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Letter No. 12661-181-SL-IEPA-0005  
June 17, 2024  
Project No. File No. 12661-181

**Re: Integrity Test Results for Existing Bypass Basin Liner**

Mr. Mark Liska  
Illinois EPA, Bureau of Water  
1021 North Grand Avenue East  
Springfield, IL 62702

*Electronic copy submitted via email to [Mark.Liska@Illinois.gov](mailto:Mark.Liska@Illinois.gov)*

Dear Mr. Liska:

On behalf of Midwest Generation, LLC (MWG), Sargent & Lundy is submitting the enclosed electrical leak location survey results and photographs demonstrating that (1) the existing high-density polyethylene (HDPE) geomembrane liner in the Bypass Basin at the Powerton Generating Station (“Powerton” or the “Station”) is competent and (2) the basin no longer contains CCR or CCR-contaminated sediments. In accordance with 35 Ill. Adm. Code 845.770(a)(4), these analytical test results and photographs are being submitted in support of MWG’s request to re-use the Bypass Basin’s existing geomembrane liner as a supplemental liner under the new composite liner system to be installed when the basin is retrofitted.

The following sections describe relevant background information on the Bypass Basin Retrofit Project, the electrical leak location survey performed on the basin’s existing geomembrane liner, repairs made to the liner, and photographs of the empty and decontaminated basin.

**BACKGROUND**

Powerton’s Bypass Basin is an existing CCR surface impoundment that was used by the Station as a settling pond when the Station’s primary settling pond, the Ash Surge Basin, was being cleaned. When in service, the Bypass Basin received bottom ash transport water discharged from the Station’s dewatering bins (which initially treat the Station’s CCR sluice water by initial sedimentation of solids) and other process waste streams related to electric power-generating operations. In 2010, the Bypass Basin’s original liner was replaced with a 60-mil HDPE geomembrane liner. To facilitate periodic removal of ash in accordance with historical cleaning practices, and to protect the liner during cleaning, the HDPE geomembrane liner along the basin floor was covered, from bottom to top, with a non-woven geotextile, a 12-inch-thick sand cushion layer, and a 6-inch-thick gravel warning layer. In early October 2020, the Station took the Bypass Basin out of service to clean the basin, and the basin has not been used since.

On July 18, 2022, MWG submitted a construction permit application to the Illinois Environmental Protection Agency (Illinois EPA or “Agency”) to retrofit the Bypass Basin with a new composite liner

system and a new leachate collection and removal system. Under MWG's proposed retrofit design, both new systems would be installed over the basin's existing HDPE geomembrane liner, which would be re-used as a supplemental liner in the retrofitted basin. Under the Illinois Pollution Control Board's "Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments" ("Illinois CCR Rule"), an "existing competent geomembrane liner" may be re-used as "a supplemental liner by submitting visual inspection, and analytical testing results to demonstrate that the existing liner is not contaminated with CCR constituents." 35 Ill. Adm. Code 845.770(a)(4).

On March 5, 2024, MWG submitted an amended written retrofit plan to the Agency to communicate changes to MWG's planned sequencing and schedule for the Bypass Basin Retrofit Project, which were based on input provided by Illinois EPA on February 27, 2024. Per the amended retrofit plan, MWG will retrofit the Bypass Basin in two phases. Phase 1 includes the following activities, which are necessary for MWG to submit the visual inspection and analytical test data Illinois EPA requires to approve re-using the Bypass Basin's existing geomembrane liner under 35 Ill. Adm. Code 845.770(a)(4):

1. Remove the gravel, sand, and geotextile that were placed over the existing geomembrane liner.
2. Decontaminate the basin's existing geomembrane liner.
3. Visually inspect the geomembrane liner for CCR and for damage (*i.e.*, tears, holes, *etc.*) and repair any observed damage.
4. Submit samples of the basin's existing geomembrane liner to a certified laboratory for analytical testing to confirm the liner is not contaminated with CCR constituents.
5. Perform an electrical leak location survey to verify the basin's existing geomembrane liner is competent and repair any identified damage.
6. Submit the visual inspection, laboratory test, and electrical leak location survey results to Illinois EPA for review.

Items 1 through 4 were completed earlier this year as described in Letter No. 12661-181-SL-IEPA-0004 submitted to Illinois EPA on May 7, 2024. Since that previous correspondence, Items 5 and 6 have been completed and are detailed in the following sections.

## **ELECTRICAL LEAK LOCATION SURVEY**

After the Station finished cleaning, decontaminating, visually inspecting, and repairing, as necessary, the Bypass Basin's existing liner, an electrical leak location survey was performed. Weaver Consultants Group ("Weaver") conducted the survey on May 23, 2024. The survey was performed in accordance with ASTM D7002, "Standard Practice for Electrical Leak Location on Exposed Geomembranes Using the Water Puddle Method." Weaver's survey methodology and results are included in the report ("Weaver Report") enclosed herewith.

As detailed in the Weaver Report, Weaver identified three locations in the Bypass Basin's geomembrane liner. Location 1 was near the seam between geomembrane liner panels P2 and P12. Locations 2 and 3 were at the bases of the pipe boots installed over the marker posts in geomembrane liner panels P36 and P18, respectively. These locations are identified on Figure 1 of the Weaver's Report, and photographs of the aberrations are shown in Appendix A of the report.

As noted in their report, Weaver did not visually observe any other aberrations in the Bypass Basin's geomembrane liner. It should be noted that the miniscule nature of the three aberrations identified by the survey demonstrates the method's sensitivity and effectiveness at identifying the smallest anomalies in a geomembrane liner. Accordingly, this electrical leak location survey provides assurance that the Bypass Basin's existing geomembrane liner is competent.

## LINER REPAIRS

After the survey was completed, Clean Air and Water (CAAW) Systems repaired the three locations identified by Weaver.<sup>1</sup> Figures 1, 2, and 3 show the repairs juxtaposed with the photographs that Weaver took during the survey. As shown in Figure 1, an HDPE geomembrane patch was placed over Location 1 near the seam between panels P2 and P12; the patch was extrusion-welded to the base sheets on both sides of the seam. Per Figure 2, additional extrudate was placed around the base of the marker post in panel P36, effectively covering the original weld at Location 2. Per Figure 3, Location 3 at the marker post in panel P18 was repaired in the same manner. At each location, CAAW Systems subsequently tested the integrity of the extrusion weld in accordance with ASTM D5641, "Standard Practice for Geomembrane Seam Evaluation by Vacuum Chamber." None of the locations exhibited leakage during the vacuum chamber test. Therefore, the repairs made at the three locations identified by Weaver are competent.

**Figure 1. Repair of Location 1 Near Seam Between Liner Panels P2 and P12.**

*(a) Weaver Photograph (#5)  
of Location 1*



*(b) HDPE Geomembrane Patch  
Welded Over Location 1*



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<sup>1</sup> Clean Air and Water Systems is an experienced supplier and installer of geosynthetic containment systems and is the company that installed the Bypass Basin's liner in 2010.

**Figure 2. Repair of Location 2 at Base of Marker Post in Liner Panel P36.**

*(a) Weaver Photograph (#6)  
of Location 2*



*(b) Additional Extrudate Placed  
Around Marker Post*



**Figure 3. Repair of Location 3 at Base of Marker Post in Liner Panel P18.**

*(a) Weaver Photograph (#7)  
of Location 3*



*(b) Additional Extrudate Placed  
Around Marker Post*



## CONCLUSIONS & NEXT STEPS

Collectively, the analytical test results and photographs submitted with this letter and Letter No. 12661-181-SL-IEPA-0004 on May 7, 2024, demonstrate that (1) the Bypass Basin's existing HDPE geomembrane liner is competent and (2) the basin no longer contains CCR or CCR-contaminated sediments. Per the analytical test results documented in Letter No. 12661-181-SL-IEPA-0004, the procedures used by the Station to clean the basin's existing liner successfully removed CCR and CCR-contaminated sediments from the liner. Photographs of the cleaned and decontaminated basin are provided in Figures 4 through 7 below. Based on the electrical leak location survey results and the repairs made to the three locations identified by Weaver, the Bypass Basin's existing HDPE geomembrane liner is competent. Therefore, the basin's existing liner is suitable for re-use as a supplemental liner under the retrofitted basin's new composite liner system in accordance with 35 Ill. Adm. Code 845.770(a)(4).

**Figure 4. Cleaned and Decontaminated Bypass Basin (Looking Southwest).**



**Figure 5. Cleaned and Decontaminated Bypass Basin (Looking Southwest).**



**Figure 6. Cleaned and Decontaminated Bypass Basin (Looking West).**



**Figure 7. Cleaned and Decontaminated Bypass Basin (Looking Northwest).**



Following the Agency's review of the enclosed electrical leak location survey test results, the documented liner repairs, and the photographs above, we kindly request Illinois EPA provide written approval for re-using the Bypass Basin's existing HDPE geomembrane liner as a supplemental liner in the retrofit construction. Please do not hesitate to contact me directly at (312) 269-6373 or via email at [tdehlin@sargentlundy.com](mailto:tdehlin@sargentlundy.com) if you have any questions on the enclosed survey results.

We appreciate Illinois EPA's feedback and support on the Bypass Basin Retrofit Project, and we look forward to continuing to work with the Agency on this matter.

Best regards,



Thomas Dehlin, P.E.  
Manager / Consultant

Mr. Mark Liska  
Re: Integrity Test Results for  
Existing Bypass Basin Liner

Page 8 of 8  
June 17, 2024

Enclosure:

1. "Leak Location Survey for the Bypass Basin liner at the Powerton Generating Station located in Pekin, IL." by Weaver Consultants Group (June 5, 2024)

Copies Furnished (via Email):

1. Lauren Hunt, Illinois EPA
2. Darin LeCrone, Illinois EPA
3. [EPA.CCR.Part845.Coordinator@Illinois.gov](mailto:EPA.CCR.Part845.Coordinator@Illinois.gov)
4. Sharene Shealey, MWG
5. Jill Buckley, MWG
6. Joe Kotas, MWG
7. Todd Mundorf, MWG





June 5, 2024

Mr. Matt Sondrol  
Clean Air and Water Systems  
123 Elm Street  
Dousman, WI 53118

RE: Leak Location Survey for the Bypass Basin liner at the Powerton Generating Station located in Pekin, IL.

Dear Mr. Sondrol,

This correspondence provides the description and results of the electrical leak location survey (LLS) performed over the existing geomembrane in the Bypass Basin at the Powerton Generating Station located in Pekin, IL. The survey was performed by Mr. Jeff Blum and Ms. Elaine Girbach of Weaver Consultants Group on May 23<sup>rd</sup>, 2024.

### **Background**

The Bypass Basin consists of an existing white 60-mil HDPE geomembrane liner installed above a subgrade. The pond also consists of several pipe penetrations with geomembrane boots. The liner survey area was approximately 0.8 acre. Photographs of the survey and findings are included.

### **Methodology**

The electrical leak location survey (LLS) test procedure is based on ASTM International Standard D7002, Standard Practices for Electrical Leak Location on Exposed Geomembranes Using the Water Puddle Method.

An electric potential is applied across the geomembrane with a low voltage direct current source that is introduced to the water sprayed above the geomembrane and a current return electrode placed in the subbase below the geomembrane. Since the polyethylene geomembrane is an electrical insulator, a leak must be present to allow the electrical current to flow from the current source through the geomembrane to the current return electrode.

The water puddle device contains and pushes a puddle of water on top of the exposed geomembrane and creates a conduit for current to flow through leaks. High potential gradients of a characteristic pattern identify the location of electrical conductivity, which are typically found as holes in the geomembrane. Voltage changes when a current is detected and a leak is converted to an audible signal at the meter.

### **Leak Detection Sensitivity**

A test of the leak detection sensitivity was performed and documented as part of the leak location survey. The test was conducted at the beginning of the survey and periodically throughout the survey to quantify sensitivity and verify equipment functionality. The sensitivity test was performed using an “artificial hole” using a cut end of an insulated 18 AWG wire in accordance with ASTM D7002. The artificial leak was connected to the same soil subbase that lies directly below the geomembrane to provide a current path.

The sensitivity test was conducted using the same speed of the water puddle or lance that was used for the actual survey.

### **Production Survey / Observation**

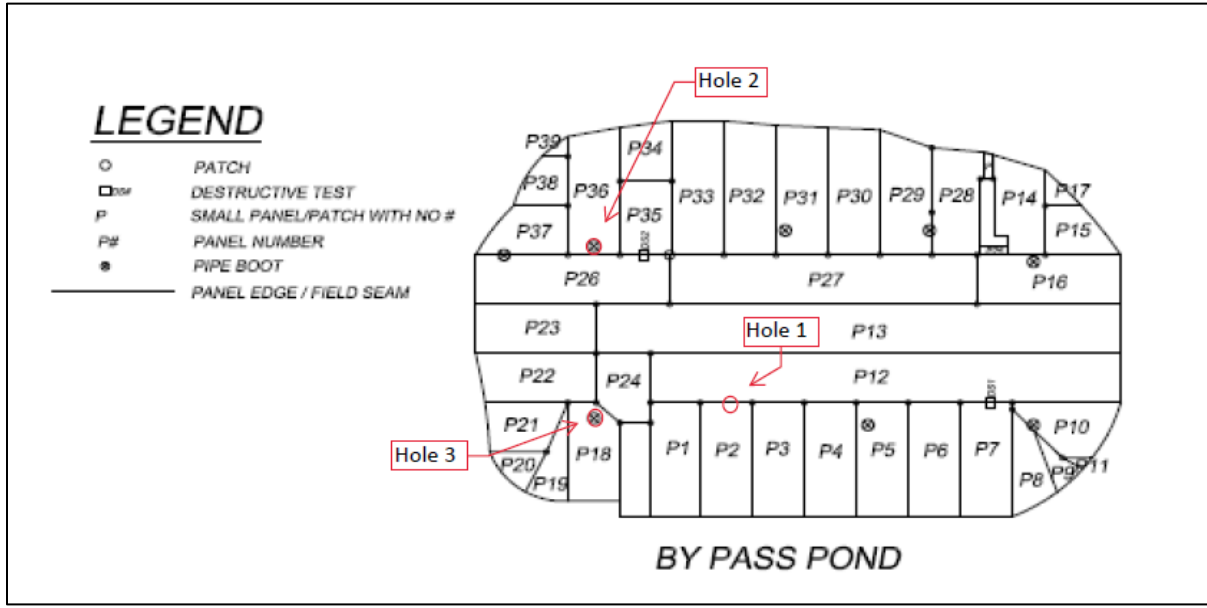
The pond consisted of an exposed geomembrane liner with eight (8) pipe penetrations. A geomembrane pipe penetration boot was installed around each pipe penetration. Additionally, the pond had two concrete structures that the geomembrane liner was connected to using stainless steel batten strips. The geomembrane at the location of batten strips could not be tested for leaks due to the conductive nature of the concrete and stainless-steel batten strips.

Weaver Consultants performed the LLS over an approximate area of 0.8 acres of exposed geomembrane. The water puddle method was utilized over the entire project area which consisted of the floor and slopes.

During the course of the survey the weather conditions consisted of sunny skies, moderate winds, and temperatures in the 90’s.

Three (3) locations were found to produce elevated readings indicative of the presence of a leak or hole. These locations are as shown in Figure 1. Each location is shown in the photographs in Appendix A. Over the remainder of the lined area there were no other signals indicating the presence of a hole or leak in the geomembrane. Additionally, during the leak location survey visual observations of the surface of the geomembrane were performed looking for indications of the presence of a hole. No additional holes were observed visually.

**Figure 1**




**Summary**

The electrical leak location survey performed on the basin liner identified three (3) holes as shown in Figure 1.

We trust this information is sufficient for your needs at this time. If you have any questions regarding this submittal or require further information, please feel free to contact our office at (616) 458-8052.

Respectfully,  
**Weaver Consultants Group**

  
Jeffrey A. Blum  
Senior Project Manager

  
Tamara Perkins  
Senior Project Engineer

Powerton Generating Station  
Bypass Pond Leak Location Survey  
Photograph Log



**Photograph #1**  
**Date: 5/23/24**

**Description:**  
Bypass Pond  
looking south.



**Photograph #2**  
**Date: 5/23/24**

**Description:**  
Bypass Pond  
north end.

Powerton Generating Station  
Bypass Pond Leak Location Survey  
Photograph Log



**Photograph #3**

**Date: 5/23/24**

**Description:**

Performing the water puddle leak location at the north end.



**Photograph #4**

**Date: 5/23/24**

**Description:**

Performing the water puddle leak location on the west slope.

Powerton Generating Station  
Bypass Pond Leak Location Survey  
Photograph Log



**Photograph #5**

**Date: 5/23/24**

**Description:**

Hole location #1. Two deep scratches through the geomembrane.



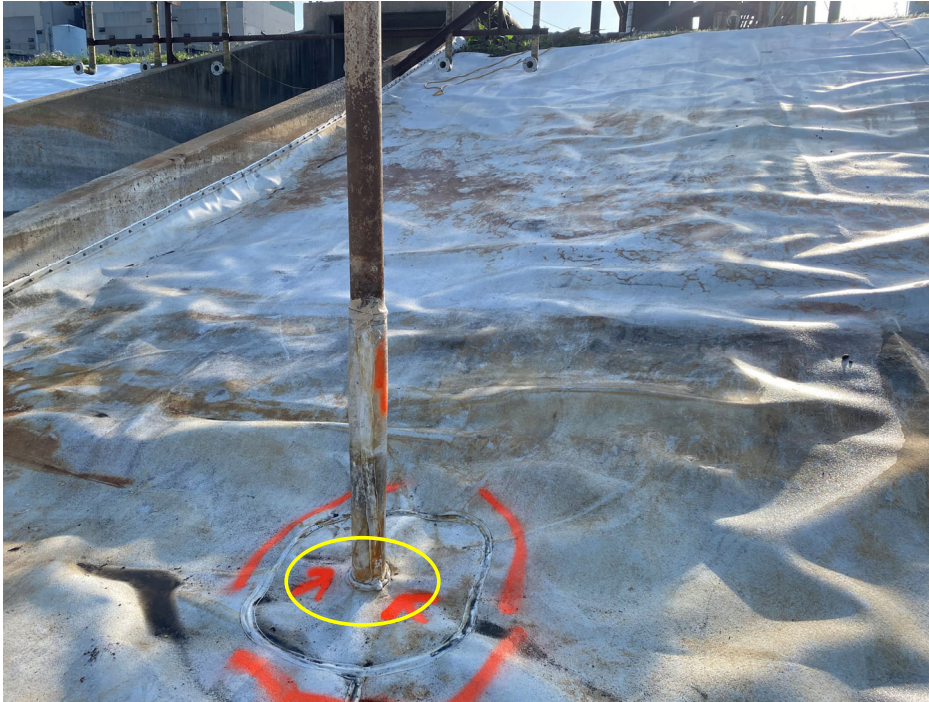
**Photograph #6**

**Date: 5/23/24**

**Description:**

Hole location #2. The leak signal was at the base of the extrusion weld of the pipe penetration boot along the west side.

Powerton Generating Station  
Bypass Pond Leak Location Survey  
Photograph Log



**Photograph #7**

**Date: 5/23/24**

**Description:**

Hole location #3. The leak signal was at the base of the extrusion weld of the pipe penetration boot along the north, south, and west side.