MWG

Midwest Generation, LLC

Joliet 29 Generating Station

2024 Inflow Design Flood Control System Plan for Ash Pond 2

Revision 0

October 13, 2024

Issue Purpose: For Use

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EXECUTIVE SUMMARY

This report presents the 2024 inflow design flood control system plan for Ash Pond 2 at Midwest Generation, LLC's (MWG) Joliet 29 Generating Station ("Joliet 29" or the "Station"). This annual plan, prepared by Sargent & Lundy (S&L) on behalf of MWG, documents how the inflow design flood control system for Ash Pond 2 has been designed and constructed to meet the hydrologic and hydraulic capacity requirements for coal combustion residual (CCR) surface impoundments promulgated by 35 Ill. Adm. Code 845.510.

To complete this assessment, S&L re-evaluated the bases of the most recent hydrologic and hydraulic calculations prepared for Ash Pond 2, which were completed in 2023. These calculations were performed using a 1,000-year design storm and by conservatively assuming (1) no rainfall abstraction (*i.e.*, the full precipitation depth over the pond's catchment area was assumed to enter the pond) and (2) that the surface water elevation in the pond at the time of the design storm event was based on the 6.3 feet of surface water observed in the pond in September 2023 plus 1 year's worth of direct precipitation and stormwater run-on to account for additional stormwater inflow to the pond until closure construction activities commence. To verify that the results of the 2023 hydrologic and hydraulic calculation were still valid, S&L determined (1) whether any changes to the calculation inputs have occurred since 2023 and (2) whether identified changes warrant updating the calculations. Where changes were determined to impact the results and conclusions of the calculations, the 2023 hydrologic and hydraulic calculation was revised in accordance with the updated input. Where no changes were noted for a given input, or where identified changes were determined to have no impact to the results and conclusions of the 2023 hydrologic and hydraulic calculation, the previous evaluation of that input was considered to remain valid for this 2024 inflow design flood control system plan.

Ash Pond 2 remains isolated and out of service with all industrial process wastewater streams and stormwater run-off streams isolated. Accumulated rainwater was removed in June 2024 to a depth of approximately six inches. Due to the accumulation of rainwater over the past several months, the current water level in the pond is 1.8 feet. The pond contains no CCR materials.

Per the pond's 2024 hazard potential classification assessment prepared in accordance with 35 Ill. Adm. Code 845.440(a)(1), Ash Pond 2 remains classified as a Class 2 CCR surface impoundment. Therefore, the inflow design flood event for Ash Pond 2 remains the 1,000-year storm per 35 Ill. Adm. Code 845.510(a)(3). In addition, there have been no significant modifications to the pond's embankments (mass excavations, mass fill placement, etc.) since the latest hydrologic and hydraulic calculations were completed in 2023.

Based on the preceding discussion, S&L revised the 2023 hydrologic and hydraulic calculations for Ash Pond 2 to account for the reduced normal water levels therein. Given the Station will continue to periodically dewater Ash Pond 2 to keep the pond at a low water level, the revised calculation determined the maximum allowable surface water elevation that Ash Pond 2 can reach while still being capable of capturing the 1000-

year 24-hour storm event without discharge through the pond's outlet weir or overtop the pond's dikes. Consistent with the 2023 hydrologic and hydraulic calculations, the revised calculations were performed by conservatively assuming no rainfall abstraction (*i.e.*, the full design precipitation depth over Ash Pond 2's catchment area was assumed to enter the pond). Finally, a 1-foot minimum freeboard below the Ash Pond 2 outlet weir was applied to determine the maximum allowable surface water elevation.

Table ES- 1 presents the results from the revised hydrologic and hydraulic calculations performed for Ash Pond 2 at Joliet 29 in accordance with 35 Ill. Adm. Code 845.510(c)(1). Based on these results, Ash Pond 2 has adequate hydraulic capacity to retain the inflow flood volume from the 1000-year, 24-hour storm without water discharging through the pond's outlet weir or overtopping the pond's berms if the surface water elevation in the pond at the time of the design storm event is no higher than 531.00 feet amsl, which is 4 feet below the pond's dikes. To maintain at least one foot of freeboard relative to the pond's outlet weir following the design event, it is recommended that the Station limit the surface water elevation in Ash Pond 2 to no higher than 530.00 feet amsl.

Table ES- 1 – Summary of Hydrologic & Hydraulic Assessment Results for Ash Pond 2

CCR Surface Impoundment	Illinois Hazard Potential Classification	Inflow Design Flood	Surface Water EL.		Outlet Weir Elevation	Pond Crest Elevation
			Pre-Design Storm	Post-Design Storm		
Ash Pond 2	Class 2	1,000 Year	531.00 feet	532.85 feet	532.85 feet	535.00 feet

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 845.510(c)(1), MWG must prepare an annual inflow design flood control system plan documenting how the inflow design flood control system for Ash Pond 2 has been designed and constructed to meet the hydrologic and hydraulic capacity requirements for CCR surface impoundments promulgated by 35 Ill. Adm. Code 845.510.

This report documents the 2024 inflow design flood control system plan prepared in accordance with the Illinois CCR Rule by Sargent & Lundy (S&L) on behalf of MWG for Ash Pond 2 at Joliet 29. This report:

- Lists the inputs and assumptions used to determine whether Ash Pond 2 can manage the inflow design flood,
- Discusses the methodology used to prepare the 2024 inflow design flood control system plan,
- Summarizes the results of the 2023 hydrologic and hydraulic calculations performed to support the conclusion of whether Ash Pond 2 meets the hydrologic and hydraulic requirements for CCR surface impoundments promulgated by the Illinois CCR Rule,
- Evaluates potential changes to the inputs used in the 2023 hydrologic and hydraulic calculations to determine whether new or updated calculations are warranted, and
- Provides the results of the hydrologic and hydraulic calculations used to determine whether Ash Pond 2 can manage the inflow design flood.

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 2024 inflow flood control system plan is strictly limited to demonstrating compliance with the Illinois CCR Rule. Pursuant to 40 CFR

257.82(c)(4), the next inflow design flood control system plan for demonstrating compliance with the Federal CCR Rule is not required until 2026, five years after the last periodic plan was completed (2021).

2.0 INPUTS

Ash Pond Operations & Inflow Design Flood Control System

The operating and physical conditions for Ash Pond 2 and for its inflow design flood control system were based on the following inputs:

- Observations made by S&L during a site visit on September 26, 2024.
- Discussions with MWG personnel.
- The pond's initial federal inflow design flood control system plan (Ref. 3).
- The history of construction prepared for the CCR surface impoundment in accordance with 40 CFR 257.73(c) (Ref. 8).
- The 2023 annual inspection report prepared for the CCR surface impoundment in accordance with 35 Ill. Adm. Code 845.540(b) (Ref. 9).
- The weekly inspection reports prepared in accordance with 35 Ill. Adm. Code 845.540(a) since the 2023 inflow design flood control system plan was issued (Ref. 10).

Finally, the area-capacity curve for the pond was obtained from the aforementioned history of construction (Ref. 8).

Inflow Design Flood Event

Per its 2024 hazard potential classification assessment (Ref. 4), Ash Pond 2 is classified as a Class 2 CCR surface impoundment pursuant to 35 Ill. Adm. Code 845.440(a)(1). Therefore, the inflow design flood event used in this hydrologic and hydraulic assessment of Ash Pond 2 is based on the 1,000-year storm (Ref. 1, § 845.510(a)(3)). Per the National Oceanic and Atmospheric Administration's (NOAA) Atlas 14 (Ref. 5), the precipitation depth for the 1,000-year, 24-hour storm event at the Joliet 29 site is 14.2 inches.

Site Topography

Topographic data for Ash Pond 2 and the surrounding areas was obtained from an aerial survey performed by Aero-Metric, Inc. in 2008 (Ref. 6).

Aerial Images

Historical and recent aerial images of the Station and surrounding areas were obtained from Google Earth Pro (Ref. 7).

3.0 ASSUMPTIONS

There are no assumptions in this document that require verification.

4.0 METHODOLOGY

The inputs for the latest hydrologic and hydraulic calculations performed for Ash Pond 2, which were completed in October 2023, were reviewed to determine if any changes have occurred since these calculations were completed. Identified changes were then evaluated to determine if updates to these calculations were warranted. If changes were identified, then the 2023 hydrologic and hydraulic calculations performed for Ash Pond 2 were revised for this 2024 inflow design flood control system plan. Where no changes were noted for a given input, or where identified changes were determined to have no impact to the results and conclusions of the 2023 hydrologic and hydraulic calculations, then the previous evaluation of that input was considered to remain valid for this 2024 inflow design flood control system plan.

5.0 HYDROLOGIC & HYDRAULIC ASSESSMENT

5.1 SUMMARY OF 2023 HYDROLOGIC & HYDRAULIC CALCULATIONS

The latest hydrologic and hydraulic calculations for Joliet 29's Ash Pond 2 were completed in October 2023. The inputs, methodology, and results of these calculations are documented in the pond's 2023 inflow design flood control system plan (Ref. 12). As stated in the 2023 plan, these calculations were performed by conservatively assuming (1) no rainfall abstraction (*i.e.*, the full design precipitation depth over the pond's catchment area was assumed to enter the pond) and (2) that the surface water elevation in the pond at the time of the design storm event was based on the 6.3 feet of surface water observed in the pond in September 2023 plus 1 year's worth of direct precipitation and stormwater run-on to account for additional stormwater inflow to the pond until closure construction activities commence. These assumptions led to a design operating water level of 529.3 feet above mean sea level (amsl).

Based on the preceding design inputs and assumptions, the surface water elevation in Ash Pond 2 after the 1,000-year flood design event was calculated to be 531.2 feet amsl. Ultimately, the results of the 2023 assessment indicated that water entering the pond during the inflow design flood event would not discharge through the pond's outlet weir (elevation 532.85 feet amsl) or overtop the pond's dikes (535 amsl). The surface water elevation in Ash Pond 2 following the design event was estimated to be 1.65 feet below the pond's outlet weir and 3.8 feet below the pond's dike. Based on these results, it was concluded that the pond has adequate hydraulic capacity to retain the 1,000-year flood event without water discharging from the pond or overtopping the pond's dikes and was therefore in conformance with 35 Ill. Adm. Code 845.510(a).

5.2 CHANGES TO INPUTS FOR 2023 HYDROLOGIC & HYDRAULIC CALCULATIONS

The following subsections summarize the evaluation conducted to determine if changes to the inputs used in the latest hydrologic and hydraulic calculations for Ash Pond 2 have occurred since the calculations were completed in 2023 that warrant updating the calculations for this 2024 assessment.

5.2.1 CHANGES IN ASH POND OPERATIONS & INFLOW DESIGN FLOOD CONTROL SYSTEM

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. Accordingly, the Station ceased sending all process and wastewater streams to Ash Pond 2, effectively isolating the pond. In accordance with the Station's ash pond maintenance practices, the Station then began dewatering and removing CCR from the pond. 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). In January 2022, MWG submitted a closure construction permit application to the Illinois EPA in accordance with Subpart B of the Illinois CCR Rule. Closure construction activities will commence at the pond upon receipt of the closure construction permit from the Illinois EPA.

As documented in the pond's most recent 2023 annual inspection report (Ref. 9), there is no CCR remaining in Ash Pond 2. In addition, the Station is actively taking measures to limit the water level in the pond. Per the weekly inspection reports prepared in accordance with 35 Ill. Adm. Code 845.540(a) since the 2023 inflow design flood control system plan was issued (Ref. 12), the Station pumped water out of the pond in June 2024 to a depth of approximately 6 inches. Since July 2024, the water level in Ash Pond 2 has been maintained at around 2 feet. Indeed, during S&L's site visit on September 26, 2024, approximately 1.8 feet of water was observed in the pond. The Station will continue to periodically dewater Ash Pond 2 to maintain relatively low operating levels.

Because Ash Pond 2 remains isolated and out of service, the inlet flume and distribution trough on the pond's western embankment no longer convey flows into the pond. Outflow from the pond is only expected to occur when the Station dewaters the pond to maintain relatively low operating levels. During these intermittent events, pumped rainwater will be discharged over the pond's overflow weir and into the outlet trough along the pond's eastern embankment. This trough drains to a 30-inch-diameter reinforced concrete pipe, which drains into an underground 30-inch diameter pipe that discharges into Pond 3, which is a non-CCR surface impoundment (Ref. 3).The 2023 hydrologic and hydraulic calculations for Ash Pond 2 evaluated the pond's capacity assuming the pond was at a higher initial surface water elevation than present and that stormwater would accumulate over a timeframe of one year without pumping. Given the Station will continue to periodically dewater Ash Pond 2 to keep the pond at a low water level, the methodology used in

the 2023 hydrologic and hydraulic calculations warrants an update to align with current Station practices at Ash Pond 2.

5.2.2 CHANGES IN ASH POND TOPOGRAPHY

Based on visual observations made by S&L during the September 2024 site visit, review of the 2023 annual inspection report (Ref. 9), and reviews of Google Earth aerial images (Ref. 7), there have been no significant modifications to Ash Pond 2's embankments (mass excavations, mass fill placement, *etc*.) since the latest hydrologic and hydraulic calculations were completed in 2023. Therefore, the topographic data collected for the site in 2008 (Ref. 6) and the area-capacity curves documented in Ash Pond 2's history of construction (Ref. 8) remain valid for use in this 2024 assessment.

5.2.3 CHANGES TO INFLOW DESIGN FLOOD EVENT

Per the pond's 2024 hazard potential classification assessment (Ref. 4), Ash Pond 2 is classified as a Class 2 CCR surface impoundment pursuant to 35 Ill. Adm. Code 845.440(a)(1), the same hazard potential classification the pond was assigned in 2023. Therefore, the inflow design flood event for Ash Pond 2 remains the 1,000-year storm (Ref. 1, § 845.510(a)(3)). As documented in the pond's 2023 inflow design flood control system plan (Ref. 12), the precipitation value for the 1,000-year, 24-hour storm event used in the latest hydrologic and hydraulic calculations completed for Ash Pond 2 was 14.2 inches per NOAA's Atlas 14.As stated in Section 2.0, NOAA's 1,000-year, 24-hour precipitation value for the Joliet site remains 14.2 inches. Therefore, the inflow design flood event used in the 2023 hydrologic and hydraulic calculations is unchanged and remains valid for use in this 2024 assessment.

5.3 REVISED HYDROLOGIC & HYDRAULIC CALCULATION RESULTS

Changes in the operational status of Ash Pond 2, primarily the periodic dewatering performed by the Station to maintain the pond at a low water level, warrant updating the hydrologic and hydraulic calculations in the 2023 inflow design flood control system plan (Ref. 12). Other than the periodic dewatering, there have been no significant modifications to the Ash Pond 2 geometry and no changes to the pond's inflow design flood event since the 2023 hydrologic and hydraulic calculations were prepared. Therefore, the topographic data (Ref. 6), area-capacity curves (Ref. 8), and 1,000-year, 24-hour precipitation value for the Joliet site (Ref. 5) used in the 2023 hydrologic and hydraulic calculations were unchanged and remain valid for use in the revised hydrologic and hydraulic calculations.

Based on the preceding discussion, S&L revised the 2023 hydrologic and hydraulic calculations for Ash Pond 2 to account for the Station's periodic dewatering efforts (Ref.13). The revised calculation determined the maximum allowable surface water elevation that Ash Pond 2 can reach while still being capable of capturing the 1000-year 24-hour storm event without discharge through the pond's outlet weir or overtop the

pond's dikes. Consistent with the 2023 hydrologic and hydraulic calculations, the revised calculations were performed by conservatively assuming no rainfall abstraction (*i.e.*, the full design precipitation depth over Ash Pond 2's catchment area was assumed to enter the pond). Finally, a 1-foot minimum freeboard below the Ash Pond 2 outlet weir was applied to determine the maximum allowable surface water elevation.

Table 5-1 summarizes the results from the hydrologic and hydraulic calculations performed for Ash Pond 2 (Ref. 13). Based on these results, water entering Ash Pond 2 during the inflow design flood event will not discharge through the pond's outlet weir or overtop the pond's dikes if the surface water elevation in the pond prior to the design event is at or below 531.00 feet amsl, which is 4 feet below the pond's dikes. To maintain at least one foot of freeboard relative to the pond's outlet weir following the design event, it is recommended that the Station limit the surface water elevation in Ash Pond 2 to no higher than 530.00 feet amsl.

Table 5-1 – Summary of Hydrologic & Hydraulic Assessment Results for Ash Pond 2

CCR Surface Impoundment	Illinois Hazard Potential Classification	Inflow Design Flood	Surface Water EL.		Outlet Weir Elevation	Pond Crest Elevation
			Pre-Design Storm	Post-Design Storm		
Ash Pond 2	Class 2	1,000 Year	531.00 feet	532.85 feet	532.85 feet	535.00 feet

6.0 CONCLUSIONS

Based on the revised hydrologic and hydraulic calculations summarized in Table 5-1, Ash Pond 2 has adequate hydraulic capacity to retain the inflow flood volume from the 1000-year, 24-hour storm without water discharging through the pond's outlet weir or overtopping the pond's berms if the surface water elevation in the pond at the time of the design storm event is no higher than 531.00 feet amsl, which is 4 feet below the pond's dikes. To maintain at least one foot of freeboard relative to the pond's outlet weir following the design event, it is recommended that the Station limit the surface water elevation in Ash Pond 2 to no higher than 530.00 feet amsl. Per the weekly inspection reports prepared in accordance with 35 Ill. Adm. Code 845.540(a) since last year's assessment, the Station has maintained the surface water elevation at a significantly lower elevation than 530.00 feet amsl; the maximum surface water elevation was recorded at 525.8 feet amsl on June 5, 2024. Given that the Station will continue dewatering Ash Pond 2 as required to maintain a relatively low water level, and per the assessment results summarized in Table 5-1, Ash Pond 2 is able to collect and control the inflow design flood event specified in 35 Ill. Adm. Code 845.510.

7.0 CERTIFICATION

I certify that:

- This inflow design flood control system plan was prepared by me or under my direct supervision.
- The work was conducted in accordance with the requirements of 35 Ill. Adm. Code 845.510.
- I am a registered professional engineer under the laws of the State of Illinois.

Certified By: Thomas Dehlin Date: 10/13/2024

Seal:

Digitally signed by Thomas Dehlin
Date: 2024.10.13 11:26:54-05'00'

8.0 REFERENCES

1. Illinois Pollution Control Board. “Standards for Disposal of Coal Combustion Residuals in CCR Surface Impoundments.” 35 Ill. Adm. Code 845. Accessed October 2, 2024.
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 2, 2024.
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