MWG

Midwest Generation, LLC
Powerton Generating Station

2021 Inflow Design Flood Control System Plan for Ash Surge Basin, Bypass Basin, & Former Ash Basin

Revision 0

October 14, 2021

Issue Purpose: Use

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1.0 PURPOSE & SCOPE

1.1 PURPOSE

The Ash Surge Basin, Bypass Basin, and Former Ash Basin at Midwest Generation, LLC's (MWG) Powerton Generating Station ("Powerton" 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 Ash Surge, Bypass, and Former Ash Basins 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 Ash Surge, Bypass, and Former Ash Basins 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." It should be noted that the Former Ash Basin is regulated under the Federal CCR Rule as an "inactive CCR surface impoundment," while it is regulated as an "existing CCR surface impoundment" under the Illinois 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 plan in accordance with 40 CFR 257.82(c)(1) for the Ash Surge, Bypass, and Former Ash Basins 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 Ash Surge, Bypass, and Former Ash Basins at Powerton. This report:

- Lists the inputs and assumptions used to determine whether the Ash Surge, Bypass, and Former Ash Basins can manage the inflow design flood,
- Discusses the methodology used to determine whether the Ash Surge, Bypass, and Former Ash Basins can manage the inflow design flood,
- Evaluates potential changes to the design inputs used in the initial hydrologic and hydraulic assessments completed for the Ash Surge, Bypass, and Former Ash Basins that were conducted in accordance with the Federal CCR Rule, and
- Summarizes the results of the hydrologic and hydraulic calculations performed to support the conclusions of whether the Ash Surge, Bypass, and Former Ash Basins 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 Ash Surge, Bypass, and Former Ash Basins 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 Systems

The inflow design flood control systems for the Ash Surge and Bypass Basins are documented in the basins' 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.

The inflow design flood control system for the Former Ash Basin is documented in the basin's initial inflow design flood control system plan, which was prepared by Geosyntec Consultants in May 2018 (Ref. 4). This plan is provided in its entirety in Appendix B.

Inflow Design Flood Event

Per their 2021 hazard potential classification assessment (Ref. 5), the Ash Surge, Bypass, and Former Ash Basins are 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 the Ash Surge, Bypass, and Former Ash Basins was 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. 6), the precipitation depth for the 1,000-year, 24-hour storm event at the Powerton site is 9.00 inches.

Site Topography

Topographic data for the Ash Surge Basin, Bypass Basin, and surrounding areas was obtained from an aerial survey performed by Aero-Metric, Inc. in 2008 (Ref. 7). Topographic data for the Former Ash Basin and surrounding areas was obtained from a survey performed by Ridgeline Consultants in 2016 (Ref. 8).

Aerial Images

Historical and recent aerial images of the Station and surrounding areas were obtained from Google Earth Pro (Ref. 9).

Ash Pond Conditions

The operating and physical conditions for the Ash Surge, Bypass, and Former Ash Basins were based on discussions with MWG personnel, the histories of construction prepared for the CCR surface impoundments in accordance with 40 CFR 257.73(c) (Refs. 10 and 11), and the annual inspection reports prepared for the CCR surface impoundments in accordance with 40 CFR 257.83(b) (Refs. 12 through 21).

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 early October 2020, Powerton took the Bypass Basin 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 Bypass Basin had been removed and minimal surface water remained. MWG currently plans to retrofit the Bypass Basin with a new composite liner system and a new leachate collection and removal system (LCRS). Retrofit construction activities will commence at the basin upon receipt of a retrofit construction permit from the Illinois EPA in accordance with Subpart B of the Illinois CCR Rule.

Powerton continues to operate the Ash Surge Basin in accordance with 40 CFR 257.103(f)(1) to manage the Station's ash dewatering bin effluent and various non-CCR wastestreams. Operating conditions at this basin have not changed since the basin's initial inflow design flood control system plan was completed in 2016. Finally, the Former Ash Basin is regulated by the Federal CCR Rule as an inactive CCR surface impoundment and, therefore, is not used by the Station to manage any of Powerton's wastestreams. However, the basin still collects stormwater from direct precipitation and run-off from adjacent areas. During the basin's most recent annual inspection in July 2021 (Ref. 21), the surface water elevation in the basin's North and South Ash Ponds was estimated to be at approximately EL. 444 feet.

Based on reviews of the annual inspection reports (Refs. 12 through 21) and Google Earth aerial images (Ref. 9), there have been no significant modifications to the Ash Surge, Bypass, and Former Ash Basins (mass excavations, major embankment modifications, *etc*.) since the basins' initial inflow design flood control system plans were completed. Therefore, there is no basis to reevaluate the basins' embankment geometry for this 2021 assessment.

4.1.2 CHANGES IN ASH POND TOPOGRAPHY

Based on reviews of the annual inspection reports (Refs. 12 through 21) and Google Earth aerial images (Ref. 9), there have been no significant modifications to the Ash Surge, Bypass, and Former Ash Basins' embankments (mass excavations, mass fill placement, *etc*.) since the basins' initial inflow design flood control system plans were completed. Therefore, the topographic data collected for the site in 2008 and 2016 (Refs. 7 and 8) and the area-capacity curves documented in the basins' histories of construction (Refs. 10 and 11) remain valid for use in this 2021 assessment.

4.2 METHODOLOGY

PondPack (Ref. 22) was used to analyze abilities of the Ash Surge and Bypass Basins to manage direct precipitation and stormwater run-on from the 1000-year, 24-hour storm event. The analysis evaluated whether the Ash Surge and Bypass Basins could contain the inflow design flood without surface water overflowing into their emergency spillway structures at EL. 466.00 feet and EL. 466.75 feet, respectively. The surface water elevations in the basins at the time of the design storm event was assumed to be at their maximum design operating levels: EL. 465.00 feet and EL. 465.50 feet, respectively. This initial surface water elevation for the Bypass Basin is conservative since, as previously mentioned, most of the CCR previously stored in the basin has been removed, minimal surface water remains, and MWG plans to retrofit the basin with a new composite liner system and a new LCRS. Finally, the time of concentration for this hydrologic and hydraulic assessment was assumed to be 5 minutes in accordance with the minimum time of concentration recommended in the U.S. Department of Agriculture's (USDA) Technical Release No. 55 (TR-55), *Urban Hydrology for Small Watersheds* (Ref. 23).

PondPack was also used to analyze the Former Ash Basin's ability to manage direct precipitation and stormwater run-on from the 1000-year, 24-hour storm event. The analysis evaluated whether the basin's North and South Ponds could contain the inflow design flood without surface water overtopping the ponds' embankments, which have approximate crest elevations of EL. 455.00 feet and EL. 458.00 feet, respectively. The surface water elevation in the ponds at the time of the design storm event was assumed to be at EL. 450.00 feet, which is four feet higher than the maximum surface water elevation recorded in the basin's annual inspection reports (Refs. 17 through 21). Similar to the hydrologic and hydraulic assessment conducted for the Ash Surge and Bypass Basins, the time of concentration was assumed to be 5 minutes in accordance with the minimum time of concentration recommended in the USDA's TR-55 (Ref. 23).

4.3 RESULTS

Table 4-1 summarizes the results from the hydrologic and hydraulic calculations performed for the Ash Surge, Bypass, and Former Ash Basins (Ref. 24). Based on these results, water entering the Ash Surge and Bypass Basins during the inflow design flood event will not overflow the basins' emergency spillway

structures. The freeboards in the Ash Surge and Bypass Basins during the design event were estimated to be 2.12 feet and 1.54 feet, respectively. Meanwhile, water entering the Former Ash Basin during the inflow design flood event will not overtop the North Pond's or South Pond's dikes. The freeboards in the North and South Ponds during the design event were estimated to be 4.13 feet and 6.77 feet, respectively.

Table 4-1 – Summary of Hydrologic & Hydraulic Assessment Results for Ash Surge Basin, Bypass Basin, & Former Ash Basin

CCR Surface Impoundment	Ash Surge Basin	Bypass Basin	Former Ash Basin, North Pond	Former Ash Basin, South Pond
IL Hazard Potential Classification	Class 2	Class 2	Class 2	Class 2
Fed. Hazard Potential Classification	Significant	Significant	Significant	Significant
Inflow Design Flood	1,000 Year	1,000 Year	1,000 Year	1,000 Year
Maximum Surface Water EL.	465.88 feet	466.46 feet	450.87 feet	451.23 feet
Emergency Spillway EL.	466.00 feet	466.75 feet	N/A	N/A
Pond Crest / Rim EL.	468.00 feet	468.00 feet	455.00 feet	458.00 feet

5.0 CONCLUSIONS

Based on the hydrologic and hydraulic calculations performed for the Ash Surge, Bypass, and Former Ash Basins (Ref. 24), the basins have adequate hydraulic capacities to retain the 1000-year flood event without water overflowing the basins' emergency spillway structures (Ash Surge and Bypass Basins only) or overtopping the basins' dikes. Therefore, the Ash Surge Basin, Bypass Basin, and Former Ash Basin 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).

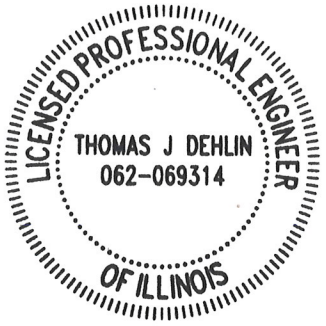
6.0 CERTIFICATION

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

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APPENDIX A: 2016 ASH SURGE & BYPASS BASIN INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN

APPENDIX B: 2018 FORMER ASH BASIN INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN