Rockport Fly Ash Landfill Deficiency Corrective Measure Report

For

Intermediate Berm Leachate Seepage

Indiana Michigan Power Company

Rockport Plant

Rockport, Indiana

November 2021

Prepared by: American Electric Power Service Corporation

1 Riverside Plaza

Columbus, OH 43215

Document ID: GERS-21-070

AEP Deficiency Index ID: #12

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Intermediate Berm Leachate Seepage

Rockport Plant

Fly Ash Landfill

Document Number: GERS-21-070

PREPARED BY Dan Murphy DATE 11/22/2021

Dan Murphy, P.E.

REVIEWED BY _____ DATE 11/22/2021

Mohammad A. Ajlouni, Ph.D., P.E.

APPROVED BY Gary F. Zych DATE 11/24/2021

Gary F. Zych, P.E.

Manager – AEP Geotechnical Engineering

Gary F. Zych

GARY F. ZYCH
REGISTERED
No.
11500709
STATE OF
INDIANA
PROFESSIONAL ENGINEER

11/24/2021

I certify to the best of my knowledge, information and belief the information contained in this report meets the requirements of 40 CFR § 257.84(b).

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1.0 Introduction

This report was prepared by AEP – Geotechnical Engineering Services (GES) section, in part, to fulfill requirements of 40 CFR 257 and to provide the Rockport Plant with a report documenting the corrective measures associated with Rockport Fly Ash Landfill.

This report specifically addresses the corrective actions related to the deficiency for intermediate berm leachate seepage. This report was prepared to address Deficiency #12 in the AEP Deficiency Index.

Plant staff initially identified this deficiency on April 5, 2021. Enerfab, MPW & Chesapeake Containment Solutions performed the corrective actions for this deficiency. S&ME, Inc. provided construction quality assurance/quality control measures. The corrective action activities were completed on October 13, 2021. Larry Hofius- Landfill Projects Coordinator supervised the work activities. Dan Murphy, P.E. with AEP GES provided technical support and oversight.

2.0 Description of Landfill

The Rockport Power Plant is located near Rockport, Indiana. It is owned and operated by Indiana Michigan Power Company (I&M). The facility operates a landfill for the disposal of CCR materials.

The landfill is permitted by the Indiana Department of Environmental Quality under RWS 1 Landfill permit 74-02. The landfill is divided into Area 1A and Area 1B. Area 1A is currently active and is permitted to receive type 1 coal combustion residual wastes for a capacity of 13.6 million cubic yards of storage. Area 1A can be further divided into Phase 1, Phase 2 North, Phase 2 South, Cell 4A, Cell 4B, Cell 6 and Cell 7. These areas are illustrated in Appendix D.

Phase 1, Phase 2 North and Phase 2 South have a composite liner and leachate collection system (type I liner). Waste is actively being placed in Phase 1. Cell 4A, Cell 4B, Cell 6 and Cell 7 are inactive and have a compacted clay or insitu clay liner (type II liner).

An intermediate berm exists along the perimeter of the type I liner. The intermediate berm consists of a bottom ash material covered with PVC rainflap welded to the floor liner and the outboard slopes have vegetation cover.

3.0 Description of Deficiency (257.84(b)(5))

On April 5, 2021, Rockport plant staff observed seepage/standing water in the southeastern corner of Cell 6 of the Rockport Landfill. The area with standing water was approximately 25 feet by 100 feet in area and the water was about 1 inch in depth on average. A sample of this water was collected to determine if this was leachate or clean runoff. The pH was determined to be equal to 10 and therefore this water was determined to be leachate from the landfill. In the afternoon of April 5, 2021, approximately 1,000 gallons of the standing water at the ground surface in Cell 6 was removed using vacuum truck. The leachate in the vacuum truck was emptied into the leachate collection system in the active landfill area.

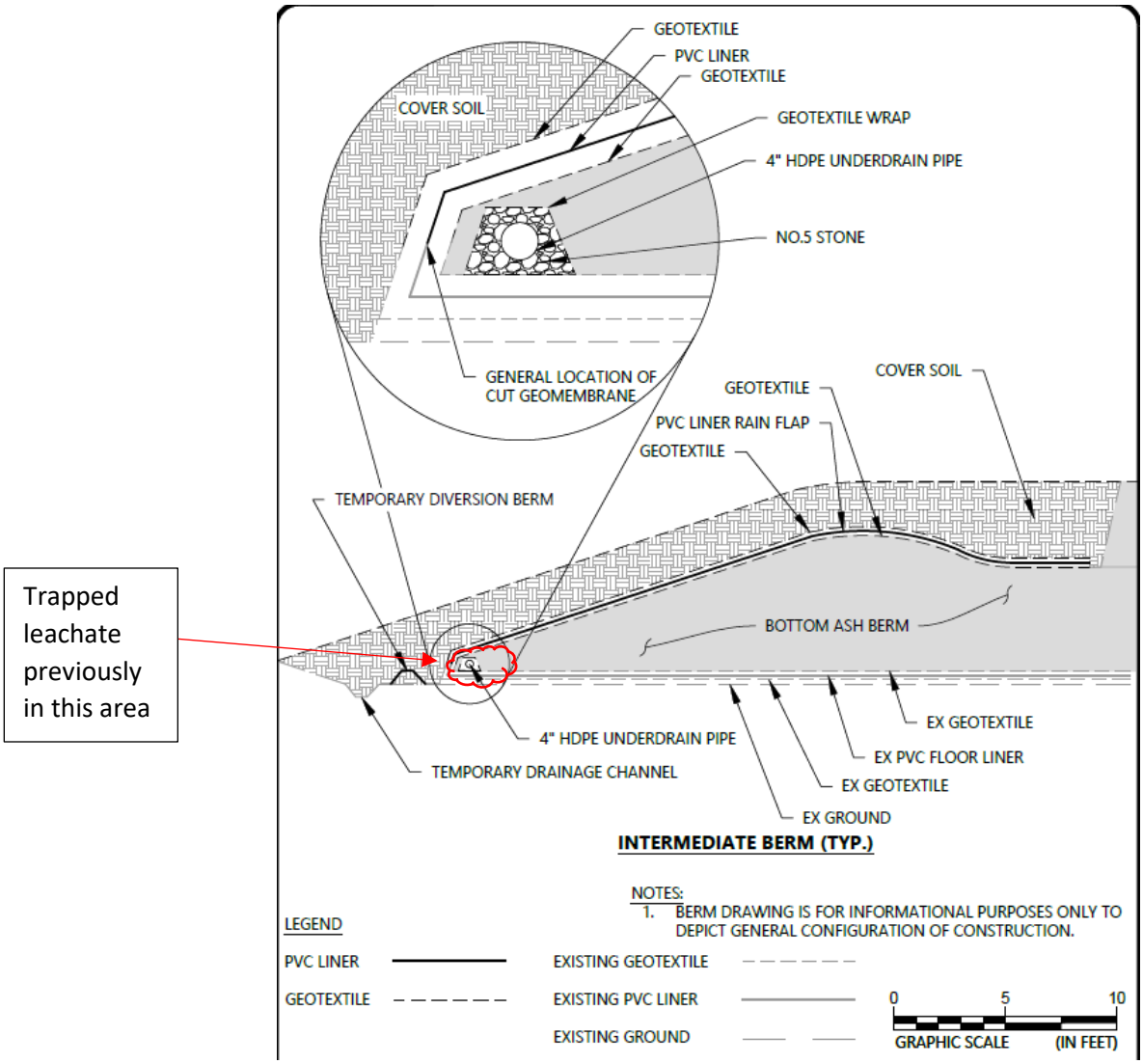

Figure 1: Intermediate Berm Cross Section. Reference Figure 5- S&ME Landfill Seepage Repair Report Nov.12, 2021

4.0 Investigation and Corrective Measures (257.84(b)(5))

AEP Geotechnical Engineering performed a site visit on April 8, 2021 to observe this issue and provide temporary measures and recommendations. A site visit report containing additional details is included in Appendix B. This issue was considered a deficiency because leachate was by-passing the leachate collection system.

The leachate seepage area was generally located at the leachate drainage divide between Phase 1 and Phase 2. Both leachate systems appear to be functioning as intended and there are no signs of obstructions.

Leachate water was observed to be trapped between the PVC geomembrane layers of the intermediate berm. Upon initial observation after excavating to uncover the edge of the PVC floor liner, leachate was observed to be flowing above and below the PVC floor liner. The total amount of leakage was estimated to be less than 1 gallon per minute.

The PVC floor liner was then slightly propped up from the underlying clay liner with 2x4 boards to allow water to drain and to allow further observation of any leakage from the floor liner. Shortly after propping the PVC liner up, no flow was observed below the floor liner and no defects or imperfections were discovered on the floor liner during subsequent remedial measures when larger areas of the floor liner were exposed. Small imperfections were found on the PVC rainflap and the seam between the floor liner and the rainflap was observed to be leaking. Refer to Figure 1 for illustration.

The leachate initially observed flowing under the liner was likely standing water that backflowed under the PVC floor liner. Upon removing the standing water and excavating to expose the liner, this water was then free to flow out into the excavation.

Chemical constitutes (Sulfate) in the leachate were analyzed and did not clearly indicate of the source of leachate (Type 1 Ash or Type 2 Ash).

There are no trends in the flow rate data for the West Pond that indicate an obstructed leachate collection pipe.

As a temporary measure to collect the leachate and convey into the proper system, a riser pipe and French drain system was constructed. A piece of the PVC liner was placed in the bottom of the French drain to prevent leachate from migrating into surrounding soils. A 2 inch-PVC solid walled pipe was installed in the bottom of the riser and tapped into the leachate conveyance system at Quick Connect #12. The riser pipe was installed outside of the footprint of the existing liner and the bottom elevation of the riser pipe was placed about 3 feet above the top surface of the Type II clay liner in Cell 6.

A sketch of the temporary measure is included in Figure 2.

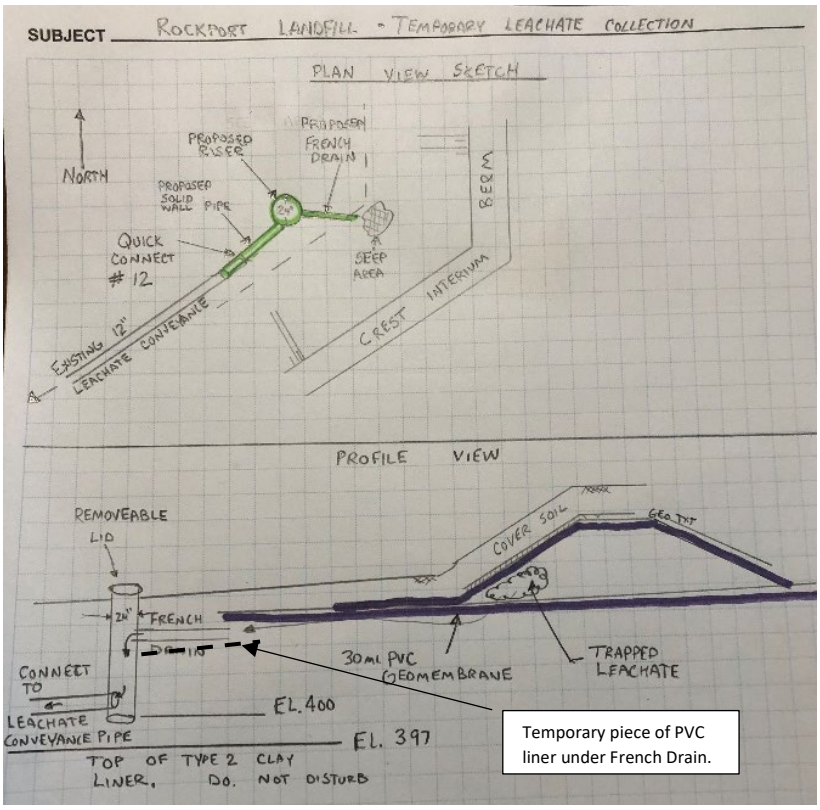

Figure 2- Sketch of Temporary Measures to collect leachate into the proper system.

The general steps for final corrective measures are outlined below. Details of repair construction and QA/QC efforts are included in Appendix A.

1. Excavate cover soils & geotextile to expose the 30-mil PVC rain flap.
2. Clean the liner and inspect the panel seams for bad seams/welds.
3. Install a section leachate collection pipe. The leachate collection pipe is perforated inside the intermediate berm and solid wall beyond the intermediate berm. The leachate collection pipe ties into the existing leachate collection system at Quick Connect #12.
4. Repair bad seams or defects by using wedge-welding techniques or solvent welding.
5. Replace the geotextile fabric, seaming the patches of geotextile into the existing geotextile. Place cover soils to match existing grades.
6. Remove the temporary leachate temporary riser pipe, French drain, backfill with cover soils and restore grass cover to disturbed areas.

The IDEM considered the addition to the leachate collection system. The forms associated with the insignificant modification are included in Appendix C.

5.0 Conclusions

The repairs consisted of repairing geomembrane liner seams and installing additional leachate collection piping. The repairs to the intermediate berm geomembrane & leachate collection system were performed in accordance with the requirements of the Rockport Fly Ash Landfill CQA/QC manual (rev. 3). The deficiency for the Rockport Landfill Intermediate Berm Seepage has been resolved in accordance with 40 CFR 257.

Appendix A: Construction Certification Report from S&ME

Landfill Seepage Repair
Rockport Fly Ash Landfill
Rockport, Indiana
S&ME Project No. 21-7736

PREPARED FOR:

American Electric Power Service Corporation
1 Riverside Plaza
Columbus, OH 43215

PREPARED BY:

S&ME, Inc.
6190 Enterprise Court
Dublin, OH 43016

November 12, 2021

November 12, 2021

American Electric Power Service Corporation
1 Riverside Plaza
Columbus, OH 43215

Attention: Mr. Daniel Murphy, P.E.

Reference: **CQA Services for Landfill Seepage Repair**
Rockport Power Plant Landfill
Rockport, Indiana
S&ME Project No. 21-7736

Dear Mr. Murphy:

S&ME is pleased to provide this construction certification report for the Rockport Fly Ash Landfill at American Electric Power's Rockport Power Plant. As part of the permit requirements, this construction report presents the supporting documentation for certification of the landfill seepage repair. Our formal certification statement may be found in Section 8.0 of this document.

This project was completed in accordance with our proposal number 21-7736 dated August 23, 2021.

We appreciate being given the opportunity to be of service to you. If you have any questions or require additional information, please do not hesitate to contact our office.

Sincerely,

S&ME, Inc.

David C. Ver Hulst, E.I.
Staff Professional

Jason D. Ross, P.E.
Project Engineer
Registration No. 11900145

Senior Reviewed by: Michael G. Rowland, P.E.

Submitted: 1 copy via email (dsmurphy@aep.com)
cc: Mitchell Montgomery (mnmontgomery@aep.com)
cc: Larry Hofius (lhofius@aep.com)

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Appendices

1.0 Project Overview

The Rockport Fly Ash Landfill is owned by American Electric Power and is regulated by the Indiana Department of Environmental Management (IDEM) as a Type I Residual Solid Waste Landfill. The fly ash landfill (landfill) is located northeast of the Rockport Power Plant, directly to the North of Rockport, Indiana. S&ME was contracted by AEP to provide construction quality assurance and construction certification services for the landfill seepage repair.

The observation and testing of construction items for this certification report were performed in general accordance with the Rockport Fly Ash Landfill Quality Assurance/Quality Control Plan (March 2014, Revision 3), and the repair sketches developed by AEP and provided to S&ME.

1.1 Project Description

During a routine inspection, Rockport landfill staff identified an area of the landfill cell 1A where leachate was escaping the intermediate berm installed as part of Cell 1A construction. After further investigation, AEP determined that a defective geomembrane liner weld at the intermediate berm was the cause of the loss of containment for the leachate. As such, the liner covering and cover soil over the bottom ash portion of the berm was removed and re-constructed as detailed within this CQA report. Replacement of the intermediate berm generally consisted of the following steps:

- Partial removal of the Existing Berm and Geomembrane (Section 2.0);
- Subgrade Preparation (Section 3.0);
- Underdrain Pipe Installation (Section 4.0);
- Intermediate Berm Construction (Section 5.0),
- Installation of new geosynthetics (Section 6.0);
- Cover soil placement (Section 7.0).

Details regarding the referenced construction items are included in the following sections of this report.

1.2 Project Personnel

Repairs to the intermediate berm at Cell 1A was performed in general accordance with the approved QA/QC Plan for the Rockport Fly Ash Landfill. The QA/QC responsibilities and lines of authority for the referenced project are as follows:

- Owner – American Electric Power (AEP)
- Construction Management – American Electric Power (AEP)
- Construction Lead Coordinator – Larry Hofius, AEP
- Field Quality Assurance and Quality Control – S&ME, Inc. personnel
- Certifying Engineer – Jason Ross, P.E., S&ME, Inc.
- Intermediate Berm Construction – Enerfab
- Geosynthetic Liner System Contractor – Chesapeake Containment Systems, Inc.

2.0 Partial Removal of Existing Berm and Geomembrane

The cover soil portion of the existing intermediate berm was removed to facilitate construction prior to S&ME's arrival on-site. At the beginning of our observations on August 30, 2021, the existing geomembrane was cut on the landfill side of the floor liner/rain flap seam that was identified by AEP to be defective.

On the landfill side of the berm, the existing waste appeared saturated and was removed and replaced with bottom ash to allow for better control of water during construction and to provide a more stable work area.

3.0 Subgrade Preparation

Following removal of the geomembrane, the subgrade in the berm area was allowed to dry before construction of the berm could begin. To facilitate drying of the subgrade, the following activities were performed:

- A temporary trench was cut outside the liner limits to allow surface water runoff from the cell to reach the leachate conveyance line. After the leachate conveyance line was connected to the underdrain pipe at Quick Connect #12 (See Section 4.0), this trench terminated at a sump from which the water was pumped back into the landfill cell.
- The edge of the existing floor liner was temporarily propped upwards to limit the leachate flows exiting the cell. This also allowed the inspection team to look for evidence of leachate flowing out beneath the floor liner for a period of several days. No leachate was observed beneath the floor liner.

Following drying of the subgrade, the exposed area just beyond the floor liner limits was compacted with a flat-plate vibratory compactor to create a smooth surface for liner deployment and supporting the toe of the intermediate berm.

4.0 Underdrain Pipe Installation

As shown in the as-built details in Appendix I, an underdrain pipe was installed at the toe of the intermediate berm, above the in-place floor liner. The underdrain pipe was a 4-inch IPS DR 17 PE 4710 HDPE pipe and was manufactured by WL Plastics. The perforated pipe traversed approximately 100 feet along the repair area and the pipe was connected to a 'tee' connection approximately 20 feet south of the north end of the perforated pipe. The pipe was non-perforated where it exited the berm approximately 20 feet south of the north end of the repair area, as depicted in the as-built pipe locations provided in Appendix I. The pipe traversed perpendicular to the final berm geometry at its outlet and terminated at existing Quick Connect #12 where the leachate is conveyed to the existing leachate conveyance line on the west side of the Cell.

The pipe was connected with a butt fusion welder which was documented as part of the QA/QC observations. The pipe fusing requirements were calculated using the McElroy pipe fusing calculator and these settings were verified for the welds that were witnessed during construction. The final weld to the in-place trunk line connection was completed using an electro fusion coupler.

The underdrain pipe was surrounded by washed No. 5 stone and a 10-ounce nonwoven geotextile (Skaps GE 110) on all sides.

4.1 As-Built Information

AEP collected location information for the installed pipe and this information is provided in Appendix I.

5.0 Intermediate Berm Construction

The intermediate berm was reconstructed with granular bottom ash where necessary. The majority of the existing berm was left intact and just the inside edge and area above the underdrain pipe required replacement.

6.0 Geosynthetic Liner Installation

An S&ME representative was on-site for the geosynthetics installation between September 14 and October 8, 2021. The installation was not continuous during this time, as the geosynthetic installer was also working on another project on-site. The following sections describe the observations and testing completed. All field documentation can be found in the daily reports and the geosynthetic field logs in Appendix II.

6.1 Materials

The flexible membrane for the project was a 30 mil PVC geomembrane as manufactured by Plastatech. The manufacturer's data sheet for the product is included in Appendix III.

The geotextile for the project was a 10-ounce non-woven geotextile manufactured by Skaps (GE-110). The manufacturer's data sheet for this material is also included in Appendix III.

6.2 MQC Testing

A total of five (5) PVC panels were sent to the project site for the seepage repair. The panels were factory fabricated by Environmental Protection, Inc. (EPI) prior to being shipped to the site. The factory fabricated panels were welded using adhesive and tested in the factory for peel and shear. The results are reported on the EPI reports provided in Appendix III.

Manufacturer's quality control (MQC) data was also provided by Plastatech for each material lot that the PVC geomembrane was obtained from. The reported values were found to meet or exceed those required by the QA/QC Plan. The MQC data is provided in Appendix III.

6.3 Geomembrane Deployment

PVC panels were manually placed by CCS laborers. The dimensions of each deployed PVC panel varied. No defects were observed when the panels were deployed. The subgrade on which the liner was deployed was smooth and free of foreign or deleterious materials. No sharp protrusions were observed on the surface of the bottom ash. The panels were temporarily anchored with sandbags during construction.

S&ME observed and documented the activities related to PVC panel/roll deployment on a continuous basis. The panel layout is included in the drawings provided in Appendix I.

6.4 Geomembrane Panel Field Seaming

Manufactured panels or delivered rolls were primarily seamed together in the field using a single-track fusion welder. A total of 241 linear feet of seaming was completed. Construction quality assurance for the welders consisted of trial seams, performed as required by the CQA plan, prior to welding field seams.

Trial seams were welded daily for each welder/machine combination prior to beginning welding and at 4 to 6 hour increments thereafter. The trial welds were tested in peel and shear by the contractor with an on-site Demtech Pro Tester T-0100 Tensiometer. The calibration records were checked and the tensiometer was formally calibrated on January 13, 2021.

The contractor cut ten (10) individual 1-inch wide destructive test coupons ("bones") that were tested on-site. The test coupons were cut with a bone-cutter, a tool specifically manufactured for cutting geomembrane test coupons. Five (5) of the ten (10) coupons were tested for peel strength and the remaining five (5) coupons were tested for shear strength.

The welder/machine combinations were approved for field seaming contingent upon the trial seam peel and shear tests meeting the requirements of the CQA/QC Plan. A summary log of the trial seams is included in Appendix II.

Prior to being welded, the PVC field seams were observed to be clean and free of dust and moisture. The seams were overlapped 4 inches, or more, prior to welding.

6.5 Non-Destructive Seam Testing

Non-destructive seam tests were performed on all fusion welded field seams using the air lance method (ASTM D4437). Factory seams were also air lanced on-site after deployment. Each seam was also visually inspected by S&ME personnel. All defects located in the seams were prominently marked and repaired. The location of each repair was recorded.

6.6 Destructive Seam Testing

Destructive seam test locations were selected and marked in the field by S&ME personnel at a minimum frequency of one sample per 500 feet of fusion field seam per machine used. A total of 2 destructive seam test samples for fusion welds were marked by S&ME, one that was cut from the installed weld (LDT-1) and one that was a trial weld that was representative of the welding performed that day (LDT-5).

The destructive seam test samples measured approximately 12 inches by 40 inches and were cut out by CCS personnel. The destructive seam test samples were cut into three (3) pieces. One sample was saved as an archive sample, the second sample was given to the contractor (CCS) for destructive seam testing at the site and the third sample was sent to the TRI-Environmental lab in Austin, Texas for independent, third-party peel and shear testing. TRI is certified by the geosynthetics research institute's laboratory accreditation program for the performance of peel and shear testing of geomembrane welded samples (ASTM D7408).

All laboratory destructive tests (LDT's) met the CQC plan requirements. The results of the passing destructive seam tests met the minimum CQA/QC Plan requirements of 15 pounds per inch for peel strength for fusion welds and 58.4 pounds per inch for shear strength for both fusion and extrusion welds. The destructive seam test results are summarized in the following table and included in Appendix II.

Table 6-1: Destructive Test Summary for Fusion Welds

Date	Linear Feet of Field Seaming	Passing Destructive Tests Performed	Passing Test Frequency
9/15/21	241	1 (LDT-1)	1 / 241 feet
10/7/21	67	1 (LDT-5)	1 / 67 feet

6.7 Liner Repairs

CCS completed panel and seam repairs in several areas within the liner placement footprint, including destructive sample locations, panel intersections, factory seam panel intersections, pipe boots, short seams and areas of damaged liner. Areas in need of repair were restored with adhesive patches and non-destructively tested by the air lance method. A total of 27 on-site field repairs were made to the installed liner. The repair locations were located in the field by AEP and are summarized as-built liner drawings included in Appendix I.

Confirmation of the strength of the adhesive patches was confirmed throughout the project by demonstrated trial welds by the Contractor. All trial welds were held for 24 hours prior to testing. In some cases, S&ME sent the trial weld to TRI for 3rd party laboratory testing of the weld (LDT-2, LDT-3, LDT-4 and LDT-6). These results are provided in Appendix II. S&ME observed all repair work and non-destructive testing of adhesive patches on a continuous basis.

6.8 As-Built Information

AEP collected location information for the installed liner, including panel limits and all repair locations. These are depicted in the layout plan included in Appendix I.

6.9 Geotextile Placement

After the completion of seaming the 30 mil PVC geomembrane liner it was then covered by a 10-ounce nonwoven geotextile (SKAPS GE-11). The geotextile was over-lapped and sewn together at the edges of each roll.

Geosynthetic placement was completed on October 8, 2021.

7.0 Cover Soil Construction

On Tuesday, October 12, 2021, S&ME observed the cover soil placement for the berm that had begun on Monday, October 11, 2021. Per our discussion on this date with the AEP representative, Mr. Hofius, the soil was placed in 6-inch loose lifts and spread with the dozer.

While on-site, S&ME observed the topsoil being stockpiled and pushed out over the previously placed soils cover the berm. Following topsoil spreading, the work area was to be seeded and mulched.

8.0 Certification

This Certification Report has been prepared by S&ME, Inc. to document that the construction of the seepage repair at the Rockport Fly Ash Landfill at the Rockport Power Plant in Spencer County, Indiana has been performed in accordance with the Permit Documents including the Rockport Fly Ash Landfill Quality Assurance/Quality Control Plan dated March, 2014 (Revision 3).

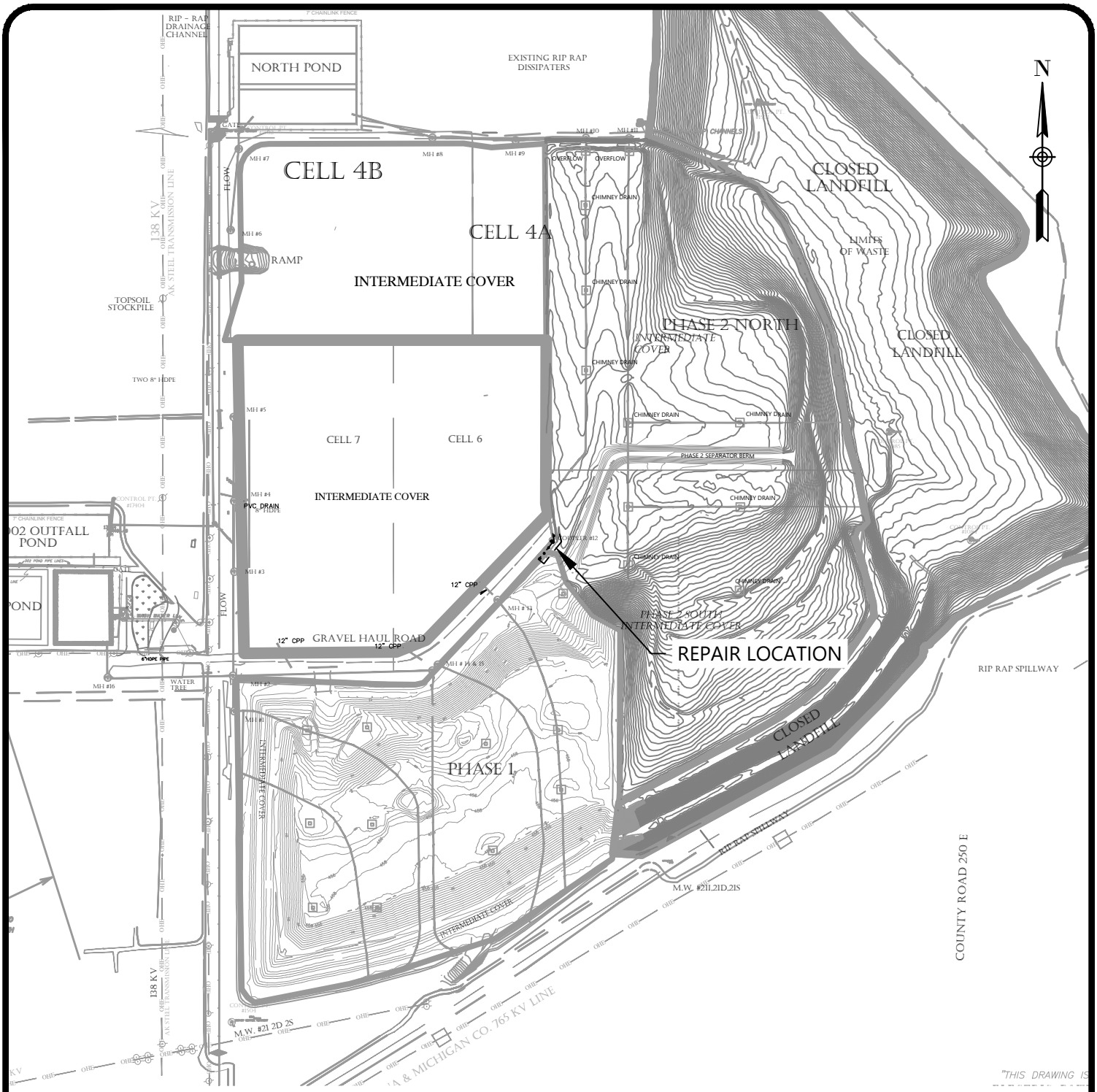
I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for such violations.

Jason D. Ross, P.E.
Project Engineer

11-12-21

Appendices

Appendix I – Project Data & As-Built Details



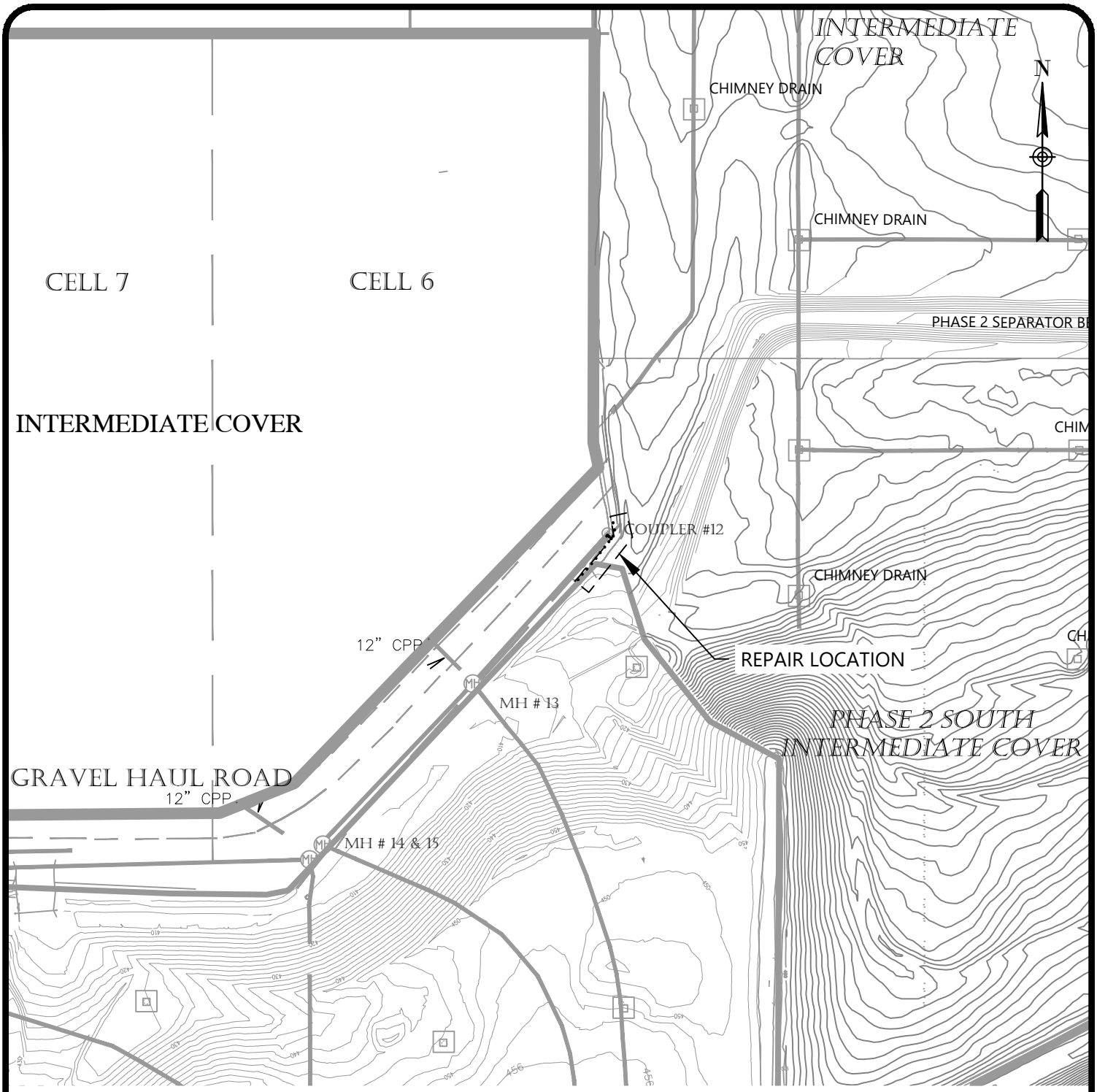
NOTE: THE REFERENCED BASEMAP DRAWING SHOWN IS "Rockport Landfill E&S MAP ASBUILT updated 10-15-2021.dwg" RECEIVED FROM AEP ON 10-28-2021.

Drawing Path: T:\Energy\Projects\2021\217736 AEP Rockport Landfill Seepage Repair\CAD\Construction\AS-BUILT.dwg

LOCATION MAP

LANDFILL SEEPAGE REPAIR
ROCKPORT FLY ASH LANDFILL
ROCKPORT, IN

SCALE:	FIGURE NO.
GRAPHIC	1
DATE:	
10/29/2021	
PROJECT NUMBER	
217736	



LEGEND

REPAIR AREA – – – – – –

0 200 400

GRAPHIC SCALE (IN FEET)

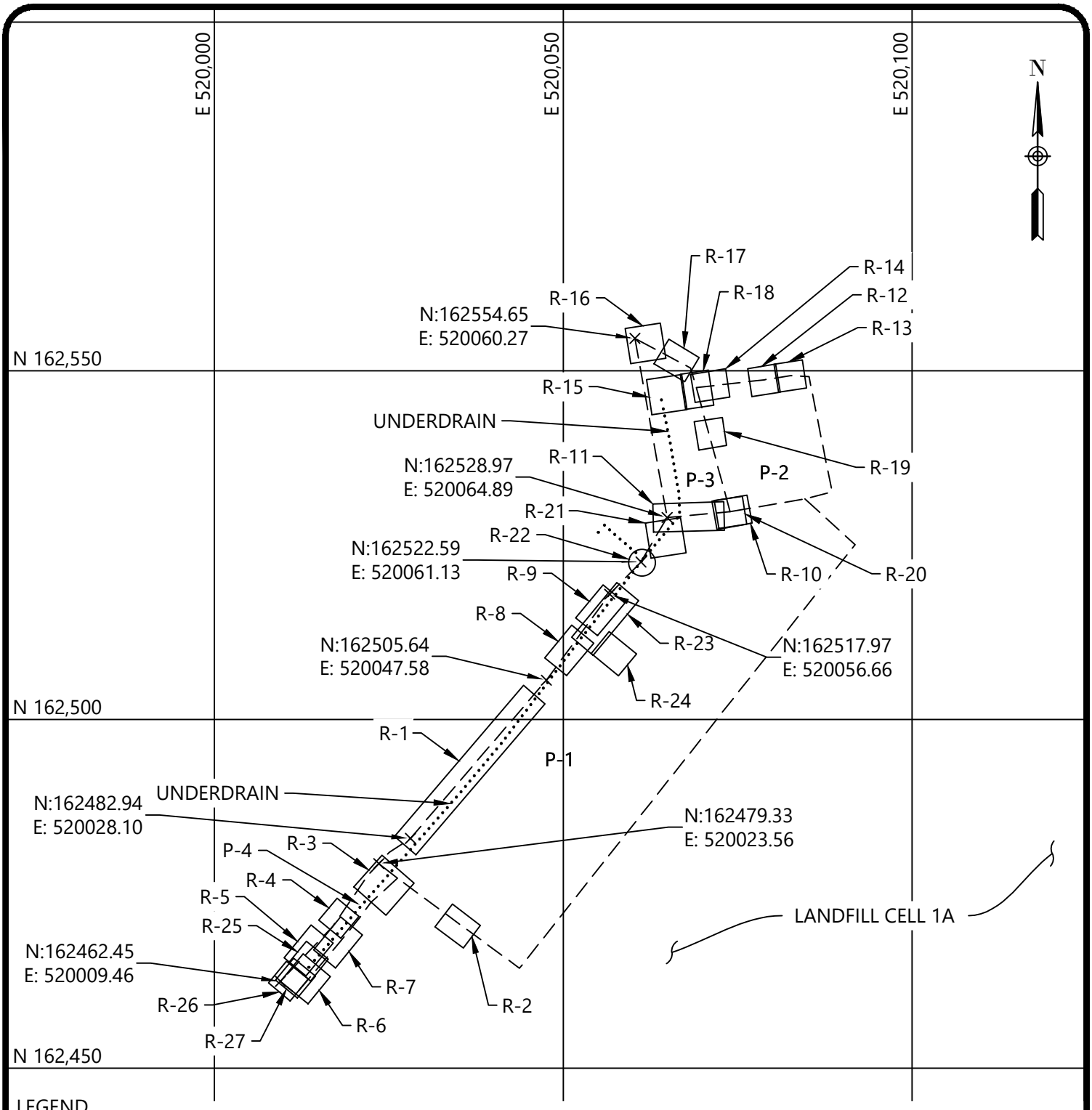
NOTE: THE REFERENCED BASEMAP DRAWING SHOWN IS "Rockport Landfill E&S MAP ASBUILT updated 10-15-2021.dwg" RECEIVED FROM AEP ON 10-28-2021.

Drawing Path: T:\Energy\Projects\2021\217736 AEP Rockport Landfill Seepage Repair\CAD\Construction\AS-BUILT.dwg

REPAIR LOCATION

LANDFILL SEEPAGE REPAIR
ROCKPORT FLY ASH LANDFILL
ROCKPORT, IN

SCALE:	FIGURE NO.
GRAPHIC	2
DATE:	
10/29/2021	
PROJECT NUMBER	
217736	



LEGEND

PVC LINER PANEL OUTLINE

PVC ADHESIVE REPAIR PATCH

UNDERDRAIN ALIGNMENT

0 20 40

GRAPHIC SCALE (IN FEET)

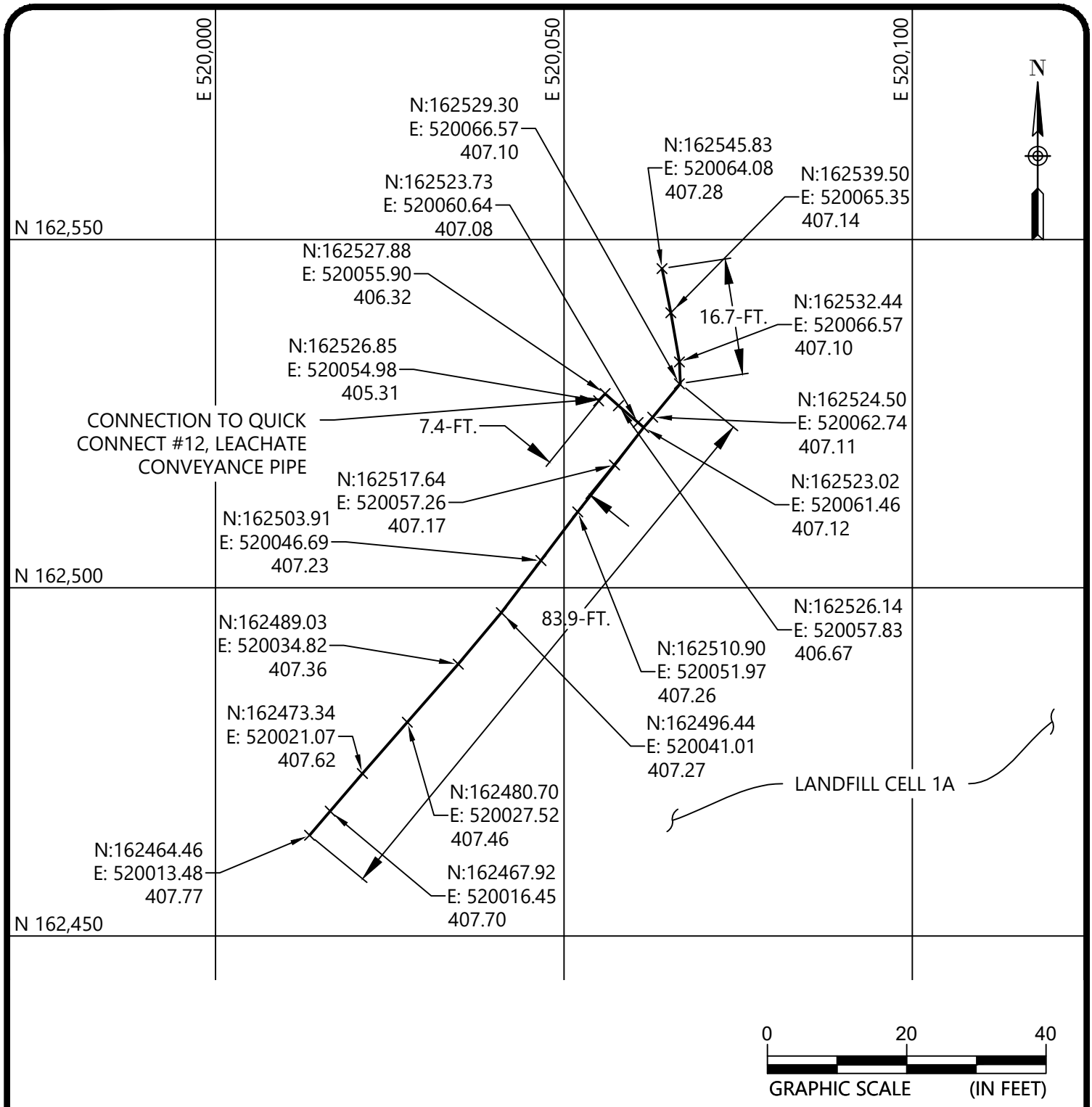
LAYOUT IS BASED ON AEP 10/11/2021 SURVEY, AND
CHEASAPEAKE CONTAINMENT SYSTEMS, INC. 10/8/2021 SURVEY

Drawing Path: T:\Energy\Projects\2021\217736 AEP Rockport Landfill Seepage Repair\CAD\Survey\217736_AEP Survey_OCT 21.dwg

PVC LINER LAYOUT PLAN

LANDFILL SEEPAGE REPAIR
ROCKPORT FLY ASH LANDFILL
ROCKPORT, IN

SCALE:	FIGURE NO.
GRAPHIC	3
DATE:	
10/29/2021	
PROJECT NUMBER	
217736	



LEGEND

SURVEY POINT — NORTHING, EASTING, ELEVATION

UNDERDRAIN

NOTES:

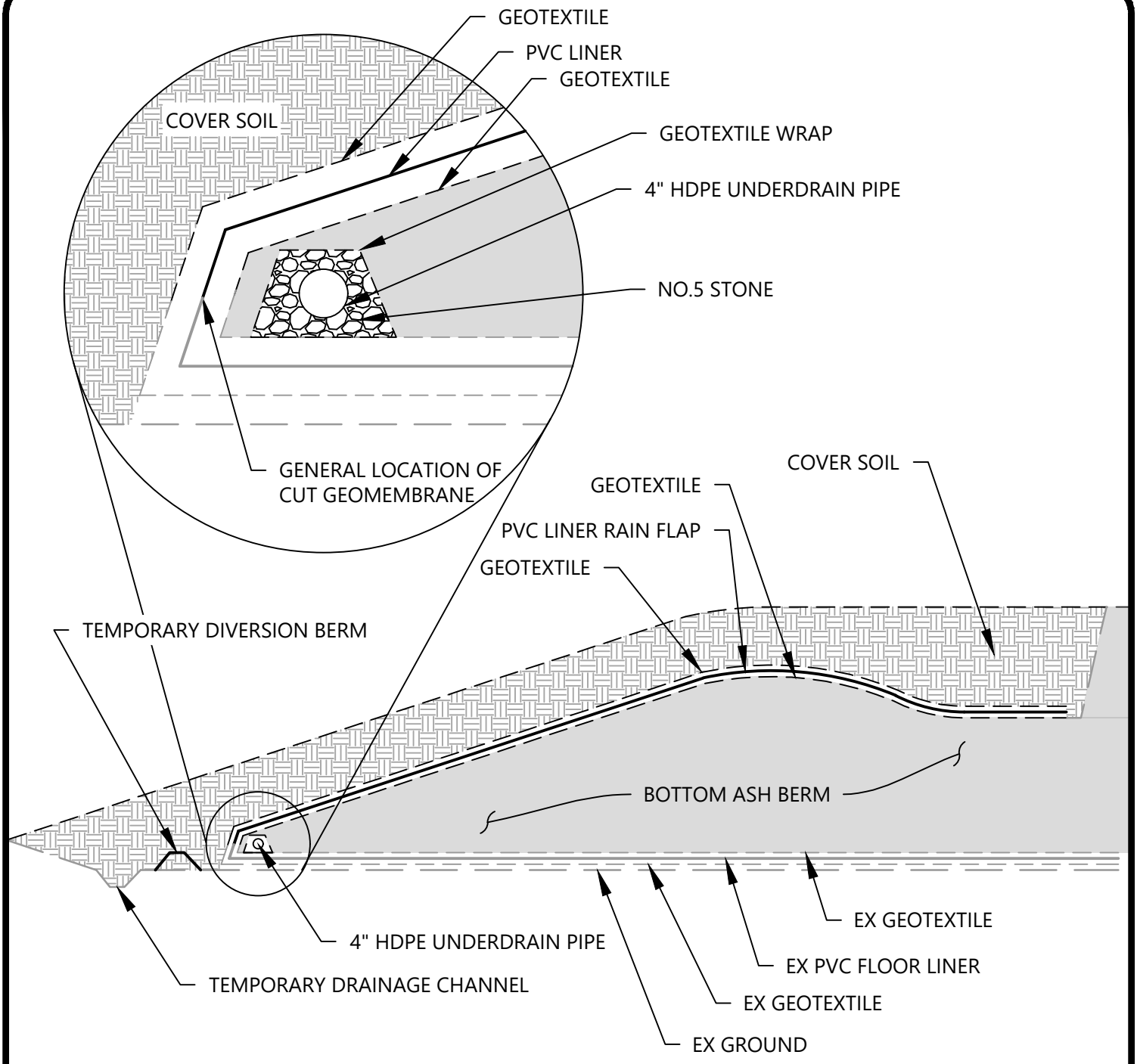
1. ELEVATIONS REPRESENT TOP OF INSTALLED PIPE (4-INCH DIAMETER IPS HDPE PIPE).
2. INFORMATION SHOWN WAS RECORDED BY AEP FOLLOWING PIPE INSTALLATION

UNDERDRAIN

LANDFILL SEEPAGE REPAIR
ROCKPORT FLY ASH LANDFILL
ROCKPORT, IN

SCALE:	FIGURE NO.
GRAPHIC	4
DATE:	
10/29/2021	
PROJECT NUMBER	
217736	

Drawing Path: T:\Energy\Projects\2021\217736 AEP Rockport Landfill Seepage Repair\CAD\Survey\217736_AEP Survey_OCT 21.dwg



INTERMEDIATE BERM (TYP.)

NOTES:

1. BERM DRAWING IS FOR INFORMATIONAL PURPOSES ONLY TO DEPICT GENERAL CONFIGURATION OF CONSTRUCTION.

LEGEND

PVC LINER	———	EXISTING GEOTEXTILE	– – – – – –
GEOTEXTILE	– – – – – –	EXISTING PVC LINER	———
		EXISTING GROUND	——— ———

0 5 10

GRAPHIC SCALE (IN FEET)

Drawing Path: T:\Energy\Projects\2021\217736 AEP Rockport Landfill Seepage Repair\CAD\Survey\217736_AEP Survey_OCT 21.dwg

	BOTTOM ASH BERM - SECTION	SCALE: GRAPHIC	FIGURE NO. 5
	LANDFILL SEEPAGE REPAIR ROCKPORT FLY ASH LANDFILL ROCKPORT, IN	DATE: 10/29/2021 PROJECT NUMBER 217736	

Appendix II – Daily Reports & Field Logs

Project:	Rockport Landfill Seepage Repair	**Job Number:**	217736
Client:	American Electric Power	**Date:**	08/30/2021
Inspector:	David Ver Hulst	**Weather:**	Sunny / 70-88°F
Contractor:	Enerfab		

General Summary of Observations

Summary of Discrepancies				
ID	Discrepancy	Remediated (Y/N)	Discrepancy Informed to	Review Required
A				
B				

S&ME representative David Ver Hulst was on-site to observe the construction progress at the AEP (American Electric Power) Rockport Fly Ash Landfill Seepage Repair project being constructed by Enerfab. S&ME will be performing quality assurance for the replacement PVC floor liner and rain flap located outside the Intermediate berm at the northeast corner of the Landfill Cell 1, and the underdrain to be installed at the toe of the berm inside the liner. Prior to arrival on-site today, the berm, floor liner and rain flap have been uncovered.

Note: The 'floor liner' references the flexible membrane liner placed on the bottom of the cell. The 'rain flap' references the flexible membrane liner that was wrapped around and terminated on top of the perimeter berm.

While on site, S&ME observed Enerfab cut the floor liner a few inches behind the seam with the existing rain flap, removing the rain flap and the leakage holes that had been previously identified along the rain flap/floor liner seam. S&ME observed leachate water coming through the berm continuously throughout the day. Enerfab fabricated wooden supports to lift the edge of the floor liner along the outside edge of the berm in order to dry out the subgrade, and determine if any leachate was coming through the berm underneath the floor liner. The leachate exiting the area was directed to the leachate trunk line.

The subgrade underneath, and beyond the edge of the liner was wet upon arrival due to excessive rain from the prior week. Enerfab worked throughout the day to relieve the water via a trench beyond the berm and to dry out the subgrade.

Toward the end of the day most of the subgrade beneath the floor liner and beyond dried up quickly and was observed to be very stiff, and no leachate appeared to be exiting from underneath the floor liner at this time.

All field observations were reported to Larry Hofius with AEP.

Photo 1: Exposed floor liner and rain flap prior to removal of existing geomembrane.

Photo 2: Floor liner and exposed subgrade after rain flap removal.

Project:	Rockport Liner Seepage Repair	**Job Number:**	217736
Client:	American Electric Power	**Date:**	8/31/2021
Inspector:	David Ver Hulst	**Weather:**	Partly Cloudy / 68-79°F
Contractor:	Enerfab		

General Summary of Observations

Summary of Discrepancies				
ID	Discrepancy	Remediated (Y/N)	Discrepancy Informed to	Review Required
A				
B				

S&ME representative David Ver Hulst was on-site to observe the construction progress at the AEP (American Electric Power) Rockport Landfill Seepage Repair project being performed by Enerfab.

While on site, S&ME observed Enerfab uncover the protective tarp from the repair area, and work to clean up the area directly behind the intermediate berm (landfill side). The area directly behind the berm is only a few feet below the top of the berm. It is where the end of the liner will lay once the new liner material is welded to the floor liner, and is folded over the berm.

Enerfab's filled in this area with dry bottom ash and created a drainage sump on the north end to dry out the area and to control leachate coming into this area during construction. Once placement of material was completed and the area had been graded, the repair area was once again covered up with a protective tarp.

Toward the end of the day most of the subgrade beneath the floor liner and beyond dried up quickly and was observed to be very stiff, and no leachate appeared to be exiting from underneath the floor liner at this time. One area of subgrade at the south end of the berm was still saturated today and required additional drying.

All field observations were reported to Larry Hofius with AEP.

Photo 1: Removal of saturated materials behind intermediate berm (landfill side).

Photo 2: Placement of bottom ash behind intermediate berm (on landfill side).

Project:	Rockport Landfill Seepage Repair	**Job Number:**	217736
Client:	American Electric Power	**Date:**	9/1/2021
Inspector:	David Ver Hulst	**Weather:**	Sunny / 66-81°F
Contractor:	Enerfab		

General Summary of Observations

Summary of Discrepancies				
ID	Discrepancy	Remediated (Y/N)	Discrepancy Informed to	Review Required
A				
B				

S&ME representative David Ver Hulst was on-site to observe the construction progress at the AEP (American Electric Power) Rockport Landfill Liner Repair project being performed by Enerfab.

While on site, S&ME observed Enerfab uncover the protective tarp from the repair area, and begin work to improve the subgrade beneath the south end of the repair area, underneath the proposed berm.

After allowing the area to dry, Enerfab used a walk behind vibratory plate to compact the subgrade and remove any undulations or rills in the surface. A small trench was cut in the subgrade outside of the proposed liner limits and was sloped to a new temporary trench on the west end of the repair area. The trench was intended to collect any leachate that was coming from the floor liner and direct it to the leachate trunk line.

Toward the end of the day most of the subgrade beneath the floor liner and beyond dried up quickly and was observed to be very stiff, and no leachate appeared to be exiting from underneath the floor liner at this time. Leachate was still existing the work area from on top of the floor liner. This leachate was collected in the temporary ditch and directed to the leachate trunk line via gravity.

All field observations were reported to Larry Hofius with AEP.

Photo 1: Re-compacting the south end of repair area to create a smoother subgrade after drying the surface in this area.

Project:	Rockport Landfill Seepage Repair	**Job Number:**	217736
Client:	American Electric Power	**Date:**	9/2/2021
Inspector:	David Ver Hulst	**Weather:**	Sunny / 61-79°F
Contractor:	Enerfab		

General Summary of Observations

Summary of Discrepancies				
ID	Discrepancy	Remediated (Y/N)	Discrepancy Informed to	Review Required
A				
B				

S&ME representative David Ver Hulst was on-site to observe the construction progress at the AEP (American Electric Power) Rockport Landfill Liner Repair project being performed by Enerfab.

While on site, S&ME observed Enerfab uncover the protective tarp from the repair area and begin work to continue drying and improving the subgrade beneath the south end of the repair area, underneath the floor liner. All subgrade on the south end of the repair area was completed, compacted and graded to drain into the temporary trench.

S&ME continued to observe no leachate exiting from underneath the floor liner at this time. All leachate from the cell was directed to the temporary ditch and to the leachate trunk line.

All field observations were reported to Larry Hofius with AEP.

Project:	Rockport Landfill Seepage Repair	**Job Number:**	217736
Client:	American Electric Power	**Date:**	9/3/2021
Inspector:	David Ver Hulst	**Weather:**	Partly Cloudy / 61-77°F
Contractor:	Enerfab		

General Summary of Observations

Summary of Discrepancies				
ID	Discrepancy	Remediated (Y/N)	Discrepancy Informed to	Review Required
A				
B				

S&ME representative David Ver Hulst was on-site to observe the construction progress at the AEP (American Electric Power) Rockport Landfill Liner Repair project being performed by Enerfab.

While on site, S&ME observed Enerfab uncover the protective tarp from the repair area, and begin work to improve leachate drainage from the floor liner. Enerfab worked in raising the edge of the geomembrane so that leachate water would not flow off the liner and into the exposed subgrade area. Enerfab constructed s a small, temporary soil berm at the edge of the floor liner limits to contain the leachate and create a raised surface for Chesapeake (liner installer) to weld liner on without interference from the leachate water. By the end of the day the soil berm had been constructed and temporarily compacted in by the mini excavator by bucket. The berm was effective at keeping the leachate inside the landfill and directing it to the underdrain pipe that began to be installed today.

The underdrain pipe and butt fusion welding machine arrived around noon. The longer section of the underdrain pipe (from the T) was welded together in 2 locations when brought on-site. The weld beads were reviewed and measured to be approximately ¼-inch and appeared consistent around the entire pipe (minimum bead size required is 3/16", per McElroy Fusion Pressure Calculator). The welds were discussed with Enerfab, who indicated the following settings were used for these welds:

Pipe Size:	4-inch IPS
Wall thickness:	DR-17
Interfacial Pressure:	75 psi
Drag Pressure:	0 psi
Bead Up Pressure:	22 psi
Heat Soak Time:	1:11 min:sec
Minimum Bead Width:	3/16-inch
Fuse/Cool Time:	2:54 min:sec
Open Close Time:	0:08 min:sec
Heater Temperature:	400-450 ˚F

Welding of the underdrain to the existing leachate line was not performed today, as different clamps were needed in order to fasten the linear pipe to the 'T' connection. Welding will resume next week.

All field observations were reported to Larry Hofius with AEP.

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Photo 1: Butt fusion welding machine for 4-inch HDPE underdrain pipe. Machine is a McElroy Pitbull 212/618 HF

Photo 2: 4-inch HDPE perforated underdrain pipe weld performed off-site meeting minimum bead width of 3/16-inch.

Project:	Rockport Landfill Seepage Repair	**Job Number:**	217736
Client:	American Electric Power	**Date:**	9/7/2021
Inspector:	David Ver Hulst	**Weather:**	Sunny / 59-84°F
Contractor:	Enerfab		

General Summary of Observations

Summary of Discrepancies				
ID	Discrepancy	Remediated (Y/N)	Discrepancy Informed to	Review Required
A				
B				

S&ME representative David Ver Hulst was on-site to observe the construction progress at the AEP (American Electric Power) Rockport Landfill Seepage Repair project being performed by Enerfab. S&ME was last on-site on Friday, September 3. (No work was performed Monday due to the holiday).

While on site, S&ME observed the welding of the T section of the underdrain pipe. Enerfab was unable to weld the pipes together with the McElroy fusion machine due to incorrect shoes for the 4-inch pipe. Another machine called a Christie, which is configured the same as the mcelroy was brought out. With the Christie welder Enerfab welded the underdrain pipe to a T-coupling.

The weld beads for the T-connection measure to approximately 3/16-inch. The following parameters were set targeted for these welds. S&ME was able to monitor the gauges on the equipment to verify the targeted parameters were achieved.

Pipe Size:	4-inch IPS
Wall thickness:	DR-17
Interfacial Pressure:	75 psi
Drag Pressure:	0 psi
Bead Up Pressure:	22 psi
Heat Soak Time:	1:11 min:sec
Minimum Bead Width:	3/16-inch
Fuse/Cool Time:	2:54 min:sec
Open Close Time:	0:08 min:sec
Heater Temperature:	400-450 ˚F

S&ME left the site at the end of the day, all field observations were reported to Larry Hofius with AEP.

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Photo 1: Christie fusion welding machine to replace the McElroy for welding the 4-inch hdpe underdrain pipe at the T section.

Photo 2: 4-inch HDPE T-section fitting, welded to the perforated underdrain pipe. Photo is shows the bead meeting a minimum width of 3/16-inch.

Project:	Rockport Landfill Seepage Repair	**Job Number:**	217736
Client:	American Electric Power	**Date:**	9/8/2021
Inspector:	David Ver Hulst	**Weather:**	Partly Cloudy / 61-82°F
Contractor:	Enerfab		

General Summary of Observations

Summary of Discrepancies				
ID	Discrepancy	Remediated (Y/N)	Discrepancy Informed to	Review Required
A				
B				

S&ME representative David Ver Hulst was on-site to observe the construction progress at the AEP (American Electric Power) Rockport Landfill Seepage Repair project being performed by Enerfab.

While on site, S&ME observed the welding and placement of the remaining underdrain pipe. Enerfab dug up the connection point in the existing leachate collection pipe system for the underdrain to tie into, and continued to weld the new underdrain pipe sections together.

The underdrain system consists of a 4-inch dia. HDPE (IPS, PE 4710) perforated pipe traversing the length of the repair area at the toe of the berm (inside the proposed rain flap). A 45-degree coupler was installed north of the 'T' connection to the leachate trunk line. The underdrain extends to approximately 80 feet south of the 'T' connection and 20 feet to the North. Where the T connects to the leachate line there is a 4-inch to 6-inch adapter fitting.

The 6-inch adapter was cut to length to be welded to a 90 degree fitting. The 90 degree fitting was welded to a ~1-foot section of pipe to be joined by an electro fusion coupler to the existing leachate pipe riser. The electro fusion coupler weld time for a 6-inch HDPE pipe was 402-sec at 40-Volts and 23-Amps. By the end of the day the entire underdrain was in place.

The weld beads were measured, and the following parameters were used by Enerfab for the 4-inch and 6-inch pipe welds:

Pipe Size:	4-inch IPS
Minimum Bead Width:	3/16-inch
Wall thickness:	DR-17
Interfacial Pressure:	75 psi
Drag Pressure:	0 psi
Bead Up Pressure:	22 psi
Heat Soak Time:	1:11 min:sec
Fuse/Cool Time:	2:54 min:sec
Open Close Time:	0:08 min:sec
Heater Temperature:	400-450 ˚F

Pipe Size:	6-inch IPS
Minimum Bead Width:	3/16-inch
Wall thickness:	DR-17
Interfacial Pressure:	75 psi
Drag Pressure:	0 psi
Bead Up Pressure:	49 psi
Heat Soak Time:	1:45 min:sec
Fuse/Cool Time:	4:17 min:sec
Open Close Time:	0:10 min:sec
Heater Temperature:	400-450 ˚F

S&ME left the site at the end of the day, all field observations were reported to Larry Hofius with AEP.

Photo 1: The large-diameter vertical pipe shown was placed temporarily to collect leachate withing the construction area.

In this photo Enerfab is uncovering the existing junction in order to connect the new underdrain pipe at this location with a thermal coupling.

Photo 2: Enerfab is using the thermal coupling equipment to weld the underdrain to the existing leachate line.

Photo 3: Raptor welding equipment shown during the welding sequence.

Photo 4: The underdrain has been connected to the leachate trunk line pipe. This photo shows the exposed underdrain pipe awaiting fabric and stone.

Project:	Rockport Landfill Seepage Repair	**Job Number:**	217736
Client:	American Electric Power	**Date:**	9/9/2021
Inspector:	David Ver Hulst	**Weather:**	Sunny / 55-81°F
Contractor:	Enerfab		

General Summary of Observations

Summary of Discrepancies				
ID	Discrepancy	Remediated (Y/N)	Discrepancy Informed to	Review Required
A				
B				

S&ME representative David Ver Hulst was on-site to observe the construction progress at the AEP (American Electric Power) Rockport Landfill Seepage Repair project being performed by Enerfab.

While on site, S&ME observed Enerfab began filling in gravel on all sides of the underdrain pipe. The gravel was a natural, washed stone (not crushed limestone). The gravel was Size No. 5 that had been previously delivered and stockpiled on-site from the Mulzer Retail Yard in Rockport, IN.

The pipe was initially positioned on top of the stone at a few locations along its length to set the grade. Then manual placement methods with shovels were used to facilitate placement of the gravel beneath the remaining portions of the pipe. Then the remaining gravel was placed on the sides and top of the pipe using the excavator to drop the stone over the pipe.

Once the gravel was in-place Enerfab used a heat gun (leister) to bond the geotextile together at its overlap on top of the pipe. , creating a burrito wrap around the underdrain. Enerfab also began filling in soil around the existing leachate pipe to underdrain connection, using a vibrating walk behind compactor. In places where the soil was too difficult to reach with the compactor, the soil was hand tamped and bentonite was added to the edges of the area along the pipe.

S&ME left the site at the end of the day, all field observations were reported to Larry Hofius with AEP.

Photo 1: The electrofusion coupling is still visible in this photo. Enerfab has filled in the pipe excavation, and is using a vibrating plate to compact the soil back in place around the pipe.

Photo 2: The underdrain pipe was surrounded with stone and wrapped with geotextile. Enerfab used a leister gun to thermal weld the geotextile together at the overlap.

Project:	Rockport Landfill Seepage Repair	**Job Number:**	217736
Client:	American Electric Power	**Date:**	9/13/2021
Inspector:	David Ver Hulst	**Weather:**	Partly Cloudy / 64-90°F
Contractor:	Enerfab		

General Summary of Observations

Summary of Discrepancies				
ID	Discrepancy	Remediated (Y/N)	Discrepancy Informed to	Review Required
A				
B				

S&ME representative David Ver Hulst was on-site to observe the construction progress at the AEP (American Electric Power) Rockport Landfill Seepage repair project being performed by Enerfab. No work had taken place for the project since Thursday, 9/9/21.

While on site, S&ME observed Enerfab continue their efforts to prepare the liner for Chesapeake Containment Systems (CCS). Sandbags were placed to prop up the liner and promote drainage of the leachate water seeping through the berm into the underdrain.

S&ME left the site at the end of the day, all field observations were reported to Larry Hofius with AEP.

Project:	Rockport Landfill Seepage Repair	**Job Number:**	217736
Client:	American Electric Power	**Date:**	9/14/2021
Inspector:	David Ver Hulst	**Weather:**	Partly Cloudy / 70-90°F
Contractor:	Chesapeake Containment Systems (CCS)		

General Summary of Observations

Summary of Discrepancies				
ID	Discrepancy	Remediated (Y/N)	Discrepancy Informed to	Review Required
A				
B				

S&ME representative David Ver Hulst was on-site to observe the construction progress at the AEP (American Electric Power) Rockport Landfill Seepage Repair project being performed by Chesapeake Containment Systems (CCS).

While on site, S&ME observed Chesapeake Containment Systems (CCS) begin installing the geosynthetics for the seepage repair. CCS used geotextile from a single roll to cover the berm in preparation for the PVC geomembrane placement. The geotextile was a Skaps GE110 nonwoven geotextile with a 10 oz/SY weight (roll number 030759246). The geotextile was stitched together at all seams.

Prior to geomembrane deployment, S&ME verified the on-site panels matched those for which manufacturer's quality control data had been submitted for. The panel numbers on-site were WO2903-1, WO2903-2, WO2567-1 and WO2568-1. These panels were fabricated by Environmental Protection Inc. and the roll numbers matched the project data.

CCS was ready to begin welding the PVC liner at 2:30pm today. The first trial weld was performed using the fusion welding and all peel tests passed, but failures were observed in the shear test. CCS attempted to change the temperature and speed on the fusion welder, but the results were still not acceptable to proceed.

No production welding was performed today, as passing results were not achieved with the fusion welder on the PVC.

S&ME left the site at the end of the day, all field observations were reported to Larry Hofius with AEP.

Photo 1: Sewing machine being used to stitch the geotextile panels together.

Photo 2: Looking north CCS has began covering up the berm with geotextile.

Project:	Rockport Landfill Seepage Repair	**Job Number:**	217736
Client:	American Electric Power	**Date:**	9/15/2021
Inspector:	David Ver Hulst	**Weather:**	Partly Cloudy / 70-84°F
Contractor:	Chesapeake Containment Systems (CCS)		

General Summary of Observations

Summary of Discrepancies				
ID	Discrepancy	Remediated (Y/N)	Discrepancy Informed to	Review Required
A				
B				

S&ME representative David Ver Hulst was on-site to observe the construction progress at the AEP (American Electric Power) Rockport Landfill Seepage Repair project being performed by Chesapeake Containment Systems (CCS).

After reviewing the test results from the prior day, it was determined that the speed of the tensiometer was incorrect for the PVC material. The rate being used was too slow and needed to be increased. With the correct testing parameters, the results for the trial weld passed, and CCS began welding the PVC.

CCS started by fusion welding all seams where they were able to, and temporarily leister/thermal welding seams and repair patches with a heat gun for the rest. The leister weld was used as a temporary measure on all patches until the adhesive is delivered to the site. That way the leachate could be contained behind the rain flap and directed to the underdrain pipe. Any future patch will completely surround/encompass the prior leister welded area. As such, none of the patches performed today are considered permanent.

At this time there was no adhesive on site, CCS is currently ordering 2 cans to be delivered the following week.

By the end of the day CCS was finishing up their welds, with the last location being the boot around the leachate collection pipe extending through the liner from the underdrain within. Due to leachate water coming through the berm area, CCS was not able to complete the boot today and will resume tomorrow.

A laboratory destructive test sample (LDT-1) was taken from the fusion weld between panels 1 and 2 at the top of the berm. The destructive test samples was sent to TRI for testing. S&ME left the site at the end of the day,

All field observations were reported to Larry Hofius with AEP.

Photo 1: Looking north CCS deployed the PVC liner over the geotextile and bottom ash berm.

Photo 2: Looking at the south end tie-in points.

Project:	Rockport Landfill Seepage Repair	**Job Number:**	217736
Client:	American Electric Power	**Date:**	9/16/2021
Inspector:	David Ver Hulst	**Weather:**	Partly Cloudy / 64-84°F
Contractor:	Chesapeake Containment Systems (CCS)		

General Summary of Observations

Summary of Discrepancies				
ID	Discrepancy	Remediated (Y/N)	Discrepancy Informed to	Review Required
A				
B				

S&ME representative David Ver Hulst was on-site to observe the construction progress at the AEP (American Electric Power) Rockport Landfill Liner Repair project being performed by Chesapeake Containment Systems (CCS).

CCS continued this morning to seal up the PVC liner repair area using only temporary leister welds, as no adhesive was on-site for the repair patches. By early afternoon, they were able to get a temporary patch on all areas, including banding and sealing around the leachate pipe protruding through the liner form the underdrain.

A second CCS crew will return to the site in the coming weeks to finish the liner for the seepage repair. Until that time, work is on-hold at the landfill seepage repair.

All field observations were reported to Larry Hofius with AEP.

Photo 1: Looking at the north end the existing and new PVC liner has been fusion welded together.

Project:	Rockport Landfill Seepage Repair	**Job Number:**	217736
Client:	American Electric Power	**Date:**	9/28/2021
Inspector:	David Ver Hulst	**Weather:**	Sunny / 61-88°F
Contractor:	Chesapeake Containment Systems (CCS)		

General Summary of Observations

Summary of Discrepancies				
ID	Discrepancy	Remediated (Y/N)	Discrepancy Informed to	Review Required
A				
B				

S&ME representative David Ver Hulst was on-site to observe the construction progress at the AEP (American Electric Power) Rockport Landfill Seepage Repair project being performed by Chesapeake Containment Systems (CCS).

No work had taken place at the landfill seepage repair since CCS left the site on September 16. Since that time, results were obtained for LDT-1 with acceptable values reported.

CCS arrived on site today to continue the repairs of the PVC liner at the Landfill. The adhesive for the PVC liner arrived earlier in the week for CCS to use in their repairs. All previous repairs made using thermal welding, or repairs identified at fusion welding locations will be repaired with a new adhesive patch.

CCS performed a trial weld with the adhesive patch. Results cannot be obtained for 24 hours, so CCS did not continue any other welding today.

CCS worked on other site clean-up activities and completed liner work at a separate project while on-site today.

All field observations were reported to Larry Hofius with AEP.

Photo 1: CCS using adhesive on the PVC liner to produce a trial weld.

Project:	Rockport Landfill Seepage Repair	**Job Number:**	217736
Client:	American Electric Power	**Date:**	9/29/2021
Inspector:	David Ver Hulst	**Weather:**	Sunny / 75-90°F
Contractor:	Chesapeake Containment Systems (CCS)		

General Summary of Observations

Summary of Discrepancies				
ID	Discrepancy	Remediated (Y/N)	Discrepancy Informed to	Review Required
A				
B				

S&ME representative David Ver Hulst was on-site to observe the construction progress at the AEP (American Electric Power) Rockport Landfill Seepage Repair project being performed by Chesapeake Containment Systems (CCS).

The trial weld for the adhesive weld was broken today by CCS with acceptable results for both peel and shear.

S&ME sent a sample from the trial weld (LDT-2) to TRI for 3rd party-confirmation testing.

CCS decided to wait on those 3rd party results before proceeding with additional liner patching.

All field observations were reported to Larry Hofius with AEP.

Project:	Rockport Landfill Seepage Repair	**Job Number:**	217736
Client:	American Electric Power	**Date:**	10/2/2021
Inspector:	David Ver Hulst	**Weather:**	Partly Cloudy, some showers 68-73°F
Contractor:	Chesapeake Containment Systems (CCS)		

General Summary of Observations

Summary of Discrepancies				
ID	Discrepancy	Remediated (Y/N)	Discrepancy Informed to	Review Required
A				
B				

S&ME representative David Ver Hulst was on-site to observe the construction progress at the AEP (American Electric Power) Rockport Landfill Liner Repair project being performed by Chesapeake Containment Systems (CCS).

S&ME arrived on site to observe the continuation of PVC liner repairs at the landfill. Destruct tests came back passing for the previous trial weld (LDT-2), and CCS has proceeded with the replacement and capping of the previous repairs made. Half of the crew has began with the more typical of repairs primarily on the berm surface higher up from the toe. S&ME observed their technique to match with the technique used to prepare the previous destruct number 2. This included placing adhesive on both surfaces of the liner to be welded, pressing the liner patch in-place and applying pressuring using a rolled on the top-side of the patch along the adhesive weld.

The other half of the crew directed their attention to the north and south ends of the liner at the toe where the new panels tie into the existing. Due to leachate water coming through the bottom of the berm at the patch locations, CCS was unable to complete the patches in these areas today. CCS is using shop vacs and are attempting to lift the liner enough to prevent the water from reaching the leak location, but the flow was not able to be sufficiently stopped to perform the weld. The leachate was being directed to a sump from which it was pumped back into the cell.

The crew ran out of adhesive before the end of the day, and with more on the way CCS plans to continue their work Monday when the next order of adhesive arrives.

A trial weld was created today to represent the adhesive welding performed. CCS will obtain results for the trial weld on Monday, 10/4 after allowing at least a 24-hour cure.

All field observations were reported to Larry Hofius with AEP.

Photo 1: CCS removed and replaced the temporary leister repair at the toe of the berm with an adhesive patch.

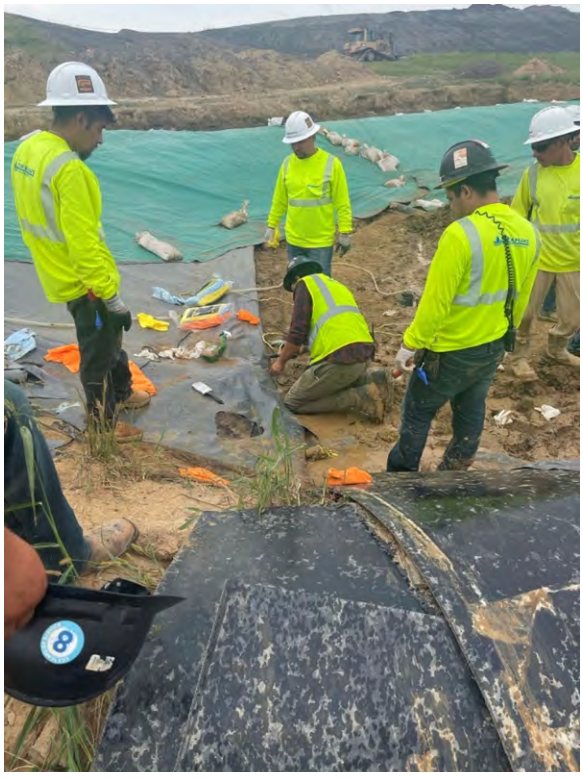

Photo 2: CCS working at the north end of the liner weld between existing and new PVC. The leachate in this area prevented a patch from being made today.

Project:	Rockport Landfill Seepage Repair	**Job Number:**	217736
Client:	American Electric Power	**Date:**	10/4/2021
Inspector:	David Ver Hulst	**Weather:**	Partly Cloudy / 61-79°F
Contractor:	Chesapeake Containment Systems (CCS)		

General Summary of Observations

Summary of Discrepancies				
ID	Discrepancy	Remediated (Y/N)	Discrepancy Informed to	Review Required
A				
B				

S&ME representative David Ver Hulst was on-site to observe the construction progress at the AEP (American Electric Power) Rockport Landfill Liner Repair project being performed by Chesapeake Containment Systems (CCS).

S&ME arrived on site to continue observations of the liner repair at the landfill. CCS continued to work on repairs at the north and south ends at the toe of the berm.

The adhesive that was ordered the previous week arrived on site in the early afternoon, and CCS was able to complete some additional patches using the adhesive weld. Areas remain to be patched on the north and south ends.

The trial weld from Saturday, 10/2 was tested today by CCS with acceptable results achieved. S&ME sent a sample of this trial weld to TRI (LDT-3) for 3rd party conformance testing.

An additional trial weld was made today to represent today's adhesive patching work (LDT-6). This trial weld will be tested tomorrow by CCS.

All field observations were reported to Larry Hofius with AEP.

Photo 1: toward the south end CCS continues to replace the thermal welds at the toe of the berm with an adhesive repair.

Project:	Rockport Landfill Seepage Repair	**Job Number:**	217736
Client:	American Electric Power	**Date:**	10/5/2021
Inspector:	David Ver Hulst	**Weather:**	Partly Cloudy / 60-77°F
Contractor:	Chesapeake Containment Systems (CCS)		

General Summary of Observations

Summary of Discrepancies				
ID	Discrepancy	Remediated (Y/N)	Discrepancy Informed to	Review Required
A				
B				

S&ME representative David Ver Hulst was on-site to observe the construction progress at the AEP (American Electric Power) Rockport Landfill Liner Repair project being performed by Chesapeake Containment Systems (CCS).

S&ME arrived on site to continue observations of the liner repair at the landfill. CCS continued to work on repairs at the north and south ends at the toe of the berm.

CCS continues to use techniques to create a dry work area for an effective weld. CCS is using shop vacs to remove leachate that enters the welding area and they are modifying the temporary berm outside the work area to raise the weld location off the floor.

CCS was using the leister gun to get temporary welds that seal more quickly than the adhesive welding. The leister gun is intended to create a temporary weld to provide a dry work space for the adhesive welding to resume. Before the end of the day Chesapeake sealed up all leaks, but further observations will have to be made the following day to see if they are ok for placing an adhesive patch overtop.

3rd party results were obtained form the trial weld performed on 10/2. Acceptable results were reported (LDT-3). CCS also recorded acceptable results for both peel and shear for the trail weld made to represent the adhesive patches on 10/04 (LDT-6). (Note: This trial weld was ultimately sent for 3rd party testing and acceptable results were recorded).

All field observations were reported to Larry Hofius with AEP.

Photo 1: At the north end of the berm CCS is repairing the weld between the existing and new PVC liner.

Project:	Rockport Landfill Seepage Repair	**Job Number:**	217736
Client:	American Electric Power	**Date:**	10/6/2021
Inspector:	Matt Shuler	**Weather:**	Cloudy 66-75°F
Contractor:	Chesapeake Containment Systems		

General Summary of Observations

Summary of Discrepancies				
ID	Discrepancy	Remediated (Y/N)	Discrepancy Informed to	Review Required
A				
B				

S&ME representative Matt Shuler was on-site to observe the construction progress at the AEP (American Electric Power) Rockport Landfill Seepage Repair project performed by Chesapeake Containment Systems.

While on site, S&ME observed Chesapeake begin work by continuing to apply the adhesive patches in the areas that were temporarily welded yesterday to stop the flow of leachate into the work area. CCS applied EPI VA-611-2 chemical fusion agent around perimeter of each patched area, per manufacturer's recommendations. PVC segments were then installed over patched areas by pressing material together with hand held seam rollers.

After adhesive patch repairs were complete, S&ME observed preliminary non-destructive air lance testing at repair seams that had been completed prior to today. Some failures were identified that were repaired with an additional patch or solvent mixture.

Air lance testing was also performed on all factory seams for the panels, where still exposed. No deficiencies were observed in the factory seams.

Photo 1: Removing water with shop-vac to prep area for adhesive patches.

Photo 2: Preparing area to apply adhesive chemical patch.

Photo 3: Applying chemical adhesive patch.

Project:	Rockport Landfill Seepage Repair	**Job Number:**	217736
Client:	American Electric Power	**Date:**	10/07/2021
Inspector:	Matt Shuler	**Weather:**	Partly sunny, 70-81°F
Contractor:	Chesapeake Containment Systems		

General Summary of Observations

Summary of Discrepancies				
ID	Discrepancy	Remediated (Y/N)	Discrepancy Informed to	Review Required
A				
B				

S&ME representative Matt Shuler was on-site to observe the construction progress at the AEP (American Electric Power) Rockport Landfill Seepage Repair project performed by Chesapeake Containment Systems.

While on site, S&ME observed Chesapeake begin work by continuing to place adhesive chemical patches at various areas. Due to difficulties in getting the area welded properly, CCS decided to cut out a portion of the PVC liner at the north end of the berm and re-start with a new section of PVC in this area. This would allow them to have a better tie-in seam with the existing floor liner. The area removed and replaced was approximately 30 feet along the berm and 5 feet wise (up the berm).

The PVC used for the repair was a new panel brought to the site by CCS. S&ME requested Manufacturer's Quality Control data for the panel (WO1605-1 and WO1605-2) from CCS.

The Contractor temporarily shifted underdrain pipe and removed bottom ash from above existing floor liner, 3 feet inward from the toe of the berm. After cleaning floor liner a new PVC panel was then fusion welded to floor liner. After air lancing the seam, the pipe and bottom ash were replaced and the panel was folded over and fusion welded to existing panel along the exterior berm. Several chemical adhesive patches were applied to transition areas on the new panel seam.

Prior to performing the fusion weld, S&ME observed the contractor perform peel and shear tests on trial welded PVC material with acceptable results. A sample of the trial weld was obtained and sent to Tri Environmental for 3rd-party lab testing (LDT-4).

Prior to performing the adhesive welds today, CCS created a trial weld (LDT-5) using the same methods as the patches performed today. The trial weld was not tested by CCS today, as they were allowing a 24-hour cure period.

S&ME also observed contractor begin fabricating and installing the PVC boot around the underdrain outlet pipe.

Photo 1: Placing new PVC panel to connect to existing floor liner.

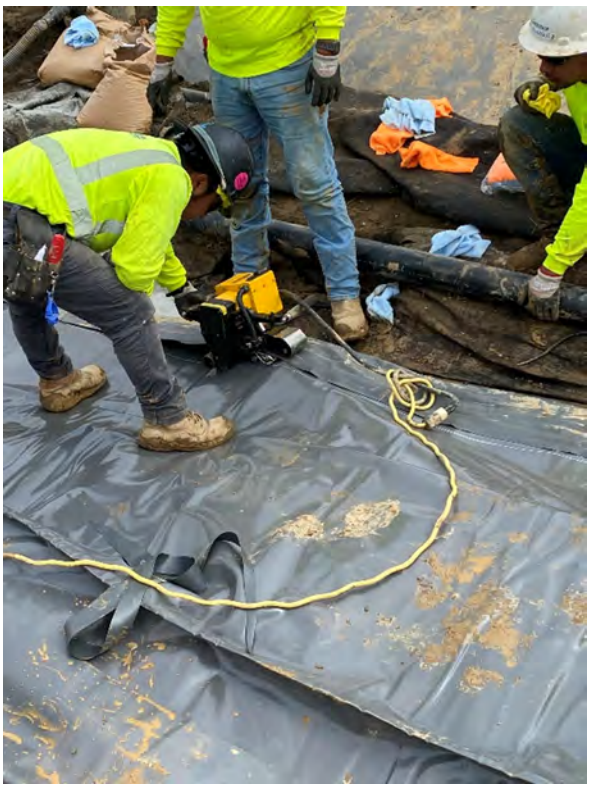

Photo 2: Wedge welding new PVC panel to existing floor.

Photo 3: Air lance testing wedge weld seam at floor.

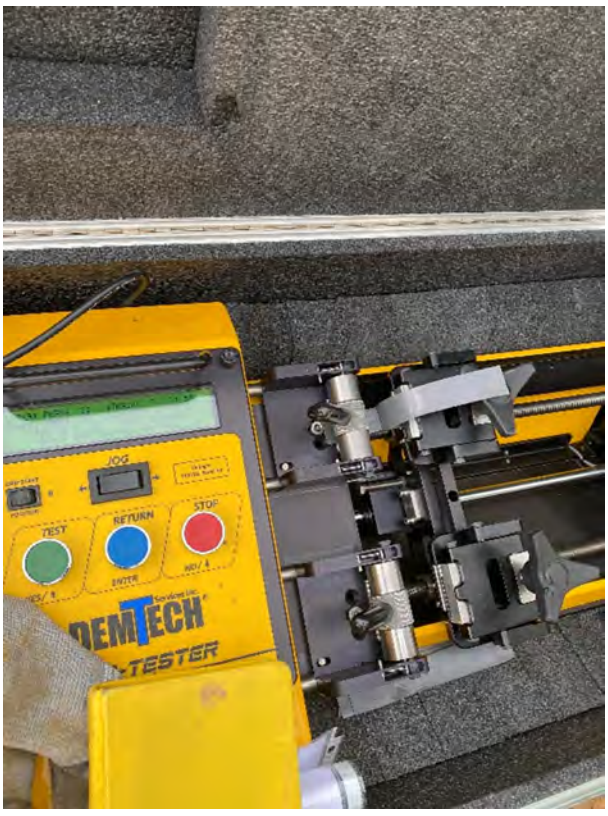

Photo 4: Field tests on fusion trial weld.

Project:	Rockport Liner Repair	**Job Number:**	217736
Client:	American Electric Power	**Date:**	10/08/2021
Inspector:	Matt Shuler	**Weather:**	Sunny, 77-81°F
Contractor:	Chesapeake Containment Systems		

General Summary of Observations

Summary of Discrepancies				
ID	Discrepancy	Remediated (Y/N)	Discrepancy Informed to	Review Required
A				
B				

S&ME representative Matt Shuler was on-site to observe the construction progress at the AEP (American Electric Power) Rockport Landfill Seepage Repair project performed by Chesapeake Containment Systems.

While on site, S&ME observed Chesapeake begin work by continuing to place adhesive chemical patches at several locations that remained to be repaired, including the south end of the berm at the toe of the slope.

The trial weld created yesterday (LDT-5) was tested by CCS with acceptable results. The additional sample was given to S&ME to ship to TRI for 3rd party testing.

S&ME observed Chesapeake continue the PVC boot installation around underdrain outlet pipe. This consisted of several preliminary leister patches and chemical adhesive patches encasing pipe and surrounding area. S&ME observed passing air lance tests on all preliminary adhesive patches prior to installation of final chemical adhesive patching encompassing all transitions/corrections at boot area.

S&ME then observed air lance tests on all remaining chemical adhesive patches, panel seams, and factory seams. In the event of air penetration through a seam, the area was marked, repaired with new patch or chemical agent, and retested with passing results observed. See Geomembrane Defect & Repair Log.

Lastly, S&ME observed Chesapeake place geotextile fabric (GE 110) over entire berm as a separation layer between PVC geomembrane and backfill clay material.

Results were also received today for the fusion weld trial seam sent to TRI from testing completed on 10/7/21. Results met or exceeded project requirements (LDT-4).

Photo 1: Placing new chemical patch over repaired area on south end of berm.

Photo 2: Adding PVC segments to begin construction of boot for outlet

Photo 3: Geotextile fabric covering completed PVC geomembrane.

Project:	Rockport Liner Repair	**Job Number:**	217736
Client:	American Electric Power	**Date:**	10/12/2021
Inspector:	Matt Shuler	**Weather:**	Partly sunny, 66-75°F
Contractor:	Enerfab		

General Summary of Observations

Summary of Discrepancies				
ID	Discrepancy	Remediated (Y/N)	Discrepancy Informed to	Review Required
A				
B				

S&ME representative Matt Shuler arrived on-site to meet with Larry Hofius, with AEP (American Electric Power) and observe the construction progress of the Rockport Landfill Seepage Repair project.

While on site, S&ME observed the continuation of backfilling the berm area containing PVC geomembrane repairs made by Chesapeake Containment Systems. Placement of soil backfill over the berm was started on Monday, 10/7/21. Today, S&ME observed Enerfab place topsoil over the previously placed soil backfill in preparation for final seed and straw.

Per discussion with Mr. Hofius, the previous day, Enerfab began placing backfill over PVC berm. Backfill was a clayey-soil material from an on-site borrow area. Operator placed material in 6 inch loose lifts; any clods in the material were broken down prior to placement to limit pressure placed on the berm geosynthetics.

AEP operators plan to continue grading and shaping the topsoil to tie into existing slope and follow up with seed and straw. S&ME was not requested on-site for further observations.

Test results were received for the trial weld (LDT-5) that was sent out for 3rd party testing from the 10-07 adhesive welds. Passing results were recorded.

Photo 1: Clay backfill placed on berm on prior day.

Photo 2: Topsoil stockpiled and ready for placement.

PVC Geomembrane

Field Installation Logs

Rockport Fly Ash Landfill

Rockport, Indiana

GEOMEMBRANE SEAM LOG

Date: 9/15/2021
Tech Initials: AV
Machine Nunmber: MX 64

S&ME Project No.: 217736
Project Name: Rockport Plant Landfill
Project Location: Rockport, IN
Description: Landfill Liner Repair
Page: 1 of 2

Project Total Carry Over
Welder Tech. Carry Over 0 | 0

Seam Panels	Seam Start/Finish	Time	Length Welded	Length From Previous Destr.	Located Destr. Number	Test Type - Air Lance	Air Lance Non-Destructive Test				Remarks[1] (ZONE)
							Tech. Init.	QC Init.	Pass/Fail	Date	
1 / 2	E / W	7:27	25	12/0	LDT 1	AL	PF	MS	Pass	10/8	
1 / ExW	N / S	7:34	85	85		AL	PF	MS	Pass	10/8	
2 / ExN	E / W	8:20	25	110		AL	PF	MS	Pass	10/8	
1 / ExS	E / W	8:35	25	135		AL	PF	MS	Pass	10/8	
4 / ExE	S / N	12:15	16	151							Seam Replaced with Cap Strip
4 / ExW	S / N	12:20	16	167							Seam Replaced with Cap Strip
/	/										
/	/										
/	/										
/	/										
/	/										
Sheet Total			192	180	**Destructive Carry Over**						
Total to Date			192								

Notes:

CQA Personnel: MS

1: Indicate if test was for entire length of seam or partial seam; and if "partial", provide seam section footage in comments (i.e. south edge to 260' north).

GEOMEMBRANE SEAM LOG

Date: 10/7/2021
Tech Initials: JV
Machine Nunmber: M1719

S&ME Project No.: 217736
Project Name: Rockport Plant Landfill
Project Location: Rockport, IN
Description: Landfill Liner Repair
Page: 2 of 2

Project Total Carry Over
Welder Tech. Carry Over 0 | 0

Seam Panels	Seam Start/Finish	Time	Length Welded	Length From Previous Destr.	Located Destr. Number	Test Type - Air Lance	Air Lance Non-Destructive Test				Remarks[1] (ZONE)
							Tech. Init.	QC Init.	Pass/Fail	Date	
2 / 3	S / N	9:00	19	19		AL	PF	MS	Pass	10/8	
1 3	na na	9:10	9	28		AL	PF	MS	Pass	10/8	Adhesive Weld
3 / ExE	S / N	12:15	27	55		AL	PF	MS	Pass	10/8	
3 / ExN	S / N	12:20	12	67		AL	PF	MS	Pass	10/8	
/	/										
/	/										
/	/										
/	/										
/	/										
Sheet Total			67	67	**Destructive Carry Over**						
Total to Date			67								

Notes: LDT 4 was obtained today on a trial weld and sent for 3rd party testing due to overall size of welding area.

CQA Personnel: MS

1: Indicate if test was for entire length of seam or partial seam; and if "partial", provide seam section footage in comments (i.e. south edge to 260' north).

GEOMEMBRANE TRIAL SEAM LOG

S&ME Project No.: 217736
Project Name: Rockport Plant Landfill
Project Location: Rockport, IN
Description: Landfill Seepage Repair
Page: 1 **of** 1

					Machine Settings		Peel Test Results					Shear Test Results									
Sample No.	Approx. Time	Tech. Init.	Mach. No.	Ambient Temp.	Preheat or Speed	Temp. Setting	1	2	3	4	5	1	2	3	4	5	Pass/ Fail	Weld Type	Material	CQA Init.	Date
1	1:55	AV	3786	87	500	800	17	18	15	21	18	48	51	51	53	60	**Fail**	F	PVC	AV	9/14
2	3:40	AV	3786	85	500	800	22	19	21	19	25	52	56	60	57	60	**Fail**	F	PVC	AV	9/14
3	5:15	AV	3786	85	450	800						56	62	64	57	60	**Fail**	F	PVC	AV	9/14
4	6:30am	AV	3786	71	500	800	35	39	33	31	30	79	80	78	79	75	**Pass**	F	PVC	AV	9/15
5	5:00	ED	NA	85	NA	NA	26	28	29	29	27	64	69	53	65	61	**Pass**	A	PVC	MM	9/30
6	8:40	ED	NA	69	NA	NA	26	28	29	29	27	64	58	61	61	58	**Pass**	A	PVC	MM	10/5
7	11:00	JV	1719	73	700	780	33	28	21	29	27	64	59	59	59	58	**Pass**	F	PVC	MM	10/7
8	2:10	JV	1719	77	700	780	23	22	20	29	25	61	61	61	58	60	**Pass**	F	PVC	MM	10/7

Weld Type: (**Ex**)trusion, (**F**)usion, (**A**)dhesive

Adhesive welds were allowed to cure for 24 hours prior to testing.

30 mil Specification: Shear ≥ 58 ppi, Peel ≥ 15 ppi

Laboratory Destructive Test Notes (see results reported separately):
LDT-2 was an adhesive trial weld created on 9/28
LDT-3 was an adhesive weld created on 10/02
LDT-6 was an adhesive trial weld created on 10/04
LDT - 4 was a fusion trial weld created on 10/07
LDT-5 was an adhesive trial weld created on 10/07

CQA Personnel: DCV MS

GEOMEMBRANE DEFECT & REPAIR LOG

S&ME Project No.: 217736
Project Name: Rockport Plant Landfill
Project Location: Rockport, IN
Description: Landfill Liner Repair

Repair Log No.	1

Defect					Repair						Non-Destructive Test				
Defect Code		Defect Panels	Defect Type	Location of Defect	Approximate Dimensions	Repair Type	Tech. Initials	Machine ID	CQA Initials	Date	Test Type	Tech. Initials	CQA Initials	Pass / Fail	Date
R-	1	P1/EL	O	6' from WEOS	2' x 27'	CAP	EA	N/A	MM	10/2/21	AL	ED	MS	P	10/6/21
R-	2	P1/EL	O	3' from EEOS	2.5' x 2.5'	P	EA	N/A	MM	10/2/21	AL	ED	MS	P	10/6/21
R-	3	P1/P4/EL	O	5' from NEOS	6' x 6'	CAP	EA	N/A	MM	10/2/21	AL	ED	MS	P	10/6/21
R-	4	P4/EL	O	9' from NEOS	2' x 2'	P	EA	N/A	MM	10/2/21	AL	ED	MS	P	10/6/21
R-	5	P4/EL	O	15' from NEOS	2' x 6'	CAP	EA	N/A	MM	10/2/21	AL	ED	MS	P	10/7/21
R-	6	P4/EL	O	20' from NEOS	5' x 5'	CAP	EA	N/A	MM	10/4/21	AL	ED	MS	P	10/7/21
R-	7	P4/EL	O	8' from NEOS	2' x 5'	CAP	EA	N/A	MM	10/4/21	AL	ED	MS	P	10/7/21
R-	8	P1/EL	O	17' from WEOS	2' x 5'	CAP	EA	N/A	MM	10/4/21	AL	ED	MS	P	10/7/21
R-	9	P1/EL	O	14' from WEOS	2' x 5'	CAP	EA	N/A	MM	10/4/21	AL	ED	MS	P	10/7/21
R-	10	1/2/3	O	9' from EEOS	2.5' x 4'	CAP	EA	N/A	MM	10/6/21	AL	ED	MS	P	10/7/21
R-	11	1/2/3/EL	O	5' from EEOS	2' x 10'	CAP	EA	N/A	MM	10/6/21	AL	ED	MS	P	10/7/21
R-	12	P2/EL	O	3' from EEOS	2' x 2.5'	P	EA	N/A	MM	10/4/21	AL	ED	MS	P	10/7/21
R-	13	P2/EL	O	8' from EEOS	2' x 2.5'	P	EA	N/A	MM	10/4/21	AL	ED	MS	P	10/7/21
R-	14	P2/EL	O	12' from EEOS	2' x 5'	CAP	EA	N/A	MM	10/6/21	AL	ED	MS	P	10/7/21
R-	15	3/EL	O	7' from NEOS	5' x 5'	P	EA	N/A	MM	10/7/21	AL	ED	MS	P	10/7/21
R-	16	P3/EL	O	NEOS	3.5' x 3.5'	CAP	EA	N/A	AV	10/7/21	AL	ED	MS	P	10/8/21
R-	17	P3/EL	O	5' from NEOS	2' x 4'	CAP	EA	N/A	AV	10/7/21	AL	ED	MS	P	10/8/21
R-	18	2/3//EL/R14	O	9' from NEOS	2' x 5'	CAP	EA	N/A	AV	10/7/21	AL	ED	MS	P	10/8/21
R-	19	P3/P2	O	11' from NEOS	2' x 3'	P	EA	N/A	ED	10/7/21	AL	ED	MS	P	10/8/21
R-	20	2/3/R10	O	SEOS	2' x 2'	P	EA	N/A	ED	10/7/21	AL	ED	MS	P	10/8/21
R-	21	1/3/EL/R11	O	2' from SEOS	5' x 5'	P	EA	N/A	ED	10/8/21	AL	ED	MS	P	10/8/21
R-	22	P2/EL	O	7' from WEOS	5' x 5'	P	EA	N/A	ED	10/8/21	AL	ED	MS	P	10/8/21
R-	23	P1/R9	O	14' from WEOS	2' x 10'	P	EA	N/A	JV	10/8/21	AL	ED	MS	P	10/8/21
R-	24	P1	O	15' from WEOS	2' x 5'	P	EA	N/A	JV	10/8/21	AL	ED	MS	P	10/8/21
R-	25	P4/R5/R6	O	19' from NEOS	2' x 2'	P	EA	N/A	JV	10/8/21	AL	ED	MS	P	10/8/21

Remarks:

Defect Type: **AT** - Air Test **LDT** - Laboratory Destructive Testing, **FDT** - Field Destructive Testing, **T** - T weld, **O** - Other

Repair Type: **G&W** - Grind and Weld, **P**- Patch, **CAP** - Cap Strip

Location Example: 5' from EEOS (5-ft from East End of Seam), INT (Intersection)

Testing Type: **SP** - Spark Test, **VB** - Vacuum Box Test, AL - Air Lance

Vacuum Box Requirements: Energize to 5 psig, view for 10 seconds at pressure

GEOMEMBRANE DEFECT & REPAIR LOG

S&ME Project No.: 217736
Project Name: Rockport Plant Landfill
Project Location: Rockport, IN
Description: Landfill Liner Repair

Repair Log No. 2

Defect				Repair						Non-Destructive Test				
Defect Code	Defect Panels	Defect Type	Location of Defect	Approximate Dimensions	Repair Type	Tech. Initials	Machine ID	CQA Initials	Date	Test Type	Tech. Initials	CQA Initials	Pass / Fail	Date
R- 26	R6/EL	O	19' from NEOS	2' x 2'	P	JV	N/A	MS	10/8/21	AL	ED	MS	P	10/8/21
R- 27	R6	O	19' from EEOS	2' x 2'	P	JV	N/A	MS	10/8/21	AL	ED	MS	P	10/8/21
R-														
R-														
R-														
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Remarks:

Defect Type: **AT** - Air Test **LDT** - Laboratory Destructive Testing, **FDT -** Field Destructive Testing**, T -** T weld, **O -** Other

Repair Type: **G&W** - Grind and Weld, **P**- Patch, **CAP** - Cap Strip

Testing Type: **SP** - Spark Test, **VB** - Vacuum Box Test, AL - Air Lance

Location Example: 5' from EEOS (5-ft from East End of Seam), INT (Intersection)

Vacuum Box Requirements: Energize to 5 psig, view for 10 seconds at pressure

September 20, 2021

Mail To:

Jason Ross
S & ME, Inc.
6190 Enterprise Ct.
Dublin, OH 43016

email: jdross@smeinc.com
email: dverhulst@smeinc.com

Bill To:

<= Same (Project # 217736)

Dear Mr. Ross:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs.
TRI is pleased to submit this final report of the laboratory testing for the sample(s) listed below.

Project:	**Rockport Landfill Seepage Repair**
TRI Job Reference Number:	67077
Material(s) Tested:	1, PVC Fusion Weld Seam
Test(s) Requested:	Peel and Shear (ASTM D7408)

Codes	
AD	Adhesion failure (100% Peel)
BRK	Break in sheeting away from Seam edge
SE	Break in sheeting at edge of seam
AD-BRK	Break in sheeting after some adhesion failure - partial peel
SIP	Separation in the plane of the sheet (leaving the bond intact)
FTB	Film tearing bond (all non "AD" failures)
NON-FTB	100% peel

If you have any questions or require any additional information, please call us at 1-800-880-8378

Sincerely,

Jarrett A. Nelson

Jarrett A. Nelson
Technical Director
Geosynthetic Services Division
www.GeosyntheticTesting.com

*Signature is on file

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: S & ME, Inc.
Project: Rockport Landfill Seepage Repair

Material: PVC Seam
Peel and Shear (ASTM D7408)
TRI Log #: 67077

PARAMETER			TEST REPLICATE 1	2	3	4	5	MEAN	STD. DEV.
Sample ID:	**LDT-1**	Fusion Weld Seam							
Material:	**30 mil PVC**								
Peel @ 2 inches per minute								Peel	
Peel Strength (ppi)			33.54	31.95	34.35	35.40	32.08	33.46	1.12
Peel Incursion (%)			100	30	80	80	30		
Peel Locus of Failure Code			AD	AD-BRK	AD-BRK	AD-BRK	AD-BRK		
Peel NSF Failure Code			NON-FTB	FTB	FTB	FTB	FTB		
Shear @ 20 inches per minute								Shear	
Shear Strength (lb/in)			77.76	78.55	72.98	70.91	68.88	73.82	0.56
Shear Locus of Failure Code			SE-1	SE-1	SE-1	SE-1	SE-1		
Shear Elongation @ Max Load (%)			>50	>50	>50	>50	>50		

Seam has been conditioned at laboratory temperature for 4 hour before testing.

October 2, 2021

Mail To:

Jason Ross
S & ME, Inc.
6190 Enterprise Ct.
Dublin, OH 43016

email: jdross@smeinc.com

Bill To:

<= Same (Project # 217736)

Dear Mr. Ross:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs.
TRI is pleased to submit this final report of the laboratory testing for the sample(s) listed below.

Project:	**AEP Rockport LF Seepage Repair**
TRI Job Reference Number:	67472
Material(s) Tested:	1, PVC Adhesive Weld Seam
Test(s) Requested:	Peel and Shear (ASTM D7408)

Codes	
AD	Adhesion failure (100% Peel)
BRK	Break in sheeting away from Seam edge
SE	Break in sheeting at edge of seam
AD-BRK	Break in sheeting after some adhesion failure - partial peel
SIP	Separation in the plane of the sheet (leaving the bond intact)
FTB	Film tearing bond (all non "AD" failures)
NON-FTB	100% peel

If you have any questions or require any additional information, please call us at 1-800-880-8378

Sincerely,

Jarrett A. Nelson

Jarrett A. Nelson
Technical Director
Geosynthetic Services Division
www.GeosyntheticTesting.com

*Signature is on file

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: S & ME, Inc.
Project: AEP Rockport LF Seepage Repair

Material: PVC Seam
Peel and Shear (ASTM D7408)
TRI Log #: 67472

PARAMETER			TEST REPLICATE 1	2	3	4	5	MEAN	STD. DEV.
Sample ID:	**LDT-2**	Adhesive Weld Seam							
Material:	**30 mil PVC**								
Peel @ 2 inches per minute								Peel	
Peel Strength (ppi)			34.76	36.71	35.81	37.95	39.85	37.02	1.38
Peel Incursion (%)			100	100	40	50	100		
Peel Locus of Failure Code			AD	AD	AD-BRK	AD-BRK	AD		
Peel NSF Failure Code			NON-FTB	NON-FTB	FTB	FTB	NON-FTB		
Shear @ 20 inches per minute								Shear	
Shear Strength (lb/in)			71.64	62.17	67.86	63.06	60.72	65.09	6.70
Shear Locus of Failure Code			SE-1	SE-1	SE-1	SE-1	SE-1		
Shear Elongation @ Max Load (%)			>50	>50	>50	>50	>50		

Per client request, the 40 hour laboratory conditioning period was omitted.

October 5, 2021

Mail To:

Jason Ross
S & ME, Inc.
6190 Enterprise Ct.
Dublin, OH 43016

email: jdross@smeinc.com

Bill To:

<= Same (Project # 217736)

Dear Mr. Ross:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs.
TRI is pleased to submit this final report of the laboratory testing for the sample(s) listed below.

Project:	**AEP Rockport LF Seepage Repair**
TRI Job Reference Number:	67530
Material(s) Tested:	1, PVC Adhesive Weld Seam
Test(s) Requested:	Peel and Shear (ASTM D7408)

Codes	
AD	Adhesion failure (100% Peel)
BRK	Break in sheeting away from Seam edge
SE	Break in sheeting at edge of seam
AD-BRK	Break in sheeting after some adhesion failure - partial peel
SIP	Separation in the plane of the sheet (leaving the bond intact)
FTB	Film tearing bond (all non "AD" failures)
NON-FTB	100% peel

If you have any questions or require any additional information, please call us at 1-800-880-8378

Sincerely,

Jarrett A. Nelson

Jarrett A. Nelson
Technical Director
Geosynthetic Services Division
www.GeosyntheticTesting.com

*Signature is on file

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: S & ME, Inc.
Project: AEP Rockport LF Seepage Repair

Material: PVC Seam
Peel and Shear (ASTM D7408)
TRI Log #: 67530

PARAMETER			TEST REPLICATE 1	2	3	4	5	MEAN	STD. DEV.
Sample ID:	**LDT-3**	Adhesive Weld Seam							
Material:	**30 mil PVC**								
Peel @ 2 inches per minute								Peel	
Peel Strength (ppi)			39.83	39.74	38.82	37.92	42.05	39.67	0.06
Peel Incursion (%)			70	50	70	90	90		
Peel Locus of Failure Code			AD-BRK	AD-BRK	AD-BRK	AD-BRK	AD-BRK		
Peel NSF Failure Code			FTB	FTB	FTB	FTB	FTB		
Shear @ 20 inches per minute								Shear	
Shear Strength (lb/in)			83.28	84.00	84.53	80.99	83.55	83.27	0.51
Shear Locus of Failure Code			SE-1	SE-1	SE-1	SE-1	SE-1		
Shear Elongation @ Max Load (%)			>50	>50	>50	>50	>50		

Per client request, the 40 hour laboratory conditioning period was omitted.

October 8, 2021

Mail To:

Jason Ross
S & ME, Inc.
6190 Enterprise Ct.
Dublin, OH 43016

email: jdross@smeinc.com

Bill To:

<= Same (Project # 217736)

Dear Mr. Ross:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs.
TRI is pleased to submit this final report of the laboratory testing for the sample(s) listed below.

Project:	**AEP Rockport LF Seepage Repair**
TRI Job Reference Number:	67656
Material(s) Tested:	1, PVC Fusion Weld Seam
Test(s) Requested:	Peel and Shear (ASTM D7408)

Codes	
AD	Adhesion failure (100% Peel)
BRK	Break in sheeting away from Seam edge
SE	Break in sheeting at edge of seam
AD-BRK	Break in sheeting after some adhesion failure - partial peel
SIP	Separation in the plane of the sheet (leaving the bond intact)
FTB	Film tearing bond (all non "AD" failures)
NON-FTB	100% peel

If you have any questions or require any additional information, please call us at 1-800-880-8378

Sincerely,

Jarrett A. Nelson

Jarrett A. Nelson
Technical Director
Geosynthetic Services Division
www.GeosyntheticTesting.com

*Signature is on file

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: S & ME, Inc.
Project: AEP Rockport LF Seepage Repair

Material: PVC Seam
Peel and Shear (ASTM D7408)
TRI Log #: 67656

PARAMETER			TEST REPLICATE 1	2	3	4	5	MEAN	STD. DEV.
Sample ID:	**LDT-4**	Fusion Weld Seam							
Material:	**30 mil PVC**								
Peel @ 2 inches per minute								Peel	
Peel Strength (ppi)			31.94	27.62	28.15	27.35	29.53	28.92	3.05
Peel Incursion (%)			50	100	50	100	100		
Peel Locus of Failure Code			AD-BRK	AD	AD-BRK	AD	AD		
Peel NSF Failure Code			FTB	NON-FTB	FTB	NON-FTB	NON-FTB		
Shear @ 20 inches per minute								Shear	
Shear Strength (lb/in)			70.13	73.26	73.66	73.24	70.57	72.17	2.21
Shear Locus of Failure Code			SE-1	SE-1	SE-1	SE-1	SE-1		
Shear Elongation @ Max Load (%)			>50	>50	>50	>50	>50		

October 12, 2021

Mail To:

Jason Ross
S & ME, Inc.
6190 Enterprise Ct.
Dublin, OH 43016

email: jdross@smeinc.com

Bill To:

<= Same (Project # 217736)

Dear Mr. Ross:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs.
TRI is pleased to submit this final report of the laboratory testing for the sample(s) listed below.

Project:	**AEP Rockport LF Seepage Repair**
TRI Job Reference Number:	67723
Material(s) Tested:	1, PVC Adhesive Weld Seam
Test(s) Requested:	Peel and Shear (ASTM D7408)

Codes	
AD	Adhesion failure (100% Peel)
BRK	Break in sheeting away from Seam edge
SE	Break in sheeting at edge of seam
AD-BRK	Break in sheeting after some adhesion failure - partial peel
SIP	Separation in the plane of the sheet (leaving the bond intact)
FTB	Film tearing bond (all non "AD" failures)
NON-FTB	100% peel

If you have any questions or require any additional information, please call us at 1-800-880-8378

Sincerely,

Jarrett A. Nelson

Jarrett A. Nelson
Technical Director
Geosynthetic Services Division
www.GeosyntheticTesting.com

*Signature is on file

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: S & ME, Inc.
Project: AEP Rockport LF Seepage Repair

Material: PVC Seam
Peel and Shear (ASTM D7408)
TRI Log #: 67723

PARAMETER			TEST REPLICATE 1	2	3	4	5	MEAN	STD. DEV.
Sample ID:	**LDT-5**	Adhesive Weld Seam							
Material:	**30 mil PVC**								
Peel @ 2 inches per minute								Peel	
Peel Strength (ppi)			*	*	*	*	*		
Peel Incursion (%)			*	*	*	*	*		
Peel Locus of Failure Code			*	*	*	*	*		
Peel NSF Failure Code			*	*	*	*	*		
Shear @ 20 inches per minute								Shear	
Shear Strength (lb/in)			84.33	78.72	78.94	89.94	84.55	83.30	3.97
Shear Locus of Failure Code			SE-1	SE-1	SE-1	SE-1	SE-1		
Shear Elongation @ Max Load (%)			>50	>50	>50	>50	>50		

Per client request, the 40 hour laboratory conditioning period was omitted. *No tab available for peel testing.

October 20, 2021

Mail To:

Jason Ross
S & ME, Inc.
6190 Enterprise Ct.
Dublin, OH 43016

email: jdross@smeinc.com

Bill To:

<= Same (Project # 213500)

Dear Mr. Ross:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs.
TRI is pleased to submit this final report of the laboratory testing for the sample(s) listed below.

Project:	**AEP Rockport LF Leachate Pond**
TRI Job Reference Number:	67934
Material(s) Tested:	1, PVC Adhesive Weld Seam
Test(s) Requested:	Peel and Shear (ASTM D7408)

Codes	
AD	Adhesion failure (100% Peel)
BRK	Break in sheeting away from Seam edge
SE	Break in sheeting at edge of seam
AD-BRK	Break in sheeting after some adhesion failure - partial peel
SIP	Separation in the plane of the sheet (leaving the bond intact)
FTB	Film tearing bond (all non "AD" failures)
NON-FTB	100% peel

If you have any questions or require any additional information, please call us at 1-800-880-8378

Sincerely,

Jarrett A. Nelson

Jarrett A. Nelson
Technical Director
Geosynthetic Services Division
www.GeosyntheticTesting.com

*Signature is on file

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: S & ME, Inc.
Project: AEP Rockport LF Leachate Pond

Material: PVC Seam
Peel and Shear (ASTM D7408)
TRI Log #: 67934

PARAMETER			TEST REPLICATE 1	2	3	4	5	MEAN	STD. DEV.
Sample ID:	**LDT-6**	Adhesive Weld Seam							
Material:	**30 mil PVC**								
Peel @ 2 inches per minute								Peel	
Peel Strength (ppi)			38.79	37.94	35.65	37.96	40.97	38.26	0.60
Peel Incursion (%)			100	100	100	100	100		
Peel Locus of Failure Code			AD	AD	AD	AD	AD		
Peel NSF Failure Code			NON-FTB	NON-FTB	NON-FTB	NON-FTB	NON-FTB		
Shear @ 20 inches per minute								Shear	
Shear Strength (lb/in)			77.42	85.18	82.18	90.04	74.26	81.82	5.49
Shear Locus of Failure Code			SE-1	SE-1	SE-1	SE-1	SE-1		
Shear Elongation @ Max Load (%)			>50	>50	>50	>50	>50		

Per client request, the 40 hour laboratory conditioning period was omitted.

Appendix III –Material Submittals

Plastatech®
Membranes, Fabrics, and Film Solutions

Contain. Control. Comply.

Plastatech® IG *Industrial Grade Geomembrane*

Description

Plastatech® IG geomembrane was developed for applications such as landfills, canals, ponds and other containment purposes. It is formulated to withstand UV exposure, atmospheric pollutants and chemicals commonly found in industrial settings.

Plastatech IG is a non-reinforced PVC membrane that offers excellent lay-flat characteristics and meets PGI-1104 and ASTM D7176 requirements. It is produced in 10, 20, 30 and 40-mil thicknesses.

Uses

- Landfill liners and caps
- Secondary containment
- Wastewater containment
- Containment ponds
- Canals

Installation

Plastatech IG will perform sufficiently when properly field fabricated and incorporated into an installation over a suitable base of pre-consolidated soil.

Contact Plastatech for installation instructions.

Warranty

Contact Plastatech for warranty details.

Storage

Store rolls lengthwise on pallets. Use tarps to keep rolls dry. Keep out of direct sunlight and weather.

Physical Properties

Plastatech IG has been subjected to the following tests.

	TEST METHOD	UNITS	10 MILS	20 MILS	30 MILS	40 MILS
Thickness	ASTM D5199	mils	10.0 ± 5%	20.0 ± 5%	30.0 ± 5%	40.0 ± 5%
Specific Gravity	ASTM D792		1.20 min.	1.20 min.	1.20 min.	1.20 min.
Tensile Properties						
Breaking Strength	ASTM D882	lbf/in.	24 min.	48 min.	73 min.	PENDING
Elongation at Break		%	250 min.	360 min.	380 min.	PENDING
100% Modulus		lbf/in.	10 min.	21 min.	32 min.	PENDING
Tear Resistance	ASTM D1004	lbf	2.5 min.	6.0 min.	8.0 min.	PENDING
Low Temperature	ASTM D1790		Pass at -9.4° F (-23° C)	Pass at -14.8° F (-26° C)	Pass at -20.2° F (-29° C)	PENDING
Dimensional Stability	ASTM D1204	%	4 max.	4 max.	3 max.	PENDING
Water Extraction	ASTM D1239	%	0.15 max.	0.15 max.	0.15 max.	PENDING
Volatile Loss	ASTM D1203	%	1.5 max.	0.9 max.	0.7 max.	PENDING
Resistance to Soil Burial						
Breaking Strength	ASTM G160	% change	5 max.	5 max.	5 max.	5 max.
Elongation at Break		% change	20 max.	20 max.	20 max.	20 max.
100% Modulus		% change	20 max.	20 max.	20 max.	20 max.
Hydrostatic Resistance	ASTM D751 Procedure A	psi	42 min.	68 min.	100 min.	PENDING

Packaging and Color Options

Available Sizes

- Common roll sizes are listed below. Contact Plastatech for custom sizes.

Available Colors

- Black
- Gray

THICKNESS	10 MILS		20 MILS		30 MILS	
Width	76 in.	108 in.	76 in.	108 in.	76 in.	108 in.
Length	1,025 yd. (3,075 feet)	720 yd. (2,160 feet)	480 yd. (1,440 feet)	330 yd. (990 feet)	300 yd. (900 feet)	210 yd. (630 feet)
Roll Area	19,475 sq. ft.	19,440 sq. ft.	9,120 sq. ft.	8,910 sq. ft.	5,700 sq. ft.	5,670 sq. ft.
Approx. Weight	1,300 lb.	1,295 lb.	1,200 lb.	1,175 lb.	1,100 lb.	1,095 lb.

For information on Plastatech, call or visit our website today.

800-892-9358
plastatech.com

Made in the USA

Plastatech Engineering, Ltd.
725 West Morley Drive | Saginaw, Michigan 48601
(800) 892-9358 phone | (989) 754-1626 fax | plastatech.com

Created: 05/06/2015 Revised: 03/04/2016, 12/27/2016, 07/22/2017 – PL080002

The Liner Company

Environmental Protection, Inc.

800 OK LINER

geomembrane.com

September 17, 2021

ATTN: Jennifer Battle
Chesapeake Containment Systems. Inc.
2690-D Salisbury Hwy
Statesville, NC. 28677
Ph: 704-208-3440
Email: jbattle@ccsliner.com

SUBJECT: 30 Mil PVC Panel
PO #21204

Enclosed are the results for the factory seam tests performed on the 30Mil Poly Vinyl Chloride (30PVC) for the AEP Rockport Repairs Project. Also attached are the manufacturer's material certifications.

If I can answer any questions or be of any further assistance, please contact me at your convenience.

Sincerely,

Denise Garland
Quality Control Lead Technician

Verification of Material Properties of 30 Mil PVC Factory Seam Sample for the AEP Rockport Repairs Project.

INTRODUCTION:

Environmental Protection, Inc. performed physical testing on 30 Mil PVC factory seam samples for the AEP Rockport Repairs Project. The samples are identified by serial number. All samples were constructed by chemical fusion welding. A minimum of one destructive sample for every 3000 lineal feet, was removed and tested per the following;

TEST PROCEDURES:

EPI performs a process inspection technique called Wolschon peel testing in accordance with section 2.07 of the EPI "QUALITY CONTROL MANUAL FORFACTORY FABRICATION OF PVC AND UltraTech® GEOMEMBRANES" Dated October 1, 2014 during fabrication of these liners. This testing surpasses current industry standards and is designed to provide the highest confidence in the quality of factory seams. The current minimum required value for this test is 5.25 pounds per inch width.

Prior to testing, the samples were allowed to acclimate under laboratory conditions for a minimum of 40 hours after fabrication; complete curing of the chemically fused seam requires approximately 28 days. The samples were then tested for peel adhesion and shear strength. Seam peel adhesion and shear strength were tested in accordance with ASTM D7408, using a one (1) inch wide specimen with a strain rate of 20 inches per minute.

TEST RESULTS:

The results of the testing are reported on the following tables. The data is reported in pounds per inch width units. All of the test results listed in this report have exceeded the minimum requirements for ASTM D7176 and D7408, and Peel and Shear Strength listed in the project specifications and have exceeded the minimum requirements for Wolschon Peel Strengths required by EPI's Geomembrane Fabrication Quality Control Manual.

All factory seams were also subjected to non-destructive testing per section 2.05 of the EPI "QUALITY CONTROL MANUAL FOR FACTORY FABRICATION OF PVC AND UltraTech® GEOMEMBRANES" Dated October 1, 2014.

Environmental Protection, Inc.
30 Mil PVC Factory Seam Test Results
for the AEP Rockport Repairs Project

WORK ORDER NUMBER	SHEAR AVG	SHEAR LOB	PEEL AVG	PEEL LOB
WO2903-1	65.97	SE	35.68	AD-BRK
WO2903-2 (No Seams)				

AVG	= AVERAGE	LOB	= LOCUS OF BRAKE
AD	= PEEL	AD-BRK	= PEEL WITH BREAK
SE	= SEAM EDGE	BRK	= BREAK IN SHEET
SHEAR	58.4 P/I/W Minimum	PEEL	18 P/I/W Minimum

Environmental Protection, Inc.
30 Mil PVC Factory Seam Test Results
for the AEP Rockport Repairs Project

WORK ORDER NUMBER	LOT NUMBER	ROLL NUMBER
WO2903-1	9167	79
WO2903-2	9167	79

Certificate of Analysis
August 10, 2021

The following test data was gathered on the shipment below.

Product Description	Plastatech IG® PVC 30 mil Emboss 350 Yards
Plastatech Product Code	57106
Manufacturing Date	08/06/21
Lot Number	9167
Lot Quantity	158 Rolls

Certified Properties	Test Method	Specification	Avg	Stdev
Thickness	ASTM D5199	30.0 ± 5% mil	30.3	0.4605
MD Breaking Strength	ASTM D882	Min 73 lb/in	87.4	3.7663
CMD Breaking Strength	ASTM D882	Min 73 lb/in	85.0	4.9158
MD Elongation	ASTM D882	Min 380%	437.9	33.7365
CMD Elongation	ASTM D882	Min 380%	446.5	31.9463
MD 100% Modulus	ASTM D882	Min 30 lb/in	43.8	2.3932
CMD 100% Modulus	ASTM D882	Min 30 lb/in	43.1	2.4253
MD Tear Resistance	ASTM D1004	Min 8.0 lbs	11.7	0.6506
CMD Tear Resistance	ASTM D1004	Min 8.0 lbs	10.9	0.5658
Low Temperature Impact	ASTM D1790	Pass 50% min -20°F (-29°C)	91.9	12.0909
Dimensional Stability	ASTM D1204	Max. 3%	-0.59%	0.43%
Hydrostatic Resistance	D751	100 psi	123.8	3.8421

Every 8th roll of this production lot was tested and adheres to the physically properties specified above. This product meets or exceeds the Manufacturer's Index Properties in accordance with ASTM-D7176. This product contains no recycled materials.

Mitch Gilbert

Director R&D/QC
Plastatech Engineering Ltd. (989) 754-6500 www.plastatech.com
725 Morley Drive (800) 892-9358 jhickey@duro-last.com
Saginaw, MI 48601 Fax (989) 754-1624

Certificate of Analysis
September 28, 2021

The following test data was gathered on the shipment below.

Product Description	Plastatech IG® PVC 30 mil Emboss 350 Yards
Plastatech Product Code	57106
Manufacturing Date	08/6/21
Lot Number	9167
Lot Quantity	158 Rolls

Index Properties	Test Method	Specification	Avg	Stdev
Specific Gravity	ASTM D792 Method A	Min 1.2 g/cm^3	1.30	0.01
Water Extraction	ASTM D1239	Max Loss 0.15%	0.1261	.0220
Volatile Loss	ASTM D1203	Max Loss 0.70%	0.014	0.001
Soil Burial Max Change (Break Strength)	ASTM G160	Max -5%	6.1	
Soil Burial Max Change (Elongation)	ASTM G160	Max -20%	-0.9	
Soil Burial Max Change (Modulus at 100%)	ASTM G160	Max -20%	-1.6	
Hydrostatic Resistance	ASTM D751 Procedure A	Min 100 psi	123	3
Minimum Plasticizer Avg. Molecular Weight	ASTM D2124	Min 400	443	

This product meets or exceeds the Manufacturer's Index Properties in accordance with ASTM-D7176. Third party tested January-February 2018. This product contains no recycled materials.

Bill Clark

JRB Quality Manager

Plastatech Engineering Ltd.
725 Morley Drive
Saginaw, MI 48601

(989) 754-6500
(800) 892-9358
Fax (989) 754-1624

www.plastatech.com
jhickey@duro-last.com

The Liner Company

Environmental Protection, Inc.

800 OK LINER

geomembrane.com

September 27, 2021

ATTN: Jennifer Battle
Chesapeake Containment Systems. Inc.
2690-D Salisbury Hwy
Statesville, NC. 28677
Ph: 704-208-3440
Email: jbattle@ccsliner.com

SUBJECT: 30 Mil PVC Panel QC Report – Rev. 1
PO #21183

Enclosed are the results for the factory seam tests performed on the 30Mil Poly Vinyl Chloride (30PVC) for the AEP Rockport Repairs Project. Also attached are the manufacturer's material certifications.

If I can answer any questions or be of any further assistance, please contact me at your convenience.

Sincerely,

Denise Garland
Quality Control Lead Technician

Verification of Material Properties of 30 Mil PVC Factory Seam Sample for the AEP Rockport Repairs Project.

INTRODUCTION:

Environmental Protection, Inc. performed physical testing on 30 Mil PVC factory seam samples for the AEP Rockport Repairs Project. The samples are identified by serial number. All samples were constructed by chemical fusion welding. A minimum of one destructive sample for every 3000 lineal feet, was removed and tested per the following;

TEST PROCEDURES:

EPI performs a process inspection technique called Wolschon peel testing in accordance with section 2.07 of the EPI "QUALITY CONTROL MANUAL FORFACTORY FABRICATION OF PVC AND UltraTech® GEOMEMBRANES" Dated October 1, 2014 during fabrication of these liners. This testing surpasses current industry standards and is designed to provide the highest confidence in the quality of factory seams. The current minimum required value for this test is 5.25 pounds per inch width.

Prior to testing, the samples were allowed to acclimate under laboratory conditions for a minimum of 40 hours after fabrication; complete curing of the chemically fused seam requires approximately 28 days. The samples were then tested for peel adhesion and shear strength. Seam peel adhesion and shear strength were tested in accordance with ASTM D7408, using a one (1) inch wide specimen with a strain rate of 20 inches per minute.

TEST RESULTS:

The results of the testing are reported on the following tables. The data is reported in pounds per inch width units. All of the test results listed in this report have exceeded the minimum requirements for ASTM D7176 and D7408, and Peel and Shear Strength listed in the project specifications and have exceeded the minimum requirements for Wolschon Peel Strengths required by EPI's Geomembrane Fabrication Quality Control Manual.

All factory seams were also subjected to non-destructive testing per section 2.05 of the EPI "QUALITY CONTROL MANUAL FOR FACTORY FABRICATION OF PVC AND UltraTech® GEOMEMBRANES" Dated October 1, 2014.

Environmental Protection, Inc.
30 Mil PVC Factory Seam Test Results
for the AEP Rockport Repairs Project

WORK ORDER NUMBER	SHEAR AVG	SHEAR LOB	PEEL AVG	PEEL LOB
WO2567-1	67.95	SE	23.78	AD
WO2568-1 NO SEAMS	N/A		N/A	

AVG	= AVERAGE	LOB	= LOCUS OF BRAKE
AD	= PEEL	AD-BRK	= PEEL WITH BREAK
SE	= SEAM EDGE	BRK	= BREAK IN SHEET
SHEAR	58.4 P/I/W Minimum	PEEL	18 P/I/W Minimum

Environmental Protection, Inc.
30 Mil PVC Factory Seam Test Results
for the AEP Rockport Repairs Project

WORK ORDER NUMBER	LOT NUMBER	ROLL NUMBER
WO2567-1	9112	36
WO2568-1	9112	32

Certificate of Analysis
June 22, 2021

The following test data was gathered on the shipment below.

Product Description	Plastatech IG® PVC 30 mil Emboss 350 Yards
Plastatech Product Code	57106
Manufacturing Date	06/15/21
Lot Number	9112
Lot Quantity	259 Rolls

Certified Properties	Test Method	Specification	Avg	Stdev
Thickness	ASTM D5199	30.0 ± 5% mil	30.6	0.5049
MD Breaking Strength	ASTM D882	Min 73 lb/in	90.5	5.3529
CMD Breaking Strength	ASTM D882	Min 73 lb/in	85.9	4.1958
MD Elongation	ASTM D882	Min 380%	430.5	35.4024
CMD Elongation	ASTM D882	Min 380%	436.7	33.4864
MD 100% Modulus	ASTM D882	Min 30 lb/in	42.0	4.2991
CMD 100% Modulus	ASTM D882	Min 30 lb/in	40.0	4.2503
MD Tear Resistance	ASTM D1004	Min 8.0 lbs	11.9	0.8519
CMD Tear Resistance	ASTM D1004	Min 8.0 lbs	11.2	0.9225
Low Temperature Impact	ASTM D1790	Pass 50% min -20°F (-29°C)	95.9	6.5679
Dimensional Stability	ASTM D1204	Max. 3%	-0.46%	0.41%
Hydrostatic Resistance	D751	100 psi	124.4	4.8691

Every 8th roll of this production lot was tested and adheres to the physically properties specified above. This product meets or exceeds the Manufacturer's Index Properties in accordance with ASTM-D7176. This product contains no recycled materials.

Mitch Gilbert

Director R&D/QC
Plastatech Engineering Ltd. (989) 754-6500 www.plastatech.com
725 Morley Drive (800) 892-9358 jhickey@duro-last.com
Saginaw, MI 48601 Fax (989) 754-1624

Certificate of Analysis
September 28, 2021

The following test data was gathered on the shipment below.

Product Description	Plastatech IG® PVC 30 mil Emboss 350 Yards
Plastatech Product Code	57106
Manufacturing Date	06/15/21
Lot Number	9112
Lot Quantity	259 Rolls

Index Properties	Test Method	Specification	Avg	Stdev
Specific Gravity	ASTM D792 Method A	Min 1.2 g/cm^3	1.30	0.01
Water Extraction	ASTM D1239	Max Loss 0.15%	0.1261	.0220
Volatile Loss	ASTM D1203	Max Loss 0.70%	0.014	0.001
Soil Burial Max Change (Break Strength)	ASTM G160	Max -5%	6.1	
Soil Burial Max Change (Elongation)	ASTM G160	Max -20%	-0.9	
Soil Burial Max Change (Modulus at 100%)	ASTM G160	Max -20%	-1.6	
Hydrostatic Resistance	ASTM D751 Procedure A	Min 100 psi	123	3
Minimum Plasticizer Avg. Molecular Weight	ASTM D2124	Min 400	443	

This product meets or exceeds the Manufacturer's Index Properties in accordance with ASTM-D7176. Third party tested January-February 2018. This product contains no recycled materials.

Bill Clark

JRB Quality Manager

Plastatech Engineering Ltd.
725 Morley Drive
Saginaw, MI 48601

(989) 754-6500
(800) 892-9358
Fax (989) 754-1624

www.plastatech.com
jhickey@duro-last.com

The Liner Company

Environmental Protection, Inc.

800 OK LINER

geomembrane.com

October 12, 2021

ATTN: Jennifer Battle
Chesapeake Containment Systems. Inc.
2690-D Salisbury Hwy
Statesville, NC. 28677
Ph: 704-208-3440
Email: jbattle@ccsliner.com

SUBJECT: 30 Mil PVC Panel QC Report

Enclosed are the results for the factory seam tests performed on the 30Mil Poly Vinyl Chloride (30PVC) for the AEP Rockport Repairs Project. Also attached are the manufacturer's material certifications.

If I can answer any questions or be of any further assistance, please contact me at your convenience.

Sincerely,

Denise Garland
Quality Control Lead Technician

Verification of Material Properties of 30 Mil PVC Factory Seam Sample for the AEP Rockport Repairs Project.

INTRODUCTION:

Environmental Protection, Inc. performed physical testing on 30 Mil PVC factory seam samples for the AEP Rockport Repairs Project. The samples are identified by serial number. All samples were constructed by chemical fusion welding. A minimum of one destructive sample for every 3000 lineal feet, was removed and tested per the following;

TEST PROCEDURES:

EPI performs a process inspection technique called Wolschon peel testing in accordance with section 2.07 of the EPI "QUALITY CONTROL MANUAL FORFACTORY FABRICATION OF PVC AND UltraTech® GEOMEMBRANES" Dated October 1, 2014 during fabrication of these liners. This testing surpasses current industry standards and is designed to provide the highest confidence in the quality of factory seams. The current minimum required value for this test is 5.25 pounds per inch width.

Prior to testing, the samples were allowed to acclimate under laboratory conditions for a minimum of 40 hours after fabrication; complete curing of the chemically fused seam requires approximately 28 days. The samples were then tested for peel adhesion and shear strength. Seam peel adhesion and shear strength were tested in accordance with ASTM D7408, using a one (1) inch wide specimen with a strain rate of 20 inches per minute.

TEST RESULTS:

The results of the testing are reported on the following tables. The data is reported in pounds per inch width units. All of the test results listed in this report have exceeded the minimum requirements for ASTM D7176 and D7408, and Peel and Shear Strength listed in the project specifications and have exceeded the minimum requirements for Wolschon Peel Strengths required by EPI's Geomembrane Fabrication Quality Control Manual.

All factory seams were also subjected to non-destructive testing per section 2.05 of the EPI "QUALITY CONTROL MANUAL FOR FACTORY FABRICATION OF PVC AND UltraTech® GEOMEMBRANES" Dated October 1, 2014.

Environmental Protection, Inc.
30 Mil PVC Factory Seam Test Results
for the AEP Rockport Repairs Project

WORK ORDER NUMBER	SHEAR AVG	SHEAR LOB	PEEL AVG	PEEL LOB
WO1605-1 WO1605-2	75.48	SE	39.16	AD

AVG	= AVERAGE	LOB	= LOCUS OF BRAKE
AD	= PEEL	AD-BRK	= PEEL WITH BREAK
SE	= SEAM EDGE	BRK	= BREAK IN SHEET
SHEAR	58.4 P/I/W Minimum	PEEL	18 P/I/W Minimum

Environmental Protection, Inc.
30 Mil PVC Factory Seam Test Results
for the AEP Rockport Repairs Project

WORK ORDER NUMBER	LOT NUMBER	ROLL NUMBER
WO1605-1	8738	60
WO1605-2	8738	60

Certificate of Analysis
September 22, 2020

The following test data was gathered on the shipment below.

Product Description	Plastatech IG® PVC 30 mil Emboss 350 Yards
Plastatech Product Code	57106
Manufacturing Date	09/16/20
Lot Number	8738
Lot Quantity	181 Rolls

Certified Properties	Test Method	Specification	Avg	Stdev
Thickness	ASTM D5199	30.0 ± 5% mil	30.2	0.5
MD Breaking Strength	ASTM D882	Min 73 lb/in	90.4	4.4
CMD Breaking Strength	ASTM D882	Min 73 lb/in	86.4	3.8
MD Elongation	ASTM D882	Min 380%	446.2	30.8
CMD Elongation	ASTM D882	Min 380%	455.7	31.8
MD 100% Modulus	ASTM D882	Min 30 lb/in	41.0	2.3
CMD 100% Modulus	ASTM D882	Min 30 lb/in	39.5	2.8
MD Tear Resistance	ASTM D1004	Min 8.0 lbs	11.1	0.7
CMD Tear Resistance	ASTM D1004	Min 8.0 lbs	10.4	0.7
Low Temperature Impact	ASTM D1790	Pass 50% min -20°F (-29°C)	84.6	14.7
Dimensional Stability	ASTM D1204	Max. 3%	-0.45%	0.28%
Hydrostatic Resistance	D751	100 psi	126.5	4.0

Every 8th roll of this production lot was tested and adheres to the physically properties specified above. This product meets or exceeds the Manufacturer's Index Properties in accordance with ASTM-D7176. This product contains no recycled materials.

Mitch Gilbert

Director R&D/QC
Plastatech Engineering Ltd.
725 Morley Drive
Saginaw, MI 48601
(989) 754-6500
(800) 892-9358
Fax (989) 754-1624
www.plastatech.com
jhickey@duro-last.com

Certificate of Analysis
September 22, 2020

The following test data was gathered on the shipment below.

Product Description	Plastatech IG® PVC 30 mil Emboss 350 Yards
Plastatech Product Code	57106
Manufacturing Date	09/16/20
Lot Number	8738
Lot Quantity	181 Rolls

Index Properties	Test Method	Specification	Avg	Stdev
Specific Gravity	ASTM D792 Method A	Min 1.2 g/cm^3	1.30	0.01
Water Extraction	ASTM D1239	Max Loss 0.15%	0.1261	.0220
Volatile Loss	ASTM D1203	Max Loss 0.70%	0.014	0.001
Soil Burial Max Change (Break Strength)	ASTM G160	Max -5%	6.1	
Soil Burial Max Change (Elongation)	ASTM G160	Max -20%	-0.9	
Soil Burial Max Change (Modulus at 100%)	ASTM G160	Max -20%	-1.6	
Hydrostatic Resistance	ASTM D751 Procedure A	Min 100 psi	123	3
Minimum Plasticizer Avg. Molecular Weight	ASTM D2124	Min 400	443	

This product meets or exceeds the Manufacturer's Index Properties in accordance with ASTM-D7176. Third party tested January-February 2018. This product contains no recycled materials.

Bill Clark

JRB Quality Manager

Plastatech Engineering Ltd.
725 Morley Drive
Saginaw, MI 48601

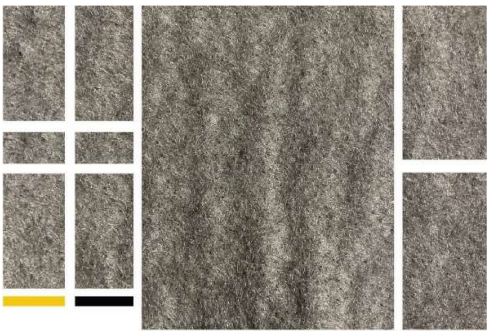
(989) 754-6500
(800) 892-9358
Fax (989) 754-1624

www.plastatech.com
jhickey@duro-last.com

NON-WOVEN GEOTEXTILE

GE - 110

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	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 x 570 ft.	4.58 m x 173.74 m
Area Per Roll	950 sq. yards	795.73 sq. meters

Note

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.

This information is provided for reference purposes only and is not intended as a warranty or guarantee. SKAPS assumes no liability in connection with the use of this information.

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

Appendix B: AEP Site Visit Report April 8, 2021

Site Visit Report
Rockport Landfill
Interim Berm Leachate Seepage Issue

AEP Unique Document ID: GERS-21-005
Date of Site Visit: April 8, 2021
Date of Report: April 30, 2021

Prepared by: Dan Murphy _____ Date: _ 04/28/2021
Dan Murphy, P.E.

Reviewed by: _____ Date: 05/05/2021
Mohammad Ajlouni, Ph. D, P.E.

Approved by: Gary F. Zych _____ Date: 5/6/2021
Gary Zych, P.E.

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Introduction

On April 5, 2021, Rockport plant staff observed seepage/standing water in the southeastern corner of Cell 6 of the Rockport Landfill. Based on pH testing, this standing water was determined to be leachate. At this location, the interim berm separates Cell 1A, Cell 5 and Cell 6. The "Quick Connect #12" for the existing leachate collection system is located in the immediate vicinity of the area of interest.

AEP Geotechnical Engineering performed a site visit on April 8, 2021 to observe this issue and this site visit report shall document observations, temporary measures and recommendations.

Timeline of Events

April 5, 2021:
Seepage/standing water observed on the southeast corner of ground surface of Cell 6. The area with standing water was approximately 25 feet by 100 feet in area and the water was about 1 inch in depth on average. A sample of this water was collected to determine if this was leachate or clean runoff. The pH was determined to be equal to 10 and therefore this water was determined to be leachate from the landfill. In the afternoon of April 5, 2021, approximately 1,000 gallons of the standing water at the ground surface in Cell 6 was removed using vacuum truck. The leachate in the vacuum truck was emptied into the leachate collection system in the active landfill area.

A small collection trench was excavated and a piece of scrap PVC liner was placed into the collection trench. Small channels were then excavated to the sources of the seepage to convey any seepage into the collection trench. The bottom of the collection trench was placed at elevation~403, which is above the top of the Type II Clay Liner in Cell 6.

April 6, 2021:
On the morning of April 6, 2021, the leachate collection trench had collected approximately 100 gallons during the overnight hours. This leachate was removed via trash pump and discharged into the leachate collection system in the active landfill area.

April 7, 2021:
On the morning of April 7, 2021, the leachate collection trench had collected approximately 100 gallons during the overnight hours. This leachate was removed via trash pump and discharged into the leachate collection system in the active landfill area.

April 8, 2021:
Site Visit conducted by AEP Geotechnical Engineering.

April 12, 2021:
Notification to IDEM. Leachate seepage issue defined as a deficiency for the CCR rule.

April 13, 2021:
Temporary leachate collection drain & riser pipe installation complete.

Temporary Measures

As a temporary measure to collect the leachate and convey into the proper system, a riser pipe and French drain system was constructed. A piece of the PVC liner was placed in the bottom of the French drain to prevent leachate from migrating into surrounding soils. A 2 inch-PVC solid walled pipe was installed in the bottom of the riser and tapped into the leachate conveyance system at Quick Connect #12. The riser pipe was installed outside of the footprint of the existing liner and the bottom elevation of the riser pipe was placed about 3 feet above the top surface of the Type 2 clay liner in Cell 6.

A sketch of the temporary measure is included in Appendix D.

Key Observations & Discussion

The observations and discussion focus on two key components of the landfill, the leachate collection system and the PVC liner system embedded in the intermediate berm. These observations are summarized in the bullets below and each observation is discussed in detail.

- **The leachate seepage area is generally located at the leachate drainage divide between Phase 1 and Phase 2. Both leachate systems appear to be functioning as intended and there are no signs of obstructions.**
- **Leachate water was observed to be trapped between the PVC geomembrane layers of the intermediate Berm and was observed to be flowing above and below the PVC geomembrane liner**.
- **Chemical constitutes (Sulfate) in the leachate are not clearly indicative of the source of leachate (Type 1 Ash or Type 2 Ash).**
- **There are no trends in the flow rate data for the West Pond that indicate an obstructed leachate collection pipe.**

1. **The leachate seepage area is generally located at the leachate drainage divide between Phase 1 and Phase 2. Both leachate systems appear to be functioning as intended and there are no signs of obstructions. Refer to Figure 1 for illustration.**

   Leachate collected in Phase 1 is directed into the West Pond Complex. The Quick Connect #12 (AKA Coupler #12) is the far upstream end of the Phase 1 Leachate Collection system, flowing by gravity into the West Pond Complex.

   Leachate collected in Phase 2 is directed into the North Pond Complex. A blind flange that penetrates the intermediate berm is located about 100 feet to the north of the leachate seepage area is the farthest upstream component of the Phase 2 Leachate Collection System.

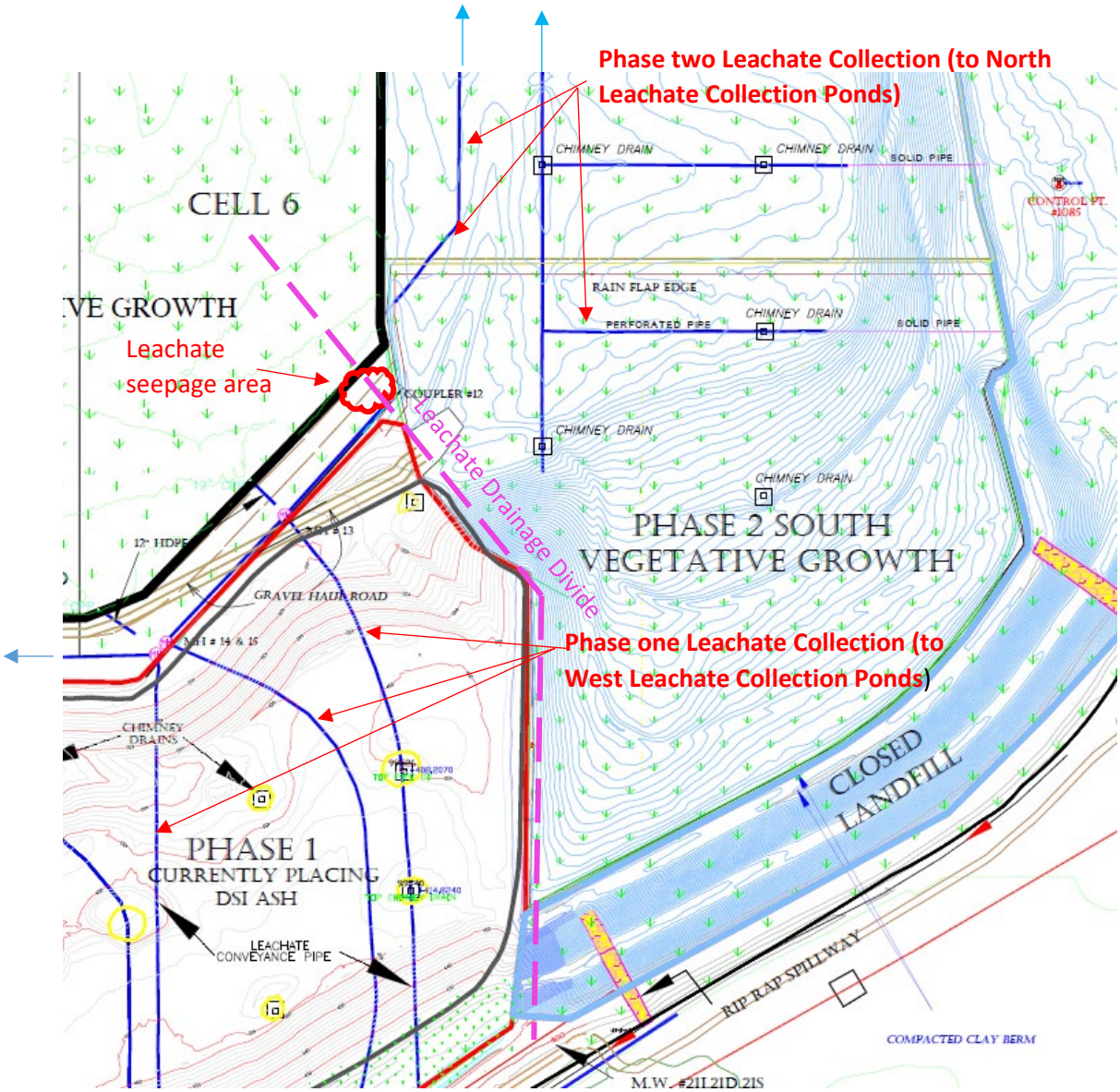


Figure 1: Site Plan Sketch

Phase one Leachate Collection System Observations:

The lids to Manholes #13, #14 and #15 were removed for visual inspection of the leachate collection system components. There was a few inches to a foot of standing water in each manhole. This water appeared clear and samples were collected for pH testing. The results of the pH testing indicated that this was non-contact water and the results are summarized in Table 1. Leachate could be heard flowing through the inner pipe of the dual containment system at all three manholes. The standing water in each manhole was pumped out and discharged into the active landfill cell area.

Sample ID	pH
Manhole #13	7.85
Manhole #14	7.61
Manhole #15	7.97

Table 1- pH test results from water in Manholes

The chimney drain closest to the affected area in the adjacent active cell area was observed to be in good condition and appeared to be functioning as intended. There were no signs of standing water or poor drainage around the bottom ash surrounding the chimney drainpipe.

A borescope camera inspection of Quick Connect #12 was performed to inspect the leachate conveyance system in the area of the leachate seepage. The borescope camera was only advanced about 45 feet downstream from Quick Connect #12 before encountering gravel/bottom ash inside the pipe. The depth of the gravel/bottom ash had approximately the bottom ½ of the 12-inch-diameter leachate conveyance pipe filled. The inside of the leachate conveyance pipe appeared very dry. The borescope camera could not advance farther due to the camera cord coiling on itself and the limited visibility of the camera lens due the sediments. The gravel/bottom ash in the leachate conveyance system was removed using vacuum truck on April 8.

Phase two Leachate Collection Observations:

A borescope camera inspection of Quick Connect #12 was performed to inspect the leachate collection system in the Phase 2 footprint. A blind flange was removed to access the leachate collection pipe. The borescope camera advanced approximately 57 feet into the pipe before the camera cord wrapped around itself and the camera could not advance any farther. The borescope camera inspection revealed that the leachate collection pipe is in good, functioning condition. There were no signs of obstructions or high water marks inside the pipe.

2. **Leachate water was observed to be trapped between the PVC geomembrane layers of the intermediate Berm and was observed to be flowing <u>above and below</u> the PVC geomembrane liner**. Refer to Figure 2 for illustration.

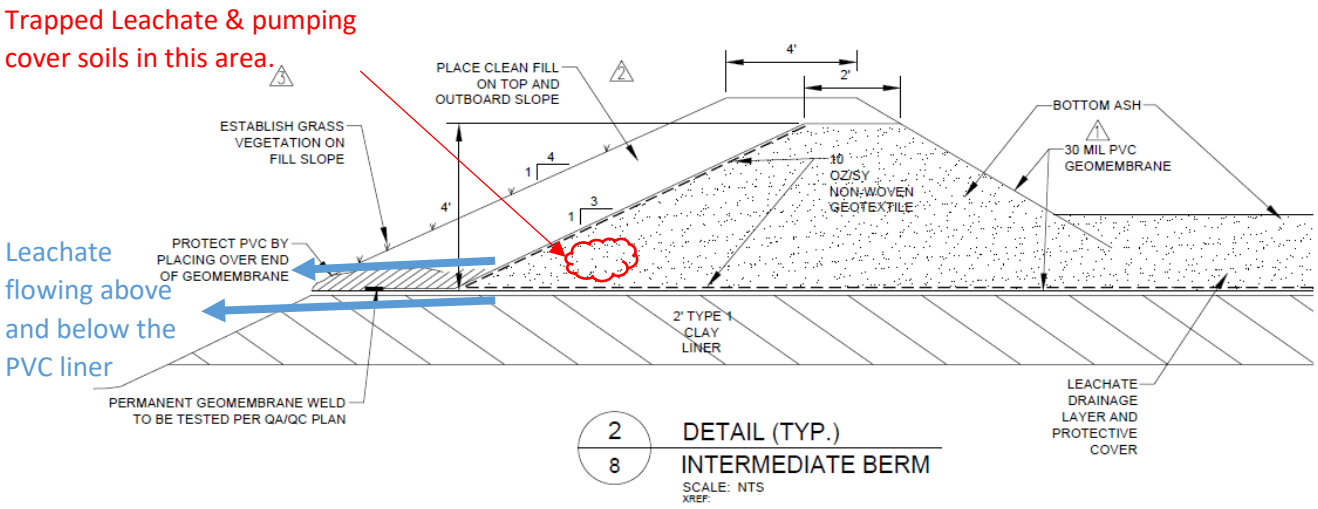


Figure 2: Intermediate Berm Cross Section. Reference Drawing 12-30470-3.

The interim berm in the area of interest was visually inspected. There were two areas where the leachate was seeping out at the toe of the northern face of the interim berm. Refer to Figure 1 for illustration of these areas. Seep 1 had dried up since the initial discovery and pumping efforts. The edge of the PVC geomembrane liner was exposed at Seep 2 and was carefully inspected to determine if the leachate was seeping above or below the geomembrane liner. Water was observed to be seeping out **above and below** the exposed edge of the PVC geomembrane liner, at a flow rate estimated to be less than 1 gallon per minute. In the area adjacent to Seep 2, there was 6-foot-diameter area where the cover soils pumped under the pressure of one's foot. The cover soils were carefully removed in this area to expose the underlying geotextile and PVC geomembrane for the interim berm. Water was observed to be have become trapped in between the layers of PVC geomembrane at the toe of the interim berm. Refer to Figure 2 for illustration of the trapped leachate in cross section of the interim berm.

The seepage locations were surveyed and the coordinates are listed below:

Seep 1 (South Seep); N 162512.588. E 520045.531. Elev=406.497

Seep 2 (North Seep); N 162532.405. E 520059.845. Elev-= 406.473

A review of the certification reports from the 2014, 2015 and 2016 were made after the site visit. The piece of interim berm in the area of the leachate seepage was constructed in 2015. Specifically of interest are Rain flap panels #99 & #100 and the liner panel #85. The North Seep location lines up very close with the seam between rain flap panels #99 and #100, while the South Seep location appears to fall near the middle of Panel #99 as shown in Figure 3.

The 30 mil- PVC rain flap was seamed using hand leister methods. During construction, there was a Request for Information submitted concerning the need for destructive sample testing on the Intermediate berm Rain flap. Terracon responded by waiving the need for destructive testing on the rain flap, however, one sample of the hand leister seams for Rain Flap Panel 101 was destructively tested with passing results.

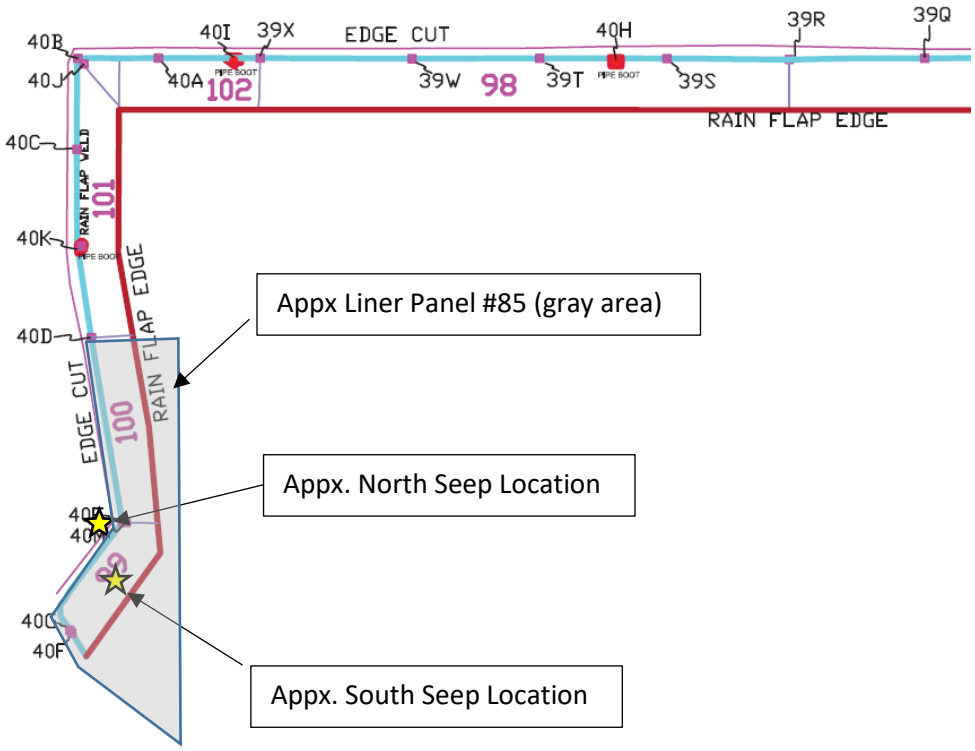


Figure 3: Approximate leachate seepage locations overlaid on Rain Flap Panel As-Built Drawing.

3. Chemical constitutes (Sulfate) in the leachate are not clearly indicative of the source of leachate.

Since the composite liner system was installed over previously placed Type 1 ash, particularly in the Cell 1 area, it is possible that this leachate seepage is emerging from the ash placed under the liner.

The sulfate content varies between leachate from Type 1 Ash and Type 2 Ash. A water quality comparison was made between the recent leachate seepage and historical leachate from the Type 1 ash. Specifically this water quality comparison focused on sulfate concentration, since there is a significant difference between the Type 1 Ash Leachate compared to the Type 2 Ash Leachate. Based on a water quality sample collected in 1994 for a NPDES permit renewal, the leachate (contact water runoff) from the Type 1 ash is in the range of approximately 300 mg/L. The sulfate content for the Type 2 Ash, that is contained by the PVC liner system and collected into the leachate collection system is typically in the range of 5,000 mg/L to 15,000 mg/L. A sample of the leachate in the seepage area indicated that the sulfate concentration is 820 mg/L.

Water Source	Sulfate Concentration
Type 1 Ash Contact Water Runoff/Leachate (1994 NPDES Permit Renewal Sample)	300 mg/L
Type 2 Ash Leachate	5,000 mg/L to 15,000 mg/L
Leachate Seepage	820 mg/L

Table 2- Sulfate Concentration comparison.

4. **There are no trends in the flow rate data for the West Pond that indicate an obstructed leachate collection pipe.**

A plot of leachate flows since October 2020 for the West Leachate Collection Pond is presented in Appendix C. While this is a relatively limited/new data set, there are no signs of diminished leachate flow rates that would be expected as the result of an obstructed leachate collection pipe. The leachate inflow in to the West Leachate Collection Pond appears to have a baseline flow around 20 gallons per minute during relatively dry weather spells. This baseline flow appears consistent since the start of the data set.

The North Leachate Collection Pond does not currently have the instrumentation necessary to collect this data installed, so there is no similar data available for the Phase 2 leachate collection system.

Recommendations

Based on the observations made during this site visit, the PVC geomembrane liner under the interim berm is no longer watertight. The leachate collection system appears to be functioning properly. It appears the issue can be resolved by repairing the PVC geomembrane and installing a new leachate collection pipe to provide an outlet for leachate in this area.

Leak location surveys can be done to help pinpoint areas of leakage to allow for focused and deliberate repair efforts, which can prevent chasing leaks and unintentionally damaging functioning liner elements. However, observing the alignment of the north seep area falls directly in line with a panel seam, the seam in question is evident.

The following bullet points below outline recommended actions to repair the leachate seepage on the interim berm.

1. Carefully excavate cover soils to expose the 30-mil PVC rain flap seams at panels #99 and #100 and the seam between the rain flap and Liner Panel #85. Carefully remove the geotextile fabric by cutting pieces out of the area of interest. Patches of replacement geotextile will be installed later.
2. Clean the liner and inspect the panel seams for bad seams/welds. Air lancing or vacuum box testing can be used to assist in the detection of bad seams/welds or other defects.
3. Repair bad seams or defects by using wedge-welding techniques or extrusion welding when wedge welding is not practical.
4. Install a short section perforated leachate collection pipe. This new leachate collection pipe would transition to a solid walled pipe, penetrate the rain flap, and connect to the existing leachate conveyance system near Quick Connect #12. This would be a similar detail to Manhole #13.
5. Replace the geotextile fabric, seaming the patches of geotextile into the existing geotextile. Place cover soils to match existing grades.
6. Remove the temporary leachate temporary riser pipe, French drain, backfill with cover soils and restore grass cover to disturbed areas.

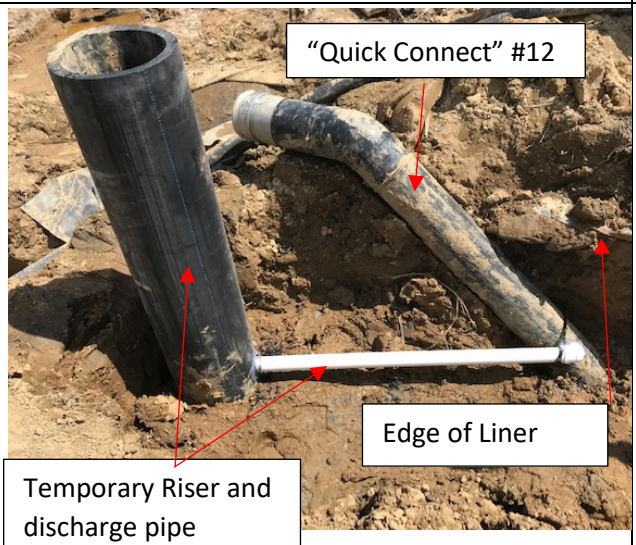
Appendix A: Photographs

	Photograph 1: View of the leachate seepage shortly after initial discovery in the area around surrounding Quick Connect #12.
	Photograph 2: Another view of the leachate seepage shortly after initial discovery in the area around Quick Connect #12, with the active Phase 1 area in the background.

	Photograph 3: View of the temporary leachate collection trench excavated upon initial discovery of the leachate seepage issue.
	Photograph 4: View inside Manhole #13 before pumping out the standing (clean water).

Photograph 5:

Close up view of the exposed PVC liner at the exterior toe of the intermediate berm. Notice the water flowing under the liner.

	Photograph 6: View of the trapped leachate water between the PVC geomembrane layers of the intermediate berm.
	Photograph 7: View illustrating the temporary measures installed to collect the leachate seepage and convey into the leachate conveyance system at Quick Connect #12.

	Photograph 8: View of the French drain being built to collect the leachate seepage and direct into the riser pipe. Notice the piece of PVC geomembrane under the French drain stone.

Appendix B: Sulfate Concentration of Leachate Sample

Form REP-702
Rev. 1, 11/2013

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
T: 614-836-4221, Audinet 210-4221
F: 614-836-4168, Audinet 210-4168
http://aepenv/labs

Water Analysis

Location: Rockport Plant *Report Date: 4/20/2021*

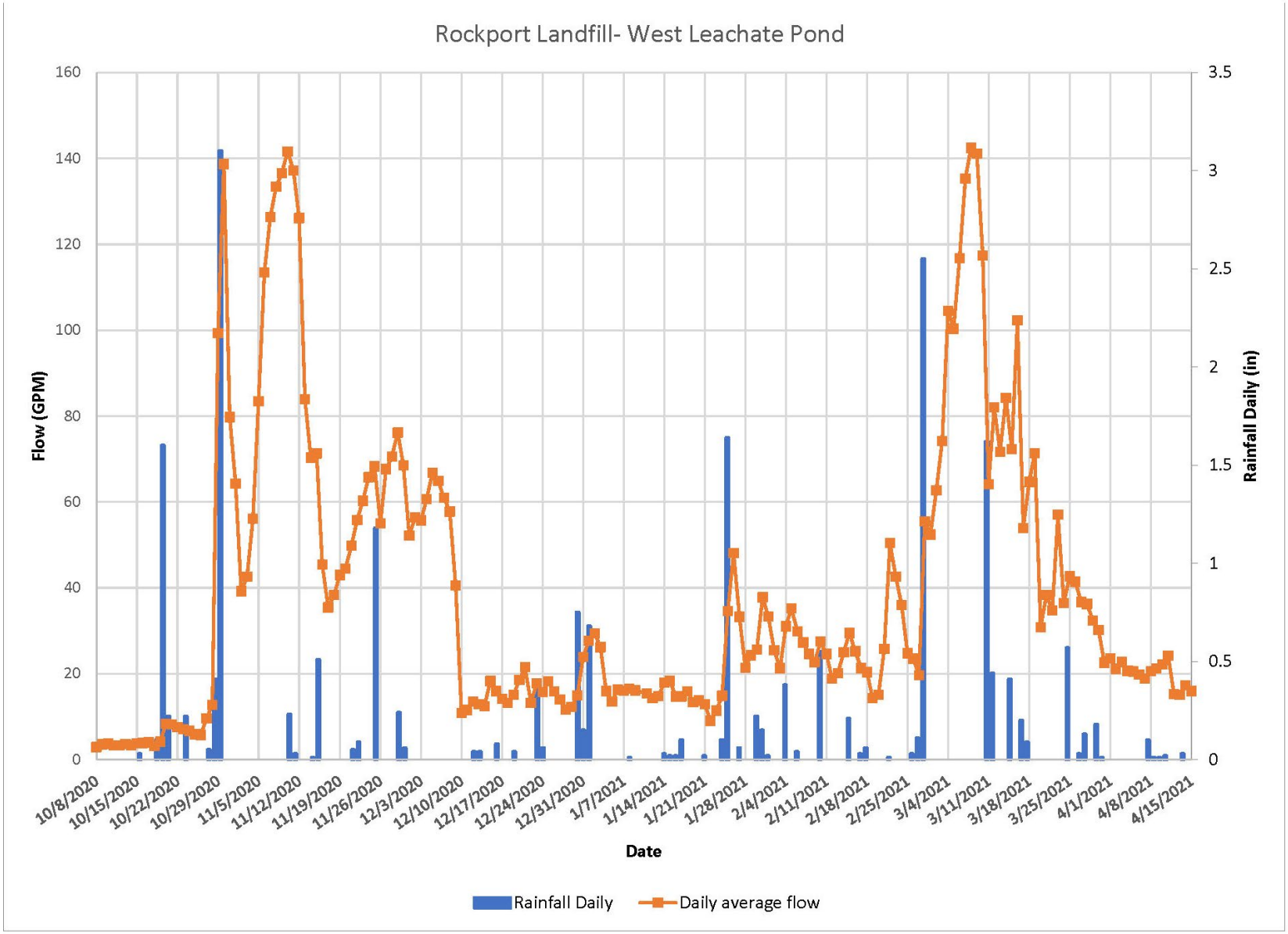
River pipe, Landfill riser

Sample Number: 210883-001 **Date Collected: 04/15/2021 09:30** **Date Received: 4/16/2021**

Parameter	Result	Units	RL	MDL	Analysis By	Analysis Date/Time	Method
Sulfate, SO4	820	mg/L	100	15	CRJ	04/16/2021 11:31	EPA 300.1-1997, Rev. 1.0

Michael Ohlinger, Chemist
Email msohlinger@aep.com *Tel.*
Fax 614-836-4168 *Audinet 8-210-*

Appendix C: Leachate Flows versus Time- West Leachate Pond Complex


Rockport Landfill- West Leachate Pond
Flow (GPM)
Rainfall Daily (in)
Date
0
20
40
60
80
100
120
140
160
0
0.5
1
1.5
2
2.5
3
3.5
10/8/2020
10/15/2020
10/22/2020
10/29/2020
11/5/2020
11/12/2020
11/19/2020
11/26/2020
12/3/2020
12/10/2020
12/17/2020
12/24/2020
12/31/2020
1/7/2021
1/14/2021
1/21/2021
1/28/2021
2/4/2021
2/11/2021
2/18/2021
2/25/2021
3/4/2021
3/11/2021
3/18/2021
3/25/2021
4/1/2021
4/8/2021
4/15/2021
Rainfall Daily
Daily average flow

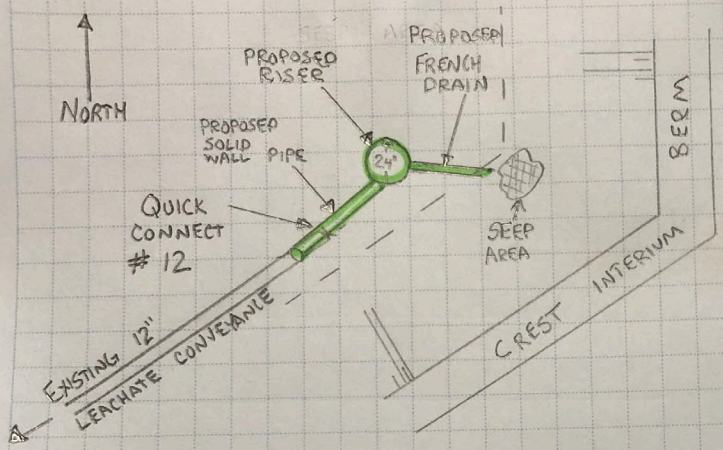
Appendix D: Temporary Measure Sketch

ENGINEERING DEPT.
AMERICAN ELECTRIC POWER SERVICE CORP.
1 RIVERSIDE PLAZA
COLUMBUS, OHIO

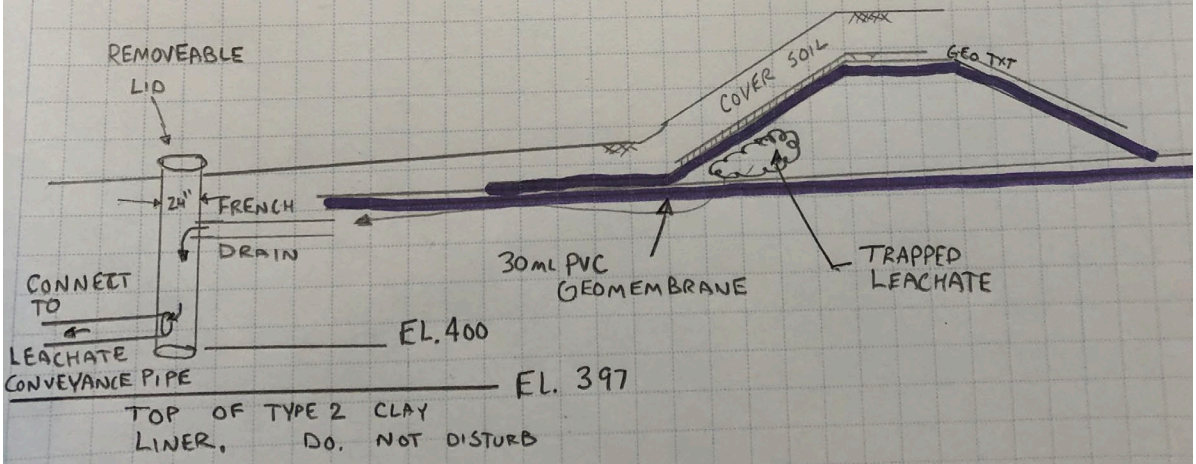
SHEET _____ OF _____
DATE _____ BY _____ CK. _____
COMPANY _____ G.O. _____
PLANT _____

SUBJECT ROCKPORT LANDFILL - TEMPORARY LEACHATE COLLECTION

PLAN VIEW SKETCH



PROFILE VIEW



Appendix C: IDEM State Form 53317

1 Riverside Plaza
Columbus, OH 43215

Via E-mail

November 1, 2021

Mr. John Hale, Permits Manager
Indiana Department of Environmental Management
OLQ Solid Waste Permits Section
IGCN 1154
100 North Senate Avenue
Indianapolis, Indiana 46204

RE: American Electric Power
Rockport Plant
Ash Landfill Permit FP 74-02
Insignificant Modification – Leachate Control

Dear Mr. Hale:

Please find the insignificant permit modification checklist included with this letter for the repair and modification of the liner near the interim berm between Cell 1B and Cell 6 at Rockport Plant's Type I Residual Solid Waste Landfill to control leachate seepage.

Written notification of the observed leachate seepage along with a description of a temporary solution to install a French drain and riser pipe to collect the seepage was submitted to IDEM via e-mail on April 12, 2021. On May 18, 2021 a permanent solution was agreed upon between AEP and IDEM, which comprised of the following actions to repair the leachate seepage on the interim berm.

- Carefully excavate cover soils to expose the 30-mil PVC rain flap seams at panels #99 and #100 and the seam between the rain flap and Liner Panel #85.
- Carefully remove the geotextile fabric by cutting pieces out of the area of interest. Patches of replacement geotextile will be installed later.
- Clean the liner and inspect the panel seams for bad seams/welds. Air lancing or vacuum box testing can be used to assist in the detection of bad seams/welds or other defects.
- Repair bad seams or defects by using wedge-welding techniques or extrusion welding when wedge welding is not practical.
- Install a short section perforated leachate collection pipe. This new leachate collection pipe would transition to a solid walled pipe, penetrate the rain flap, and connect to the existing leachate conveyance system near Quick Connect #12. This would be a similar detail to Manhole #13.
- Replace the geotextile fabric, seaming the patches of geotextile into the existing geotextile. Place cover soils to match existing grades.
- Remove the temporary leachate temporary riser pipe, French drain, backfill with cover soils and restore grass cover to disturbed areas.

The steps outlined above were carried out, and the modification was considered complete on October 13, 2021. An as-built report documenting the repairs will be submitted within 45 days of the completion.

If there are any questions, please contact me at (614) 716-2259, or by email at jrjent@aep.com.

Sincerely,

Justin R. Jent

Justin R. Jent, P.E.
Environmental Services

ec: G. Hiadari – IDEM
M. Montgomery – AEP
D. Murphy – AEP

INSIGNIFICANT PERMIT MODIFICATION CHECKLIST
SOLID WASTE LAND DISPOSAL FACILITIES

State Form 53317 (6-07)
Indiana Department of Environmental Management

INSTRUCTIONS: *The following checklist is provided to help you in determining whether or not your proposed modification qualifies as an insignificant facility modification under 329 IAC 10-2-97.1 and 329 IAC 10-3-3. Check **all** boxes that apply to your proposed modification.*

Required Information	Y	N	Apply Using Instructions In:
Please check as applicable:			
Relocation of a solid waste land disposal facility hauling road.	☐	☐	**Part A**
Relocation of office buildings.	☐	☐	**Part A**
Changes in sequences of filling in permitted areas.			
Installation of temporary sediment control measures.	☐	☐	**Part A**
Installation of leachate control systems to prevent leachate migration off-site.	☒	☐	**Part A**
Installation of additional methane venting wells to an approved system.	☐	☐	**Part A**
Installation of weighing scales.	☐	☐	**Part A**
Replacement of a ground water monitoring well or piezometer no more than fifteen (15) feet horizontally from the original location and at an equal depth.	☐	☐	**Part A**
Use of an alternative daily cover (ADC) under 329 IAC 10-20-14.1(c).	☐	☐	**Part A**
Approvals granted under 329 IAC 10-21 unless the commissioner determines the approval to be a minor modification.	☐	☐	**Part A**
Alternative storage methods for salvaged or recycled materials under 329 IAC 10-20-6(b).	☐	☐	**Part A**
Changes in the frequency that collection containers regulated under 329 IAC 10-20-4(g)(1) and 329 IAC 10-20-4(g)(2) must be emptied.	☐	☐	**Part A**
Improvements to a drainage system around the facility.	☐	☐	**Part B**
Use of an ADC under 329 IAC 10-20-14.1(d).	☐	☐	**Part B**
For any other proposed insignificant modification, answer:	☐	☐	**Part B**
a. does it improve the operation of the facility (if yes, show in documentation).	☐	☐	**Part B**
b. does it significantly alter the approved solid waste land disposal facility permit (if no, show in documentation).	☐	☐	**Part B**
			Part B
Have you included a detailed written description of your modification project?	☐	☐	**Part B**
Have you included maps and plot plans showing changes to be made by the modification project?	☐	☐	**Part B**

Indiana Department of Environmental Management
Indianapolis
Insignificant Modification Application
Solid Waste Land Disposal Facilities
329 IAC 10

Introduction

All solid waste land disposal facilities periodically make changes which do not significantly alter their permit conditions while improving facility operations. Such changes can be defined under 329 IAC 10-2-97.1 as **insignificant facility modifications**. Such facility modifications may be excluded from needing a major or minor permit modification if a permittee follows the steps outlined under 329 IAC 10-3-3. The following instructions and attached checklist will help you in: 1) determining if your proposed changes qualify as insignificant modifications and 2) applying for or notifying IDEM of an insignificant modification.

Part A

Under 329 IAC 10-3-3, a permittee only has to notify IDEM to make any of the following nine (9) insignificant modifications listed under 329 IAC 10-2-97.1. They include:

- Relocation of a solid waste land disposal facility waste hauling road.
- Relocation of office buildings.
- Changes in sequences of filling in permitted areas.
- Installation of temporary sediment control measures.
- Installation of leachate control systems to prevent leachate migration off-site.
- Installation of additional methane venting wells to an approved system.
- Installation of weighing scales.
- Replacement of a ground water monitoring well or piezometer no more than fifteen (15) feet horizontally from the original location and at an equal depth.
- Use of an alternative daily cover (ADC) under 329 IAC 10-20-14.1(c).
- Approvals granted under 329 IAC 10-21 unless the commissioner determines the approval to be a minor modification.
- Alternative storage methods for salvaged or recycled materials under 329 IAC 10-20-6(b).
- Changes in the frequency that collection containers regulated under 329 IAC 10-20-4(g)(1) and 329 IAC 10-20-4(g)(2) must be emptied.

These changes are also listed on the enclosed checklist. If you are proposing one of these modifications, you must notify IDEM no later than **seven (7) calendar days** after you have made the modification. The notice must include the attached checklist checked “yes” for the modification project, the date the project was or is expected to be completed and a detailed description of the modification, including a written description accompanied, where appropriate, with plot plans and/or maps detailing where changes have been or will be made.

Part B

The remaining insignificant modifications listed under 329 IAC 10-2-97.1 can not proceed as insignificant modifications until approved by IDEM. They include:

- Improvements to drainage at the facility or modifications to sediment controls.
- Use of an ADC under 329 IAC 10-20-14.1(d).
- Any modification to the land disposal facility that the commissioner determines will improve the operation of the facility without significantly altering the approved solid waste land disposal facility.

As for the other insignificant modifications, you should submit the enclosed checklist with the appropriate type of insignificant modification checked "yes," along with a detailed description of the proposed modification, including a written description accompanied, where appropriate, with plot plans and/or maps detailing where changes will be made.

For proposed insignificant modifications not specifically listed, your submittal will need to demonstrate that the proposed modification will:

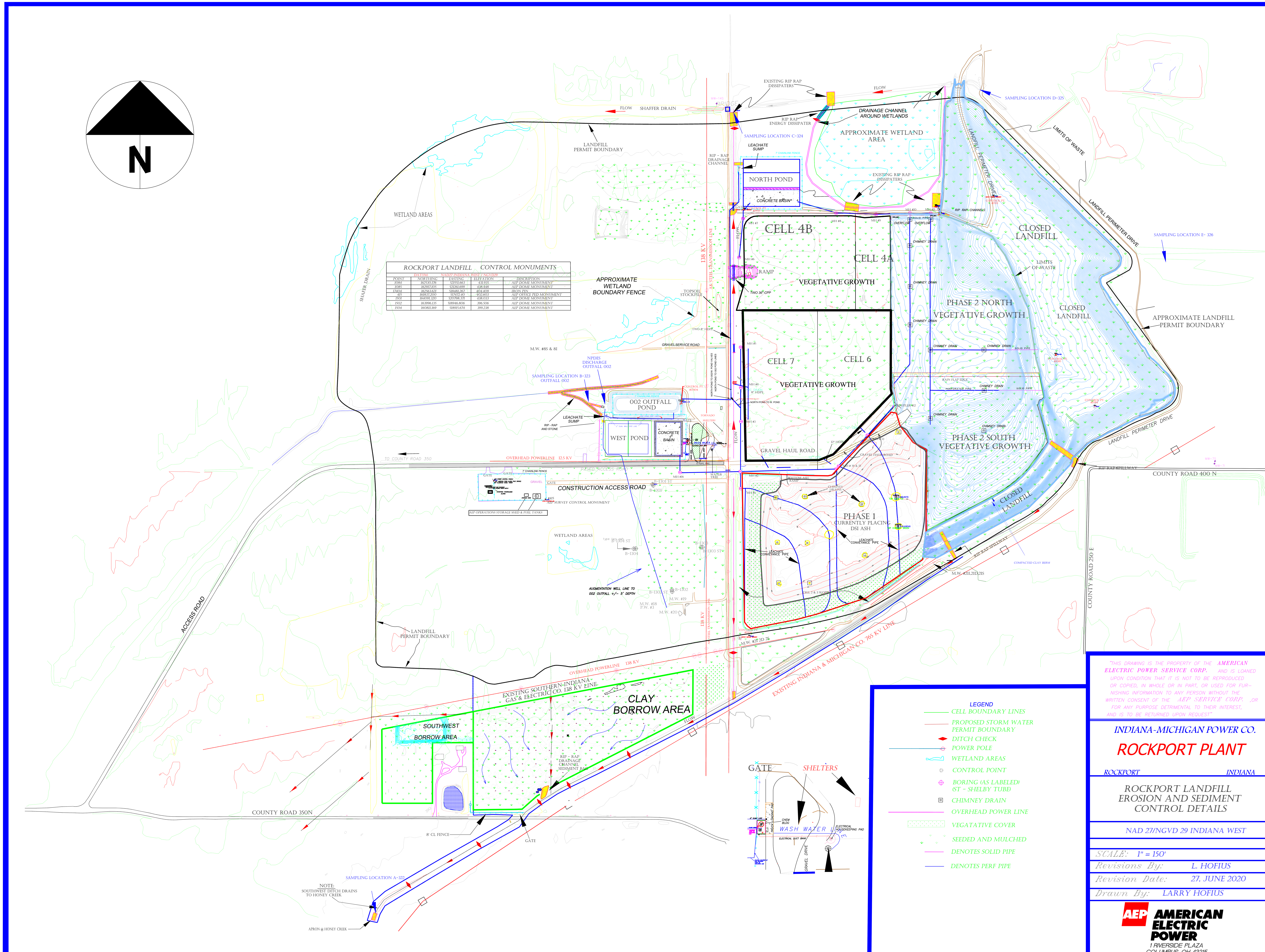
- improve the facility operation, and
- does not significantly alter the approved solid waste land disposal permit.

First, under these conditions, any modification which does not improve or which lessens the ability of your facility's operation to protect the environment may not qualify as an insignificant modification. Second, any modification which would directly change current permit conditions, and the related provisions specified in the application materials upon which these conditions are based, may also be determined to be at least a minor modification. Accordingly, you should check "yes" or "no" to the related questions on the checklist concerning these issues.

IDEM will notify you in writing within thirty (30) days of receipt of your notification if you need to submit an application for a major or minor modification to your permit for your proposed project. If you do not receive notification within this 30-day time period, you may proceed with your insignificant modification in accordance with the documentation you submitted to IDEM.

If you have any additional questions concerning your insignificant modification submittal, please contact us at 317-232-8871.

Appendix D: Rockport Landfill Erosion and Sediment Control Sketch.



N
LANDFILL PERMIT BOUNDARY
WETLAND AREAS
SHAFFER DRAIN
FLOW
EXISTING RIP RAP DISSIPATERS
DRAINAGE CHANNEL AROUND WETLANDS
RIP RAP ENERGY DISSIPATER
SAMPLING LOCATION C-324
APPROXIMATE WETLAND AREA
SAMPLING LOCATION D-325
LIMITS OF WASTE
LEACHATE SUMP
RIP - RAP DRAINAGE CHANNEL
NORTH POND
CONCRETE BASIN
CELL 4B
CELL 4A
RAMP
VEGETATIVE GROWTH
CLOSED LANDFILL
LANDFILL PERIMETER DRIVE
SAMPLING LOCATION E- 326
PHASE 2 NORTH VEGETATIVE GROWTH
APPROXIMATE LANDFILL PERMIT BOUNDARY
APPROXIMATE WETLAND BOUNDARY FENCE
TOPSOIL STOCKPILE
138 KV
CELL 7
CELL 6
M.W. #8S & 8I
NPDES DISCHARGE OUTFALL 002
SAMPLING LOCATION B-323 OUTFALL 002
002 OUTFALL POND
WEST POND
GRAVEL HAUL ROAD
PHASE 2 SOUTH VEGETATIVE GROWTH
OVERHEAD POWERLINE 12.5 KV
TO COUNTY ROAD 350
CONSTRUCTION ACCESS ROAD
COUNTY ROAD 400 N
PHASE 1 CURRENTLY PLACING DSI ASH
LEACHATE CONVEYANCE PIPE
WETLAND AREAS
AUGMENTATION WELL LINE TO 002 OUTFALL +/- 5' DEPTH
ACCESS ROAD
COUNTY ROAD 250 E
EXISTING SOUTHERN-INDIANA GAS & ELECTRIC CO. 138 KV LINE
OVERHEAD POWERLINE 138 KV
EXISTING INDIANA & MICHIGAN CO. 765 KV LINE
CLAY BORROW AREA
SOUTHWEST BORROW AREA
RIP - RAP DRAINAGE CHANNEL SEDIMENT BAR
COUNTY ROAD 350N
8' CL FENCE
GATE
SAMPLING LOCATION A-322
NOTE: SOUTHWEST DITCH DRAINS TO HONEY CREEK
APRON @ HONEY CREEK
GATE
SHELTERS
WASH WATER LINE
GRAVEL DRIVE

ROCKPORT LANDFILL CONTROL MONUMENTS

DATUM: NAD27 INDIANA WEST / NGVD29

POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
1084	162530.176	521551.663	431.935	AEP DOME MONUMENT
1085	162917.105	521261.699	438.448	AEP DOME MONUMENT
17404	162563.621	518481.267	404.409	IRON PIN
415	161837.200	517472.40	402.603	AEP OFFICE PED MONUMENT
1501	164091.320	520798.371	438.033	AEP DOME MONUMENT
1502	163996.135	518946.806	396.506	AEP DOME MONUMENT
1504	160811.169	518915.674	399.238	AEP DOME MONUMENT

LEGEND

- CELL BOUNDARY LINES
- PROPOSED STORM WATER PERMIT BOUNDARY
- DITCH CHECK
- POWER POLE
- WETLAND AREAS
- CONTROL POINT
- BORING (AS LABELED) (ST - SHELBY TUBE)
- CHIMNEY DRAIN
- OVERHEAD POWER LINE
- VEGATATIVE COVER
- SEEDED AND MULCHED
- DENOTES SOLID PIPE
- DENOTES PERF PIPE

INDIANA-MICHIGAN POWER CO.

ROCKPORT PLANT

ROCKPORT INDIANA

ROCKPORT LANDFILL EROSION AND SEDIMENT CONTROL DETAILS

NAD 27/NGVD 29 INDIANA WEST

SCALE: 1" = 150'

Revisions By: L. HOFIUS

Revision Date: 27, JUNE 2020

Drawn By: LARRY HOFIUS

AMERICAN ELECTRIC POWER
1 RIVERSIDE PLAZA
COLUMBUS, OH 43215