS
	115.5	BRK	80.5	SE 1	95.7	SE 1	
	115.2	BRK	79.3	SE 1	92.6	SE 1	
	115.2	BRK	82.1	SE 1	90.6	SE 1	
	113.4	BRK	80.8	SE 1	89.9	SE 1	
DS-32	113.5	BRK	89.2	SE 1	88.9	SE 1	PASS
	113.6	BRK	87.7	SE 1	88.7	SE 1	
	112.7	BRK	88.7	SE 1	87.5	SE 1	
	112.2	BRK	83.7	SE 1	100.8	SE 1	
	111.0	BRK	85.6	SE 1	98.9	SE 1	
DS-33	114.1	BRK	81.9	SE 1	105.8	SE 1	PASS
	114.3	BRK	100.7	SE 1	85.6	SE 1	
	114.9	BRK	83.3	SE 1	104.9	SE 1	
	113.7	BRK	97.0	SE 1	96.1	SE 1	
	109.9	BRK	82.4	SE 1	90.5	SE 1	
DS-34	111.1	BRK	87.0	SE 1	81.9	SE 1	PASS
	112.2	BRK	85.6	SE 1	90.9	SE 1	
	112.4	BRK	85.9	SE 1	112.1	SE 1	
	111.8	BRK	86.1	SE 1	111.1	SE 1	
	113.0	BRK	86.2	SE 1	100.0	SE 1	
DS-35	112.7	BRK	93.3	SE 1	95.7	SE 1	PASS
	112.9	BRK	96.4	SE 1	98.6	SE 1	
	110.6	BRK	96.6	SE 1	100.1	SE 1	
	109.5	BRK	102.4	SE 1	104.8	SE 1	
	109.1	BRK	97.7	SE 1	103.2	SE 1	

(1) PEEL (1) represents outer track or top flap.

DFSUM

(2) PEEL (2) represents inner track or bottom flap.

(3) BREAK CODES BASED ON MODES ILLUSTRATED IN ASTM D6392.

SUMMARY OF DESTRUCTIVE TEST RESULTS
FUSION METHOD
ASTM D6392

CEC
Whiting Ponds 1 & 2 CQA
Michigan

SAMPLE NUMBER	SHEAR STRENGTH (ppi)	SHEAR BREAK CODE (3)	PEEL (1) STRENGTH (ppi)	PEEL (1) BREAK CODE (3)	PEEL (2) STRENGTH (ppi)	PEEL (2) BREAK CODE (3)	REMARKS
DS-36	110.2	BRK	93.4	SE 1	91.4	SE 1	PASS
	110.1	BRK	89.3	SE 1	92.8	SE 1	
	109.9	BRK	89.8	SE 1	87.2	SE 1	
	110.0	BRK	97.2	SE 1	88.0	SE 1	
	111.2	BRK	96.3	SE 1	94.1	SE 1	
DS-37	110.7	BRK	87.1	SE 1	104.7	SE 1	PASS
	108.8	BRK	88.3	SE 1	103.2	BRK	
	110.0	BRK	90.5	SE 1	97.1	SE 1	
	109.8	BRK	90.4	SE 1	102.5	SE 1	
	110.1	BRK	90.3	SE 1	98.0	SE 1	
DS-38	111.1	BRK	90.1	SE 1	101.8	SE 1	PASS
	111.6	BRK	93.3	SE 1	104.6	SE 1	
	111.5	BRK	92.6	SE 1	102.4	SE 1	
	110.8	BRK	91.0	SE 1	101.2	SE 1	
	110.7	BRK	91.2	SE 1	103.0	SE 1	
DS-39	124.9	BRK	97.7	SE 1	105.5	SE 1	PASS
	126.2	BRK	82.9	SE 1	102.4	SE 1	
	125.0	BRK	74.8	SE 1	107.6	SE 1	
	124.3	BRK	65.2	SE 1	103.1	SE 1	
	122.5	BRK	101.7	SE 1	100.4	SE 1	
DS-40	117.5	BRK	84.9	SE 1	97.4	SE 1	PASS
	117.9	BRK	87.9	SE 1	88.1	SE 1	
	116.9	BRK	78.7	SE 1	88.7	SE 1	
	115.6	BRK	81.6	SE 1	90.2	SE 1	
	112.0	BRK	86.3	SE 1	90.5	SE 1	
DS-41	116.9	BRK	82.2	SE 1	97.7	SE 1	PASS
	117.2	BRK	81.7	SE 1	100.1	SE 1	
	118.1	BRK	67.1	SE 1	99.9	SE 1	
	118.5	BRK	88.8	SE 1	102.6	SE 1	
	114.3	BRK	86.7	SE 1	100.3	SE 1	
DS-42	111.6	BRK	72.1	SE 1	78.9	SE 1	PASS
	112.0	BRK	89.4	SE 1	85.7	SE 1	
	111.9	BRK	68.5	SE 1	73.7	SE 1	
	112.9	BRK	71.4	SE 1	89.1	SE 1	
	110.4	BRK	68.8	SE 1	87.0	SE 1	

(1) PEEL (1) represents outer track or top flap.

DFSUM

(2) PEEL (2) represents inner track or bottom flap.

(3) BREAK CODES BASED ON MODES ILLUSTRATED IN ASTM D6392.

SUMMARY OF DESTRUCTIVE TEST RESULTS
FUSION METHOD
ASTM D6392

CEC
Whiting Ponds 1 & 2 CQA
Michigan

SAMPLE NUMBER	SHEAR STRENGTH (ppi)	SHEAR BREAK CODE (3)	PEEL (1) STRENGTH (ppi)	PEEL (1) BREAK CODE (3)	PEEL (2) STRENGTH (ppi)	PEEL (2) BREAK CODE (3)	REMARKS
DS-43	117.5	BRK	85.8	SE 1	85.4	SE 1	PASS
	117.7	BRK	97.2	SE 1	92.4	SE 1	
	116.3	BRK	95.5	SE 1	89.9	SE 1	
	114.9	BRK	96.1	SE 1	91.5	SE 1	
	111.6	BRK	87.5	SE 1	93.6	SE 1	
DS-44	120.6	BRK	104.0	SE 1	94.1	SE 1	FAIL, SEE 44P AND 44N FOR BOUNDING DESTRUCTIVE SAMPLES. ALL FAILED SEAMS WERE RECONSTRUCTED
	120.8	BRK	77.3	**AD-RBK (33%)**	82.8	SE 1	
	121.1	BRK	92.4	SE 1	93.0	SE 1	
	120.5	BRK	94.7	SE 1	88.6	SE 1	
	120.5	BRK	93.9	SE 1	91.6	SE 1	
DS-44P	117.3	BRK	95.7	SE 1	91.0	SE 1	PASS, BOUNDS 44 SERIES IN THE PREVIOUS DIRECTION.
	117.6	BRK	97.1	SE 1	90.1	SE 1	
	117.2	BRK	94.5	SE 1	88.5	SE 1	
	117.2	BRK	92.8	SE 1	91.4	SE 1	
	114.8	BRK	92.4	SE 1	91.0	SE 1	
DS-44N	117.5	BRK	97.6	SE 1	97.1	SE 1	PASS, BOUNDS 44 SERIES IN THE NEXT DIRECTION
	116.7	BRK	104.8	SE 1	101.2	SE 1	
	116.8	BRK	98.0	SE 1	94.5	SE 1	
	116.1	BRK	106.1	SE 1	95.9	SE 1	
	114.8	BRK	96.2	SE 1	96.7	SE 1	
DS-45	117.1	BRK	91.0	SE 1	99.3	SE 1	PASS
	116.1	BRK	91.6	SE 1	100.4	SE 1	
	113.5	BRK	88.6	SE 1	100.1	SE 1	
	112.0	BRK	86.5	SE 1	98.5	SE 1	
	111.6	BRK	85.3	SE 1	88.9	SE 1	
DS-46	118.0	BRK	86.6	SE 1	86.2	SE 1	PASS
	119.4	BRK	95.5	SE 1	82.7	SE 1	
	119.1	BRK	86.5	SE 1	90.4	SE 1	
	118.7	BRK	89.7	SE 1	86.4	SE 1	
	113.6	BRK	93.0	SE 1	87.0	SE 1	
DS-47	116.4	BRK	91.6	SE 1	83.6	SE 1	PASS
	115.2	BRK	98.0	SE 1	85.8	SE 1	
	113.0	BRK	91.8	SE 1	84.7	SE 1	
	113.2	BRK	91.7	SE 1	90.9	SE 1	
	110.7	BRK	98.6	SE 1	85.8	SE 1	

(1) PEEL (1) represents outer track or top flap.

DFSUM

(2) PEEL (2) represents inner track or bottom flap.

(3) BREAK CODES BASED ON MODES ILLUSTRATED IN ASTM D6392.

SUMMARY OF DESTRUCTIVE TEST RESULTS
FUSION METHOD
ASTM D6392

CEC
Whiting Ponds 1 & 2 CQA
Michigan

SAMPLE NUMBER	SHEAR STRENGTH (ppi)	SHEAR BREAK CODE (3)	PEEL (1) STRENGTH (ppi)	PEEL (1) BREAK CODE (3)	PEEL (2) STRENGTH (ppi)	PEEL (2) BREAK CODE (3)	REMARKS
DS-48	115.2	BRK	90.1	SE 1	87.2	SE 1	PASS
	117.6	BRK	88.1	SE 1	84.8	SE 1	
	119.8	BRK	91.2	SE 1	90.7	SE 1	
	121.2	BRK	93.4	SE 1	99.0	SE 1	
	120.0	BRK	92.4	SE 1	96.3	SE 1	
DS-49	109.6	BRK	86.6	SE 1	72.0	SE 1	PASS
	109.8	BRK	85.9	SE 1	78.4	SE 1	
	108.7	BRK	86.5	SE 1	87.0	SE 1	
	109.0	BRK	87.7	SE 1	74.1	SE 1	
	106.2	BRK	88.0	SE 1	75.8	SE 1	
DS-50	112.0	BRK	80.3	SE 1	82.9	SE 1	PASS
	112.7	BRK	81.8	SE 1	90.3	SE 1	
	111.2	BRK	82.3	SE 1	90.4	SE 1	
	107.6	BRK	79.7	SE 1	99.0	SE 1	
	109.8	BRK	85.4	SE 1	90.5	SE 1	
DS-51	113.9	BRK	96.7	SE 1	91.9	SE 1	PASS
	114.3	BRK	98.1	SE 1	89.4	SE 1	
	112.6	BRK	97.5	SE 1	90.3	SE 1	
	112.8	BRK	93.6	SE 1	87.3	SE 1	
	111.9	BRK	94.9	SE 1	86.8	SE 1	
DS-52	116.7	BRK	91.6	SE 1	87.6	SE 1	PASS
	117.1	BRK	92.2	SE 1	87.9	SE 1	
	114.6	BRK	92.3	SE 1	86.0	SE 1	
	114.2	BRK	97.1	SE 1	86.7	SE 1	
	113.4	BRK	96.0	SE 1	87.1	SE 1	
DS-53	111.6	BRK	87.6	SE 1	93.0	SE 1	PASS
	111.0	BRK	84.9	SE 1	94.4	SE 1	
	108.0	BRK	87.0	SE 1	91.7	SE 1	
	109.7	BRK	84.0	SE 1	95.4	SE 1	
	107.6	BRK	85.9	SE 1	92.6	SE 1	
DS-54	110.2	BRK	71.4	SE 1	89.3	SE 1	PASS
	112.6	BRK	86.5	SE 1	88.6	SE 1	
	114.9	BRK	73.5	SE 1	86.6	SE 1	
	116.4	BRK	87.1	SE 1	90.7	SE 1	
	115.6	BRK	81.8	SE 1	88.7	SE 1	

(1) PEEL (1) represents outer track or top flap.

DFSUM

(2) PEEL (2) represents inner track or bottom flap.

(3) BREAK CODES BASED ON MODES ILLUSTRATED IN ASTM D6392.

SUMMARY OF DESTRUCTIVE TEST RESULTS
FUSION METHOD
ASTM D6392

CEC
Whiting Ponds 1 & 2 CQA
Michigan

SAMPLE NUMBER	SHEAR STRENGTH (ppi)	SHEAR BREAK CODE (3)	PEEL (1) STRENGTH (ppi)	PEEL (1) BREAK CODE (3)	PEEL (2) STRENGTH (ppi)	PEEL (2) BREAK CODE (3)	REMARKS
DS-55	111.6	BRK	88.7	SE 1	92.1	SE 1	PASS
	111.9	BRK	85.0	SE 1	95.1	SE 1	
	110.2	BRK	88.9	SE 1	85.8	SE 1	
	110.6	BRK	86.5	SE 1	87.9	SE 1	
	109.7	BRK	87.0	SE 1	90.7	SE 1	
DS-56	113.7	BRK	83.4	SE 1	86.7	SE 1	PASS
	114.1	BRK	86.5	SE 1	81.2	SE 1	
	114.9	BRK	86.7	SE 1	83.6	SE 1	
	115.2	BRK	90.8	SE 1	73.0	SE 1	
	114.2	BRK	85.1	SE 1	78.9	SE 1	
DS-57	115.0	BRK	95.4	SE 1	84.7	SE 1	PASS
	114.9	BRK	89.1	SE 1	82.6	SE 1	
	114.3	BRK	97.9	SE 1	83.5	SE 1	
	115.3	BRK	97.8	SE 1	85.6	SE 1	
	113.7	BRK	97.0	SE 1	85.1	SE 1	
DS-58	113.9	BRK	82.7	SE 1	88.8	SE 1	PASS
	113.3	BRK	90.5	SE 1	97.4	SE 1	
	113.2	BRK	86.5	SE 1	93.2	SE 1	
	114.2	BRK	86.8	SE 1	93.2	SE 1	
	114.7	BRK	92.6	SE 1	88.6	SE 1	
DS-59	115.9	BRK	89.8	SE 1	93.6	SE 1	PASS
	116.3	BRK	100.4	SE 1	83.1	SE 1	
	118.7	BRK	85.2	SE 1	84.4	SE 1	
	121.3	BRK	89.8	SE 1	87.5	SE 1	
	120.9	BRK	94.2	SE 1	84.6	SE 1	
DS-60	110.4	BRK	69.6	SE 1	99.3	SE 1	PASS
	110.9	BRK	73.4	SE 1	75.0	SE 1	
	111.8	BRK	71.2	SE 1	70.9	SE 1	
	112.5	BRK	89.0	SE 1	96.3	SE 1	
	111.1	BRK	81.9	SE 1	91.2	SE 1	
DS-61	118.4	BRK	89.2	SE 1	75.4	SE 1	PASS
	118.1	BRK	66.0	SE 1	75.8	SE 1	
	117.7	BRK	95.7	SE 1	102.4	SE 1	
	119.1	BRK	91.3	SE 1	95.8	SE 1	
	117.9	BRK	91.5	SE 1	96.8	SE 1	

(1) PEEL (1) represents outer track or top flap.

DFSUM

(2) PEEL (2) represents inner track or bottom flap.

(3) BREAK CODES BASED ON MODES ILLUSTRATED IN ASTM D6392.

SUMMARY OF DESTRUCTIVE TEST RESULTS
FUSION METHOD
ASTM D6392

CEC
Whiting Ponds 1 & 2 CQA
Michigan

SAMPLE NUMBER	SHEAR STRENGTH (ppi)	SHEAR BREAK CODE (3)	PEEL (1) STRENGTH (ppi)	PEEL (1) BREAK CODE (3)	PEEL (2) STRENGTH (ppi)	PEEL (2) BREAK CODE (3)	REMARKS
DS-62	113.8	BRK	78.6	SE 1	84.6	SE 1	PASS
	113.2	BRK	85.7	SE 1	86.8	SE 1	
	113.1	BRK	84.1	SE 1	81.3	SE 1	
	114.0	BRK	84.4	SE 1	86.8	SE 1	
	112.3	BRK	84.1	SE 1	81.1	SE 1	
DS-63	114.3	BRK	82.4	SE 1	89.6	SE 1	PASS
	114.3	BRK	82.8	SE 1	80.4	SE 1	
	114.9	BRK	83.7	SE 1	83.3	SE 1	
	115.2	BRK	79.3	SE 1	87.3	SE 1	
	113.3	BRK	81.0	SE 1	89.7	SE 1	
DS-64	119.2	BRK	76.1	SE 1	85.7	SE 1	PASS
	118.1	BRK	71.8	SE 1	88.2	SE 1	
	118.4	BRK	70.8	SE 1	83.3	SE 1	
	119.4	BRK	71.7	SE 1	88.8	SE 1	
	118.3	BRK	71.9	SE 1	87.3	SE 1	
DS-65	124.7	BRK	84.8	SE 1	86.0	SE 1	PASS
	123.8	BRK	92.7	SE 1	96.2	SE 1	
	121.5	BRK	78.5	SE 1	86.1	SE 1	
	121.1	BRK	75.9	SE 1	77.9	SE 1	
	120.8	BRK	78.0	SE 1	78.3	SE 1	
DS-66	113.1	BRK	81.3	SE 1	74.3	SE 1	PASS
	113.2	BRK	80.2	SE 1	74.2	SE 1	
	112.9	BRK	82.5	SE 1	72.5	SE 1	
	112.1	BRK	77.9	SE 1	94.1	SE 1	
	110.4	BRK	76.6	SE 1	79.7	SE 1	
DS-67	117.3	BRK	88.8	SE 1	98.7	SE 1	PASS
	118.8	BRK	83.4	SE 1	93.0	SE 1	
	117.9	BRK	98.5	SE 1	92.9	SE 1	
	117.7	BRK	96.2	SE 1	95.7	SE 1	
	117.2	BRK	89.9	SE 1	89.9	SE 1	
DS-68	106.0	BRK	83.2	SE 1	87.5	SE 1	PASS
	107.1	BRK	67.1	SE 1	84.0	SE 1	
	105.6	BRK	83.4	SE 1	82.6	SE 1	
	104.4	BRK	76.3	SE 1	87.5	SE 1	
	105.1	BRK	85.2	SE 1	84.5	SE 1	

(1) PEEL (1) represents outer track or top flap.

DFSUM

(2) PEEL (2) represents inner track or bottom flap.

(3) BREAK CODES BASED ON MODES ILLUSTRATED IN ASTM D6392.

SUMMARY OF DESTRUCTIVE TEST RESULTS
FUSION METHOD
ASTM D6392

CEC
Whiting Ponds 1 & 2 CQA
Michigan

SAMPLE NUMBER	SHEAR STRENGTH (ppi)	SHEAR BREAK CODE (3)	PEEL (1) STRENGTH (ppi)	PEEL (1) BREAK CODE (3)	PEEL (2) STRENGTH (ppi)	PEEL (2) BREAK CODE (3)	REMARKS
DS-69	106.1	BRK	81.6	SE 1	86.0	SE 1	PASS
	105.3	BRK	82.1	SE 1	85.4	SE 1	
	103.9	BRK	81.7	SE 1	87.1	SE 1	
	105.7	BRK	83.2	SE 1	90.8	SE 1	
	102.6	BRK	87.6	SE 1	89.8	SE 1	
DS-70	107.0	BRK	85.0	SE 1	94.7	SE 1	PASS
	107.3	BRK	83.7	SE 1	93.5	SE 1	
	106.6	BRK	80.7	SE 1	97.2	SE 1	
	109.2	BRK	81.1	SE 1	94.6	SE 1	
	108.8	BRK	87.0	SE 1	95.4	SE 1	
DS-71	111.3	BRK	85.6	SE 1	86.6	SE 1	PASS
	111.5	BRK	91.0	SE 1	88.4	SE 1	
	112.4	BRK	91.5	SE 1	91.2	SE 1	
	114.3	BRK	98.6	SE 1	85.7	SE 1	
	112.3	BRK	98.0	SE 1	90.3	SE 1	
DS-72	113.2	BRK	96.9	SE 1	84.1	SE 1	PASS
	113.8	BRK	94.8	SE 1	85.2	SE 1	
	114.1	BRK	97.4	SE 1	88.6	SE 1	
	114.4	BRK	97.5	SE 1	88.0	SE 1	
	113.4	BRK	98.7	SE 1	88.5	SE 1	
DS-73	113.4	BRK	88.2	SE 1	95.5	SE 1	PASS
	113.5	BRK	87.9	SE 1	74.5	SE 1	
	112.9	BRK	86.3	SE 1	90.2	SE 1	
	114.4	BRK	86.2	SE 1	91.0	SE 1	
	111.6	BRK	85.2	SE 1	85.1	SE 1	
DS-74	112.6	BRK	88.9	SE 1	77.1	SE 1	PASS
	112.0	BRK	86.0	SE 1	98.1	SE 1	
	111.2	BRK	87.2	SE 1	89.6	SE 1	
	113.0	BRK	86.1	SE 1	83.7	SE 1	
	110.8	BRK	87.2	SE 1	90.4	SE 1	
DS-75	111.4	BRK	94.9	SE 1	86.4	SE 1	PASS
	110.7	BRK	93.0	SE 1	83.8	SE 1	
	110.9	BRK	89.7	SE 1	82.8	SE 1	
	111.8	BRK	97.0	SE 1	84.5	SE 1	
	109.3	BRK	90.2	SE 1	83.1	SE 1	

(1) PEEL (1) represents outer track or top flap.

DFSUM

(2) PEEL (2) represents inner track or bottom flap.

(3) BREAK CODES BASED ON MODES ILLUSTRATED IN ASTM D6392.

SUMMARY OF DESTRUCTIVE TEST RESULTS
FUSION METHOD
ASTM D6392

CEC
Whiting Ponds 1 & 2 CQA
Michigan

	SHEAR		PEEL (1)		PEEL (2)		
SAMPLE NUMBER	STRENGTH (ppi)	BREAK CODE (3)	STRENGTH (ppi)	BREAK CODE (3)	STRENGTH (ppi)	BREAK CODE (3)	REMARKS
DS-76	101.4	BRK	99.8	SE 1	77.4	SE 1	PASS
	101.4	BRK	96.2	SE 1	73.2	SE 1	
	101.5	BRK	96.5	SE 1	80.5	SE 1	
	102.2	BRK	100.4	SE 1	72.5	SE 1	
	101.0	BRK	101.6	SE 1	80.1	SE 1	
DS-77	111.3	BRK	80.4	SE 1	89.3	SE 1	PASS
	110.9	BRK	80.6	SE 1	89.2	SE 1	
	112.0	BRK	86.5	SE 1	92.9	SE 1	
	111.3	BRK	80.8	SE 1	91.9	SE 1	
	110.4	BRK	85.1	SE 1	97.4	SE 1	
-	-	-	-	-	-	-	-
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
-	-	-	-	-	-	-	-
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
-	-	-	-	-	-	-	-
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
-	-	-	-	-	-	-	-
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
-	-	-	-	-	-	-	-
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	

(1) PEEL (1) represents outer track or top flap. DFSUM
(2) PEEL (2) represents inner track or bottom flap.
(3) BREAK CODES BASED ON MODES ILLUSTRATED IN ASTM D6392.

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

1788523

J.R. Whiting Ash Pond Closure

Destructive No.:	DS-1
Seam Type (Fus/Ext):	Fusion
Seam Number:	1/2
Location:	100'W
Date Seamed	8.15.19
Defect Code:	1A
Machine Number:	734
Welding Tech.:	AMJR
Machine Temp:	860
Machine Speed:	7.0
Date Tested:	8.15.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
85	SE1	Pass	72	SE1	PASS
81	SE1	Pass	82	SE1	PASS
87	SE1	Pass	73	SE1	PASS
91	SE1	Pass	71	SE1	PASS
85	SE1	Pass	76	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
106	BRK	Pass
103	BRK	Pass
101	BRK	Pass
104	BRK	Pass
102	BRK	Pass

Destructive No.:	DS-2
Seam Type (Fus/Ext):	Fusion
Seam Number:	2/3
Location:	100'W
Date Seamed	8.15.19
Defect Code:	1B
Machine Number:	5B
Welding Tech.:	AR
Machine Temp:	860
Machine Speed:	5.5
Date Tested:	8.15.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
85	SE1	Pass	80	SE1	PASS
79	SE1	Pass	76	SE1	PASS
79	SE1	Pass	87	SE1	PASS
85	SE1	Pass	90	SE1	PASS
88	SE1	Pass	87	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
102	BRK	Pass
99	BRK	Pass
102	BRK	Pass
99	BRK	Pass
99	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY
J.R. Whiting Ash Pond Closure

1788523

Destructive No.:	DS-3
Seam Type (Fus/Ext):	Fusion
Seam Number:	1/2
Location:	123'E
Date Seamed	8.15.19
Defect Code:	1C
Machine Number:	1734
Welding Tech.:	AMJR
Machine Temp:	860
Machine Pre-Heat:	7.0
Date Tested:	8.15.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
75	SE1	Pass	80	SE1	PASS
83	SE1	Pass	70	SE1	PASS
83	SE1	Pass	77	SE1	PASS
82	SE1	Pass	75	SE1	PASS
77	SE1	Pass	84	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
105	BRK	Pass
102	BRK	Pass
106	BRK	Pass
103	BRK	Pass
104	BRK	Pass

Destructive No.:	DS-4
Seam Type (Fus/Ext):	Fusion
Seam Number:	2/3
Location:	100'E
Date Seamed	8.15.17
Defect Code:	1D
Machine Number:	58
Welding Tech.:	AR
Machine Temp:	860
Machine Pre-Heat:	5.5
Date Tested:	8.15.17
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
80	SE1	Pass	84	SE1	PASS
70	SE1	Pass	84	SE1	PASS
78	SE1	Pass	86	SE1	PASS
80	SE1	Pass	100	SE1	PASS
76	SE1	Pass	86	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
99	BRK	Pass
100	BRK	Pass
104	BRK	Pass
103	BRK	Pass
104	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY
J.R. Whiting Ash Pond Closure

1788523

Destructive No.:	DS-5
Seam Type (Fus/Ext):	Fusion
Seam Number:	3/4
Location:	377 'W
Date Seamed	8.15.19
Defect Code:	1E
Machine Number:	1734
Welding Tech.:	AMJR
Machine Temp:	860
Machine Speed:	7.0
Date Tested:	8.15.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
80	SE1	Pass	85	SE1	Pass
86	SE1	Pass	96	SE1	Pass
84	SE1	Pass	91	SE1	Pass
92	SE1	Pass	88	SE1	Pass
77	SE1	Pass	87	SE1	Pass

SHEAR		
Strength	Break Code	Pass / Fail
102	BRK	Pass
102	BRK	Pass
103	BRK	Pass
105	BRK	Pass
104	BRK	Pass

Destructive No.:	DS-6
Seam Type (Fus/Ext):	Fusion
Seam Number:	4/5
Location:	377 'W
Date Seamed	8.15.19
Defect Code:	1F
Machine Number:	58
Welding Tech.:	AR
Machine Temp:	860
Machine Speed:	5.5
Date Tested:	8.15.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
70	SE1	Pass	83	SE1	Pass
86	SE1	Pass	91	SE1	Pass
75	SE1	Pass	86	SE1	Pass
77	SE1	Pass	75	SE1	Pass
73	SE1	Pass	74	SE1	Pass

SHEAR		
Strength	Break Code	Pass / Fail
102	BRK	Pass
101	BRK	Pass
99	BRK	Pass
101	BRK	Pass
101	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY
J.R. Whiting Ash Pond Closure

1788523

Destructive No.:	DS-7
Seam Type (Fus/Ext):	Fusion
Seam Number:	5/6
Location:	157' W
Date Seamed	8.15.19
Defect Code:	1G
Machine Number:	1734
Welding Tech.:	AMJR
Machine Temp:	860
Machine Speed:	7.0
Date Tested:	8.15.17
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	PASS

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
85	SE1	Pass	92	SE1	Pass
78	SE1	Pass	93	SE1	Pass
78	SE1	Pass	81	SE1	Pass
86	SE1	Pass	79	SE1	Pass
78	SE1	Pass	91	SE1	Pass

SHEAR		
Strength	Break Code	Pass / Fail
107	BRK	Pass
105	BRK	Pass
100	BRK	Pass
104	BRK	Pass
105	BRK	Pass

Destructive No.:	DS-8
Seam Type (Fus/Ext):	Fusion
Seam Number:	5/6
Location:	63' E
Date Seamed	8.15.17
Defect Code:	1H
Machine Number:	1734
Welding Tech.:	AMJR
Machine Temp:	860
Machine Speed:	7.0
Date Tested:	8.15.17
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	PASS

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
95	SE1	Pass	76	SE1	Pass
101	SE1	Pass	76	SE1	Pass
75	SE1	Pass	91	SE1	Pass
84	SE1	Pass	96	SE1	Pass
93	SE1	Pass	78	SE1	Pass

SHEAR		
Strength	Break Code	Pass / Fail
105	BRK	Pass
104	BRK	Pass
105	BRK	Pass
106	BRK	Pass
106	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

1788523

J.R. Whiting Ash Pond Closure

Destructive No.:	DS-9
Seam Type (Fus/Ext):	Fusion
Seam Number:	617
Location:	157'W
Date Seamed	8.15.19
Defect Code:	1J
Machine Number:	58
Welding Tech.:	AR
Machine Temp:	860
Machine Speed:	7.5
Date Tested:	8.15.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
90	SE1	Pass	82	SE1	Pass
75	SE1	Pass	81	SE1	Pass
92	SE1	Pass	83	SE1	Pass
76	SE1	Pass	87	SE1	Pass
66	SE1	Pass	86	SE1	Pass

SHEAR		
Strength	Break Code	Pass / Fail
107	BRK	Pass
105	BRK	Pass
105	BRK	Pass
104	BRK	Pass
99	BRK	Pass

Destructive No.:	DS-10
Seam Type (Fus/Ext):	Fusion
Seam Number:	617
Location:	63'E
Date Seamed	8.15.19
Defect Code:	1K
Machine Number:	58
Welding Tech.:	8.15.19
Machine Temp:	860
Machine Speed:	7.5
Date Tested:	8.15.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
85	SE1	Pass	79	SE1	Pass
70	SE1	Pass	76	SE1	Pass
79	SE1	Pass	77	SE1	Pass
61	SE1	Pass	73	SE1	Pass
78	SE1	Pass	87	SE1	Pass

SHEAR		
Strength	Break Code	Pass / Fail
105	BRK	Pass
104	BRK	Pass
106	BRK	Pass
106	BRK	Pass
105	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

1788523

J.R. Whiting Ash Pond Closure

Destructive No.:	DS-11
Seam Type (Fus/Ext):	Fusion
Seam Number:	7/8
Location:	94' W
Date Seamed	8.15.19
Defect Code:	IN
Machine Number:	1734
Welding Tech.:	AMJR
Machine Temp:	860
Machine Speed:	7.0
Date Tested:	8.15.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
92	SE1	Pass	77	SE1	Pass
92	SE1	Pass	80	SE1	Pass
90	SE1	Pass	71	SE1	Pass
90	SE1	Pass	82	SE1	Pass
94	SE1	Pass	78	SE1	Pass

SHEAR		
Strength	Break Code	Pass / Fail
106	BRK	Pass
102	BRK	Pass
106	BRK	Pass
106	BRK	Pass
107	BRK	Pass

Destructive No.:	DS-12
Seam Type (Fus/Ext):	Fusion
Seam Number:	7/8
Location:	126' E
Date Seamed	8.15.19
Defect Code:	LP
Machine Number:	1734
Welding Tech.:	AMJR
Machine Temp:	860
Machine Speed:	7.0
Date Tested:	8.15.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
92	SE1	Pass	79	SE1	Pass
77	SE1	Pass	78	SE1	Pass
92	SE1	Pass	78	SE1	Pass
88	SE1	Pass	82	SE1	Pass
80	SE1	Pass	78	SE1	Pass

SHEAR		
Strength	Break Code	Pass / Fail
104	BRK	Pass
104	BRK	Pass
103	BRK	Pass
99	BRK	Pass
101	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

1788523

J.R. Whiting Ash Pond Closure

Destructive No.:	DS-13
Seam Type (Fus/Ext):	Fusion
Seam Number:	8/9
Location:	94'W
Date Seamed	8.16.19
Defect Code:	1Q
Machine Number:	58
Welding Tech.:	AR
Machine Temp:	860
Machine Speed:	7
Date Tested:	8.17.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASSED**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
76	SE1	Pass	84	SE1	Pass
72	SE1	Pass	85	SE1	Pass
86	SE1	Pass	79	SE1	Pass
85	SE1	Pass	77	SE1	Pass
69	SE1	Pass	76	SE1	Pass

SHEAR		
Strength	Break Code	Pass / Fail
90	BRK	Pass
89	BRK	Pass
92	BRK	Pass
92	BRK	Pass
93	BRK	Pass

Destructive No.:	DS-14
Seam Type (Fus/Ext):	Fusion
Seam Number:	8/9
Location:	126'E
Date Seamed	8.16.19
Defect Code:	1R
Machine Number:	58
Welding Tech.:	AR
Machine Temp:	860
Machine Speed:	7
Date Tested:	8.17.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
90	SE1	Pass	83	SE1	Pass
79	SE1	Pass	88	SE1	Pass
90	SE1	Pass	81	SE1	Pass
68	SE1	Pass	80	SE1	Pass
71	SE1	Pass	80	SE1	Pass

SHEAR		
Strength	Break Code	Pass / Fail
91	BRK	Pass
90	BRK	Pass
98	BRK	Pass
97	BRK	Pass
97	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

1788523

J.R. Whiting Ash Pond Closure

Destructive No.:	DS-15
Seam Type (Fus/Ext):	Fusion
Seam Number:	9/10
Location:	374'W
Date Seamed	8.16.19
Defect Code:	15
Machine Number:	1734
Welding Tech.:	AMJR
Machine Temp:	860
Machine Speed:	7.5
Date Tested:	8.17.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
76	SE1	Pass	78	SE1	Pass
81	SE1	Pass	78	SE1	Pass
75	SE1	Pass	78	SE1	Pass
70	SE1	Pass	80	SE1	Pass
75	SE1	Pass	84	SE1	Pass

SHEAR		
Strength	Break Code	Pass / Fail
94	BRK	Pass
94	BRK	Pass
91	BRK	Pass
98	BRK	Pass
95	BRK	Pass

Destructive No.:	DS-16
Seam Type (Fus/Ext):	Fusion
Seam Number:	10/11
Location:	100'W
Date Seamed	8.16.19
Defect Code:	1W
Machine Number:	1741
Welding Tech.:	ML
Machine Temp:	860
Machine Speed:	7
Date Tested:	8.17.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
94	SE1	Pass	92	SE1	Pass
88	SE1	Pass	86	SE1	Pass
86	SE1	Pass	96	SE1	Pass
82	SE1	Pass	84	SE1	Pass
75	SE1	Pass	84	SE1	Pass

SHEAR		
Strength	Break Code	Pass / Fail
94	BRK	Pass
95	BRK	Pass
94	BRK	Pass
93	BRK	Pass
95	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

1788523

J.R. Whiting Ash Pond Closure

Destructive No.:	DS-17
Seam Type (Fus/Ext):	Fusion
Seam Number:	10/11
Location:	120' E
Date Seamed	8.16.19
Defect Code:	1X
Machine Number:	1741
Welding Tech.:	ML
Machine Temp:	860
Machine Speed:	7
Date Tested:	8.17.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
74	SE1	Pass	77	SE1	Pass
78	SE1	Pass	78	SE1	Pass
70	SE1	Pass	78	SE1	Pass
67	SE1	Pass	75	SE1	Pass
80	SE1	Pass	78	SE1	Pass

SHEAR		
Strength	Break Code	Pass / Fail
95	BRK	Pass
89	BRK	Pass
94	BRK	Pass
89	BRK	Pass
97	BRK	Pass

Destructive No.:	DS-18
Seam Type (Fus/Ext):	Fusion
Seam Number:	11/12
Location:	346' E
Date Seamed	8.16.19
Defect Code:	2A
Machine Number:	58
Welding Tech.:	AR
Machine Temp:	860
Machine Speed:	7
Date Tested:	8.17.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
73	SE1	Pass	78	SE1	Pass
77	SE1	Pass	78	SE1	Pass
76	SE1	Pass	79	SE1	Pass
75	SE1	Pass	60	SE1	Pass
71	SE1	Pass	78	SE1	Pass

SHEAR		
Strength	Break Code	Pass / Fail
92	BRK	Pass
88	BRK	Pass
94	BRK	Pass
94	BRK	Pass
92	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

J.R. Whiting Ash Pond Closure

1788523

Destructive No.:	DS-19
Seam Type (Fus/Ext):	Fusion
Seam Number:	12/13
Location:	154'W
Date Seamed	8.16.19
Defect Code:	2B
Machine Number:	1739
Welding Tech.:	AMJR
Machine Temp:	860
Machine Speed:	7.5
Date Tested:	8.17.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
83	SE1	Pass	70	SE1	Pass
81	SE1	Pass	74	SE1	Pass
86	SE1	Pass	80	SE1	Pass
68	SE1	Pass	68	SE1	Pass
68	SE1	Pass		SE1	Pass

SHEAR		
Strength	Break Code	Pass / Fail
99	BRK	Pass
87	BRK	Pass
98	BRK	Pass
94	BRK	Pass
92	BRK	Pass

Destructive No.:	DS-20
Seam Type (Fus/Ext):	Fusion
Seam Number:	12/13
Location:	66'E
Date Seamed	8.16.19
Defect Code:	2C
Machine Number:	1734
Welding Tech.:	AMJR
Machine Temp:	860
Machine Speed:	7.5
Date Tested:	8.17.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
73	SE1	Pass	83	SE1	Pass
84	SE1	Pass	70	SE1	Pass
81	SE1	Pass	74	SE1	Pass
90	SE1	Pass	75	SE1	Pass
77	SE1	Pass	61	SE1	Pass

SHEAR		
Strength	Break Code	Pass / Fail
93	BRK	Pass
92	BRK	Pass
93	BRK	Pass
94	BRK	Pass
94	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

J.R. Whiting Ash Pond Closure

1788523

Destructive No.:	DS-21
Seam Type (Fus/Ext):	Fusion
Seam Number:	13/14
Location:	380' W
Date Seamed	8.16.19
Defect Code:	2G
Machine Number:	1741
Welding Tech.:	ML
Machine Temp:	860
Machine Preheat:	7
Date Tested:	8.17.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
80	SE1	Pass	76	SE1	PASS
82	SE1	Pass	73	SE1	PASS
78	SE1	Pass	85	SE1	PASS
83	SE1	Pass	68	SE1	PASS
83	SE1	Pass	72	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
98	BRK	Pass
99	BRK	Pass
99	BRK	Pass
100	BRK	Pass
92	BRK	Pass

Destructive No.:	DS-22
Seam Type (Fus/Ext):	Fusion
Seam Number:	14/15
Location:	154' W
Date Seamed	8.16.19
Defect Code:	2H
Machine Number:	58
Welding Tech.:	AR
Machine Temp:	860
Machine Preheat:	7
Date Tested:	8.17.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
71	SE1	Pass	80	SE1	PASS
73	SE1	Pass	73	SE1	PASS
90	SE1	Pass	78	SE1	PASS
83	SE1	Pass	85	SE1	PASS
84	SE1	Pass	76	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
97	BRK	Pass
98	BRK	Pass
94	BRK	Pass
94	BRK	Pass
95	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

J.R. Whiting Ash Pond Closure

1788523

Destructive No.:	DS-23
Seam Type (Fus/Ext):	Fusion
Seam Number:	14/15
Location:	66'E
Date Seamed	8.16.19
Defect Code:	2I
Machine Number:	58
Welding Tech.:	AR
Machine Temp:	860
Machine Preheat:	7.
Date Tested:	8.17.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
74	SE1	Pass	84	SEI	PASS
79	SE1	Pass	64	SEI	PASS
83	SE1	Pass	69	SEI	PASS
82	SE1	Pass	78	SEI	PASS
81	SE1	Pass	90	SEI	PASS

SHEAR		
Strength	Break Code	Pass / Fail
95	BRK	Pass
94	BRK	Pass
92	BRK	Pass
91	BRK	Pass
94	BRK	Pass

Destructive No.:	DS-24
Seam Type (Fus/Ext):	Fusion
Seam Number:	15/16
Location:	286'E
Date Seamed	8.16.19
Defect Code:	2J
Machine Number:	1734
Welding Tech.:	AMJR
Machine Temp:	860
Machine Preheat:	7.5
Date Tested:	8.17.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
79	SE1	Pass	70	SEI	PASS
73	SE1	Pass	89	SEI	PASS
78	SE1	Pass	69	SEI	PASS
73	SE1	Pass	85	SEI	PASS
85	SE1	Pass	80	SEI	PASS

SHEAR		
Strength	Break Code	Pass / Fail
96	BRK	Pass
96	BRK	Pass
94	BRK	Pass
99	BRK	Pass
96	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

1788523

J.R. Whiting Ash Pond Closure

Destructive No.:	DS-25
Seam Type (Fus/Ext):	Fusion
Seam Number:	16/17
Location:	16Φ'W
Date Seamed	8.16.19
Defect Code:	2M
Machine Number:	1741
Welding Tech.:	ML
Machine Temp:	860
Machine Speed:	7
Date Tested:	8.17.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
82	SE1	Pass	79	SE1	Pass
78	SE1	Pass	84	SE1	Pass
78	SE1	Pass	84	SE1	Pass
80	SE1	Pass	79	SE1	Pass
79	SE1	Pass	80	SE1	Pass

SHEAR		
Strength	Break Code	Pass / Fail
90	BRK	Pass
99	BRK	Pass
94	BRK	Pass
99	BRK	Pass
96	BRK	Pass

Destructive No.:	DS-26
Seam Type (Fus/Ext):	Fusion
Seam Number:	16/17
Location:	60'E
Date Seamed	8.16.19
Defect Code:	2N
Machine Number:	1741
Welding Tech.:	ML
Machine Temp:	860
Machine Speed:	7
Date Tested:	8.17.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
80	SE1	Pass	86	SE1	Pass
78	SE1	Pass	81	SE1	Pass
80	SE1	Pass	78	SE1	Pass
78	SE1	Pass	78	SE1	Pass
84	SE1	Pass	81	SE1	Pass

SHEAR		
Strength	Break Code	Pass / Fail
92	BRK	Pass
93	BRK	Pass
93	BRK	Pass
94	BRK	Pass
93	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

J.R. Whiting Ash Pond Closure

1788523

Destructive No.:	DS-27
Seam Type (Fus/Ext):	Fusion
Seam Number:	17/18
Location:	214' W
Date Seamed	8.17.19
Defect Code:	2P
Machine Number:	1734
Welding Tech.:	AMJR
Machine Temp:	860
Machine Speed:	8
Date Tested:	8.17.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
73	SE1	Pass	68	SE1	Pass
61	SE1	Pass	71	SE1	Pass
67	SE1	Pass	83	SE1	Pass
75	SE1	Pass	79	SE1	Pass
64	SE1	Pass	64	SE1	Pass

SHEAR		
Strength	Break Code	Pass / Fail
97	BRK	Pass
94	BRK	Pass
93	BRK	Pass
93	BRK	Pass
88	BRK	Pass

Destructive No.:	DS-28
Seam Type (Fus/Ext):	Fusion
Seam Number:	17/18
Location:	6' E
Date Seamed	8.17.19
Defect Code:	2Q
Machine Number:	1734
Welding Tech.:	AMJR
Machine Temp:	860
Machine Speed:	8
Date Tested:	8.17.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
88	SE1	Pass	79	SE1	Pass
73	SE1	Pass	83	SE1	Pass
74	SE1	Pass	77	SE1	Pass
77	SE1	Pass	80	SE1	Pass
73	SE1	Pass	71	SE1	Pass

SHEAR		
Strength	Break Code	Pass / Fail
89	BRK	Pass
92	BRK	Pass
92	BRK	Pass
92	BRK	Pass
91	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

J.R. Whiting Ash Pond Closure

1788523

Destructive No.:	DS-29
Seam Type (Fus/Ext):	Fusion
Seam Number:	18/19
Location:	286'E
Date Seamed	8.17.19
Defect Code:	2R
Machine Number:	58
Welding Tech.:	AR
Machine Temp:	860
Machine Speed:	7.5
Date Tested:	8.17.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
82	SE1	Pass	89	SE1	Pass
83	SE1	Pass	83	SE1	Pass
78	SE1	Pass	80	SE1	Pass
81	SE1	Pass	80	SE1	Pass
73	SE1	Pass	88	SE1	Pass

SHEAR		
Strength	Break Code	Pass / Fail
92	BRK	Pass
93	BRK	Pass
88	BRK	Pass
88	BRK	Pass
92	BRK	Pass

Destructive No.:	DS-30
Seam Type (Fus/Ext):	Fusion
Seam Number:	19/20
Location:	250'E
Date Seamed	8.17.19
Defect Code:	2S
Machine Number:	1741
Welding Tech.:	ML
Machine Temp:	860
Machine Speed:	6.5
Date Tested:	8.17.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
69	SE1	Pass	70	SE1	Pass
78	SE1	Pass	70	SE1	Pass
65	SE1	Pass	82	SE1	Pass
65	SE1	Pass	79	SE1	Pass
74	SE1	Pass	71	SE1	Pass

SHEAR		
Strength	Break Code	Pass / Fail
95	BRK	Pass
94	BRK	Pass
91	BRK	Pass
91	BRK	Pass
95	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

J.R. Whiting Ash Pond Closure

1788523

Destructive No.:	DS-31
Seam Type (Fus/Ext):	Fusion
Seam Number:	2Φ/21
Location:	226'E
Date Seamed	8.17.19
Defect Code:	2T
Machine Number:	1734
Welding Tech.:	AMJR
Machine Temp:	86Φ
Machine Speed:	8
Date Tested:	8.17.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
71	SE1	Pass	83	SE1	Pass
75	SE1	Pass	89	SE1	Pass
68	SE1	Pass	74	SE1	Pass
65	SE1	Pass	79	SE1	Pass
73	SE1	Pass	71	SE1	Pass

SHEAR		
Strength	Break Code	Pass / Fail
93	BRK	Pass
93	BRK	Pass
95	BRK	Pass
93	BRK	Pass
9Φ	BRK	Pass

Destructive No.:	DS-32
Seam Type (Fus/Ext):	Fusion
Seam Number:	21/22
Location:	214'W
Date Seamed	8.17.19
Defect Code:	2W
Machine Number:	58
Welding Tech.:	AR
Machine Temp:	86Φ
Machine Speed:	7.5
Date Tested:	8.17.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
81	SE1	Pass	77	SE1	Pass
71	SE1	Pass	75	SE1	Pass
75	SE1	Pass	8Φ	SE1	Pass
81	SE1	Pass	85	SE1	Pass
82	SE1	Pass	8Φ	SE1	Pass

SHEAR		
Strength	Break Code	Pass / Fail
89	BRK	Pass
87	BRK	Pass
87	BRK	Pass
95	BRK	Pass
89	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

1788523

J.R. Whiting Ash Pond Closure

Destructive No.:	DS-33
Seam Type (Fus/Ext):	Fusion
Seam Number:	21/22
Location:	6'E
Date Seamed	8.17.19
Defect Code:	2X
Machine Number:	58
Welding Tech.:	AR
Machine Temp:	860
Machine Speed:	7.5
Date Tested:	8.17.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
89	SE1	Pass	66	SE1	Pass
87	SE1	Pass	71	SE1	Pass
91	SE1	Pass	69	SE1	Pass
85	SE1	Pass	72	SE1	Pass
79	SE1	Pass	78	SE1	Pass

SHEAR		
Strength	Break Code	Pass / Fail
96	BRK	Pass
96	BRK	Pass
94	BRK	Pass
93	BRK	Pass
92	BRK	Pass

Destructive No.:	DS-34
Seam Type (Fus/Ext):	Fusion
Seam Number:	22/23
Location:	226'E
Date Seamed	8.20.19
Defect Code:	3A
Machine Number:	58
Welding Tech.:	AR
Machine Temp:	860
Machine Speed:	7.5
Date Tested:	8.20.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
74	SE1	Pass	69	SE1	Pass
75	SE1	Pass	77	SE1	Pass
76	SE1	Pass	77	SE1	Pass
82	SE1	Pass	75	SE1	Pass
66	SE1	Pass	74	SE1	Pass

SHEAR		
Strength	Break Code	Pass / Fail
91	BRK	Pass
94	BRK	Pass
93	BRK	Pass
94	BRK	Pass
94	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

1788523

J.R. Whiting Ash Pond Closure

Destructive No.:	DS-35
Seam Type (Fus/Ext):	Fusion
Seam Number:	23/24
Location:	20'W
Date Seamed	8.20.19
Defect Code:	3B
Machine Number:	1741
Welding Tech.:	ML
Machine Temp:	860
Machine Speed:	7.5
Date Tested:	8.20.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
75	SE1	Pass	83	SE1	Pass
87	SE1	Pass	90	SE1	Pass
78	SE1	Pass	79	SE1	Pass
88	SE1	Pass	84	SE1	Pass
86	SE1	Pass	78	SE1	Pass

SHEAR		
Strength	Break Code	Pass / Fail
95	BRK	Pass
94	BRK	Pass
95	BRK	Pass
93	BRK	Pass
101	BRK	Pass

Destructive No.:	DS-36
Seam Type (Fus/Ext):	Fusion
Seam Number:	23/24
Location:	200'E
Date Seamed	8.20.19
Defect Code:	3C
Machine Number:	1741
Welding Tech.:	ML
Machine Temp:	860
Machine Speed:	7.5
Date Tested:	8.20.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
77	SE1	Pass	72	SE1	Pass
81	SE1	Pass	83	SE1	Pass
81	SE1	Pass	76	SE1	Pass
85	SE1	Pass	73	SE1	Pass
73	SE1	Pass	79	SE1	Pass

SHEAR		
Strength	Break Code	Pass / Fail
93	BRK	Pass
92	BRK	Pass
100	BRK	Pass
96	BRK	Pass
93	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

J.R. Whiting Ash Pond Closure

1788523

Destructive No.:	DS-37
Seam Type (Fus/Ext):	Fusion
Seam Number:	24/25
Location:	274 'W
Date Seamed	8.20.19
Defect Code:	3D
Machine Number:	1734
Welding Tech.:	AMJR
Machine Temp:	860
Machine Speed:	7.5
Date Tested:	8.20.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
90	SE1	Pass	75	SE1	Pass
90	SE1	Pass	79	SE1	Pass
72	SE1	Pass	90	SE1	Pass
70	SE1	Pass	89	SE1	Pass
71	SE1	Pass	97	SE1	Pass

SHEAR		
Strength	Break Code	Pass / Fail
91	BRK	Pass
95	BRK	Pass
96	BRK	Pass
95	BRK	Pass
95	BRK	Pass

Destructive No.:	DS-38
Seam Type (Fus/Ext):	Fusion
Seam Number:	23/24
Location:	WEOS
Date Seamed	8.20.19
Defect Code:	3E
Machine Number:	1741
Welding Tech.:	ML
Machine Temp:	860
Machine Speed:	7.5
Date Tested:	8.20.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
84	SE1	Pass	76	SE1	Pass
86	SE1	Pass	79	SE1	Pass
74	SE1	Pass	75	SE1	Pass
78	SE1	Pass	86	SE1	Pass
84	SE1	Pass	74	SE1	Pass

SHEAR		
Strength	Break Code	Pass / Fail
93	BRK	Pass
94	BRK	Pass
93	BRK	Pass
94	BRK	Pass
104	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

1788523

J.R. Whiting Ash Pond Closure

Destructive No.:	DS-39
Seam Type (Fus/Ext):	Fusion
Seam Number:	25/26
Location:	100' WEOS
Date Seamed	9.27.19
Defect Code:	3G
Machine Number:	M-1743
Welding Tech.:	PF
Machine Temp:	860
Machine Speed:	7.0
Date Tested:	9.30.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
77	SE1	Pass	87	SE1	PASS
80	SE1	Pass	83	SE1	PASS
79	SE1	Pass	76	SE1	PASS
79	SE1	Pass	80	SE1	PASS
65	SE1	Pass	80	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
111	BRK	Pass
107	BRK	Pass
107	BRK	Pass
113	BRK	Pass
113	BRK	Pass

Destructive No.:	DS-40
Seam Type (Fus/Ext):	Fusion
Seam Number:	25/26
Location:	360' WEOS
Date Seamed	9.27.19
Defect Code:	3H
Machine Number:	M-1743
Welding Tech.:	PF
Machine Temp:	860
Machine Speed:	7.0
Date Tested:	9.30.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
70	SE1	Pass	77	SE1	PASS
70	SE1	Pass	70	SE1	PASS
101	SE1	Pass	82	SE1	PASS
88	SE1	Pass	83	SE1	PASS
66	SE1	Pass	78	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
109	BRK	Pass
111	BRK	Pass
109	BRK	Pass
109	BRK	Pass
109	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

1788523

J.R. Whiting Ash Pond Closure

Destructive No.:	DS-41
Seam Type (Fus/Ext):	Fusion
Seam Number:	26/27
Location:	100' EEOS
Date Seamed	9.27.19
Defect Code:	3I
Machine Number:	M-1707
Welding Tech.:	S.D.
Machine Temp:	860
Machine Speed:	7.5
Date Tested:	9.30.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
80	SE1	Pass	92	SE1	PASS
74	SE1	Pass	86	SE1	PASS
81	SE1	Pass	84	SE1	PASS
76	SE1	Pass	86	SE1	PASS
79	SE1	Pass	85	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
98	BRK	Pass
107	BRK	Pass
104	BRK	Pass
108	BRK	Pass
107	BRK	Pass

Destructive No.:	DS-42
Seam Type (Fus/Ext):	Fusion
Seam Number:	26/27
Location:	130' WEOS
Date Seamed	9.27.19
Defect Code:	3S
Machine Number:	M-1707
Welding Tech.:	S.D.
Machine Temp:	860
Machine Speed:	7.5
Date Tested:	9.30.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
75	SE1	Pass	85	SE1	PASS
65	SE1	Pass	84	SE1	PASS
87	SE1	Pass	83	SE1	PASS
89	SE1	Pass	76	SE1	PASS
68	SE1	Pass	83	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
103	BRK	Pass
104	BRK	Pass
107	BRK	Pass
106	BRK	Pass
104	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

1788523

J.R. Whiting Ash Pond Closure

Destructive No.:	DS-43
Seam Type (Fus/Ext):	Fusion
Seam Number:	27/28
Location:	100' EEOS
Date Seamed	10.1.19
Defect Code:	3K
Machine Number:	M-65
Welding Tech.:	RH
Machine Temp:	860
Machine Speed:	7
Date Tested:	10.1.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
80	SE1	Pass	75	SE1	PASS
76	SE1	Pass	82	SE1	PASS
80	SE1	Pass	82	SE1	PASS
76	SE1	Pass	88	SE1	PASS
86	SE1	Pass	75	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
97	BRK	Pass
100	BRK	Pass
97	BRK	Pass
97	BRK	Pass
99	BRK	Pass

Destructive No.:	DS-44
Seam Type (Fus/Ext):	Fusion
Seam Number:	27/28
Location:	130' WEOS
Date Seamed	10.1.19
Defect Code:	3M
Machine Number:	M-65
Welding Tech.:	RH
Machine Temp:	860
Machine Speed:	7
Date Tested:	10.1.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
81	SE1	Pass	77	SE1	PASS
81	SE1	Pass	77	SE1	PASS
78	SE1	Pass	76	SE1	PASS
75	SE1	Pass	76	SE1	PASS
83	SE1	Pass	78	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
96	BRK	Pass
95	BRK	Pass
96	BRK	Pass
96	BRK	Pass
95	BRK	Pass

DS-44 passed field testing but failed laboratory testing - DS-44B and DS-44A were sampled and passed field and laboratory destruct testing.

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

1788523

J.R. Whiting Ash Pond Closure

Destructive No.:	DS-45
Seam Type (Fus/Ext):	Fusion
Seam Number:	28/29
Location:	36Φ' WEOS
Date Seamed	9.27.19
Defect Code:	3P
Machine Number:	M-1743
Welding Tech.:	PF
Machine Temp:	86Φ
Machine Speed:	7.Φ
Date Tested:	9.30.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
72	SE1	Pass	78	SE1	PASS
83	SE1	Pass	81	SE1	PASS
75	SE1	Pass	82	SE1	PASS
78	SE1	Pass	84	SE1	PASS
76	SE1	Pass	84	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
101	BRK	Pass
103	BRK	Pass
105	BRK	Pass
106	BRK	Pass
103	BRK	Pass

Destructive No.:	DS-46
Seam Type (Fus/Ext):	Fusion
Seam Number:	29/30
Location:	36Φ' WEOS
Date Seamed	9.27.19
Defect Code:	3Q
Machine Number:	M-1767
Welding Tech.:	S.P.
Machine Temp:	86Φ
Machine Speed:	7.5
Date Tested:	9.30.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
72	SE1	Pass	78	SE1	PASS
71	SE1	Pass	85	SE1	PASS
81	SE1	Pass	84	SE1	PASS
71	SE1	Pass	77	SE1	PASS
90	SE1	Pass	77	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
99	BRK	Pass
103	BRK	Pass
101	BRK	Pass
99	BRK	Pass
101	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

1788523

J.R. Whiting Ash Pond Closure

Destructive No.:	DS-47
Seam Type (Fus/Ext):	Fusion
Seam Number:	30/31
Location:	360' WEOS
Date Seamed	10.1.19
Defect Code:	3R
Machine Number:	M65
Welding Tech.:	RH
Machine Temp:	860
Machine Speed:	7
Date Tested:	10.1.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
72	SE1	Pass	82	SE1	PASS
85	SE1	Pass	85	SE1	PASS
92	SE1	Pass	73	SE1	PASS
84	SE1	Pass	78	SE1	PASS
82	SE1	Pass	73	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
95	BRK	Pass
95	BRK	Pass
97	BRK	Pass
95	BRK	Pass
98	BRK	Pass

Destructive No.:	DS-48
Seam Type (Fus/Ext):	Fusion
Seam Number:	31/32
Location:	140' EEOS
Date Seamed	10.1.19
Defect Code:	3S
Machine Number:	M 1707
Welding Tech.:	SD
Machine Temp:	860
Machine Speed:	7.5
Date Tested:	10.1.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
76	SE1	Pass	74	SE1	PASS
79	SE1	Pass	76	SE1	PASS
73	SE1	Pass	71	SE1	PASS
81	SE1	Pass	79	SE1	PASS
80	SE1	Pass	71	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
95	BRK	Pass
95	BRK	Pass
96	BRK	Pass
96	BRK	Pass
94	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

1788523

J.R. Whiting Ash Pond Closure

Destructive No.:	DS-49
Seam Type (Fus/Ext):	Fusion
Seam Number:	31/32
Location:	90' WEOS
Date Seamed	10.1.19
Defect Code:	3W
Machine Number:	M 1707
Welding Tech.:	SD
Machine Temp:	860
Machine Speed:	7.5
Date Tested:	10.1.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
74	SE1	Pass	64	SE1	PASS
76	SE1	Pass	70	SE1	PASS
75	SE1	Pass	74	SE1	PASS
77	SE1	Pass	78	SE1	PASS
78	SE1	Pass	81	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
94	BRK	Pass
96	BRK	Pass
99	BRK	Pass
92	BRK	Pass
96	BRK	Pass

Destructive No.:	DS-50
Seam Type (Fus/Ext):	Fusion
Seam Number:	32/33
Location:	320' WEOS
Date Seamed	10/2/19
Defect Code:	4C
Machine Number:	M-1707
Welding Tech.:	SD
Machine Temp:	860
Machine Speed:	7.5
Date Tested:	10/4/19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
95	SE1	Pass	75	SE1	PASS
88	SE1	Pass	79	SE1	PASS
76	SE1	Pass	90	SE1	PASS
80	SE1	Pass	89	SE1	PASS
81	SE1	Pass	90	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
121	BRK	Pass
115	BRK	Pass
121	BRK	Pass
121	BRK	Pass
113	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

1788523

J.R. Whiting Ash Pond Closure

Destructive No.:	DS-51
Seam Type (Fus/Ext):	Fusion
Seam Number:	33/34
Location:	14Φ' EEOS
Date Seamed	10/2/19
Defect Code:	4D
Machine Number:	M-65
Welding Tech.:	RH
Machine Temp:	86Φ
Machine Speed:	7
Date Tested:	10/4/19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
86	SE1	Pass	87	SE1	PASS
87	SE1	Pass	88	SE1	PASS
90	SE1	Pass	88	SE1	PASS
92	SE1	Pass	86	SE1	PASS
87	SE1	Pass	86	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
113	BRK	Pass
114	BRK	Pass
112	BRK	Pass
118	BRK	Pass
119	BRK	Pass

Destructive No.:	DS-52
Seam Type (Fus/Ext):	Fusion
Seam Number:	33/34
Location:	9Φ' WEOS
Date Seamed	10/2/19
Defect Code:	4E
Machine Number:	M-65
Welding Tech.:	RH
Machine Temp:	86Φ
Machine Speed:	7
Date Tested:	10/4/19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
79	SE1	Pass	82	SE1	PASS
83	SE1	Pass	86	SE1	PASS
85	SE1	Pass	77	SE1	PASS
72	SE1	Pass	73	SE1	PASS
81	SE1	Pass	72	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
107	BRK	Pass
113	BRK	Pass
110	BRK	Pass
111	BRK	Pass
116	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

1788523

J.R. Whiting Ash Pond Closure

Destructive No.:	DS-53
Seam Type (Fus/Ext):	Fusion
Seam Number:	34/35
Location:	14Φ 'EEOS
Date Seamed	10/2/19
Defect Code:	4F
Machine Number:	M-1743
Welding Tech.:	PF
Machine Temp:	86Φ
Machine Speed:	7.5
Date Tested:	10/4/19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
8Φ	SE1	Pass	9Φ	SE1	PASS
83	SE1	Pass	92	SE1	PASS
81	SE1	Pass	93	SE1	PASS
81	SE1	Pass	91	SE1	PASS
83	SE1	Pass	88	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
11Φ	BRK	Pass
113	BRK	Pass
111	BRK	Pass
115	BRK	Pass
114	BRK	Pass

Destructive No.:	DS-54
Seam Type (Fus/Ext):	Fusion
Seam Number:	34/35
Location:	9Φ 'WEOS
Date Seamed	10/2/19
Defect Code:	4G
Machine Number:	M-1743
Welding Tech.:	PF
Machine Temp:	86Φ
Machine Speed:	7.5
Date Tested:	10/4/19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
82	SE1	Pass	79	SE1	PASS
86	SE1	Pass	87	SE1	PASS
82	SE1	Pass	8Φ	SE1	PASS
86	SE1	Pass	75	SE1	PASS
8Φ	SE1	Pass	74	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
113	BRK	Pass
115	BRK	Pass
115	BRK	Pass
114	BRK	Pass
116	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

1788523

J.R. Whiting Ash Pond Closure

Destructive No.:	DS-55
Seam Type (Fus/Ext):	Fusion
Seam Number:	35/36
Location:	180' EEOS
Date Seamed	10/2/19
Defect Code:	4H
Machine Number:	M-1707
Welding Tech.:	SD
Machine Temp:	860
Machine Speed:	7.5
Date Tested:	10/4/19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
82	SE1	Pass	91	SE1	PASS
76	SE1	Pass	85	SE1	PASS
85	SE1	Pass	86	SE1	PASS
83	SE1	Pass	92	SE1	PASS
76	SE1	Pass	82	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
115	BRK	Pass
112	BRK	Pass
115	BRK	Pass
114	BRK	Pass
114	BRK	Pass

Destructive No.:	DS-56
Seam Type (Fus/Ext):	Fusion
Seam Number:	35/36
Location:	50' WEOS
Date Seamed	10/2/19
Defect Code:	4I
Machine Number:	M-1707
Welding Tech.:	SD
Machine Temp:	860
Machine Speed:	7.5
Date Tested:	10/4/19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
86	SE1	Pass	74	SE1	PASS
83	SE1	Pass	85	SE1	PASS
84	SE1	Pass	73	SE1	PASS
86	SE1	Pass	72	SE1	PASS
87	SE1	Pass	65	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
118	BRK	Pass
117	BRK	Pass
116	BRK	Pass
117	BRK	Pass
119	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

1788523

J.R. Whiting Ash Pond Closure

Destructive No.:	DS-57
Seam Type (Fus/Ext):	Fusion
Seam Number:	36/37
Location:	32Φ' WEOS
Date Seamed	10/2/19
Defect Code:	4J
Machine Number:	M-65
Welding Tech.:	RH
Machine Temp:	860
Machine Speed:	7
Date Tested:	10/4/19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
84	SE1	Pass	77	SE1	PASS
80	SE1	Pass	70	SE1	PASS
78	SE1	Pass	78	SE1	PASS
77	SE1	Pass	80	SE1	PASS
96	SE1	Pass	85	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
112	BRK	Pass
115	BRK	Pass
113	BRK	Pass
114	BRK	Pass
115	BRK	Pass

Destructive No.:	DS-58
Seam Type (Fus/Ext):	Fusion
Seam Number:	37/38
Location:	32Φ' WEOS
Date Seamed	10/2/19
Defect Code:	4K
Machine Number:	M-1743
Welding Tech.:	PF
Machine Temp:	860
Machine Speed:	7.5
Date Tested:	10/4/19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
86	SE1	Pass	94	SE1	PASS
88	SE1	Pass	89	SE1	PASS
95	SE1	Pass	85	SE1	PASS
90	SE1	Pass	88	SE1	PASS
97	SE1	Pass	89	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
123	BRK	Pass
117	BRK	Pass
119	BRK	Pass
122	BRK	Pass
116	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

1788523

J.R. Whiting Ash Pond Closure

Destructive No.:	DS-59
Seam Type (Fus/Ext):	Fusion
Seam Number:	39/40
Location:	280' EEOS
Date Seamed	10.4.19
Defect Code:	4P
Machine Number:	M-1707
Welding Tech.:	SD
Machine Temp:	860
Machine Speed:	7,5
Date Tested:	10,7,19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
82	SE1	Pass	84	SE1	PASS
75	SE1	Pass	82	SE1	PASS
75	SE1	Pass	87	SE1	PASS
80	SE1	Pass	79	SE1	PASS
76	SE1	Pass	81	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
107	BRK	Pass
107	BRK	Pass
108	BRK	Pass
108	BRK	Pass
114	BRK	Pass

Destructive No.:	DS-60
Seam Type (Fus/Ext):	Fusion
Seam Number:	40/41
Location:	180' WEOS
Date Seamed	10.4.19
Defect Code:	4Q
Machine Number:	M-1743
Welding Tech.:	PF
Machine Temp:	860
Machine Speed:	7,5
Date Tested:	10,7,19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
92	SE1	Pass	75	SE1	PASS
86	SE1	Pass	76	SE1	PASS
75	SE1	Pass	83	SE1	PASS
89	SE1	Pass	79	SE1	PASS
89	SE1	Pass	83	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
108	BRK	Pass
110	BRK	Pass
108	BRK	Pass
108	BRK	Pass
107	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

1788523

J.R. Whiting Ash Pond Closure

Destructive No.:	DS-61
Seam Type (Fus/Ext):	Fusion
Seam Number:	40/41
Location:	50' EEOS
Date Seamed	10.4.19
Defect Code:	4R
Machine Number:	M-1743
Welding Tech.:	PF
Machine Temp:	860
Machine Speed:	7.5
Date Tested:	10.7.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	PASS

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
75	SE1	Pass	84	SE1	PASS
74	SE1	Pass	82	SE1	PASS
81	SE1	Pass	85	SE1	PASS
70	SE1	Pass	82	SE1	PASS
73	SE1	Pass	83	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
109	BRK	Pass
109	BRK	Pass
112	BRK	Pass
111	BRK	Pass
110	BRK	Pass

Destructive No.:	DS-62
Seam Type (Fus/Ext):	Fusion
Seam Number:	41/42
Location:	180' WEOS
Date Seamed	10.4.19
Defect Code:	45
Machine Number:	M-65
Welding Tech.:	RH
Machine Temp:	860
Machine Speed:	7
Date Tested:	10.7.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	PASS

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
83	SE1	Pass	81	SE1	PASS
82	SE1	Pass	82	SE1	PASS
82	SE1	Pass	86	SE1	PASS
83	SE1	Pass	79	SE1	PASS
80	SE1	Pass	88	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
111	BRK	Pass
110	BRK	Pass
111	BRK	Pass
111	BRK	Pass
111	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

1788523

J.R. Whiting Ash Pond Closure

Destructive No.:	DS-73
Seam Type (Fus/Ext):	Fusion
Seam Number:	47/48
Location:	240 'WEST
Date Seamed	10.5.17
Defect Code:	5F
Machine Number:	M-1743
Welding Tech.:	PF
Machine Temp:	860
Machine Speed:	7.5
Date Tested:	10.7.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
87	SE1	Pass	75	SE1	PASS
76	SE1	Pass	81	SE1	PASS
78	SE1	Pass	72	SE1	PASS
74	SE1	Pass	78	SE1	PASS
79	SE1	Pass	70	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
102	BRK	Pass
102	BRK	Pass
103	BRK	Pass
105	BRK	Pass
107	BRK	Pass

Destructive No.:	DS-74
Seam Type (Fus/Ext):	Fusion
Seam Number:	48/49
Location:	260 'EAST
Date Seamed	10.5.19
Defect Code:	5J
Machine Number:	M-65
Welding Tech.:	RH
Machine Temp:	860
Machine Speed:	7
Date Tested:	10.7.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
79	SE1	Pass	73	SE1	PASS
88	SE1	Pass	65	SE1	PASS
92	SE1	Pass	76	SE1	PASS
77	SE1	Pass	81	SE1	PASS
82	SE1	Pass	81	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
103	BRK	Pass
105	BRK	Pass
101	BRK	Pass
101	BRK	Pass
108	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

1788523

J.R. Whiting Ash Pond Closure

Destructive No.:	DS-65
Seam Type (Fus/Ext):	Fusion
Seam Number:	42/43
Location:	1Φ'EEOS
Date Seamed	1Φ.4.19
Defect Code:	4x
Machine Number:	M-1747
Welding Tech.:	SD
Machine Temp:	86Φ
Machine Speed:	7.5
Date Tested:	1Φ.7.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	PASS

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
77	SE1	Pass	76	SE1	PASS
81	SE1	Pass	73	SE1	PASS
8Φ	SE1	Pass	75	SE1	PASS
78	SE1	Pass	8Φ	SE1	PASS
76	SE1	Pass	8Φ	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
1Φ7	BRK	Pass
111	BRK	Pass
113	BRK	Pass
11Φ	BRK	Pass
11Φ	BRK	Pass

Destructive No.:	DS-66
Seam Type (Fus/Ext):	Fusion
Seam Number:	43/44
Location:	28Φ'EEOS
Date Seamed	1Φ.4.19
Defect Code:	5A
Machine Number:	M-1743
Welding Tech.:	PF
Machine Temp:	86Φ
Machine Speed:	7.5
Date Tested:	1Φ.7.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	PASS

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
98	SE1	Pass	76	SE1	PASS
87	SE1	Pass	76	SE1	PASS
96	SE1	Pass	77	SE1	PASS
87	SE1	Pass	78	SE1	PASS
91	SE1	Pass	77	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
1Φ6	BRK	Pass
1Φ9	BRK	Pass
1Φ8	BRK	Pass
167	BRK	Pass
1Φ9	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

1788523

J.R. Whiting Ash Pond Closure

Destructive No.:	DS-67
Seam Type (Fus/Ext):	Fusion
Seam Number:	38/39
Location:	280' EEOS
Date Seamed	10.4.19
Defect Code:	5B
Machine Number:	M-65
Welding Tech.:	RH
Machine Temp:	860
Machine Speed:	7
Date Tested:	10.7.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
85	SE1	Pass	85	SE1	PASS
80	SE1	Pass	82	SE1	PASS
85	SE1	Pass	80	SE1	PASS
84	SE1	Pass	84	SE1	PASS
78	SE1	Pass	83	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
110	BRK	Pass
109	BRK	Pass
110	BRK	Pass
111	BRK	Pass
109	BRK	Pass

Destructive No.:	DS-68
Seam Type (Fus/Ext):	Fusion
Seam Number:	44/45
Location:	220' EEOS
Date Seamed	10.5.19
Defect Code:	5D
Machine Number:	M-1743
Welding Tech.:	PF
Machine Temp:	860
Machine Speed:	7.5
Date Tested:	10.7.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
85	SE1	Pass	76	SE1	PASS
89	SE1	Pass	79	SE1	PASS
83	SE1	Pass	78	SE1	PASS
85	SE1	Pass	80	SE1	PASS
78	SE1	Pass	83	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
105	BRK	Pass
106	BRK	Pass
103	BRK	Pass
108	BRK	Pass
104	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

1788523

J.R. Whiting Ash Pond Closure

Destructive No.:	DS-69
Seam Type (Fus/Ext):	Fusion
Seam Number:	44/45
Location:	10' WEDS
Date Seamed	10.5.19
Defect Code:	5E
Machine Number:	M-1743
Welding Tech.:	PF
Machine Temp:	860
Machine Speed:	7.5
Date Tested:	10.7.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
83	SE1	Pass	85	SE1	PASS
78	SE1	Pass	92	SE1	PASS
77	SE1	Pass	95	SE1	PASS
79	SE1	Pass	84	SE1	PASS
78	SE1	Pass	86	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
109	BRK	Pass
106	BRK	Pass
112	BRK	Pass
108	BRK	Pass
102	BRK	Pass

Destructive No.:	DS-70
Seam Type (Fus/Ext):	Fusion
Seam Number:	45/46
Location:	240' WEDS
Date Seamed	10.5.19
Defect Code:	5F
Machine Number:	M-1707
Welding Tech.:	SD
Machine Temp:	7.5
Machine Speed:	860
Date Tested:	10.7.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
71	SE1	Pass	73	SE1	PASS
76	SE1	Pass	79	SE1	PASS
75	SE1	Pass	72	SE1	PASS
72	SE1	Pass	74	SE1	PASS
73	SE1	Pass	70	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
108	BRK	Pass
108	BRK	Pass
112	BRK	Pass
110	BRK	Pass
106	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

1788523

J.R. Whiting Ash Pond Closure

Destructive No.:	DS-71
Seam Type (Fus/Ext):	Fusion
Seam Number:	46/47
Location:	220'E
Date Seamed	10.5.19
Defect Code:	5G
Machine Number:	M.65
Welding Tech.:	RH
Machine Temp:	860
Machine Speed:	7
Date Tested:	10.7.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
81	SE1	Pass	82	SE1	PASS
85	SE1	Pass	76	SE1	PASS
89	SE1	Pass	88	SE1	PASS
79	SE1	Pass	91	SE1	PASS
82	SE1	Pass	82	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
105	BRK	Pass
103	BRK	Pass
110	BRK	Pass
106	BRK	Pass
103	BRK	Pass

Destructive No.:	DS-72
Seam Type (Fus/Ext):	Fusion
Seam Number:	46/47
Location:	140'WEOS
Date Seamed	10.5.19
Defect Code:	5H
Machine Number:	M-65
Welding Tech.:	RH
Machine Temp:	860
Machine Speed:	7
Date Tested:	10.7.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
80	SE1	Pass	91	SE1	PASS
78	SE1	Pass	87	SE1	PASS
82	SE1	Pass	77	SE1	PASS
80	SE1	Pass	85	SE1	PASS
82	SE1	Pass	85	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
106	BRK	Pass
112	BRK	Pass
108	BRK	Pass
105	BRK	Pass
110	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

1788523

J.R. Whiting Ash Pond Closure

Destructive No.:	DS-63
Seam Type (Fus/Ext):	Fusion
Seam Number:	41/42
Location:	5Φ'EEOS
Date Seamed	1Φ.4.19
Defect Code:	4T
Machine Number:	M-65
Welding Tech.:	RH
Machine Temp:	86Φ
Machine Speed:	7
Date Tested:	1Φ.7.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	PASS

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
84	SE1	Pass	77	SE1	PASS
86	SE1	Pass	74	SE1	PASS
85	SE1	Pass	79	SE1	PASS
82	SE1	Pass	77	SE1	PASS
76	SE1	Pass	77	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
104	BRK	Pass
105	BRK	Pass
108	BRK	Pass
113	BRK	Pass
108	BRK	Pass

Destructive No.:	DS-64
Seam Type (Fus/Ext):	Fusion
Seam Number:	42/43
Location:	22Φ'WEOS
Date Seamed	1Φ.4.19
Defect Code:	4W
Machine Number:	M-17Φ7
Welding Tech.:	SD
Machine Temp:	86Φ
Machine Speed:	7.5
Date Tested:	1Φ.7.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	PASS

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
78	SE1	Pass	7Φ	SE1	PASS
79	SE1	Pass	71	SE1	PASS
67	SE1	Pass	92	SE1	PASS
65	SE1	Pass	75	SE1	PASS
75	SE1	Pass	78	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
107	BRK	Pass
108	BRK	Pass
108	BRK	Pass
111	BRK	Pass
106	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

1788523

J.R. Whiting Ash Pond Closure

Destructive No.:	DS-75
Seam Type (Fus/Ext):	Fusion
Seam Number:	49/5Φ
Location:	EEOS
Date Seamed	10.5.19
Defect Code:	5K
Machine Number:	M-65
Welding Tech.:	RH
Machine Temp:	86Φ
Machine Speed:	7
Date Tested:	10.7.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
78	SE1	Pass	88	SE1	PASS
74	SE1	Pass	85	SE1	PASS
91	SE1	Pass	74	SE1	PASS
8Φ	SE1	Pass	8Φ	SE1	PASS
93	SE1	Pass	79	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
102	BRK	Pass
106	BRK	Pass
103	BRK	Pass
105	BRK	Pass
103	BRK	Pass

Destructive No.:	DS-76
Seam Type (Fus/Ext):	Fusion
Seam Number:	29/52
Location:	7'SEOS
Date Seamed	10.5.19
Defect Code:	5T
Machine Number:	M-17Φ7
Welding Tech.:	SD
Machine Temp:	86Φ
Machine Speed:	7
Date Tested:	10.7.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
74	SE1	Pass	9Φ	SE1	PASS
76	SE1	Pass	95	SE1	PASS
71	SE1	Pass	91	SE1	PASS
88	SE1	Pass	9Φ	SE1	PASS
64	SE1	Pass	88	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
97	BRK	Pass
98	BRK	Pass
97	BRK	Pass
101	BRK	Pass
105	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

1788523

J.R. Whiting Ash Pond Closure

Destructive No.:	DS-44B
Seam Type (Fus/Ext):	Fusion
Seam Number:	27/28
Location:	14Φ' WEOS
Date Seamed	10.1.19
Defect Code:	4M
Machine Number:	M-65
Welding Tech.:	RH
Machine Temp:	86Φ
Machine Speed:	7
Date Tested:	10.4.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	DS-44P
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
93	SE1	Pass	101	SE1	PASS
94	SE1	Pass	98	SE1	PASS
91	SE1	Pass	92	SE1	PASS
9Φ	SE1	Pass	91	SE1	PASS
93	SE1	Pass	93	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
11Φ	BRK	Pass
117	BRK	Pass
119	BRK	Pass
122	BRK	Pass
122	BRK	Pass

Destructive No.:	DX-2
Seam Type (Fus/Ext):	~~Fusion~~ EXTRUSION
Seam Number:	28/5M
Location:	2Φ' EEOS
Date Seamed	10.5.19
Defect Code:	5N
Machine Number:	X5Φ
Welding Tech.:	SS
Machine Temp:	5ΦΦ
Machine ~~Speed~~ PREHEAT	5ΦΦ
Date Tested:	10.7.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
75	SE1	Pass	—	SE1	PASS
7Φ	SE1	Pass	—	SE1	PASS
73	SE1	Pass	—	SE1	PASS
76	SE1	Pass	—	SE1	PASS
83	SE1	Pass	—	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
99	BRK	Pass
97	BRK	Pass
101	BRK	Pass
101	BRK	Pass
105	BRK	Pass

1788523

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY
J.R. Whiting Ash Pond Closure

Destructive No.:	DS- 77
Seam Type (Fus/Ext):	Fusion
Seam Number:	49/51
Location:	57' EEOS
Date Seamed	10.5.19
Defect Code:	5W
Machine Number:	M-1793
Welding Tech.:	PF
Machine Temp:	860
Machine Speed:	7.5
Date Tested:	10.7.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
102	SE1	Pass	80	SE1	PASS
87	SE1	Pass	81	SE1	PASS
88	SE1	Pass	75	SE1	PASS
84	SE1	Pass	79	SE1	PASS
89	SE1	Pass	77	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
105	BRK	Pass
109	BRK	Pass
114	BRK	Pass
112	BRK	Pass
115	BRK	Pass

Destructive No.:	DS- 44A
Seam Type (Fus/Ext):	Fusion
Seam Number:	30/31
Location:	12' EEOS
Date Seamed	10.1.19
Defect Code:	4W
Machine Number:	M-65
Welding Tech.:	RH
Machine Temp:	860
Machine Speed:	7
Date Tested:	10.4.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	DS-44N
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
93	SE1	Pass	78	SE1	PASS
90	SE1	Pass	83	SE1	PASS
85	SE1	Pass	81	SE1	PASS
88	SE1	Pass	85	SE1	PASS
89	SE1	Pass	80	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
118	BRK	Pass
120	BRK	Pass
123	BRK	Pass
126	BRK	Pass
126	BRK	Pass

FAILED DESTRUCTIVE SAMPLE TRACKING LOG

PAGE ____ OF ____

PROJECT NUMBER: 1788523 **PROJECT TITLE:** JRW Ash & Chemical Pond Clousure
OWNER: CEC **CONTRACTOR:** Chesapeake
LOCATION: Erie, Mi.

DATE 10.4.19 **DESTRUCTIVE NUMBER** DS-44 **PASSING SAMPLE IN DIRECTION P** DS-44P
MONITOR DH **MACHINE NUMBER** M-65 **PASSING SAMPLE IN DIRECTION N** DS-44N
SEAMER(S) ID RH

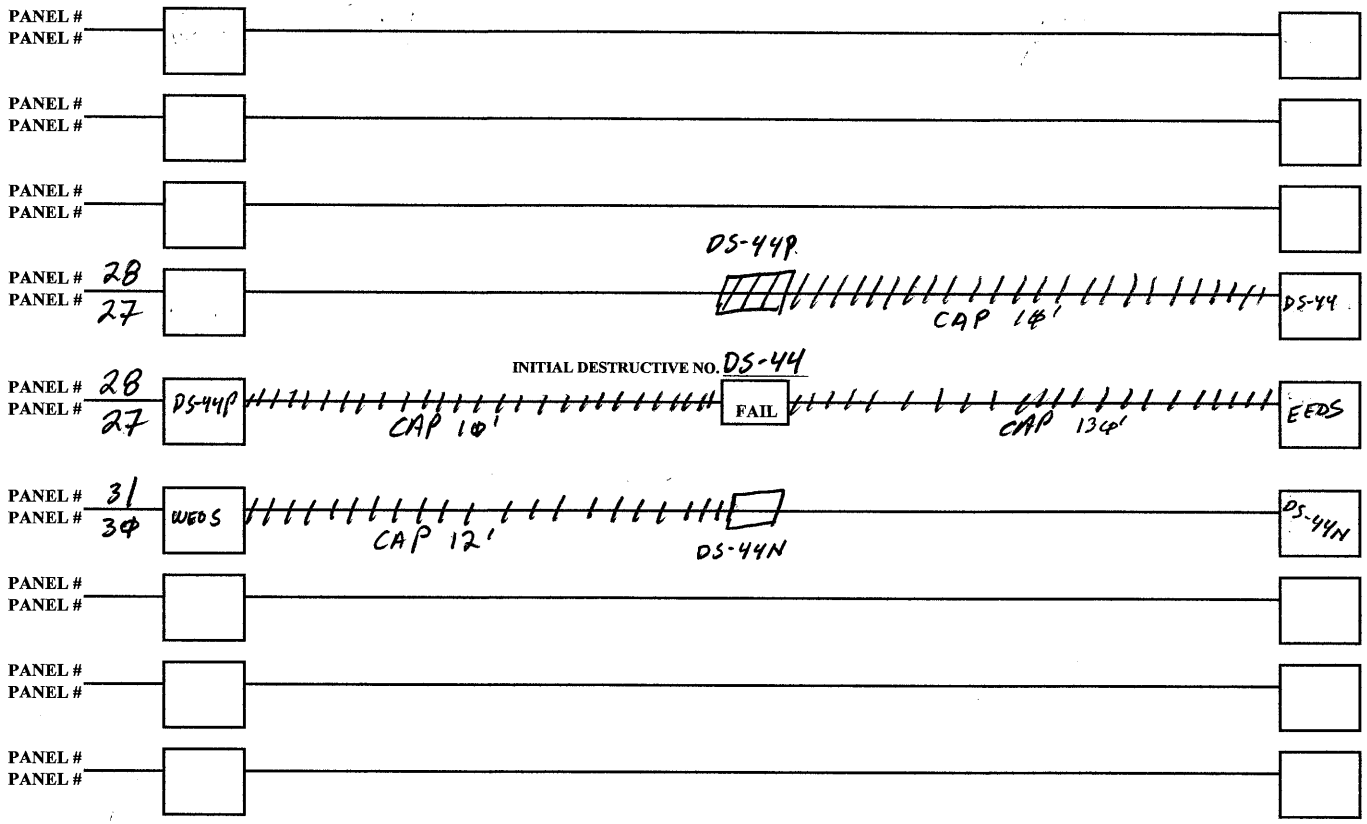
CHRONOLOGICAL SEAMING ORDER		
SEAM OR REPAIR NO.	SEAM DATE	START TIME
27 / 28 SEAMING SHEET # 1 LINE # 2	10.1.19	1425
30 / 31 SEAMING SHEET # 1 LINE # 3	10.1.19	1614
____ / ____ SEAMING SHEET # ____ LINE # ____		
____ / ____ SEAMING SHEET # ____ LINE # ____		
____ / ____ SEAMING SHEET # ____ LINE # ____		
____ / ____ SEAMING SHEET # ____ LINE # ____		
____ / ____ SEAMING SHEET # ____ LINE # ____		
____ / ____ SEAMING SHEET # ____ LINE # ____		
____ / ____ SEAMING SHEET # ____ LINE # ____		

START POINT | ILLUSTRATED RECORD OF DESTRUCTIVE SAMPLE TRACKING AND SEAM RECONSTRUCTION | FINISH POINT

S / E + W / N

DIRECTION OF SEAMING ----->

PANEL # / PANEL #



CONTINUED Y / N SHEET NO. ____

(P) "PREVIOUS" DIRECTION

(N) "NEXT" DIRECTION

CONTINUED? Y / N SHEET NO. ____

NOTE: COMPLETE SEAMING ORDER INFORMATION FROM FIELD SEAMING LOGS. COMPLETE ILLUSTRATION SECTION FROM DIRECT OBSERVATION OF THE SEAMS. ILLUSTRATE FOLLOW-UP DESTRUCTIVE SAMPLES, CAPS AND/OR RECONSTRUCTED SEAMS AND REFERENCE REPAIR NUMBERS.
GOLDER FORM: G21-0699
(JUNE 1999)

REVIEWED BY: TBS DATE: 12-2-19

GOLDER ASSOCIATES INC.

APPENDIX L.2

Extrusion Results

JR Whiting - Ponds 1 and 2
Extrusion Footage

Daily Destructive Sample Summary (Repairs Only)

Machine	Date	Destruct Needed (Yes/No)	Destruct Number	Comments
X-1715	8/15/19	No	-	No repair greater than 10' on this day
X-40	8/17/19	No	-	No repair greater than 10' on this day
X-1715	8/17/19	No	-	No repair greater than 10' on this day
X-40	8/20/19	No	DX-1	No repair greater than 10' on this day
X-50	9/30/19	No	-	No repair greater than 10' on this day
X-35	9/30/19	No	-	No repair greater than 10' on this day
X-50	10/1/19	No	-	No repair greater than 10' on this day
X-50	10/4/19	No	-	No repair greater than 10' on this day
X-50	10/5/19	Yes	DX-2	Repair greater than 10' (5M 140')
X-35	10/7/19	Yes	DX-3	Repair greater than 10' (7F 20')
X-50	10/7/19	No	-	No repair greater than 10' on this day

Please note that all extrusion welding for this project was performed on repairs.

GEOMEMBRANE SEAM DESTRUCTIVE SAMPLE LOG

PROJECT NUMBER: 1788523 **PROJECT TITLE:** JRW Ash & Chemical Pond Clousure
OWNER: CEC **CONTRACTOR:** Chesapeake
LOCATION: Erie, Mi.

SHEET NUMBER 2

	DESTRUCTIVE SAMPLE NUMBER	DESTRUCTIVE SEAM NUMBER	MACHINE NUMBER	DATE REMOVED	FIELD TEST RESULTS PEEL (PASS/FAIL)	FIELD TEST RESULTS SHEAR (PASS/FAIL)	MON.	DATE SHIPPED	LAB TEST STATUS (PASS/FAIL)	DATE OF NOTIFICATION	REMARKS
1	DS-21	13 114	1741	8 1171 19	P	P	DH	8 1171 19	P	8 1221 19	
2	DS-22	14 115	58	8 1171 19	P	P	DH	8 1171 19	P	8 1221 19	
3	DS-23	14 115	58	8 1171 19	P	P	DH	8 1171 19	P	8 1221 19	
4	DS-24	15 116	1734	8 1171 19	P	P	DH	8 1171 19	P	8 1221 19	
5	DS-25	16 117	1741	8 1171 19	P	P	DH	8 1171 19	P	8 1221 19	
6	DS-26	16 117	1741	8 1171 19	P	P	DH	8 1171 19	P	8 1221 19	
7	DS-27	17 118	1734	8 1171 19	P	P	DH	8 1171 19	P	8 1221 19	
8	DS-28	17 118	1734	8 1171 19	P	P	DH	8 1171 19	P	8 1221 19	
9	DS-29	18 119	58	8 1171 19	P	P	DH	8 1171 19	P	8 1221 19	
10	DS-30	19 120	1741	8 1171 19	P	P	DH	8 1171 19	P	8 1221 19	
11	DS-31	20 121	1734	8 1171 19	P	P	DH	8 1171 19	P	8 1221 19	
12	DS-32	21 122	58	8 1171 19	P	P	DH	8 1171 19	P	8 1221 19	
13	DS-33	21 122	58	8 1171 19	P	P	DH	8 1171 19	P	8 1221 19	
14	DS-34	22 123	58	8 1201 19	P	P	DH	8 1201 19	P	8 1221 19	
15	DS-35	23 124	1741	8 1201 19	P	P	DH	8 1201 19	P	8 1221 19	
16	DS-36	23 124	1741	8 1201 19	P	P	DH	8 1201 19	P	8 1221 19	
17	DS-37	24 125	1734	8 1201 19	P	P	DH	8 1201 19	P	8 1221 19	
18	DS-38	23 124	1741	8 1201 19	P	P	DH	8 1201 19	P	8 1221 19	
19	DX-1	— 1 —	X4Φ	8 1201 19	P	P	DH	8 1201 19	P	8 1221 19	TRIAL WELD
20	DS-39	25 126	1743	8 1201 19	P	P	DH	8 1201 19	P	8 1221 19	

REVIEWED BY: PS **DATE:** 12-2-15

GOLDER FORM: G20-0699
(JUNE 1999)

GOLDER ASSOCIATES INC.

GEOMEMBRANE SEAM DESTRUCTIVE SAMPLE LOG

PROJECT NUMBER: 1788523 **PROJECT TITLE:** JRW Ash & Chemical Pond Clousure
OWNER: CEC **CONTRACTOR:** Chesapeake
LOCATION: Erie, Mi.

SHEET NUMBER 5

	DESTRUCTIVE SAMPLE NUMBER	DESTRUCTIVE SEAM NUMBER	MACHINE NUMBER	DATE REMOVED	FIELD TEST RESULTS PEEL : SHEAR (PASS/FAIL)	MON.	DATE SHIPPED	LAB TEST STATUS (PASS/FAIL)	DATE OF NOTIFICATION	REMARKS
1	DX-2	28 15M	X5Φ	1Φ 17 19	P : P	DH	1Φ 17 19	P	1Φ 19 19	CAP STRIP
2	DX-3	31 17F	X35	1Φ 17 19	P : P	DH	1Φ 17 19	P	1Φ 19 19	CAP STRIP
3		/		/ /	:		/ /		/ /	
4		/		/ /	:		/ /		/ /	
5		/		/ /	:		/ /		/ /	
6		/		/ /	:		/ /		/ /	
7		/		/ /	:		/ /		/ /	
8		/		/ /	:		/ /		/ /	
9		/		/ /	:		/ /		/ /	
10		/		/ /	:		/ /		/ /	
11		/		/ /	:		/ /		/ /	
12		/		/ /	:		/ /		/ /	
13		/		/ /	:		/ /		/ /	
14		/		/ /	:		/ /		/ /	
15		/		/ /	:		/ /		/ /	
16		/		/ /	:		/ /		/ /	
17		/		/ /	:		/ /		/ /	
18		/		/ /	:		/ /		/ /	
19		/		/ /	:		/ /		/ /	
20		/		/ /	:		/ /		/ /	

REVIEWED BY: BS **DATE:** 12-2-19

GOLDER FORM: G20-0699
(JUNE 1999)

GOLDER ASSOCIATES INC.

SUMMARY OF DESTRUCTIVE TEST RESULTS
EXTRUSION METHOD
ASTM D6392

CEC
WHITING PONDS 1 & 2 CQA
MICHIGAN

SAMPLE NUMBER	SHEAR STRENGTH (ppi)	SHEAR BREAK CODE (1)	PEEL STRENGTH (ppi)	PEEL BREAK CODE (1)	REMARKS
DX-1	97.1	BRK 2	99.6	SE 3	
	100.0	BRK 1	88.9	BRK 2	PASS
	100.3	BRK 2	97.5	SE 2	
	102.1	BRK 2	105.9	BRK 2	
	103.9	BRK 1	98.9	BRK 2	
DX-2	103.3	BRK 1	85.5	SE 3	
	104.3	BRK 1	71.0	SE 3	PASS
	102.6	BRK 1	79.6	SE 3	
	101.9	BRK 1	76.0	SE 3	
	102.8	BRK 2	85.7	SE 3	
DX-3	104.2	BRK 2	72.4	SE 3	
	104.5	BRK 2	75.3	SE 3	PASS
	104.1	BRK 2	81.8	SE 3	
	102.9	BRK 2	81.8	SE 3	
	102.1	BRK 2	80.5	SE 3	
-	-	-	-	-	-
	-	-	-	-	
	-	-	-	-	
	-	-	-	-	
	-	-	-	-	
-	-	-	-	-	-
	-	-	-	-	
	-	-	-	-	
	-	-	-	-	
	-	-	-	-	
-	-	-	-	-	-
	-	-	-	-	
	-	-	-	-	
	-	-	-	-	
	-	-	-	-	
-	-	-	-	-	-
	-	-	-	-	
	-	-	-	-	
	-	-	-	-	
	-	-	-	-	

(1) BREAK CODES BASED ON MODES ILLUSTRATED IN ASTM D6392.

DESUM

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

1788523

J.R. Whiting Ash Pond Closure

Destructive No.:	DX-1
Seam Type (Fus/Ext):	Extrusion
Seam Number:	TRIAL WELD
Location:	NA
Date Seamed	8.20.19
Defect Code:	NA
Machine Number:	X4Φ
Welding Tech.:	AR
Machine Temp:	55Φ
Machine Speed: PREHEAT	5ΦΦ
Date Tested:	8.20.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
84	SE1	Pass	—	—	—
82	SE1	Pass	—	—	—
85	SE1	Pass	—	—	—
85	SE1	Pass	—	—	—
83	SE1	Pass	—	—	—

SHEAR		
Strength	Break Code	Pass / Fail
91	BRK	Pass
87	BRK	Pass
8Φ	BRK	Pass
88	BRK	Pass
88	BRK	Pass

Destructive No.:	
Seam Type (Fus/Ext):	
Seam Number:	
Location:	
Date Seamed	
Defect Code:	
Machine Number:	
Welding Tech.:	
Machine Temp:	
Machine Speed:	
Date Tested:	
Tested By:	
Checked By:	
Comments:	
Pass/Fail:	

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail

SHEAR		
Strength	Break Code	Pass / Fail

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

1788523

J.R. Whiting Ash Pond Closure

Destructive No.:	DS-44B
Seam Type (Fus/Ext):	Fusion
Seam Number:	27/28
Location:	14Φ' WEOS
Date Seamed	10.1.19
Defect Code:	4M
Machine Number:	M-65
Welding Tech.:	RH
Machine Temp:	86Φ
Machine Speed:	7
Date Tested:	10.4.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	DS-44P
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
93	SE1	Pass	101	SE1	PASS
94	SE1	Pass	98	SE1	PASS
91	SE1	Pass	92	SE1	PASS
9Φ	SE1	Pass	91	SE1	PASS
93	SE1	Pass	93	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
11Φ	BRK	Pass
117	BRK	Pass
119	BRK	Pass
122	BRK	Pass
122	BRK	Pass

Destructive No.:	DX-2
Seam Type (Fus/Ext):	~~Fusion~~ EXTRUSION
Seam Number:	28/5M
Location:	2Φ' EEOS
Date Seamed	10.5.19
Defect Code:	5N
Machine Number:	X5Φ
Welding Tech.:	SS
Machine Temp:	5ΦΦ
Machine ~~Speed~~ PREHEAT	5ΦΦ
Date Tested:	10.7.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	**PASS**

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
75	SE1	Pass	—	SE1	PASS
7Φ	SE1	Pass	—	SE1	PASS
73	SE1	Pass	—	SE1	PASS
76	SE1	Pass	—	SE1	PASS
83	SE1	Pass	—	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
99	BRK	Pass
97	BRK	Pass
101	BRK	Pass
101	BRK	Pass
105	BRK	Pass

HDPE GEOMEMBRANE DESTRUCTIVE TESTING SUMMARY

1788523

J.R. Whiting Ash Pond Closure

Destructive No.:	Dx-3
Seam Type (Fus/Ext):	~~Fusion~~ EXTRUSION
Seam Number:	31/7F
Location:	WEOS
Date Seamed	10.7.19
Defect Code:	7G
Machine Number:	X35
Welding Tech.:	RH
Machine Temp:	500
Machine ~~Speed~~ PREHEAT	450
Date Tested:	10.7.19
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	PASS

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
81	SE1	Pass	—	SE1	PASS
75	SE1	Pass	—	SE1	PASS
79	SE1	Pass	—	SE1	PASS
78	SE1	Pass	—	SE1	PASS
70	SE1	Pass	—	SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
100	BRK	Pass
99	BRK	Pass
105	BRK	Pass
105	BRK	Pass
107	BRK	Pass

Destructive No.:	
Seam Type (Fus/Ext):	Fusion
Seam Number:	
Location:	
Date Seamed	
Defect Code:	
Machine Number:	
Welding Tech.:	
Machine Temp:	
Machine Speed:	
Date Tested:	
Tested By:	Cheasapeake
Checked By:	David Hutchinson
Comments:	
Pass/Fail:	PASS

Note: See Seaming Observation Summary and Trial Seam Summary for abbreviations.

PEEL					
Inside			Outside		
Strength	Break Code	Pass / Fail	Strength	Break Code	Pass / Fail
	SE1	Pass		SE1	PASS
	SE1	Pass		SE1	PASS
	SE1	Pass		SE1	PASS
	SE1	Pass		SE1	PASS
	SE1	Pass		SE1	PASS

SHEAR		
Strength	Break Code	Pass / Fail
	BRK	Pass
	BRK	Pass
	BRK	Pass
	BRK	Pass
	BRK	Pass

APPENDIX M

Stormwater System Information

Baughman Tile Co.
Pioneers in the Drainage Industry

Poly Smooth-Line®
4" I.D. (100mm)

Baughman Tile Company F477 Joint Installation Guidelines

Poly Smooth-Line F477 pipe is produced with a bell-and-spigot connection using an ASTM F477 gasket. To make certain that the product performs to expectation, it is crucial that the joint is assembled properly. Please use the following guidelines to obtain a quality bell-and-spigot joint. Failure to adhere to these guidelines can result in a poor performing joint and jeopardize the quality of the drainage system.

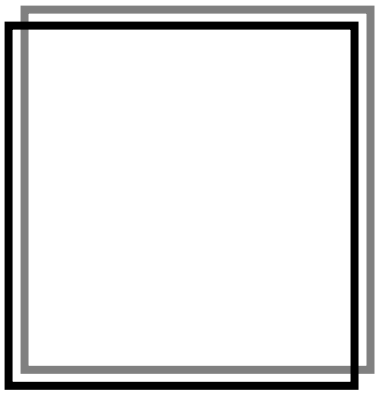
Bell-and-Spigot Joint Assembly Guidelines:

* Pipe shall be lowered into the trench by hand or by the use of excavating equipment utilizing a nylon sling.
* Inspect the bell portion of the pipe for any cracks or visible defects, clean the bell to remove any foreign material.
* Spray a generous layer of gasket lubricant (available from BTC) onto the inside portion of the bell. Use a clean rag to ensure that the lubricant is properly distributed.
* Inspect the spigot portion of the pipe and clean the spigot to remove any foreign material
* Remove the protective wrap from around the gasket and dispose of properly.
* Inspect the gasket to ensure there are no cracks, gashes, or visible defects.
* Inspect the gasket to ensure it is properly seated in the gasket groove. Looking down the pipe in the direction of the spigot, the white lettering on the gasket should be facing you and easily visible.
* Spray a generous layer of gasket lubricant (available from BTC) onto the exposed gasket. Use a clean rag to ensure that the lubricant is properly and evenly distributed.
* After inside of bell and the spigot are lubricated, DO NOT allow these sections to contact dirt or backfill. Foreign matter could stick and compromise the joint integrity.
* Place spigot into bell and align. It is important that the spigot end of the pipe is always pushed into the bell portion of the pipe. Pushing bell end onto spigot could compromise the joint integrity.
* Smaller diameter pipe (up to 24") can usually be joined by hand installation. For larger diameters, it may be necessary to use a bar or other equipment to push the joint together. If a bar or additional equipment is used, a installation hub (which can be purchased from BTC or made from a spigot end of the pipe) should be used to prevent damage to the bell.
* When pushing the spigot into the bell, be sure that the bedding material or any other foreign material does not enter the bell. Foreign matter can compromise the joint integrity.

These installation guidelines are provided as a guide for the proper installation of Poly Smooth-Line F477 joints. These do not replace standard industry or project specifications. As with all Baughman Tile Company products, it is important that all products are installed according to all OSHA and local safety standards. For more information on safe work practices, reference the OSHA website at www.osha.gov. For more information on installing corrugated polyethylene pipe, reference the PPI/CPPA installation technical booklet, ASTM and AASHTO installation standards, and other industry benchmarks.

Baughman Tile Co.
Pioneers in the Drainage Industry

Filter Wrapped Tubing
specification sheet



Geotextile Sock:

Material	polyester
Product Class	ASTM D6707
Weight (oz./yd^2)	3.5
Puncture Resistance	35
Puncture Strength 50mm P	180
Mullen Burst, p.s.I. (kpa)	100
Water Permeability	2.4 s (-1)
AOS, US sieve, (UM)	30 (600)
UV Degradation Strength Retained	50% after 500 hrs

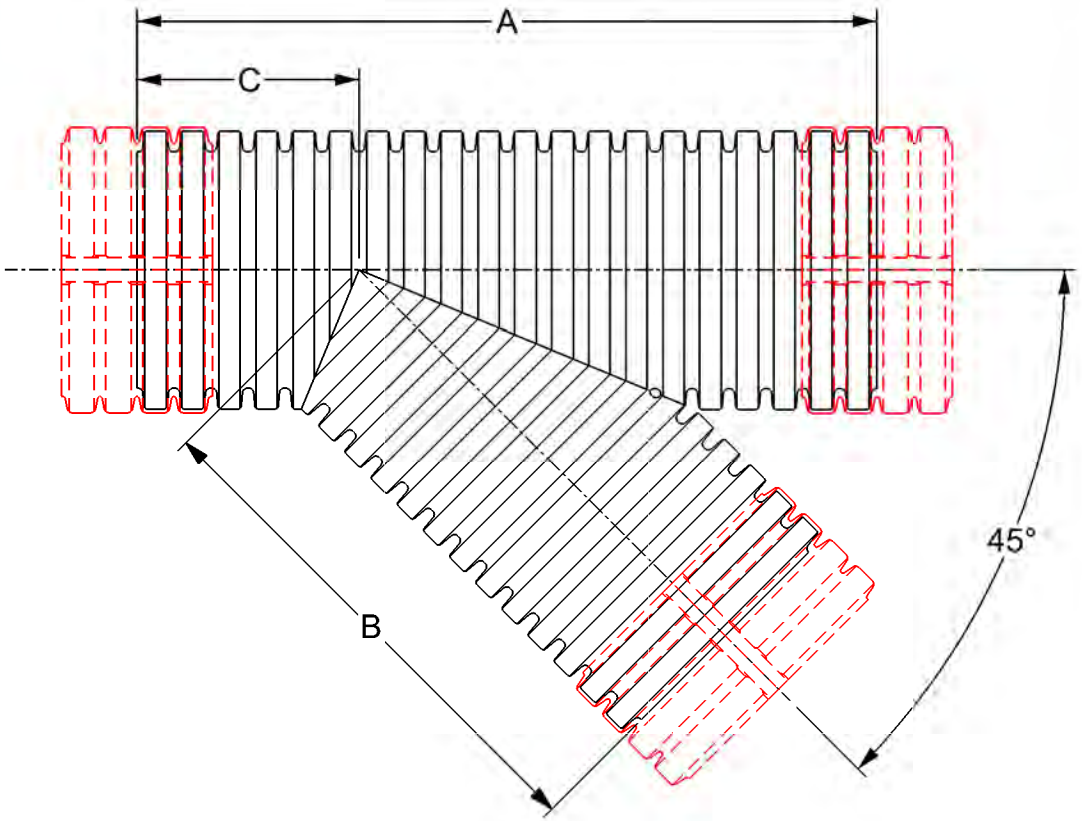
Baughman Tile Company
8516 Twp. Rd. 137 Paulding, OH 45879 (419) 399-3160

Standard Perforation Patterns

AASHTO Class II Perforation

The following terminology for perforations is derived from the applicable AASHTO specification. Differences between the specifications are covered in the table below. Class II perforations shall be located in the outside valleys of the corrugations, be circular and/or slotted and evenly spaced around the circumference and length of the pipe. The perforations shall be located in the outside valleys of the corrugations. The water inlet area shall be no less than 0.945 in^2/ft (20 cm^2/m) for pipe diameters 4- through 10-inch (100 - 250mm), 1.42 in^2/ft (30 cm^2/m) for pipe diameters 12- through 18-inch (300 - 450 mm) and 1.89 in^2/ft (40 cm^2/m) for pipe diameters larger than and equal to 24 inches (600 mm). Table 1 below represents ADS standard perforation patterns for AASHTO Class II.

Nominal I.D.		Perforation Type	Maximum Slot Length or Diameter		Maximum Slot Width		Minimum Inlet Area	
in	mm		in	mm	in	mm	in^2/ft	cm^2/m
4	100	Slot	0.875	22	0.125	3	1.0	21
6	150	Slot	0.875	22	0.125	3	1.0	21
8	200	Slot	1.18	30	0.125	3	1.0	21
10	250	Slot	1.18	30	0.125	3	1.0	21
12	300	Circular	0.313	8	-	-	1.5	32
15	375	Circular	0.313	8	-	-	1.5	32
18	450	Circular	0.313	8	-	-	1.5	32
24	600	Circular	0.313	8	-	-	2.0	42
30	750	Circular	0.375	9.5	-	-	2.0	42
36	900	Circular	0.375	9.5	-	-	2.0	42
42	1050	Circular	0.375	9.5	-	-	2.0	42
48	1200	Circular	0.375	9.5	-	-	2.0	42
54	1350	Circular	0.375	9.5	-	-	2.0	42
60	1500	Circular	0.375	9.5	-	-	2.0	42



Size	A	B	C	Item
	Inch	Inch	Inch	Code
4"	13	9 1/8	3 7/8	F04DWWYE
6"	18 1/4	13 1/8	5 1/8	F06DWWYE
8"	22 1/4	16 1/2	5 7/8	F08DWWYE
10"	29 1/8	21 7/8	7 1/4	F10DWWYE
12"	38 3/4	27 1/8	11 5/8	F12DWWYE
15"	46 1/2	34 7/8	11 5/8	F15DWWYE
18"	52 3/8	37 7/8	14 1/2	F18DWWYE
24"	58 1/4	43 5/8	14 1/2	F24DWWYE
30"	73 3/4	54 3/8	19 3/8	F30DWWYE
36"	81 7/8	62 3/8	19 1/2	F36DWWYE
42"	98	72 1/4	25 3/4	F42DWWYE
48"	108 1/4	82 1/2	25 3/4	F48DWWYE

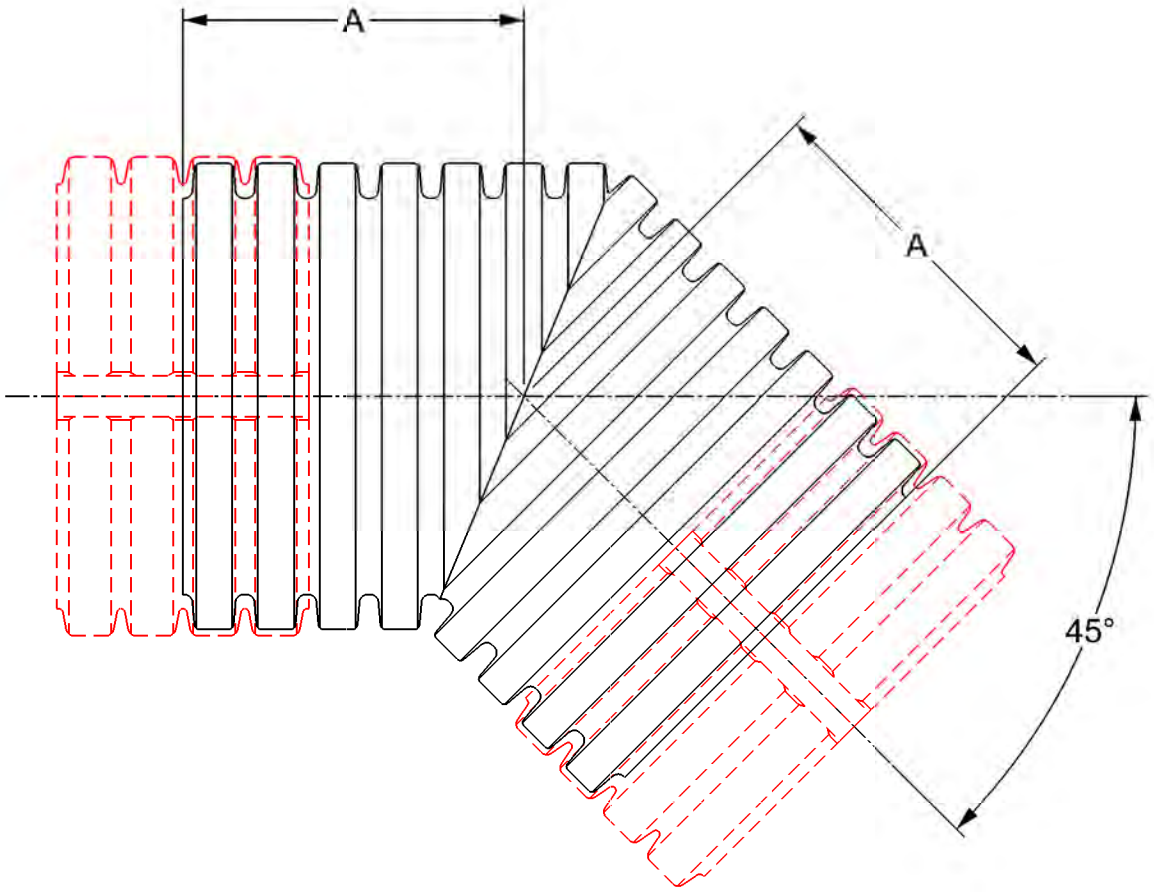
Dimensions shown are for reference only.

Baughman Tile Co.
Pioneers in the Drainage Industry

TITLE Dual Wall Wye - Plain End External

DRAWN BY JS

DATE 4-4-14



Size	A
	Inch
4"	4 1/2
6"	5 1/8
8"	6 3/4
10"	8 3/4
12"	10 5/8
15"	13 1/8
18"	15 1/2
24"	17 1/2
30"	23 1/4
36"	23 3/8
42"	31"
48"	31"

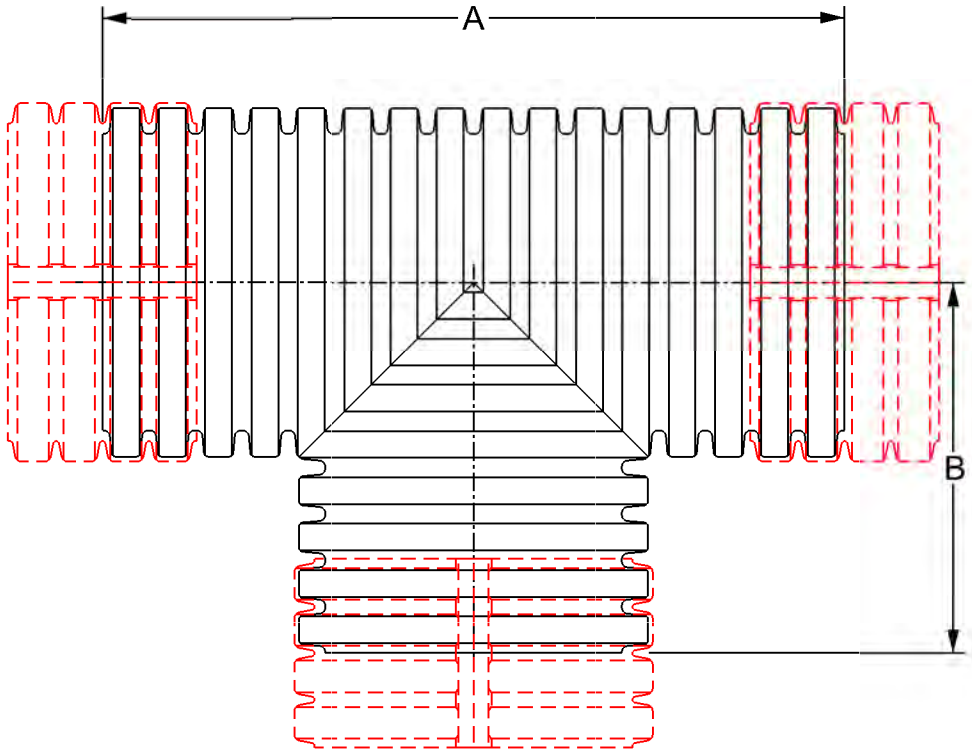
Baughman Tile Co.
BTC Pioneers in the Drainage Industry

TITLE 45° Elbow - DWP

PART No.

DRAWN BY JS

DATE 4-8-14



Size	A	B	Item Code
	Inch	Inch	
4"	11 3/4	5 7/8	F04DWTEE
6"	16 1/8	8	F06DWTEE
8"	17 1/2	8 3/4	F08DWTEE
10"	23 1/4	11 5/8	F10DWTEE
12"	31	15 1/2	F12DWTEE
15"	34 7/8	17 1/2	F15DWTEE
18"	40 3/4	20 3/8	F18DWTEE
24"	46 3/8	23 1/4	F24DWTEE
30"	62 1/8	31	F30DWTEE
36"	62 3/8	31 1/4	F36DWTEE
42"	82 1/2	41 1/4	F42DWTEE
48"	92 7/8	46 3/8	F48DWTEE

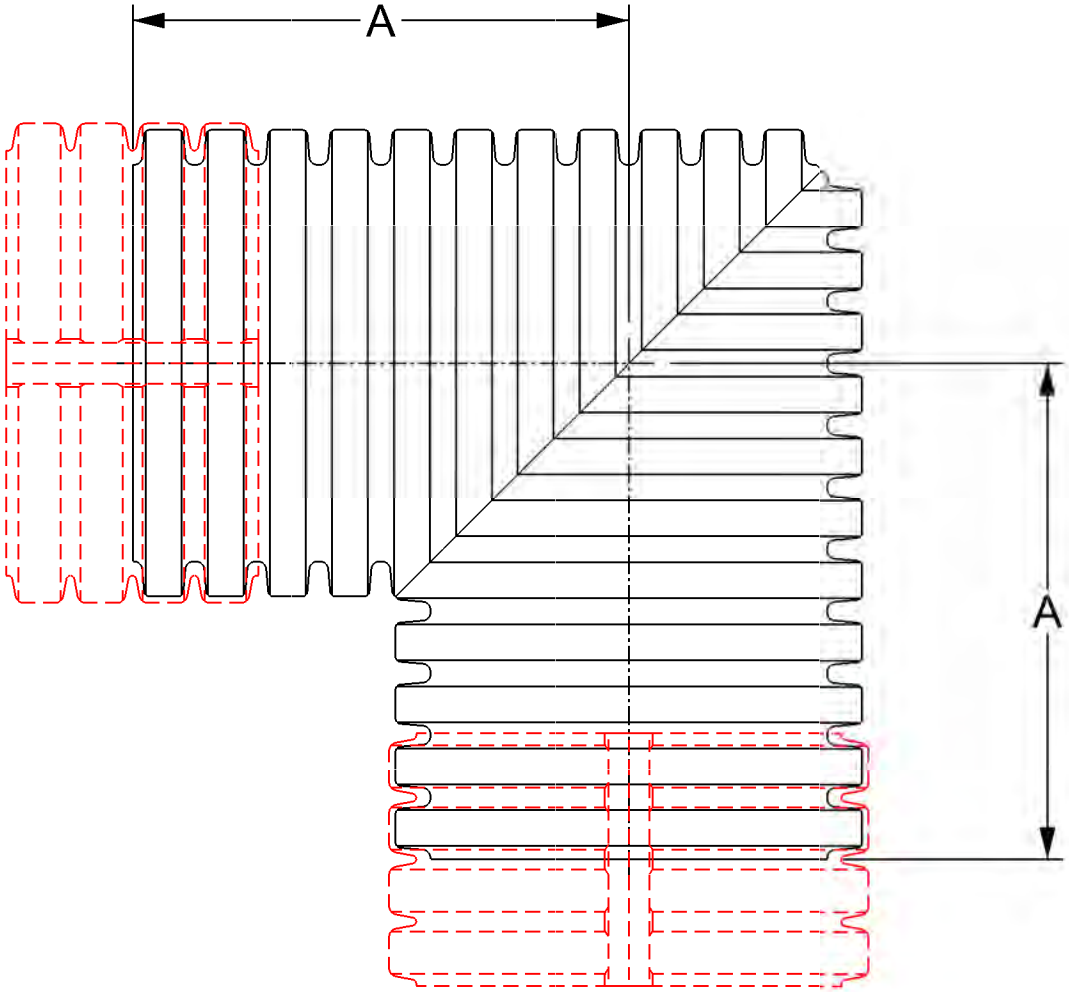
Dimensions shown are for reference only.

Baughman Tile Co.
Pioneers in the Drainage Industry

TITLE Dual Wall Tee - Plain End External

DRAWN BY JS

DATE 4-2-14



Size	A
	Inch
4"	6 1/8
6"	7 1/4
8"	9 3/4
10"	11 5/8
12"	15 1/2
15"	20 3/8
18"	23 1/4
24"	27 5/8
30"	34 7/8
36"	35 1/8
42"	41 1/4
48"	46 3/8

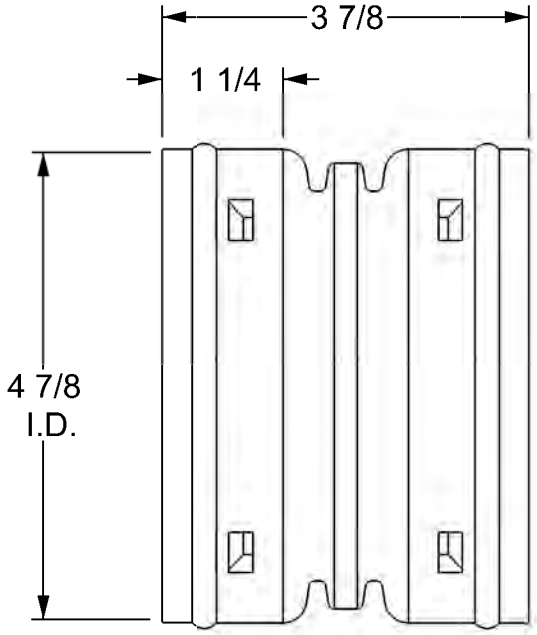
Baughman Tile Co.
BTC Pioneers in the Drainage Industry

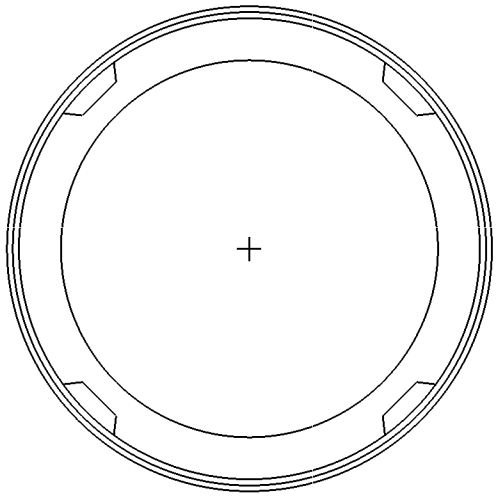
TITLE 90° Elbow - DWP

PART No.

DRAWN BY JS

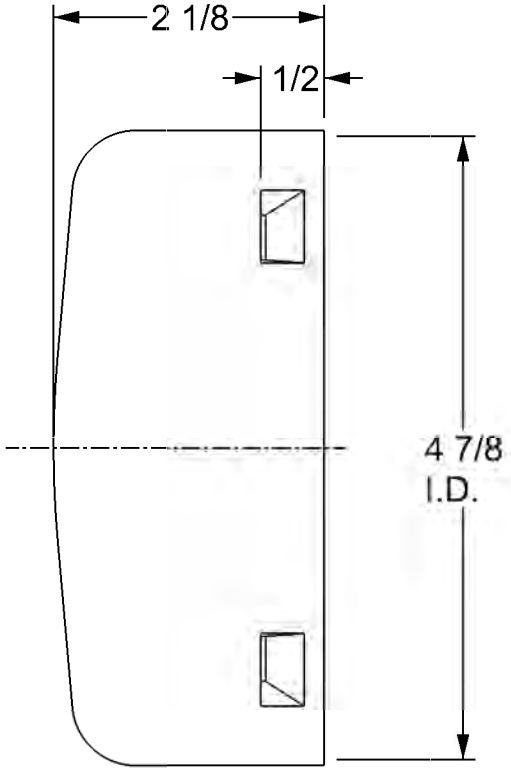
DATE 4-8-14

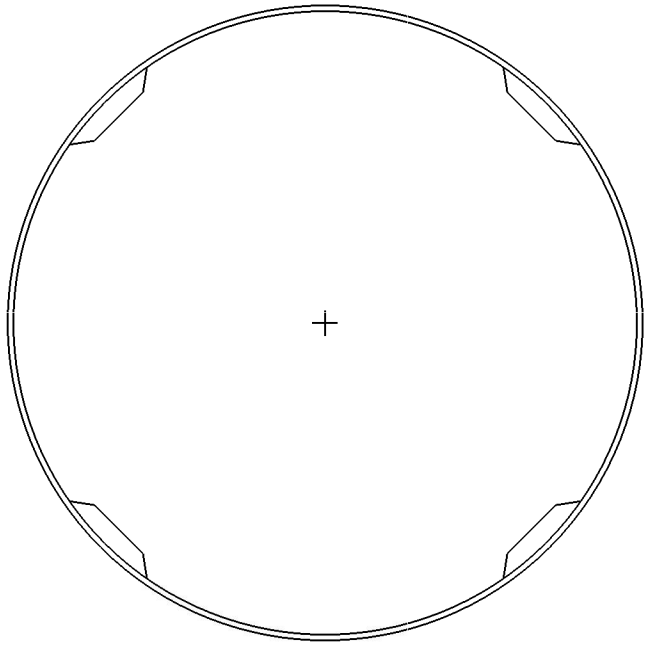


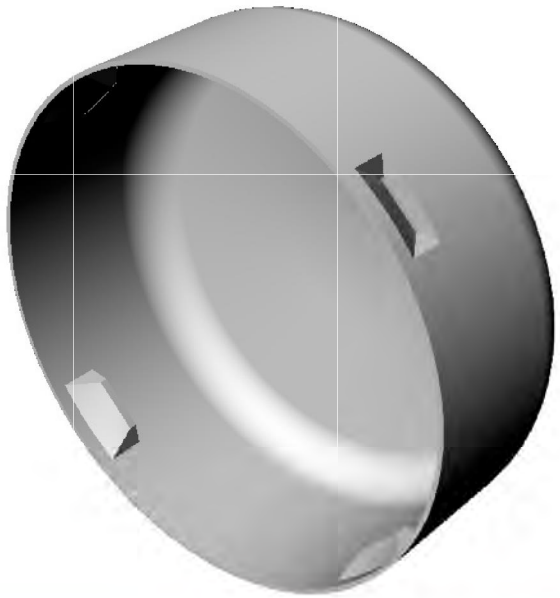


Baughman Tile Co.
Pioneers in the Drainage Industry

TITLE	4" (100 mm) Double Bell Coupler
PART No.	F04DBLBELL
DRAWN BY	JS
DATE	1-14-14

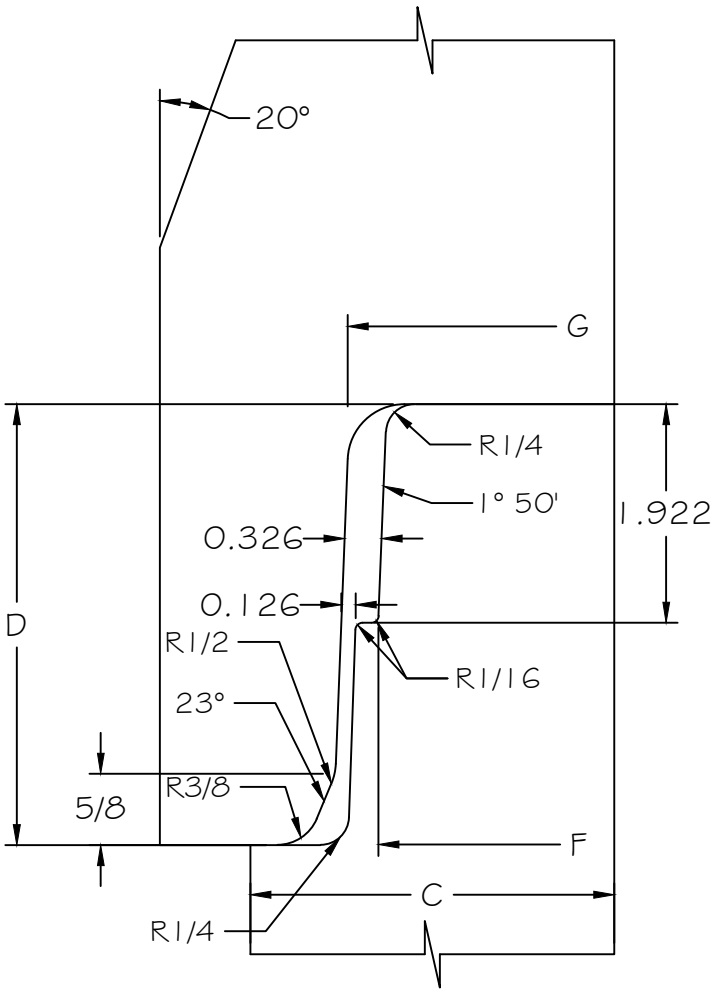




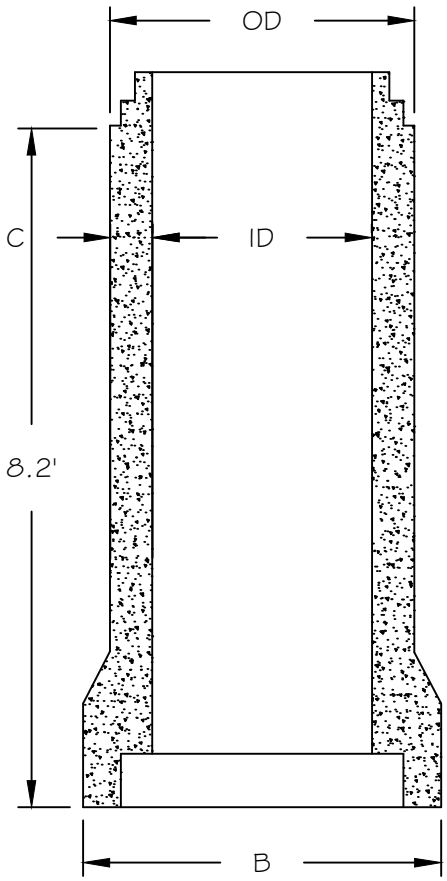


Baughman Tile Co.
Pioneers in the Drainage Industry

TITLE	4" (100 mm) End Cap
PART No.	F04ENDCAP
DRAWN BY	JS
DATE	7-31-14



RCP JOINT DETAIL



RCP CROSS SECTION

PIPE SIZE		DELL OD	WALL THICKNESS	SPIGOT LENGTH		GASKET SURFACE DIA.	BELL ID
ID	OD	B	C	D	E	F	G
12	17.5	20	2.75	3.562	1.640	14.722	15.251
15	21.0	23.875	3.00	3.562	1.640	18.222	18.751
18	24.5	27.625	3.25	3.750	1.828	21.847	22.375
21	28	31.625	3.50	3.750	1.828	25.347	25.876
24	31.5	35.625	3.75	3.875	1.953	28.854	29.383
27	35	39.625	4.00	3.875	1.953	32.319	32.848
30	38.5	40.875	4.25	3.875	1.953	34.339	34.868
36	45.5	48.375	4.75	3.875	1.953	40.839	41.368

NOTES:
1- Manufactured in accordance with ASTM C76 specifications
2- All dimensions are in inches, unless otherwise shown
3. Superseal gaskets manufactured in accordance with ASTM C443 specifications

Co-Pipe Products, Inc.
20501 GODDARD ROAD, TAYLOR, MI 48180
TEL: 1.800.521.3514, (734) 287-1000
FAX: (734) 287-8132
WWW.copipe.com

RCP JOINT DETAIL (12" TO 36")

SCALE: NTS

DATE: OCT.16.2019

APPENDIX N

Seed, Fertilizer, and Mulch Information

Date: 9-24-19

Sold: NERC

Federal:

Shipped To: The Yard

State:

Project No. **#3909**

Job No. **JR Whiting - Pond 1, 2, & CT Pond, Monroe County**

Name of Seed Mixture: **MDOT TUF MODIFIED ROADSIDE SEED MIX**

Wgt/Kgs Per. Bag 50#/22.68

Total Wgt/Kgs 6,000# /2,721.6

Sales Order:

Lot Number: LC-19-03222-19-05

MDOT TUF MODIFIED ROADSIDE SEED MIX

40%	Ruddy Creeping Red Fescue
20%	Sideways Perennial Ryegrass
20%	Eureka II Hard Fescue
10%	SR2100 Kentucky Bluegrass
10%	Fults Puccinella Distans

La Crosse Seed LLC certifies that all varieties and percentages of seeds to be used in this mixture conforms to all requirements and specifications of the Michigan Department of State Highways and Transportation, or Michigan Department of Aeronautics whichever is applicable.

Signed By: _____

NERC
Natural
Environmental
Reclamation
Concepts, Inc.

September 24, 2019

Re: Project: 3909 - JR Whiting

To Whom It May Concern:

N.E.R.C., Inc. is listing that they will be using MDOT Spec Number: 917.10 24-14-14 Fertilizer. This product will be used at JR Whiting - Pond 1, 2, & CT Pond, Monroe County in Erie, Michigan. We plan on using approximately 10,000 lbs. The 24-14-14 Fertilizer will be purchased from SiteOne Landscape Supply. Please see attached data sheet.

We certify that the following described material has been tested and meets the specification requirements of the Michigan Department of Transportation and ASTM, AASHTO or MDOT Specifications.

Feel free to contact me if you have any questions.

Best Regards,

Ashley M. Sholtis

Ashley M. Sholtis
Office Manager, Officer

143 WEST MAIN • P. O. BOX 70 • HANOVER, MICHIGAN 49241
(517) 563-2898 • FAX (517) 563-2899
NERC@PLANTINGPROS.COM

TCS GrowStar® for greener, healthier turf

Professional Starter Fertilizer

24-14-14

COVERAGE: 50 pounds of *TCS GrowStar®* 24-14-14 Starter Fertilizer covers 12,020 sq. ft. at the application rate of 1 LB. of nitrogen (4.16 pounds of fertilizer) per 1,000 sq. ft.

GUARANTEED ANALYSIS

TOTAL NITROGEN (N).....24.0%
5.5% Ammoniacal Nitrogen
18.5% Urea Nitrogen*
AVAILABLE PHOSPHATE (P_2O_5).....14.0%
SOLUBLE POTASH (K_2O).....14.0%
DERIVED FROM: Ammonium Phosphate, Muriate of Potash, Polymer Sulfur-Coated Urea, Urea
CHLORINE (Cl).....10.5%
*8.6% Slowly Available Nitrogen from Polymer Sulfur-Coated Urea

DIRECTIONS FOR USE: This TCS product is a professional quality starter fertilizer. Its suitability for use in any given application depends on existing soil chemistry, turf type, and intended use of the turf area. The best results with this product are obtained when it is applied to newly seeded or sodded grass, and watered into the turf soon after application. Avoid mowing immediately following application to prevent pick-up. Application with rotary or pendulum spreaders is recommended for uniform distribution. The use of a drop spreader is not recommended. Consult your spreader manual or spreader manufacturer to determine spreader settings to achieve application rates desired. You may need to adjust the setting depending on the walking speed, spreader condition, and product.

Do not apply near water, storm drains or drainage ditches. Do not apply if heavy rain is expected. Apply this product only to your lawn, and sweep any product that lands on the driveway, sidewalk, or street back onto your lawn. This product may stain driveways, walkways, streets, porches, and other non-target areas. Do not apply to frozen ground.

For use when establishing new lawns, repairing lawns, or when a soil test indicates a phosphorus deficiency.

For Professional Use

WARRANTY

Turf Care Supply Corp. warrants that this product conforms to the analysis on its label. When used in accordance with label directions, under normal conditions, this product is reasonably fit for its intended purposes. Since time, method of application, weather, plant and soil conditions, mixture with other chemicals, and other factors affecting the use of this product are beyond our control, no warranty is given concerning the use of this product contrary to label directions or under conditions which are abnormal or not reasonably foreseeable. The user assumes all risks of any such use.

Information concerning the raw materials contained in this product can be obtained by writing to: Turf Care Supply, Attn: EHS / 50 Pearl Road, Suite 200 / Brunswick, Ohio 44212, referring to the item number found on this bag.

If this product is being sold in a state requiring the publication of information regarding its metal content, information regarding the contents and levels of metals in this product is available at the following website: http://www.aapfco.org/metals.htm.

⚠ WARNING - KEEP OUT OF THE REACH OF CHILDREN

Causes eye irritation. Causes skin irritation. Harmful if inhaled. Harmful if swallowed. Wear protective gloves and other clothing to prevent exposure. Wash thoroughly after handling. Avoid breathing dust. Use only outdoors or in a well-ventilated area. Keep container tightly closed. **IF ON SKIN:** Wash with plenty of water. Take off contaminated clothing and wash before reuse. If skin irritation occurs, get medical advice/attention. **IF IN EYES:** Rinse cautiously, with plenty of water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists, get medical advice/attention. **IF INHALED:** Remove person to fresh air and keep comfortable for breathing. Call a **POISON CENTER** or doctor if you feel unwell. If medical advice is needed, have product container or label at hand. Dispose of contents by utilizing as directed on this label, or call your local solid waste agency for disposal instructions. Dispose of empty container, out of reach of children. **Storage:** Store in original container, out of reach of children.

F1612 **Net Weight 50 lbs. (22.67 kg)**

Manufactured by: Turf Care Supply Corp.
50 Pearl Road, Suite 200 • Brunswick, OH 44212

#903845

8 10007 35154 4

TurfCare™ supply corp.

SAFETY DATA SHEET
TCS Growstar Starter Fertilizer

Printed: 04/11/2018
Revision: 04/11/2018

1. Product and Company Identification

1622SDS

Product Code: 903845

Product Name: TCS Growstar Starter Fertilizer

Company Name: Turf Care Supply Corp.
50 Pearl Road
Suite 200
Brunswick, OH 44212

Phone Number: 1 (330)558-0910

Web site address: www.turfcaresupply.com

Email address: regaffairs@tcscusa.com

Emergency Contact Information: PERS
Turf Care Supply Corp.

1 (800)633-8253
1 (330)558-0910

Synonyms: Granular Fertilizer

2. Hazards Identification

Acute Toxicity: Oral, Category 4

GHS Signal Word: Warning

GHS Hazard Phrases: Harmful if swallowed.
Causes skin irritation. Causes serious eye irritation. May cause repiratory irritation.
May cause damage to respiratory system and lungs through prolonged or repeated exposure.

GHS Precaution Phrases: Avoid breathing dust.
Wear protective gloves, protective clothing, and eye protection.
Call a POISON CENTER or doctor/physician if you feel unwell.

GHS Response Phrases: If eye irritation persists, get medical advice/attention.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do so. Continue rinsing.

GHS Storage and Disposal Phrases: Store in a diked or contained area to prevent uncontrolled release to the environment.
Store in a closed container.
If material cannot be completely used according to label directions, dispose of container and contents according to section 13.

Potential Health Effects (Acute and Chronic): Chronic: Prolonged or repeated skin contact may cause dermatitis. Prolonged or repeated exposure may cause permanent eye damage. Chronic exposure may cause lung damage. Effects may be delayed.

Inhalation: May be harmful if inhaled. Low hazard for normal industrial handling. The toxicological properties of this substance have not been fully investigated. May cause systemic effects. Material may be irritating to mucous membranes and upper respiratory tract.

Skin Contact: May cause skin irritation. Dust causes mechanical irritation. Low hazard for usual industrial handling.

Eye Contact: May cause eye irritation. Dust may cause mechanical irritation.

Ingestion: May be harmful if swallowed. May cause gastrointestinal irritation with nausea, vomiting and diarrhea. Low hazard for normal industrial handling. The toxicological properties of this substance have not been fully investigated. May cause systemic effects.

3. Composition/Information on Ingredients

CAS #	Hazardous Components (Chemical Name)	Concentration
57-13-6	Urea	40.3 %
7783-28-0	Diammonium phosphate	30.4 %
7447-40-7	Potassium chloride	23.3 %
1317-65-3	Limestone	4.33 %
14808-60-7	Quartz	0.144 %

4. First Aid Measures

Emergency and First Aid Procedures:

In Case of Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

In Case of Skin Contact: Get medical aid if irritation develops or persists. In case of contact, flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical aid if irritation develops and persists. Wash clothing before reuse. Wash off with soap and plenty of water.

In Case of Eye Contact: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid. Do NOT allow victim to rub eyes or keep eyes closed.

In Case of Ingestion: Get medical aid. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Call a poison control center. If swallowed, do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person.

Signs and Symptoms Of Exposure: To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Note to Physician: Treat symptomatically and supportively.

5. Fire Fighting Measures

Flash Pt: No data.

Explosive Limits: LEL: No data. UEL: No data.

Autoignition Pt: No data.

Suitable Extinguishing Media: For small fires, use dry chemical, carbon dioxide, or water spray. For large fires, use dry chemical, carbon dioxide, alcohol-resistant foam, or water spray.

Fire Fighting Instructions: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Substance is noncombustible. Decomposes at high temperatures, resulting in toxic and corrosive products. Runoff from fire control or dilution water may cause pollution.

Flammable Properties and Hazards: Most of the components of this product are non-combustible. However, a portion of them may support combustion at elevated temperatures.

Hazardous Combustion Products: Thermal decomposition may result in the production of ammonia, formaldehyde, biuret, chlorine, cyanic acid, and cyanide, and oxides of carbon, nitrogen, phosphorus, potassium, sulfur, and chlorine, and oxides of alkaline earth metals, and certain heavier metals used as nutrients in fertilizer products, such as copper, iron, manganese, and zinc, and other toxic and irritating fumes and gases.

6. Accidental Release Measures

Steps To Be Taken In Case Material Is Released Or Spilled:

Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Avoid generating dusty conditions. Provide ventilation. Avoid runoff into storm sewers and ditches which lead to waterways. Do not let this product enter the environment except as directed on product label. Clean up spills immediately, observing precautions in the Protective Equipment section.

Personal precautions.
Use personal protective equipment. Avoid dust formation. Avoid breathing dust. Ensure adequate ventilation.

Environmental precautions.
Do not let product enter drains.

Pick up and arrange disposal without creating dust. Keep in suitable, closed containers for disposal.

PROCEDURES & PERSONAL PRECAUTIONS.
Exercise appropriate precautions to minimize direct contact with skin or eyes and prevent inhalation of dust.

Methods for cleaning up.
Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

7. Handling and Storage

Precautions To Be Taken in Handling:

Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Avoid ingestion and inhalation. Wash thoroughly after handling. Use only in a well-ventilated area. Keep container tightly closed. Wash clothing before reuse.

Provide appropriate exhaust ventilation at places where dust is formed.

Precautions To Be Taken in Storing:

Store in a cool, dry place. Keep container closed when not in use.

8. Exposure Controls/Personal Protection

CAS #	Partial Chemical Name	OSHA TWA	ACGIH TWA	Other Limits
57-13-6	Urea	No data.	No data.	No data.
7783-28-0	Diammonium phosphate	No data.	No data.	No data.
7447-40-7	Potassium chloride	No data.	No data.	No data.
1317-65-3	Limestone	PEL: 15 (dust); 5 (resp.) mg/m3	No data.	No data.
14808-60-7	Quartz	PEL: 50 ug/m3	TLV: 0.05 mg/m3 (R)	No data.

Respiratory Equipment (Specify Type):	A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges.
Eye Protection:	Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Protective Gloves:	Wear appropriate protective gloves to prevent skin exposure. Wash and dry hands.
Other Protective Clothing:	Wear appropriate protective clothing to prevent skin exposure. Choose body protection according to the amount and concentration of the dangerous substance at the work place.
Engineering Controls (Ventilation etc.):	Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
Work/Hygienic/Maintenance Practices:	Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday. Wash thoroughly after handling.

9. Physical and Chemical Properties

Physical States:	[ ] Gas [ ] Liquid [X] Solid
Appearance and Odor:	Multi-colored, granular solid. Slight ammonia-like odor.
pH:	No data.
Melting Point:	~ 133 C
Boiling Point:	No data.
Flash Pt:	No data.
Evaporation Rate:	No data.
Flammability (solid, gas):	No data available.
Explosive Limits:	LEL: No data. UEL: No data.
Vapor Pressure (vs. Air or mm Hg):	No data.
Vapor Density (vs. Air = 1):	No data.
Specific Gravity (Water = 1):	No data.
Bulk density:	~ 45 - 65 LB/CF
Solubility in Water:	~ 1,079 G/L at 20.0 C
Solubility Notes:	The solubility cited is for the urea component of this product, if present. See section 3.
Octanol/Water Partition Coefficient:	No data.
Autoignition Pt:	No data.
Decomposition Temperature:	~ 135 C
Viscosity:	No data.
Additional Physical Information	The melting point and decomposition temperatures cited are for the urea component of this product, if present. See section 3. Urea decomposes before boiling. (UNEP Publication, OECD SIDS UREA, CAS No: 57-13-6)

10. Stability and Reactivity

Stability: Unstable [ ] Stable [X]

Conditions To Avoid - Instability: Incompatible materials, dust generation, heating to decomposition. High temperatures.

Incompatibility - Materials To Avoid: Strong oxidizing agents, bases, acids, aluminum.

Hazardous Decomposition or Byproducts: The decomposition of fertilizer products may result in the generation of some or all of the following: ammonia, formaldehyde, biuret, chlorine, cyanic acid, and cyanide, and oxides of carbon, nitrogen, phosphorus, potassium, sulfur, and chlorine, and oxides of alkaline earth metals, and certain heavier metals used as nutrients in fertilizer products, such as copper, iron, manganese, and zinc, and other irritating and toxic fumes and gases.

Possibility of Hazardous Reactions: Will occur [ ] Will not occur [X]

Conditions To Avoid - Hazardous Reactions: No data available.

11. Toxicological Information

Toxicological Information:

Epidemiology: No information found.
Teratogenicity: Teratogenic effects have occurred in experimental animals.
Neurotoxic effects have occurred in experimental animals.
Reproductive toxicity - no data available.
Inhalation: May cause damage to organs through prolonged or repeated exposure.

CAS# 57-13-6: Urea:
Other Studies:, TCLo, Inhalation, Rat, 288.0 MG/M3, 17 W; Gigiena Truda i Professional'nye Zabolevaniya.(Labor Hygiene and Occupational Disease), V/O Mezhdunarodnaya Kniga, Moscow 113095 Russia, Vol/p/yr: 30(3),43, 1986

Acute toxicity, LD50, Oral, Rat, 8471. MG/KG; Gigiena i Sanitariya, Mezhdunarodnaya Kniga, ul. B. Yakimanka, 39, 113095, Moscow 113095 Russia, Vol/p/yr: 51(6),8, 1986

Standard Draize Test, Skin, Human, 22.00 MG, 3 D; Cutaneous Toxicity, Proceedings of the 3rd Conference, 1976, D, V.A., and P. L, New York, Academic Press, Inc., London United Kingdom, Vol/p/yr: -,127, 1977

CAS# 7447-40-7: Potassium chloride:
Acute toxicity, LD50, Oral, Rat, 2600. MG/KG; "Sbornik Vysledku Toxixologickeho Vysetreni Latek A Pripravku," , Institut Pro Vychovu Vedoucicn P, Marhold, J.V., Institut Pro Vychovu Vedoucicn, Pracovniku Chemickeho, Prumyclu Praha Czechoslovakia, Vol/p/yr: -,8, 1972

Standard Draize Test, Eyes, Species: Rabbit, 500.0 MG, 24 H; "Sbornik Vysledku Toxixologickeho Vysetreni Latek A Pripravku," , Institut Pro Vychovu Vedoucicn P, Marhold, J.V., Institut Pro Vychovu Vedoucicn, Pracovniku Chemickeho, Prumyclu Praha Czechoslovakia, Vol/p/yr: -,8, 1972

Carcinogenicity/Other Information: This material may contain small amounts of respirable crystalline and amorphous silica. The International Agency for Cancer Research (IARC) has classified crystalline silica as a carcinogen to humans (Group 1), and amorphous silica as not classifiable as to its

carcinogenicity to humans (Group 3). See "Silica, Some Silicates, Coal dust and para-Aramid Fibrils in IARC Monographs on the Evaluation of Carcinogenic Risks to Humans", (Vol. 68).

CAS #	Hazardous Components (Chemical Name)	NTP	IARC	ACGIH	OSHA
57-13-6	Urea	n.a.	n.a.	n.a.	n.a.
7783-28-0	Diammonium phosphate	n.a.	n.a.	n.a.	n.a.
7447-40-7	Potassium chloride	n.a.	n.a.	n.a.	n.a.
1317-65-3	Limestone	n.a.	n.a.	n.a.	n.a.
14808-60-7	Quartz	Known	1	A2	n.a.

12. Ecological Information

General Ecological Information:

Environmental: If released to the atmosphere, urea will degrade rapidly in the vapor-phase by reaction with photochemically produced hydroxyl radicals (half-life of 9.6 hr). If released to soil, urea is hydrolyzed to ammonium through soil urease activity (the basis of its use as a fertilizer). The rate of hydrolysis can be fast (24 hr); however, a number of variables (such as increasing the pellet size of the fertilizer) can decrease the degradation rate.

Do not empty into drains.

Urea will dissolve and disperse in water, and will promote algae growth which may degrade water quality and taste. Notify downstream water users of any release that may affect water quality.
CAS# 57-13-6: Urea:
Lethal concentration to 0% of test organisms., Creek Chub (Semotilus atromaculatus), 16000000. UG/L, 24 H, Mortality, Water temperature: 15.0 C - 21.0 C C, pH: 8.30, Hardness: 98.00 MG/L; Appraisal of a Chemical Waste Problem by Fish Toxicity Tests, Gillette, L.A., D.L. Miller, and H.E. Redman, 1952

CAS# 7783-28-0: Diammonium phosphate:
LC50, Fathead Minnow (Pimephales promelas), juvenile(s), 36000. UG/L, 48 H, Mortality, Water temperature: 24.0 C C, pH: 7.80, Hardness: 194.00 MG/L; Acute Toxicity of Phos-Check (Trade Name) 202 and Diammonium Phosphate to Fathead Minnows, Inman, R.C., 1974

CAS# 7447-40-7: Potassium chloride:
LC50, Rainbow Trout (Oncorhynchus mykiss), 1610000. UG/L, 48 H, Mortality, Water temperature: 17.0 C C, pH: 7.70, Hardness: 40.00 MG/L; Toxicity of Candidate Molluscicides to Zebra Mussels (Dreissena polymorpha) and Selected Nontarget Organisms, Waller, D.L., J.J. Rach, W.G. Cope, L.L. Marking, S.W. Fisher, and H. Dabrowska, 1993

Persistence and Degradability: No data available.

Bioaccumulative Potential: No data available.

Mobility in Soil: No data available.

13. Disposal Considerations

Waste Disposal Method: If material cannot be completely used according to label directions, dispose of container and contents according to this section.

Contact a licensed professional waste disposal service to dispose of this material.

Do not let product enter drains.

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None listed.
RCRA U-Series: None listed.

Observe all federal, state, and local environmental regulations.

14. Transport Information

LAND TRANSPORT (US DOT):

DOT Proper Shipping Name: Not Regulated.
DOT Hazard Class:
UN/NA Number:

15. Regulatory Information

EPA SARA (Superfund Amendments and Reauthorization Act of 1986) Lists

CAS #	Hazardous Components (Chemical Name)	S. 302 (EHS)	S. 304 RQ	S. 313 (TRI)
57-13-6	Urea	No	No	No
7783-28-0	Diammonium phosphate	No	No	No
7447-40-7	Potassium chloride	No	No	No
1317-65-3	Limestone	No	No	No
14808-60-7	Quartz	No	No	No

This material meets the EPA 'Hazard Categories' defined for SARA Title III Sections 311/312 as indicated:	[X] Yes [ ] No	Acute (immediate) Health Hazard
	[X] Yes [ ] No	Chronic (delayed) Health Hazard
	[ ] Yes [X] No	Fire Hazard
	[ ] Yes [X] No	Sudden Release of Pressure Hazard
	[ ] Yes [X] No	Reactive Hazard

CAS #	Hazardous Components (Chemical Name)	Other US EPA or State Lists
57-13-6	Urea	CAA HAP,ODC: No; CWA NPDES: No; TSCA: Yes - Inventory, 8A CAIR; CA PROP.65: No; MA Oil/HazMat: No; MI CMR, Part 5: No; NJ EHS: No; NY Part 597: No; PA HSL: No
7783-28-0	Diammonium phosphate	CAA HAP,ODC: No; CWA NPDES: No; TSCA: Yes - Inventory; CA PROP.65: No; MA Oil/HazMat: No; MI CMR, Part 5: No; NJ EHS: No; NY Part 597: No; PA HSL: No
7447-40-7	Potassium chloride	CAA HAP,ODC: No; CWA NPDES: No; TSCA: Yes - Inventory; CA PROP.65: No; MA Oil/HazMat: No; MI CMR, Part 5: No; NJ EHS: No; NY Part 597: No; PA HSL: No
1317-65-3	Limestone	CAA HAP,ODC: No; CWA NPDES: No; TSCA: Yes - Inventory; CA PROP.65: No; MA Oil/HazMat: No; MI CMR,

14808-60-7 Quartz	Part 5: No; NJ EHS: No; NY Part 597: No; PA HSL: Yes - 1 CAA HAP,ODC: No; CWA NPDES: No; TSCA: Yes - Inventory; CA PROP.65: No; MA Oil/HazMat: No; MI CMR, Part 5: No; NJ EHS: No; NY Part 597: No; PA HSL: Yes - 1

16. Other Information

Revision Date: 04/11/2018

Hazard Rating System:

Additional Information About This Product: No data available.

Company Policy or Disclaimer: Disclaimer and Limitation of Liability: This data sheet was developed from information on the constituent materials identified herein and does not relate to the use of such materials in combination with any other material or process. No warranty is expressed or implied with respect to the completeness or ongoing accuracy of the information contained in this data sheet, and Turf Care Supply Corp. disclaims all liability for reliance on such information. This data sheet is not a guarantee of safety. Users are responsible for ensuring that they have all current information necessary to safely use the product described by this data sheet for their specific purposes.

NERC
Natural
Environmental
Reclamation
Concepts, Inc.

September 26, 2019

Re: Project No.: 3909

To Whom It May Concern:

N.E.R.C., Inc. is listing that they will be using MDOT Spec Number: 816.01-04 Straw Bales. This product will be used at JR Whiting – Pond 1, 2, & CT Pond, Monroe County. We plan on using approximately 40 Tons. The Straw Bales will be purchased from Harmony Farms.

We certify that the following described material has been tested and meets the specification requirements of the Michigan Department of Transportation and ASTM, AASHTO or MDOT Specifications.

Feel free to contact me if you have any questions.

Best Regards,

Ashley M. Sholtis

Ashley M. Sholtis
Office Manager, Officer

143 WEST MAIN • P. O. BOX 70 • HANOVER, MICHIGAN 49241
(517) 563-2898 • FAX (517) 563-2899
NERC@PLANTINGPROS.COM

EROSION CONTROL MATERIALS
ENVIROSCAPE ECM, LTD.

Toll free: 888.550.1999
Phone: 419.594.3210
Fax: 419.594.3213

22700 St. Rt. 613
Oakwood, OH 45873
Email: Info@Strawblanket.com

www.strawblanket.com

S2000BD Double Net Straw Blanket

Contents:	Weed free straw
Netting:	Double jute, Leno weave Biodegradable
Thread:	Biodegradable
Standard Roll Size:	100.0 sq yards/ 83.6 sq meters
Standard Width:	8.00 feet/ 2.44 meters
Functional Longevity:	12 – 24 months
Best Use:	2:1 slopes, Medium-flow, roadways

S2000BD is a fully Biodegradable blanket. The netting is made from Double jute, Leno weave. The thread is Biodegradable, while the filament of matrix is weed free straw.

Blankets can be produced from 50 SY to 1,000 SY and be from 4 ft. to 16 ft. wide.

As described in Federal Highway Administration's Standard Specification FP-03 in Section 713.17 and as described by ECTC as a Type 2.D.

Test Method Description	**Standard Testing**
Mass/Unit Area ASTM D 6475	11.05 oz/ sq yd
Tensile Strength –MD ASTM D 6818	75 lbs/ft*
Tensile Strength –TD ASTM D 6818	75 lbs/ft*
Thickness ASTM D 6525	0.25+ inches*
Light Penetration ASTM D 6567	14.0%%
Water Absorption ASTM D 1117, ECTC TASC 00197	411%%
Elongation –MD ASTM D 6818	17.7 lb/in%
Elongation –TD ASTM D 6818	14.5 lb/in%
C Factor	<0.20@2:1*
Permissible Shear Stress	**1.75 lbs/ft.***
Permissible rate of flow	**6 ft/s***
Enviroscape ECM certifies that the above criteria is met by this specified product and that is meets requirements as described in the Federal Highway Administration's Standard Specification FP-03 in Section 713.17 and as described by ECTC as a Type 2.D. *MARV-Minimum Average Roll Value. Actual manufactured MARV's meet or exceed above stated values.	

This document may also be downloaded at http://www.strawblanket.com/S2000BDMaterialSpec.pdf

Updated on 5-4-16

ECTC Erosion Control Technology Council
International Erosion Control Association

golder.com