

MWVG

Midwest Generation, LLC

Waukegan Generating Station

2022 Inflow Design Flood Control System Plan for East Ash Pond & West Ash Pond

Revision 0

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1.0 PURPOSE & SCOPE

1.1 PURPOSE

The East Ash Pond and the West Ash Pond at Midwest Generation, LLC's (MWG) Waukegan Generating Station ("Waukegan" or the "Station") are existing coal combustion residual (CCR) surface impoundments that are 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 systems for the East and West Ash Ponds have 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 2022 inflow design flood control system plan prepared in accordance with the Illinois CCR Rule by Sargent & Lundy (S&L) on behalf of MWG for the East and West Ash Ponds at Waukegan. This report:

- Lists the inputs and assumptions used to determine whether the East and West Ash Ponds can manage the inflow design flood,
- Discusses the methodology used to prepare the 2022 inflow design flood control system plan,
- Summarizes the results of the 2021 hydrologic and hydraulic calculations performed to support the conclusion of whether the East and West Ash Ponds meet the hydrologic and hydraulic requirements for CCR surface impoundments promulgated by the Illinois CCR Rule,
- Evaluates potential changes to the inputs used in the 2021 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 the East and West Ash Ponds can manage the inflow design flood.

1.2 SCOPE

In addition to being regulated under the Illinois CCR Rule, Waukegan's East and West Ash Ponds are 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, the East and West Ash Ponds 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 2022 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 will be completed in 2026, five years after the last periodic plan was completed (2021).

2.0 INPUTS

Inflow Design Flood Control System

The inflow design flood control systems for the East and West Ash Ponds are documented in the ponds' initial federal inflow design flood control system plan, which was prepared by Geosyntec Consultants in October 2016 (Ref. 3). This plan is provided in its entirety in Appendix A.

Inflow Design Flood Event

Per the ponds' 2022 hazard potential classification assessment (Ref. 4), the East and West Ash Ponds are both classified as Class 2 CCR surface impoundments pursuant to 35 Ill. Adm. Code 845.440(a)(1). Therefore, the inflow design flood event for both ponds 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 value for the 1,000-year, 24-hour storm event at the Waukegan site is 8.30 inches.

Site Topography

Topographic data for the East Ash Pond, the West Ash Pond, and the surrounding areas was obtained from the photogrammetric survey performed by Geo Terra in 2015 (Ref. 6) that is documented in the ponds' history of construction (Ref. 7).

Aerial Images

Historical and recent aerial images of the Station and surrounding areas were obtained from Google Earth Pro (Ref. 8).

Ash Pond Conditions

The operating and physical conditions for the East and West Ash Ponds were based on observations made during a site visit by S&L on September 14, 2022, discussions with MWG personnel, the history of construction prepared for the CCR surface impoundment in accordance with 40 CFR 257.73(c) (Ref. 7), and the 2021 annual inspection report prepared for the CCR surface impoundment in accordance with 40 CFR 257.83(b) (Ref. 9). The area-capacity curves for the ponds were obtained from the aforementioned history of construction (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 the East and West Ash Ponds, which were completed in October 2021, 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 no changes were identified, or if identified changes were determined to have no impact to the results and conclusions of these calculations, then the latest hydrologic and hydraulic calculations performed for the East and West Ash Ponds were considered to still be valid for this 2022 inflow design flood control system plan.

5.0 HYDROLOGIC & HYDRAULIC ASSESSMENT

5.1 SUMMARY OF 2021 HYDROLOGIC & HYDRAULIC CALCULATIONS

The latest hydrologic and hydraulic calculations for Waukegan's East and West Ash Ponds were completed in October 2021. The inputs, methodology, and results of these calculations are documented in the ponds' 2021 inflow design flood control system plan (Ref. 10). As stated in the 2021 plan, these calculations were performed by conservatively assuming (1) no rainfall abstraction (*i.e.*, the full design precipitation depth over a pond's catchment area was assumed to enter the pond) and (2) that the surface water elevations in the ponds at the time of the design storm event were at the ponds' respective maximum design operating levels (597.50 feet above mean sea level (amsl) for the East Ash Pond and 600.00 feet amsl for the West Ash Pond). The results of this 2021 assessment indicated that water entering the ponds during the inflow design flood event would not overtop the ponds' dikes. The freeboards in the East and West Ash Ponds during the design event were estimated to be 1.1 feet and 1.7 feet, respectively. Based on these results, it was concluded that the ponds have adequate hydraulic capacities to retain the 1,000-year flood event without water overtopping the ponds' dikes and were therefore in conformance with 35 Ill. Adm. Code 845.510(a).

5.2 CHANGES TO INPUTS FOR 2021 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 the East and West Ash Ponds have occurred since the calculations were completed in 2021 that warrant updating the calculations.

5.2.1 CHANGES IN ASH POND OPERATIONS

In June 2020, Waukegan took the West Ash Pond out of service for routine cleaning. During the September 2022 site visit, a small quantity of CCR and minimal surface water (relative to the pond's storage capacity) were observed in the pond. In April 2021, MWG filed a notice of intent to close the West Ash Pond in accordance with the Federal CCR Rule's closure criteria (Ref. 2, § 257.102). Following the retirements of

Units 7 and 8 in June 2022, Waukegan ceased placing CCR wastestreams in the East Ash Pond. However, the pond will continue to manage stormwater run-off from the Station property until the West Ash Pond is closed and repurposed as a stormwater retention basin, at which point MWG will file a notice of intent to close the East Ash Pond. Closure constructive activities will commence at both ponds upon receipt of closure construction permits from the Illinois EPA in accordance with Subpart B of the Illinois CCR Rule.

Except for the elimination of CCR wastestreams into the East Ash Pond, operating conditions at the East and West Ash Ponds have not changed since the latest hydrologic and hydraulic calculations were prepared in 2021. Because these calculations were based on conservatively assuming the surface water in both ponds was at each pond's respective maximum design operating level, there have been no significant changes to the operations of the Waukegan ash ponds that warrant updating the 2021 hydrologic and hydraulic calculations.

5.2.2 CHANGES IN ASH POND TOPOGRAPHY

Based on visual observations made during S&L's site visit on September 14, 2022, review of the 2021 annual inspection report (Ref. 9), and reviews of Google Earth aerial images (Ref. 8), there have been no significant modifications to embankments for the East and West Ash Ponds (mass excavations, mass fill placement, *etc.*) since the latest hydrologic and hydraulic calculations were completed in 2021. Therefore, the topographic data and (Ref. 6) and the area-capacity curves (Ref. 7) used in these calculations are unchanged and remain valid for use in this 2022 assessment.

5.2.3 CHANGES TO INFLOW DESIGN FLOOD EVENT

Per the ponds' 2022 hazard potential classification assessment (Ref. 4), the East and West Ash Ponds are both classified as Class 2 CCR surface impoundments pursuant to 35 Ill. Adm. Code 845.440(a)(1), the same hazard potential classifications the ponds were assigned in 2021. Therefore, the inflow design flood event for both ponds remains the 1,000-year storm (Ref. 1, § 845.510(a)(3)). As documented in the ponds' 2021 inflow design flood control system plan (Ref. 10), the precipitation value for the 1,000-year, 24-hour storm event used in the latest hydrologic and hydraulic calculations completed for the East and West Ash Ponds was 8.30 inches per NOAA's Atlas 14. As stated in Section 2.0, NOAA's 1,000-year, 24-hour precipitation value for the Waukegan site remains 8.30 inches. Therefore, the inflow design flood event used in the 2021 hydrologic and hydraulic calculations is unchanged and remains valid for use in this 2022 assessment.

5.3 RESULTS

Other than changes in the operational status of the East Ash Pond (cessation of CCR wastestreams), there have been no significant modifications to the East and West Ash Ponds and no changes to the ponds' inflow

design flood event since the latest hydrologic and hydraulic calculations were prepared in 2021. Therefore, the results and conclusions documented for the East and West Ash Ponds' inflow design flood control systems in the 2021 inflow design flood control system plan remain valid.

Table 5-1 summarizes the results from the latest hydrologic and hydraulic calculations performed for the East and West Ash Ponds. Based on these results, water entering the ponds during the inflow design flood event will not overtop the ponds' dikes. The freeboards in the East and West Ash Ponds during the design event were estimated to be 1.1 feet and 1.7 feet, respectively.

Table 5-1 – Summary of Hydrologic & Hydraulic Assessment Results for East & West Ash Ponds

CCR Surface Impoundment	Illinois Hazard Potential Classification	Inflow Design Flood	Maximum Surface Water Elevation	Pond Crest Elevation
East Ash Pond	Class 2	1,000 Year	598.40 feet	599.50 feet
West Ash Pond	Class 2	1,000 Year	600.80 feet	602.50 feet

6.0 CONCLUSIONS

Based on the results in Table 5-1, Waukegan's East and West Ash Ponds have adequate hydraulic capacities to retain the 1,000-year flood event without water overtopping the ponds' dikes. Therefore, the East and West Ash Ponds are able to collect and control the inflow design flood event specified in 35 Ill. Adm. Code 845.510(a)(3).

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 J. Dehlin

Date: October 14, 2022

Seal:



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 13, 2022.
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, 2022.
3. Geosyntec Consultants. "Inflow Design Flood Control System Plan, Ash Pond 2, Waukegan Station." October 2016.
4. Sargent & Lundy. "2022 Hazard Potential Classification Assessment for East Ash Pond & West Ash Pond." Rev. 0. S&L Project No. A12661.123. October 2022.
5. National Oceanic and Atmospheric Administration. "Point Precipitation Frequency Estimates." NOAA Atlas 14, Volume 2, Version 3.
6. Geo Terra. Aerial Survey of Waukegan Generating Station Dated December 4, 2015.
7. Geosyntec Consultants. "History of Construction, East and West Ash Basins, Waukegan Station." October 2016.
8. Google Earth Pro v7.3.0.3832. Accessed October 13, 2022.
9. Civil & Environmental Consultants, Inc. "Annual Inspection Report, East Ash Pond and West Ash Pond, Waukegan Station." October 13, 2021.
10. Sargent & Lundy. "2021 Inflow Design Flood Control System Plan for East Ash Pond & West Ash Pond." Rev. 0. S&L Project No. 12661-123. October 14, 2021.

**APPENDIX A: 2016 FEDERAL INFLOW DESIGN FLOOD
CONTROL SYSTEM PLAN FOR EAST & WEST ASH PONDS**

