MWG

Midwest Generation, LLC

Powerton Generating Station

Bypass Basin Retrofit Plan

Revision 1

March 5, 2024

Issue Purpose: Use

Project No.: 12661-181

55 East Monroe Street
Chicago, IL 60603-5780 USA
312-269-2000
www.sargentlundy.com

Sargent & Lundy

LEGAL NOTICE

This report was prepared by Sargent & Lundy (S&L) expressly for the sole use of Midwest Generation, LLC (Client) in accordance with the contract agreement between S&L and Client. This report was prepared using the degree of skill and care ordinarily exercised by engineers practicing under similar circumstances. Client acknowledges: (1) S&L prepared this report subject to the particular scope limitations, budgetary and time constraints, and business objectives of Client; (2) information and data provided by others, including Client, may not have been independently verified by S&L; and (3) the information and data contained in this report are time-sensitive and changes in the data, applicable codes, standards, and acceptable engineering practices may invalidate the findings of this report. Any use or reliance upon this report by third parties shall be at their sole risk.

TABLE OF CONTENTS

1.0 PURPOSE & SCOPE

Illinois CCR Rule Reference: 35 Ill. Adm. Code 845.770(c)
Federal CCR Rule Reference: 40 CFR 257.102(k)(2)

1.1 PURPOSE

Midwest Generation, LLC (MWG) plans to retrofit the Bypass Basin at the Powerton Generating Station ("Powerton" or "Station") in Pekin, Illinois with a new composite liner system and a new leachate collection and removal system. The Bypass Basin is an existing coal combustion residual (CCR) surface impoundment that was historically used by the Station as a settling pond for bottom ash transport water discharged from the Station's dewatering bins (which initially treat the Station's CCR sluice water) and for other process waste streams related to electric power-generating operations when the Station's Ash Surge Basin was being cleaned. However, the Bypass Basin has not been in service since early October 2020 when the Station started cleaning out the basin in accordance with historical cleaning practices. The Bypass Basin is lined with a 60-mil high-density polyethylene (HDPE) geomembrane liner, has a surface area of approximately 0.83 acre, and has a storage capacity of approximately 9,000 cubic yards.

As a CCR surface impoundment, the Bypass Basin is regulated by both the Illinois Pollution Control Board's "Standards for the Disposal of Coal Combustion Residuals in CCR Surface Impoundments," which are codified in Title 35, Part 845 to the Illinois Administrative Code (35 Ill. Adm. Code 845), and the U.S. Environmental Protection Agency's (EPA) "Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments," which are codified in 40 CFR Part 257 Subpart D. These state and federal CCR regulations are referred to herein as the Illinois CCR Rule and the Federal CCR Rule, respectively. Pursuant to 35 Ill. Adm. Code 845.770(c) and 40 CFR 257.102(k)(2), this document provides MWG's written retrofit plan for the Bypass Basin.

Revision 1 of this document represents the first amendment to the initial written retrofit plan for Powerton's Bypass Basin, which was included with the retrofit construction permit application submitted to Illinois EPA for the basin on July 15, 2022. This amended written retrofit plan addresses changes to the sequencing and schedule of activities necessary to satisfy the retrofit criteria in 35 Ill. Adm. Code 845.770 and 40 CFR 257.102(k). These schedule changes are based in part on input MWG received from Illinois EPA during an in-person meeting on February 27, 2024.

1.2 SCOPE

Per the 2016 Water Infrastructure Improvements for the Nation (WIIN) Act, the Bypass Basin will continue to be subject to both the Illinois and Federal CCR Rules until the U.S. EPA approves the Illinois EPA's CCR permit program. The Illinois EPA has yet to publish a timeline for submitting its proposed CCR permit

program to the U.S. EPA for approval, and so this written retrofit plan has been prepared pursuant to both sets of regulations.

2.0 RETROFIT PLAN NARRATIVE DESCRIPTION

Illinois CCR Rule Reference: 35 Ill. Adm. Code 845.770(c)(1)(A)
Federal CCR Rule Reference: 40 CFR 257.102(k)(2)(i)(A)

MWG will retrofit the Bypass Basin in two phases: (1) decontaminating and verifying the integrity of the basin's existing geomembrane liner and (2) installing structural fill, a new composite liner system, and a new leachate collection and removal system within the basin.

MWG plans to re-use the Bypass Basin's existing HDPE geomembrane liner as a supplemental liner in the retrofitted basin. Phase 1 of retrofitting the Bypass Basin covers the activities necessary for MWG to submit the visual inspection and analytical test data Illinois EPA requires to approve re-using the existing liner in accordance with 35 Ill. Adm. Code 845.770(a)(4). MWG will execute Phase 1 by performing the following sequential steps:

1. Remove the gravel warning and sand cushion layers over the existing geomembrane liner from the basin and transport the soil materials to a permitted disposal facility.
2. Decontaminate the basin's existing geomembrane liner and appurtenant structures (*e.g.*, inlet and outlet structures, piping).
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 no longer 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.
7. Illinois EPA approves re-use of the Bypass Basin's existing geomembrane liner as a supplemental liner under the basin's new composite liner.

Phase 2 of retrofitting the Bypass Basin covers the activities necessary to install a new composite liner system and a new leachate collection and removal system within the basin. MWG will execute Phase 2 by performing the following sequential steps:

1. Obtain a construction permit from the Illinois EPA.
2. Procure the materials for the basin's new composite liner system and new leachate collection and removal system.

3. Procure a General Work Contractor to retrofit the basin and a Construction Quality Assurance (CQA) Contractor to verify the basin is retrofitted in accordance with specified requirements.
4. Place structural fill within the basin floor to establish the slopes for the new leachate collection and removal system and to support the new composite liner (see Section 2.1).
5. Install an alternative composite liner system in accordance with 35 Ill. Adm. Code 845.410 and 40 CFR 257.72 (see Section 2.2).
6. Install a leachate collection and removal system in accordance with 35 Ill. Adm. Code 845.420 (see Section 2.3).
7. Submit to the Illinois EPA:
    a. A retrofit completion report (see Section 8.0), and
    b. A certification from a qualified professional engineer licensed in the State of Illinois that the Bypass Basin has been retrofitted in accordance with the activities outlined in this retrofit plan (or subsequent amendment of this retrofit plan), the requirements stipulated in 35 Ill. Adm. Code Part 845, and the requirements of 40 CFR 257.102(k).

2.1 STRUCTURAL FILL

Pursuant to 35 Ill. Adm. Code 845.420(a)(3), the retrofitted Bypass Basin will have a new leachate collection and removal system that slopes towards a collection pipe at a minimum slope of three percent. Because the existing basin floor is approximately flat, MWG will place, compact, and grade structural fill along the basin floor to establish the lines and grades for the new leachate collection and removal system. The structural fill will be placed over the Bypass Basin's existing HDPE geomembrane liner, which MWG plans to leave in-place as a supplemental liner under the basin's new composite liner. All earthwork activities associated with placing, compacting, and grading structural fill along the basin floor will be done in a manner to prevent tearing, ripping, or otherwise damaging the Bypass Basin's existing HDPE geomembrane liner.

2.2 COMPOSITE LINER

Illinois CCR Rule Reference: 35 Ill. Adm. Code 845.410(a) & 845.400(c)
Federal CCR Rule Reference: 40 CFR 257.72(a) & 257.70(c)

MWG will retrofit the Bypass Basin with an alternative composite liner system that meets the requirements of 35 Ill. Adm. Code 845.400(c) and 40 CFR 257.70(c). The composite liner will consist of a 60-mil HDPE geomembrane over a geosynthetic clay liner (GCL). Pursuant to 35 Ill. Adm. Code 845.400(c)(2) and 40 CFR 257.70(c)(1), the GCL component will have a hydraulic conductivity of no more than 1×10^{-9} cm/sec to ensure that the liquid flow rate through the GCL is less than the liquid flow rate through two feet of compacted soil with a hydraulic conductivity of no more than 1×10^{-7} cm/sec.

2.3 LEACHATE COLLECTION & REMOVAL SYSTEM

Illinois CCR Rule Reference: 35 Ill. Adm. Code 845.420(a)

In addition to installing a new composite liner in the basin, MWG will install a new leachate collection and removal system (LCRS) in the Bypass Basin pursuant to 35 Ill. Adm. Code 845.420. This LCRS will be placed over the new composite liner and will be constructed of drainage geocomposite with a transmissivity of at least 6×10^{-4} m^2/sec in accordance with 35 Ill. Adm. Code 845.420(a)(4). The drainage geocomposite will consist of an HDPE geonet core with a non-woven geotextile layer heat-laminated to each side of the geonet core, and will be sloped towards a perforated collection pipe installed in a trench along the middle of the basin. As discussed in Section 2.1, the structural fill placed along the basin floor will ensure the drainage geocomposite slopes towards the collection pipe at a slope of at least three percent pursuant to 35 Ill. Adm. Code 845.420(a)(3). This collection pipe will then convey leachate to a sump pump at the southern end of the retrofitted Bypass Basin to ultimately be pumped out of the basin. This drainage geocomposite and collection pipe system will ensure leachate flows from all points within the basin to the sump, will be constructed in such a way as to prevent clogging of the LCRS during the active life and post-closure care period of the basin, and will be large enough to conduct periodic cleaning. The upper non-woven geotextile component of the drainage geocomposite will also prevent CCR and non-CCR sediments from intruding into, clogging, and impeding the flow of leachate through the HDPE geonet core.

In addition to the upper non-woven geotextile component of the drainage geocomposite, a sand filter layer will be installed above the retrofitted Bypass Basin's LCRS to prevent CCR and non-CCR sediments from clogging the LCRS. This sand filter layer will have a hydraulic conductivity of at least 1×10^{-5} cm/sec pursuant to 35 Ill. Adm. Code 845.420(a)(2). Meanwhile, the upper non-woven geotextile component of the drainage geocomposite will preclude the intrusion of sand particles from the filter layer into the HDPE geonet core's apertures, which would otherwise impede the flow of leachate through the geonet.

Finally, in accordance with 35 Ill. Adm. Code 845.420(a)(8), a protective warning layer will be installed over the sand filter layer to provide a means of deflecting the force of CCR pumped into the retrofitted Bypass Basin. Along the floor of the retrofitted Bypass Basin, this uppermost layer will be comprised of coarse aggregate materials to provide a working surface for operators removing CCR from the basin; it will also serve as a means of warning these operators that they have reached the basin floor and to stop excavating. Along the basin's side slopes, the protective warning layer will consist of riprap on a gravel bedding layer to protect the sand filter layer from erosion.

3.0 CCR REMOVAL & DECONTAMINATION PROCEDURES

Illinois CCR Rule Reference: 35 Ill. Adm. Code 845.770(c)(1)(B)
Federal CCR Rule Reference: 40 CFR 257.102(k)(2)(i)(B)

In early October 2020, Powerton took the Bypass Basin out of service for routine cleaning and began drawing down the surface water in the basin to dewater the basin and the CCR material stored therein. The Station then began removing the ash stored above the granular protective layers covering the basin's existing geomembrane liner in accordance with the Station's historical cleaning and maintenance practices for the Bypass Basin whereby ash is periodically removed from the basin to recover storage capacity. As of late October 2021, no CCR remains in the Bypass Basin. With the CCR removed from the basin, the retrofit work described in Section 2.0 will be performed in accordance with this retrofit plan (or subsequent amendment of this retrofit plan) and the construction permit issued by the Illinois EPA.

In order to submit the visual inspection and analytical test data Illinois EPA requires to approve re-using the Bypass Basin's existing HDPE geomembrane liner as a supplemental liner in accordance with 35 Ill. Adm. Code 845.770(a)(4), MWG will first remove the granular protective layers covering the existing liner: a 6-in.-thick gravel warning layer and a 12-in.-thick sand cushion layer. These soil materials will be loaded onto trucks and transported to a permitted disposal facility. Because these soil materials are likely to contain CCR materials, the trucks transporting the material off-site will carry manifests pursuant to 35 Ill. Adm. Code 845.740(c)(1)(A) and as specified in 35 Ill. Adm. Code 809. In addition, a CCR transportation plan will be prepared in accordance with 35 Ill. Adm. Code 845.740(c)(1)(B) which will include:

- Identification of the transportation method selected.
- The frequency, time of day, and routes of CCR transportation.
- Any measures to minimize noise, traffic, and safety concerns caused by the transportation of the CCR.
- Measures to limit fugitive dust from any transportation of CCR.
- Installation and use of a vehicle washing station.
- A means of covering the CCR for any mode of CCR transportation.
- A requirement that the CCR is transported by a permitted special waste hauler under 35 Ill. Adm. Code 809.201.

On-site fugitive dust control measures will also be implemented as necessary to minimize airborne CCR particulates while CCR-impacted material is being handled. Pursuant to 35 Ill. Adm. Code 845.740(c)(2)(A), these dust control measures will include a water spray, commercial dust suppressant, or a combination of these.

Prior to the removal of the granular protective layers covering the Bypass Basin's existing geomembrane liner, signage will be posted at the Station's entrance warning of the hazards of CCR dust inhalation in accordance with 35 Ill. Adm. Code 845.740(c)(3)(A). Pursuant to 35 Ill. Adm. Code 845.740(c)(3)(B), a written notice will be issued to each of the local governments through which the CCR-impacted material will be transported. This written notice will include an explanation of the hazards of CCR dust inhalation, the aforementioned CCR transportation plan, and a tentative transportation schedule.

After the granular protective layers in the basin have been removed, MWG will begin decontaminating the Bypass Basin's existing geomembrane liner. The basin's inlet and outlet structures, associated piping, *etc*. will also be decontaminated. At a minimum, decontamination procedures will include pressure washing of the geomembrane liner and pond appurtenances in a systematic manner to remove all CCR. Following decontamination, the existing geomembrane liner will be visually inspected, and an electrical leak location survey will be conducted to ensure the liner is competent. Any damage to the existing geomembrane liner observed during the visual inspection or identified by the electrical leak location survey will be repaired, and all repairs will be documented. MWG will also submit samples of the existing liner to a certified laboratory for analytical testing to confirm the liner is no longer contaminated with CCR constituents. The results from the visual inspection and analytical tests will then be submitted to the Illinois EPA to approve MWG's proposal to re-use the existing geomembrane liner as a supplemental liner under the new composite liner in the retrofitted Bypass Basin.

4.0 ESTIMATED MAXIMUM INVENTORY OF CCR TO BE REMOVED

Illinois CCR Rule Reference: 35 Ill. Adm. Code 845.770(c)(1)(C)
Federal CCR Rule Reference: 40 CFR 257.102(k)(2)(i)(C)

As previously stated, no appreciable volume of CCR remains in the Bypass Basin since Powerton cleaned the basin in accordance with the Station's ash pond maintenance practices. However, it is likely that CCR materials are present within the granular protective layers covering the Bypass Basin's existing geomembrane liner. For the purposes of this retrofit plan, the maximum amount of CCR that will be removed during the retrofit of the Bypass Basin is conservatively based on the volume of the granular protective layers that will be removed from the basin prior to the installation of the basin's new composite liner and new LCRS: approximately 1,000 cubic yards.

5.0 ESTIMATED LARGEST AREA TO BE RETROFITTED

Illinois CCR Rule Reference: 35 Ill. Adm. Code 845.770(c)(1)(D)
Federal CCR Rule Reference: 40 CFR 257.102(k)(2)(i)(D)

The estimated largest area of the Bypass Basin to be retrofitted is anticipated to be the basin's full surface area: 0.83 acre.

6.0 RETROFIT SCHEDULE

Illinois CCR Rule Reference: 35 Ill. Adm. Code 845.770(c)(1)(E)
Federal CCR Rule Reference: 40 CFR 257.102(k)(2)(i)(E)

MWG expects to complete the retrofit work for the Bypass Basin in 2024. Table 1 lists the major milestones necessary for retrofitting the Bypass Basin and the expected duration for completing each milestone.

Table 1 – Planning Level Schedule for Retrofitting the Bypass Basin

Activity	Estimated Duration
Prepare Retrofit Construction Design Documents	Complete
Submit Retrofit Construction Permit Application to Illinois EPA	Complete
Phase 1 – Existing Liner Decontamination and Integrity Verification	
Remove Protective Granular Layers Above Existing Liner	2 Months
Decontaminate Existing Liner and Basin Appurtenances	1 Week
Verify Decontamination and Liner Integrity (Including Laboratory Testing)	5 Weeks
Obtain Approval from Illinois EPA to Re-Use Existing Liner as Supplemental Liner	1 Month
Phase 2 – Retrofit Construction	
Purchase Composite Liner and LCRS Materials	4 Months
Hire General Work Contractor to Complete Retrofit Work	4 Months
Hire CQA Contractor to Inspect and Test Retrofit Work	3 Months
Obtain Retrofit Construction Permit from Illinois EPA	5 Months
Install Structural Fill	1 Week
Install Composite Liner System	1 Week

Activity	Estimated Duration
Phase 2 – Retrofit Construction (Continued)	
Install Leachate Collection and Removal System (Including Filter and Protective Layers)	2 Weeks
Submit Retrofit Completion Report and Certification to Illinois EPA	1 Week
Obtain Approval of Retrofit Completion Report and Certification from Illinois EPA	1 Month
Complete and Certify Retrofit of the Bypass Basin	--

7.0 AMENDMENTS TO RETROFIT PLAN

Illinois CCR Rule Reference: 35 Ill. Adm. Code 845.770(c)(3)
Federal CCR Rule Reference: 40 CFR 257.102(k)(2)(iii)

This retrofit plan will be amended in accordance with 35 Ill. Adm. Code 845.770(c)(3) and 40 CFR 257.102(k)(2)(iii) if a change in the operation of the Bypass Basin would substantially affect this retrofit plan or if an unanticipated event necessitates a revision to this retrofit plan. Any and all amendments to this retrofit plan will be certified by a qualified professional engineer licensed in the State of Illinois in accordance with 35 Ill. Adm. Code 845.770(c)(4) and 40 CFR 257.102(k)(2)(iv).

8.0 COMPLETION OF RETROFIT ACTIVITIES

Illinois CCR Rule Reference: 35 Ill. Adm. Code 845.770(g)
Federal CCR Rule Reference: 40 CFR 257.102(k)(4)

Upon completion of all retrofit activities required by 35 Ill. Adm. Code Part 845 and 40 CFR 257.102(k) and approved by the Illinois EPA in a construction permit, a retrofit completion report and certification will be submitted to the Illinois EPA. The retrofit completion report will include (1) the engineering and hydrogeology reports containing monitoring well completion reports, boring logs, all CQA reports, certifications, designations of CQA officers-in-absentia required by 35 Ill. Adm. Code 845.290; (2) photographs with time, date, and location information of the liner system and leachate collection system; (3) other photographs relied upon for documentation of construction activities; (4) a written summary of the retrofit requirements and completed activities as stated in the construction permit and 35 Ill. Adm. Code 845; and (5) any other information relied upon by the qualified professional engineer for the certification. Pursuant to 35 Ill. Adm. Code 845.770(g)(2) and 40 CFR 257.102(k)(4), the certification will be prepared by an independent, qualified professional engineer licensed in the State of Illinois and will verify that the Bypass Basin has been retrofitted in accordance with this retrofit plan (or subsequent amendment of this retrofit plan), the requirements of 35 Ill. Adm. Code Part 845, and the requirements of 40 CFR 257.102(k). Finally, within 30 days of the Illinois

EPA approving the retrofit completion report and certification, a notification of completion of retrofit activities will be prepared in accordance with 35 Ill. Adm. Code 845.770(h).

9.0 CERTIFICATION

Illinois CCR Rule Reference: 35 Ill. Adm. Code 845.770(c)(4)
Federal CCR Rule Reference: 40 CFR 257.102(k)(2)(iv)

I certify that:

- This written retrofit plan for the Bypass Basin was prepared by me or under my direct supervision.
- The work was conducted in accordance with the requirements of 35 Ill. Adm. Code 845.770 and with the requirements of 40 CFR 257.102(k).
- I am a registered professional engineer under the laws of the State of Illinois.

Certified By: Thomas J. Dehlin Date: March 5, 2024

Seal: