

MWVG

Midwest Generation, LLC

Joliet 29 Generating Station

2023 Structural Stability Assessment for Ash Pond 2



Revision 0

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1.0 PURPOSE & SCOPE

1.1 PURPOSE

Ash Pond 2 at Midwest Generation, LLC's (MWG) Joliet 29 Generating Station ("Joliet 29" or the "Station") is an existing coal combustion residual (CCR) surface impoundment that is regulated by the Illinois Pollution Control Board's "Standards for the Disposal of Coal Combustion Residuals in CCR Surface Impoundments." These regulations are codified in Part 845 to Title 35 of the Illinois Administrative Code (35 Ill. Adm. Code 845, Ref. 1) and are also referred to herein as the "Illinois CCR Rule." Pursuant to 35 Ill. Adm. Code 845.450(a), MWG must conduct and complete an annual structural stability assessment that documents whether the design, construction, operation, and maintenance of Ash Pond 2 are consistent with recognized and generally accepted engineering practices for the CCR surface impoundment's storage capacity.

This report documents the 2023 structural stability assessment conducted and completed in accordance with the Illinois CCR Rule by Sargent & Lundy (S&L) on behalf of MWG for Ash Pond 2 at Joliet 29.

1.2 SCOPE

In addition to being regulated under the Illinois CCR Rule, Joliet 29's Ash Pond 2 is also regulated by the U.S. Environmental Protection Agency's (EPA) "Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments," 40 CFR Part 257 Subpart D (Ref. 2), also referred to herein as the "Federal CCR Rule." Per the 2016 Water Infrastructure Improvements for the Nation (WIIN) Act, Ash Pond 2 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. However, the scope of this 2023 structural stability assessment is strictly limited to demonstrating compliance with the Illinois CCR Rule. Pursuant to 40 CFR 257.73(f)(3), the next structural stability assessment for demonstrating compliance with the Federal CCR Rule is not required until 2026, five years after the last federal assessment was completed (2021).

2.0 INPUTS, PREVIOUS RESULTS, & CURRENT OPERATIONS

2.1 INPUTS

The findings documented in this 2023 structural stability assessment for Ash Pond 2 are based on visual observations made by S&L during a site visit on September 14, 2023; discussions with MWG personnel; historical and recent aerial images obtained from Google Earth Pro (Ref. 3); and the following documents:

- Initial federal structural stability assessment for Ash Pond 2 (Ref. 4),
- Annual inspection reports for Ash Pond 2 (Refs. 5 through 11), and
- History of construction for Ash Pond 2 (Ref. 12).

The initial federal structural stability assessment for Ash Pond 2, which was completed in October 2016, is included in its entirety in Appendix A.

2.2 2022 RECOMMENDED CORRECTIVE MEASURES

The following corrective measures were recommended for Ash Pond 2 based on the findings documented in the 2022 annual structural stability assessment (Ref. 13):

- Mow or otherwise cut vegetation that is taller than 12 inches along the crest of Ash Pond 2's north dike,
- Fill animal burrows observed near the crests of Ash Pond 2's south and west dikes and continue monitoring for animal activity, and
- Prior to repurposing Ash Pond 2 as a new stormwater detention basin, conduct a visual surveillance program to verify that the discharge pipes for Pond 1 and Ash Pond 2 are in good, working condition and are free of significant material defects that could compromise the pipes' integrities.

2.3 CURRENT POND OPERATING CONDITIONS

Ash Pond 2 was originally designed to manage CCR and miscellaneous non-CCR wastestreams from the Station. Following the conversion of Joliet 29's coal-fired units to natural gas, the pond was no longer used to manage CCR wastestreams and was eventually taken out of service. In accordance with the Station's ash pond maintenance practices, the Station then began dewatering and removing CCR from the pond. As documented in the pond's annual inspection reports since 2019 (Refs. 8 through 11), minimal CCR remains in Ash Pond 2. During S&L's site visit in September 2023, no CCR and approximately 6.3 feet of stormwater were visually observed in Ash Pond 2. In April 2021, MWG filed a notice of intent to close Ash Pond 2 in accordance with the Federal CCR Rule's closure criteria (Ref. 2, § 257.102). Closure construction activities will commence at the pond upon receipt of a closure construction permit from the Illinois EPA in accordance with Subpart B of the Illinois CCR Rule.

3.0 ASSESSMENT

3.1 STABLE FOUNDATIONS & ABUTMENTS

(35 Ill. Adm. Code 845.450(a)(1))

Ash Pond 2 is comprised of three earthen dikes and does not have any abutments. Detailed information on the soils supporting Ash Pond 2's dikes is provided in the pond's initial federal structural stability assessment in Appendix A. Based on reviews of the pond's annual inspection reports (Refs. 5 through 11) and Google Earth aerial images (Ref. 3), there have been no significant modifications to Ash Pond 2's geometry since its initial federal structural stability assessment was completed. Therefore, the details of the soils supporting Ash

Pond 2's dikes and corresponding conclusions documented in the pond's initial federal structural stability assessment remain valid for this 2023 assessment (see Appendix A). Thus, the soils supporting Ash Pond 2's dikes are considered to be stable for the maximum volume of CCR and CCR wastewater which can be impounded therein.

3.2 SLOPE PROTECTION

(35 Ill. Adm. Code 845.450(a)(2) & (4))

The upstream slopes of Ash Pond 2 are lined with high-density polyethylene (HDPE) geomembrane. This form of cover protects the upstream slopes of the pond's dikes against surface erosion, wave action, and adverse effects of sudden (rapid) drawdown.

Slope protection for the downstream slopes of Ash Pond 2 consists of either the HDPE geomembrane liner of Pond 1 (western dike) or vegetative cover (eastern and southern dikes). The gravel, sand, and cobble surfacing noted in the pond's initial federal structural stability assessment was also observed along the downstream slopes of the pond's eastern and southern dikes during our September 2023 site visit. These forms of cover protect the downstream slopes of the pond's dikes against surface erosion, wave action, and adverse effects of sudden (rapid) drawdown.

During our site visit on September 14, 2023, four total animal burrows were observed in the downstream slopes for Ash Pond 2's south and west dikes. The observed holes do not suggest that the stability of the subject dikes have been compromised, especially given their locations on the slopes and given that Ash Pond 2 is not currently in service. Upon notification of the existence of these animal burrows, the Station promptly contacted the U.S. Department of Agriculture (USDA) to assist in monitoring and mitigating the observed burrowing. After the USDA completed its monitoring period, the Station filled in the animal burrows. It is recommended that the Station continue to monitor the embankments for signs of animal burrowing.

During our September 2023 site visit, S&L noted that the one remote area on the crest of the pond's north dike where the vegetation was observed to be taller than 12 inches in the 2022 structural stability assessment no longer had excessive vegetation. However, S&L did note woody vegetation and vegetation taller than 12 inches along the downstream slope of Ash Pond 2's east dike. Upon notification of the excessive vegetation, the Station promptly mowed and cut this vegetation. In accordance with the Illinois CCR Rule (Ref. 1, §§ 845.430(b)(4) and 845.430(b)(5)), the Station promptly mowed / cut this excessive vegetation to reduce the height of the cover below the 12-inch threshold. It is important to note that the excessive vegetation observed did not suggest a stability issue with the subject dike.

3.3 DIKE COMPACTION

(35 Ill. Adm. Code 845.450(a)(3))

As documented in Ash Pond 2's initial federal and 2023 safety factor assessments (Refs. 4 and 14), the pond's dikes are sufficiently compacted to withstand the range of loading conditions in the CCR surface impoundment.

3.4 SPILLWAYS

(35 Ill. Adm. Code 845.450(a)(5))

Ash Pond 2 does not have any spillways. As documented in the pond's 2023 inflow design flood control system plan (Ref. 15), the pond is capable of managing the design flood event (1,000-year, 24-hour storm) without a spillway.

3.5 EMBEDDED HYDRAULIC STRUCTURES

(35 Ill. Adm. Code 845.450(a)(6))

Portions of the discharge pipes from Pond 1 and from Ash Pond 2 underlie the latter's southern dike. The locations of these two pipes are shown on Figure 2 of the pond's initial federal structural stability assessment in Appendix A. As documented in the 2016 assessment, visual surveillance of these pipes was performed in May 2016 by a third party that specializes in video camera pipe inspections. No significant deterioration, deformation, distortion, bedding deficiencies, sedimentation, or debris that may negatively affect Ash Pond 2 were identified during this surveillance program. It is noted that a portion of Pond 1's discharge pipe passes under Ash Pond 2's northern crest, but this portion of Ash Pond 2 is effectively incised and, thus, is not considered to be at risk if the discharge pipe's integrity was to become compromised.

No similar pipe surveillance programs have been performed since the initial video camera inspection in May 2016. However, no visual signs of distress at the dike surfaces that could be indicative of pipe deterioration, failure, deformation, *etc.* were observed (*e.g.*, soft spots caused by leaking water, distortions in dike alignment) during S&L's September 2023 site visit. Moreover, since Ash Pond 2 has been taken out of service and has low levels of surface water remaining in it, the pond's discharge pipe is not expected to convey water again unless it is re-used as part of the pond's closure design. Therefore, it is recommended that the Station conduct a visual surveillance program to confirm the discharge pipes for Pond 1 and (the current) Ash Pond 2 are in good, working condition and are free of significant material defects that could impact the pipes' integrities as a part of the planned closure activities for Ash Pond 2.

3.6 LOW POOL & RAPID DRAWDOWN STABILITY

(35 Ill. Adm. Code 845.450(a)(7))

As documented in Ash Pond 2’s initial federal safety factor assessment (Ref. 4), the results of which were revalidated in the 2023 safety factor assessment (Ref. 14), the structural stability of the pond’s downstream slopes is maintained during a low pool condition in Pond 1. Because Pond 1 is lined with an HDPE geomembrane, a sudden (rapid) drawdown condition was determined to not be an applicable loading condition for Ash Pond 2 since Pond 1’s liner precludes the infiltration of water into Ash Pond 2’s western dike.

Based on reviews of Ash Pond 2’s annual inspection reports (Refs. 5 through 11) and Google Earth aerial images (Ref. 3), there have been no significant modifications to Pond 1 since Ash Pond 2’s initial federal structural stability assessment was completed. Therefore, the conclusions documented therein regarding the stability of Ash Pond 2’s western dike during low pool and sudden (rapid) drawdown conditions at Pond 1 remain valid for this 2023 assessment (see Appendix A).

4.0 RECOMMENDED CORRECTIVE MEASURES

(35 Ill. Adm. Code 845.450(b)(1))

Table 4-1 lists the corrective measures recommended for Ash Pond 2 in accordance with the findings documented in this 2023 structural stability assessment.

Although woody vegetation, vegetation taller than 12 inches, and animal burrows were observed during S&L’s site visit on September 14, 2023, the Station property mowed / cut the vegetation in accordance with the Illinois CCR Rule (Ref. 1, §§ 845.430(b)(4) and 845.430(b)(5)) and filled in the animal burrows. Therefore, no further corrective measures are required at this time to address excessive vegetation and animal burrows observed along the pond’s dikes.

Table 4-1 – Recommended Corrective Measures for Ash Pond 2

Recommended Corrective Measure	Timeframe
Conduct a visual surveillance program to verify that the discharge pipes for Pond 1 and Ash Pond 2 are in good, working condition and are free of significant material defects that could compromise the pipes’ integrities.	During Closure Construction

5.0 CERTIFICATION

I certify that:

- This structural stability assessment was prepared by me or under my direct supervision.
- The work was conducted in accordance with the requirements of 35 Ill. Adm. Code 845.450.
- I am a registered professional engineer under the laws of the State of Illinois.

Certified By: Thomas J. Dehlin

Date: October 13, 2023

Seal:



6.0 REFERENCES

1. Illinois Pollution Control Board. "Standards for Disposal of Coal Combustion Residuals in CCR Surface Impoundments." 35 Ill. Adm. Code 845. Accessed October 13, 2023.
2. U.S. Environmental Protection Agency. "Standards for Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments." 40 CFR Part 257 Subpart D. <https://www.ecfr.gov/current/title-40/chapter-I/subchapter-I/part-257/subpart-D>. Accessed October 13, 2023.
3. Google Earth Pro v7.3.0.3832. Accessed October 13, 2023.
4. Geosyntec Consultants. "Structural Stability and Factor of Safety Assessment, Ash Pond 2, Joliet 29 Station." October 2016.
5. Geosyntec Consultants. "Annual Inspection Report, Ash Pond 2, Joliet 29 Station." January 18, 2016.
6. Geosyntec Consultants. "Annual Inspection Report, Ash Pond 2, Joliet 29 Station." October 16, 2017.
7. Civil & Environmental Consultants, Inc. "Annual Inspection Report, Ash Pond 2, Joliet Station." October 16, 2018.
8. Civil & Environmental Consultants, Inc. "Annual Inspection Report, Ash Pond 2, Joliet Station." October 16, 2019.
9. Civil & Environmental Consultants, Inc. "Annual Inspection Report, Ash Pond 2, Joliet Station." October 9, 2020.
10. Civil & Environmental Consultants, Inc. "Annual Inspection Report, Ash Pond 2, Joliet Station." October 13, 2021.
11. Civil & Environmental Consultants, Inc. "Annual Inspection Report, Ash Pond 2, Joliet Station." October 14, 2022.
12. Geosyntec Consultants. "History of Construction, Ash Pond 2, Joliet 29 Station." October 2016.
13. Sargent & Lundy. "2022 Structural Stability Assessment for Ash Pond 2." S&L Project No. A12661.150. October 2022.
14. Sargent & Lundy. "2023 Safety Factor Assessment for Ash Pond 2." S&L Project No. A12661.172. October 2023.
15. Sargent & Lundy. "2023 Inflow Design Flood Control System Plan for Ash Pond 2." S&L Project No. A12661.172. October 2023.

**APPENDIX A: 2016 FEDERAL STRUCTURAL STABILITY
ASSESSMENT FOR ASH POND 2**

