

MWG

Midwest Generation, LLC
Waukegan Generating Station

2021 Inflow Design Flood Control System Plan for East Ash Pond & West Ash Pond



Revision 0

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Issue Purpose: Use

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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 inflow design flood control system plan that documents 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.

The East and West Ash Ponds are also regulated by the U.S. Environmental Protection Agency's "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." Pursuant to 40 CFR 257.82(c)(4), the Federal CCR Rule requires MWG to prepare a periodic inflow design flood control system plans in accordance with 40 CFR 257.82(c)(1) for the East and West Ash Ponds every five years.

This report documents the 2021 inflow design flood control system plan prepared in accordance with the Illinois and Federal CCR Rules 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 determine whether the East and West Ash Ponds can manage the inflow design flood,
- Evaluates potential changes to the design inputs used in the initial hydrologic and hydraulic assessment completed for the East and West Ash Ponds that was conducted in accordance with the Federal CCR Rule, and
- Summarizes the results of the 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 both the Federal and Illinois CCR Rules.

1.2 SCOPE

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, and so MWG must prepare an inflow design flood control system plan pursuant to both sets of regulations at this time.

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 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' 2021 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) and as significant hazard potential CCR surface impoundments pursuant to 40 CFR 257.73(a)(2). Therefore, the inflow design flood event used in this hydrologic and hydraulic assessment of both ponds is based on the 1,000-year storm (Ref. 1, § 845.510(a)(3); Ref. 2, § 257.82(a)(3)). Per the National Oceanic and Atmospheric Administration's Atlas 14 (Ref. 5), the precipitation depth 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 discussions with MWG personnel, the history of construction prepared for the CCR surface impoundments in accordance with 40 CFR 257.73(c) (Ref. 7), and the annual inspection reports prepared for the CCR surface impoundments in accordance with 40 CFR 257.83(b) (Refs. 9 through 12). 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 HYDROLOGIC & HYDRAULIC ASSESSMENT

4.1 CHANGES SINCE INITIAL INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN

4.1.1 CHANGES IN ASH POND OPERATIONS

In June 2020, Waukegan took the West Ash Pond out of service for routine cleaning. During a site visit in September 2021, it was noted that most of the CCR previously stored in the West Ash Pond had been removed and minimal surface water remained. 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). 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. Meanwhile, Waukegan continues to operate the East Ash Pond to manage CCR wastestreams and various non-CCR wastestreams from the Station in accordance with 40 CFR 257.103(f)(1). Operating conditions at this pond have not changed since the initial inflow design flood control system plan was prepared in 2016 for the East and West Ash Ponds.

Based on reviews of the annual inspection reports (Refs. 9 through 12) and Google Earth aerial images (Ref. 8), there have been no significant modifications to the East and West Ash Ponds (mass excavations, major embankment modifications, *etc.*) since the initial inflow design flood control system plan was completed. Therefore, there is no basis to reevaluate the embankment geometry for this 2021 assessment.

4.1.2 CHANGES IN ASH POND TOPOGRAPHY

Based on reviews of the annual inspection reports (Refs. 9 through 12) and 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 initial inflow design flood control system plan was completed. It should be noted that the lowering of the East Ash Pond's eastern dike in the fall of 2016, as noted in the 2017 annual inspection report (Ref. 9), was incorporated into the initial inflow design flood control system plan. Therefore, the topographic data collected for the ponds in 2015 (Ref. 4) and the area-capacity curves documented in ponds' history of construction (Ref. 7) remain valid for use in this 2021 assessment.

4.2 METHODOLOGY

Because the East and West Ash Ponds are perched, stormwater entering the ponds during the design storm event is limited to direct precipitation and stormwater run-off from the access roads on the ponds' dikes. No

rainfall abstraction was considered (*i.e.*, the full design precipitation depth over a pond’s catchment area was assumed to enter the pond), which is a conservative assumption. The surface water elevations in the East and West Ash Ponds at the time of the design storm event were assumed to be the ponds’ maximum design operating levels: 597.50 feet and 600.00 feet, respectively. The assumed initial surface water elevation in the West Ash Pond is conservative since, as previously mentioned, most of the CCR and surface water previously stored in that pond has been removed.

4.3 RESULTS

Table 4-1 summarizes the results from the hydrologic and hydraulic calculations performed for the East and West Ash Ponds (Ref. 13). 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 4-1 – Summary of Hydrologic & Hydraulic Assessment Results for East & West Ash Ponds

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

5.0 CONCLUSIONS

Based on the hydrologic and hydraulic calculations performed for the East and West Ash Ponds (Ref. 13), the ponds have adequate hydraulic capacities to retain the 1000-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) and 40 CFR 257.82(a)(3).

6.0 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 and with the requirements of 40 CFR 257.82.
- I am a registered professional engineer under the laws of the State of Illinois.

Certified By: Thomas J. Dehlin

Date: October 14, 2021

Seal:



Th. Dehlin
10/14/2021
Exp. 11/30/2021

7.0 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, 2021.
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, 2021.
3. Geosyntec Consultants. "Inflow Design Flood Control System Plan, Ash Pond 2, Waukegan Station." October 2016.
4. Sargent & Lundy. "2021 Hazard Potential Classification Assessment for East Ash Pond & West Ash Pond." Rev. 0. S&L Project No. 12661-123. October 2021.
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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.
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10. Civil & Environmental Consultants, Inc. "Annual Inspection Report, East Ash Pond and West Ash Pond, Waukegan Station." October 16, 2018.
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13. Sargent & Lundy. "East and West Ash Pond Hydraulic Capacity Calculation." S&L Calc. No. MG-WS-C001, Rev. 0. S&L Project No. 12661-123. October 2021.

**APPENDIX A: 2016 EAST & WEST ASH POND INFLOW
DESIGN FLOOD CONTROL SYSTEM PLAN**

