MWG

Midwest Generation, LLC

Powerton Generating Station

2024 Inflow Design Flood Control System Plan for Ash Surge Basin, Bypass Basin, & Former Ash Basin

Revision 0

October 13, 2024

Issue Purpose: Use

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EXECUTIVE SUMMARY

This report presents the 2024 inflow design flood control system plan for the Ash Surge Basin, Bypass Basin, and Former Ash Basin at Midwest Generation, LLC's (MWG) Powerton Generating Station ("Powerton" or the "Station"). This annual plan, prepared by Sargent & Lundy (S&L) on behalf of MWG, 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 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 the Ash Surge, Bypass, and Former Ash Basins, which were completed in 2021. These calculations were performed by conservatively assuming no rainfall abstraction (*i.e.*, the full design precipitation depth over a basin's catchment area was assumed to enter the basin). Moreover, it was conservatively assumed that the surface water elevations in the Ash Surge and Bypass Basins at the time of the design storm event were at the basins' respective maximum design operating levels. Finally, it was conservatively assumed that the surface water elevation in the Former Ash Basin at the time of the design storm event was at 450.00 feet above mean sea level (amsl), four feet higher than the maximum surface water elevation recorded in the basin's annual inspection reports that had been completed through October 2021.

To verify the results of the 2021 hydrologic and hydraulic calculations were still valid, S&L determined (1) whether any changes to the calculation inputs have occurred since 2021 and (2) whether identified changes warrant updating the calculations. Where changes were determined to impact the results and conclusions of the calculations for a given basin, the 2021 hydrologic and hydraulic calculations were 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 on the results and conclusions of the 2021 hydrologic and hydraulic calculations for a given basin, the previous evaluation of that input was considered to remain valid for this 2024 inflow design flood control system plan.

In 2024, Powerton retrofitted the Bypass Basin in accordance with 35 Ill. Adm. Code 845.770 and the retrofit construction permit issued by the Illinois Environmental Protection Agency (EPA) on July 3, 2024, by installing a new composite liner system and a new leachate collection and removal system (LCRS) over the basin's existing geomembrane liner, which was left in-place as a supplemental liner for the retrofitted basin. In addition, the basin's emergency spillway was decommissioned and plugged with flowable fill, and its overflow weir elevation was maintained at its pre-retrofit / existing elevation of 465.50 feet amsl. Because the overflow weir elevation in the Bypass Basin was not adjusted during retrofit activities, fill material placed within the basin to support and/or protect the basin's new composite liner system and LCRS reduced the

basin's available storage capacity. This reduction in operating volume warrants updating the 2021 hydrologic and hydraulic calculations for the Bypass Basin's retrofitted condition.

Upon completion of retrofit activities at the Bypass Basin, Powerton took the Ash Surge Basin out of service out of service and started dewatering the basin. With the Ash Surge Basin out of service, the normal surface water elevation in that basin will be lower than its maximum design operating level, which was the assumed water level in the basin at the time of the design storm event in the 2021 hydrologic and hydraulic calculations. Meanwhile, the maximum surface water elevation observed in the inactive Former Ash Basin between 2021 and 2024 (approximately 446 feet amsl) is less than the surface water elevation assumed for the Former Ash Basin prior to the inflow design flood (450 feet amsl) in the 2021 hydrologic and hydraulic calculations. Because these calculations were based on conservative assumptions regarding the surface water elevations in the Ash Surge and Former Ash Basins, there have been no significant changes to the operations of these basins that warrant updating the 2021 hydrologic and hydraulic calculations.

Per the basins' 2024 hazard potential classification assessment prepared in accordance with 35 Ill. Adm. Code 845.440(a)(1), the Ash Surge, Bypass, and Former Ash Basins remain classified as Class 2 CCR surface impoundments. Therefore, the inflow design flood event for the basins 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 embankments for the Ash Surge and Former Ash Basins (mass excavations, fill placement, etc.) since the latest hydrologic and hydraulic calculations were completed in 2021. Finally, post-construction survey data provided by the contractor who retrofitted the Bypass Basin was used to develop an updated area-capacity curve for the retrofitted Bypass Basin in the revised hydrologic and hydraulic assessment performed for that basin.

Based on the preceding discussion, the results and conclusions documented for the Ash Surge and Former Ash Basin's inflow design flood control systems in the 2021 inflow design flood control system plan remain valid. Conversely, retrofit construction in 2024 reduced the storage capacity in the Bypass Basin, so S&L revised the 2021 hydrologic and hydraulic calculations for the Bypass Basin to account for this reduced operating volume. Given that the overflow weir elevation in the basin was maintained at its pre-retrofit / existing elevation of 465.50 feet amsl, the maximum surface water elevation in the basin prior to the design storm event was taken as 465.50 feet amsl. Consistent with the 2021 hydrologic and hydraulic calculations, the revised calculations were performed by conservatively assuming no rainfall abstraction (*i.e.*, the full design precipitation depth over the basin's catchment area was assumed to enter the basin). Finally, because the basin's emergency spillway was decommissioned and plugged with flowable fill, the acceptance criterion was changed to the retrofitted Bypass Basin containing the design inflow from a 1,000-year, 24-hour storm without water overtopping the basin's embankments at EL. 469.04 feet amsl.

Table ES-1 presents the results from the hydrologic and hydraulic calculations performed for the Ash Surge and Former Ash Basins in 2021 and for the retrofitted Bypass Basin in 2024, all in accordance with 35 Ill. Adm. Code 845.510(c)(1). Based on these results, water entering the basins during the inflow design flood event will not overtop the basins' crests. The calculated freeboards in each basin following the design storm event were determined to be 2.12 feet (Ash Surge Basin), 2.37 feet (Bypass Basin), 4.13 feet (Former Ash Basin, North Pond), and 6.77 feet (Former Ash Basin, South Pond). In addition, water entering the Ash Surge Basin will not overflow into that basin's emergency spillway structure.

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

CCR Surface Impoundment	Ash Surge Basin	Retrofitted Bypass Basin	Former Ash Basin, North Pond	Former Ash Basin, South Pond
IL Hazard Potential Classification	Class 2	Class 2	Class 2	Class 2
Inflow Design Flood	1,000 Year	1,000 Year	1,000 Year	1,000 Year
Maximum Surface Water EL.	465.88 feet	466.67 feet	450.87 feet	451.23 feet
Emergency Spillway EL.	466.00 feet	N/A	N/A	N/A
Basin's Crest / Rim EL.	468.00 feet	469.04 feet	455.00 feet	458.00 feet

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 annual inflow design flood control system plan documenting 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.

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 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 prepare the 2024 inflow design flood control system plan,
- Summarizes the results of the 2021 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 the Illinois CCR Rule.
- Evaluates potential changes to the design 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 Ash Surge, Bypass, and Former Ash Basins can manage the inflow design flood.

1.2 SCOPE

In addition to being regulated under the Illinois CCR Rule, Powerton's Ash Surge Basin, Bypass Basin, and Former Ash Basin 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 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. 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 Basin Conditions & Inflow Design Flood Control Systems

The operating and physical conditions for the Ash Surge, Bypass, and Former Ash Basins and for their inflow design flood control systems were based on the following inputs:

- Observations made by S&L during site visits on August 22, 2024 (Ash Surge and Former Ash Basins) and on September 25, 2024 (Bypass Basin).
- Discussions with MWG personnel.
- The basins' initial federal inflow design flood control system plans (Refs. 3 and 4).
- The histories of construction prepared for the CCR surface impoundments in accordance with 40 CFR 257.73(c) (Refs. 10 and 11).
- The most recent annual inspection reports prepared for the CCR surface impoundments in accordance with 35 Ill. Adm. Code 845.540(b) (Refs. 12 and 13).

Inflow Design Flood Event

Per their 2024 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). Therefore, the inflow design flood event used in this hydrologic and hydraulic assessment of the Ash Surge, Bypass, and Former Ash Basins is based on the 1,000-year storm (Ref. 1, § 845.510(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).

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 Ash Surge Basin, Bypass Basin, and Former Ash Basin, 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 changes were identified, then the 2021 hydrologic and hydraulic calculations performed for the Ash Surge Basin, Bypass Basin, and/or Former Ash Basin 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 2021 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 INFLOW DESIGN FLOOD CONTROL SYSTEMS

The following descriptions of the inflow design flood control systems for the Ash Surge and Bypass Basins are taken from the basins' initial federal inflow design flood control system plan, which was prepared by Geosyntec Consultants in October 2016 (Ref. 3):

> The [Ash Surge and Bypass] Basins are located east of the old inlet canal and northeast of the main powerblock building. The [b]asins are operated to receive sluiced CCR and other process water from plant operations one basin at a time. Inflow from plant operations is discharged into the [b]asins through concrete inflow channels located along the southern boundary of the Ash Surge Basin and the [northwestern] boundary of the Bypass Basin.
>
> Routine outflow from the Ash Surge Basin drains northward through a 48-inch diameter reinforced concrete pipe located at the bottom of the basin along its northern perimeter. This pipe connects to the sump located within the pump station located approximately 35 feet north of the Ash Surge Basin. [Powerton] maintains three pumps at the pump station, including one backup pump. As indicated by historical sump water level data, the pump controls are managed so that the water level within the Ash Surge Basin is maintained between 463.5 feet and 465 feet [above mean sea level (amsl)]. From the pump station, discharged process water is pumped to the Service Water Basin located northwest of the Ash Surge Basin. The Ash Surge Basin also includes an emergency spillway along the eastern boundary that would discharge toward the Former Ash Basin (FAB). The spillway is constructed with two box culverts, each approximately 4.5 feet in width and approximately 1.5 feet in height that extend beneath the embankment crest. A concrete apron is located east of the box culvert and rip rap is located downstream of the apron. Topographic survey point data from the

> basin crest indicates a minimum crest elevation of the [Ash Surge Basin] of approximately 467.6 feet [amsl].
>
> Routine outflow from the Bypass Basin flows over a weir wall within the basin into a 36-inch diameter reinforced concrete pipe. This pipe extends northward within the east embankment of the Bypass and Ash Surge Basins until it reaches the northeast corner of the Ash Surge Basin, where the pipe extends west to the pump station north of the Ash Surge Basin. From the pump station, discharged process water is pumped to the [Service Water Basin] located northwest of the Ash Surge Basin. When in service, the operating water level in the Bypass Basin is maintained at the elevation of the top of the weir wall.

The following description of the inflow design flood control system for the Former Ash Basin is taken from the basin's initial federal inflow design flood control system plan, which was prepared by Geosyntec Consultants in May 2018 (Ref. 4):

> The [Former Ash Basin] is an inactive surface impoundment with an approximate area of 30 acres, located near the Illinois River. A rail road embankment built in 2010 divides the impoundment into North and South Pond…Based on current operations at the Powerton station, there is no regular discharge of sluiced ash into the North and South Ponds of the [Former Ash Basin].
>
> No intake or decant structure exist for [the Former Ash Basin]. No spillway exists for [the Former Ash Basin].

5.2 SUMMARY OF 2021 HYDROLOGIC & HYDRAULIC CALCULATIONS

The latest hydrologic and hydraulic calculations for Powerton's Ash Surge Basin, Bypass Basin, and Former Ash Basin were completed in October 2021. The inputs, methodology, and results of these calculations are documented in the basins' 2021 inflow design flood control system plan (Ref. 14). As stated in the 2021 plan, these calculations were performed by conservatively assuming no rainfall abstraction (*i.e.*, the full design precipitation depth over a basin's catchment area was assumed to enter the basin). Moreover, it was conservatively assumed that the surface water elevations in the Ash Surge and Bypass Basins at the time of the design storm event were at the basins' respective maximum design operating levels. Finally, it was conservatively assumed that the surface water elevation in the Former Ash Basin at the time of the design storm event was at 450.00 feet amsl, four feet higher than the maximum surface water elevation recorded in the basin's annual inspection reports that had been completed through October 2021.

The 2021 hydrologic and hydraulic assessment for the Ash Surge and Bypass Basins evaluated whether the basins could contain the inflow design flood without surface water overflowing into their emergency spillway structures at EL. 466.00 feet amsl and EL. 466.75 feet amsl, respectively. Indeed, the assessment concluded

that water entering the basins during the inflow design flood event would not overflow into the basins' emergency spillway structures. The water levels in the Ash Surge and Bypass Basins following the design event were estimated to be 0.12 foot and 0.29 foot, respectively, below their corresponding emergency spillway structures. Meanwhile, the freeboards were estimated to be 2.12 feet and 1.54 feet in the Ash Surge Basin and the Bypass Basin, respectively. Based on these results, it was concluded that the basins have adequate hydraulic capacities to retain the 1,000-year flood event without water overflowing into the basins' emergency spillway structures or overtopping the basins' dikes. Therefore, the basins were determined to be in conformance with 35 Ill. Adm. Code 845.510(a).

Similarly, the 2021 hydrologic and hydraulic assessment for the Former Ash Basin 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 amsl and EL. 458.00 feet amsl, respectively. Indeed, the assessment concluded that water entering the ponds during the inflow design flood event would not overtop the ponds' dikes. The freeboards for the North and South Ponds following the design event were estimated to be 4.13 feet and 6.77 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, thus, the Former Ash Basin was determined to be in conformance with 35 Ill. Adm. Code 845.510(a).

5.3 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 Ash Surge Basin, Bypass Basin, and Former Ash Basin have occurred since the calculations were completed in 2021 that warrant updating the calculations.

5.3.1 CHANGES IN ASH BASIN OPERATIONS

In 2024, Powerton retrofitted the Bypass Basin in accordance with 35 Ill. Adm. Code 845.770 and the July 3, 2024, construction permit issued by Illinois EPA. The retrofit design features a new composite liner system and LCRS over an existing geomembrane liner, which was left in-place as a supplemental liner for the retrofitted basin. Structural fill was placed over the supplemental liner to support the new liner and to provide the slopes required for the LCRS. In addition, different layers of granular fill were placed over the new LCRS to prevent CCR and non-CCR sediments from clogging the LCRS (sand filter layer), to provide a means of deflecting the force of CCR pumped into the basin (protective warning layer), and to protect against erosion (riprap and riprap bedding layer). Moreover, 1.5 feet of granular fill was placed along the top of the basin's embankments, vertically expanding the dikes to accommodate the fill layers placed along the basin floor and sideslopes and to support vehicular traffic. Finally, the basin's emergency spillway was decommissioned and

plugged with flowable fill, and its overflow weir elevation was maintained at its pre-retrofit / existing elevation of 465.50 feet amsl.

Powerton has taken the Ash Surge Basin out of service and started dewatering the basin. MWG currently plans to retrofit the Ash Surge Basin with a new composite liner system and a new LCRS upon receipt of a retrofit construction permit from the Illinois EPA in accordance with Subpart B of the Illinois CCR Rule. MWG submitted a construction permit application for retrofitting the Ash Surge Basin to Illinois EPA on July 27, 2023.

Finally, the Former Ash Basin is 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. Per the basin's July 2024 annual inspection report (Ref. 13), the maximum surface water elevation in the basin's North and South Ponds between the 2021 and 2023 annual inspections was estimated to be approximately EL. 446 feet amsl. Per the basin's July 2024 annual inspection report (Ref. 13), the maximum water depth observed was estimated to be 7.6 feet. Using the area-capacity curve provided for the basin in its history of construction (Ref. 11), the maximum surface water elevation for the basin was approximately 440 feet amsl.

Based on the preceding discussion, the operating conditions at the Ash Surge and Former Ash Basins have not changed since the latest hydrologic and hydraulic calculations were prepared in 2021. Moreover, the maximum surface water elevation observed in the Former Ash Basin between 2021 and 2024 (approximately 446 feet amsl) is less than the surface water elevation assumed for the Former Ash Basin prior to the inflow design flood (450 feet amsl). In addition, with the Ash Surge Basin out of service, the normal surface water elevation in that basin will be lower than its maximum design operating level, which was the assumed water level in the basin at the time of the design storm event in the 2021 hydrologic and hydraulic calculations. Because these calculations were based on conservative assumptions regarding the surface water elevations in the Ash Surge and Former Ash Basins, there have been no significant changes to the operations of these basins that warrant updating the 2021 hydrologic and hydraulic calculations.

Because the overflow weir elevation in the Bypass Basin was not adjusted during retrofit activities, the fill material placed within the basin has reduced its available storage capacity. This reduction in operating volume warrants updating the 2021 hydrologic and hydraulic calculations for the Bypass Basin's retrofitted condition.

5.3.2 CHANGES IN ASH BASIN TOPOGRAPHY

Based on visual observations made by S&L during site visits on August 22 and September 25, 2024, reviews of the latest annual inspection reports (Refs. 12 and 13), and reviews of Google Earth aerial images (Ref. 9),

there have been no significant modifications to the Ash Surge and Former Ash Basins' embankments (mass excavations, mass fill placement, *etc*.) since the latest hydrologic and hydraulic calculations were completed in 2021. 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) that were used in these calculations are unchanged and remain valid for use in this 2024 assessment. Meanwhile, post-construction survey data provided by the contractor who retrofitted the Bypass Basin (Ref. 15) was used to develop an updated area-capacity curve for the retrofitted Bypass Basin. This area-capacity curve is provided in Appendix A.

5.3.3 CHANGES TO INFLOW DESIGN FLOOD EVENT

Per the basins' 2024 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), the same hazard potential classifications the basins were assigned in 2021. Therefore, the inflow design flood event for the basins remains the 1,000-year storm (Ref. 1, § 845.510(a)(3)). As documented in the basins' 2021 inflow design flood control system plan (Ref. 14), the precipitation value for the 1,000-year, 24-hour storm event used in the latest hydrologic and hydraulic calculations completed for the Ash Surge, Bypass, and Former Ash Basins was 9.00 inches per NOAA's Atlas 14. As stated in Section 2.0, NOAA's 1,000-year, 24-hour precipitation value for the Powerton site remains 9.00 inches. Therefore, the inflow design flood event used in the 2021 hydrologic and hydraulic calculations is unchanged and remains valid for use in this 2024 assessment.

5.4 REVISED HYDROLOGIC & HYDRAULIC CALCULATION RESULTS

There have been no significant modifications to the Ash Surge and Former Ash Basin and no changes to the basins' inflow design flood events since the latest hydrologic and hydraulic calculations were prepared in 2021. Therefore, the results and conclusions documented for the Ash Surge and Former Ash Basin's inflow design flood control systems in the 2021 inflow design flood control system plan (Ref. 14) remain valid.

Retrofit construction in 2024 reduced the storage capacity in the Bypass Basin, which warrants updating the hydrologic and hydraulic calculations in the 2021 inflow design flood control system plan (Ref. 14). However, the basin's inflow design flood event has not changed since those calculations were prepared in 2021; therefore, the 1,000-year, 24-hour precipitation value for the Powerton site (Ref. 6) used in 2021 remains valid for use in the revised hydrologic and hydraulic calculations for the retrofitted Bypass Basin.

Based on the preceding discussion, S&L revised the 2021 hydrologic and hydraulic calculations for the retrofitted Bypass Basin to account for the reduced storage capacity therein (Ref. 16). Given that the overflow weir elevation in the basin was maintained at its pre-retrofit / existing elevation of 465.50 feet amsl,

the maximum surface water elevation in the basin prior to the design storm event was taken as 465.50 feet amsl. Consistent with the 2021 hydrologic and hydraulic calculations, the revised calculations were performed by conservatively assuming no rainfall abstraction (*i.e.*, the full design precipitation depth over the basin's catchment area was assumed to enter the basin). Finally, because the basin's emergency spillway was decommissioned and plugged with flowable fill, the acceptance criterion was changed to the retrofitted Bypass Basin containing the design inflow from a 1,000-year, 24-hour storm without water overtopping the basin's embankments at EL. 469.04 feet amsl.

Table 5-1 summarizes the results from the hydrologic and hydraulic calculations performed for the Ash Surge and Former Ash Basins in 2021 and for the retrofitted Bypass Basin in 2024. Based on these results, water entering the Ash Surge Basin during the inflow design flood event will not overflow into the basin's emergency spillway structure. The water level in the Ash Surge Basin following the design event was estimated to be 0.12 foot and 2.12 feet, respectively, below the invert elevation of its emergency spillway structure and the crest elevations of its embankments. Meanwhile, the freeboard in the retrofitted Bypass Basin following the design event was estimated to be 2.37 feet. Finally, 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 following the design event were estimated to be 4.13 feet and 6.77 feet, respectively. Table 5-1 – Summary of Hydrologic & Hydraulic Assessment Results for Ash Surge Basin, Retrofitted Bypass Basin, & Former Ash Basin

CCR Surface Impoundment	Ash Surge Basin	Retrofitted Bypass Basin	Former Ash Basin, North Pond	Former Ash Basin, South Pond
IL Hazard Potential Classification	Class 2	Class 2	Class 2	Class 2
Inflow Design Flood	1,000 Year	1,000 Year	1,000 Year	1,000 Year
Maximum Surface Water EL.	465.88 feet	466.67 feet	450.87 feet	451.23 feet
Emergency Spillway EL.	466.00 feet	N/A	N/A	N/A
Basin's Crest / Rim EL.	468.00 feet	469.04 feet	455.00 feet	458.00 feet

6.0 CONCLUSIONS

Based on the results in Table 5-1, the Ash Surge Basin, Bypass Basin, and Former Ash Basin have adequate hydraulic capacities to retain the 1,000-year flood event without water overtopping the basins' dikes. In addition, the Ash Surge Basin has adequate hydraulic capacity to retain the 1,000-year flood event without water overflowing into its emergency spillway structure. 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).

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 13, 2024

Seal:

Digitally signed by Thomas Dehlin
Date: 2024.10.13 11:29:58-05'00'

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 September 27, 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 September 27, 2024.
3. Geosyntec Consultants. “Inflow Design Flood Control System Plan, Ash Surge and Bypass Basins, Powerton Station.” October 2016.
4. Geosyntec Consultants. “Inflow Design Flood Control System Plan, Former Ash Basin, Powerton Station.” May 2018.
5. Sargent & Lundy. “2024 Hazard Potential Classification Assessment for Ash Surge Basin, Bypass Basin, & Former Ash Basin.” Rev. 0. S&L Project No. A12661.190. October 2024.
6. National Oceanic and Atmospheric Administration. “Point Precipitation Frequency Estimates.” NOAA Atlas 14, Volume 2, Version 3.
7. Aero-Metric, Inc. Aerial Survey of Powerton Generating Station Dated June 19, 2008.
8. Ridgeline Consultants. Aerial Survey of Former Ash Basin Dated February and March 2016.
9. Google Earth Pro v7.3.0.3832. Accessed September 27, 2024.
10. Geosyntec Consultants. “History of Construction, Ash Surge Basin and Bypass Basin, Powerton Station.” October 2016.
11. Geosyntec Consultants. “History of Construction, Former Ash Basin, Powerton Station.” April 2018.
12. Civil & Environmental Consultants, Inc. “Annual Inspection Report, Ash Surge Basin and Ash Bypass Basin, Powerton Station.” October 23, 2023.
13. Civil & Environmental Consultants, Inc. “Annual Inspection Report, Powerton Station - Former Ash Basin.” July 14, 2024.
14. Sargent & Lundy. “Inflow Design Flood Control System Plan for Ash Surge Basin, Bypass Basin, and Former Ash Basin.” Rev. 0. S&L Project No. 12661-122. October 2021.
15. Bluff City Construction. “Powerton Retrofit Bypass Basin, Above Liner Survey Locations,” Sheet No. 4 of 9, September 2024.
16. Sargent & Lundy. “Ash Surge, Bypass and Former Ash Basins Hydraulic Capacity Calculation.” S&L Calc. No. MG-PS-C001. S&L Project No. 12661-122 / 190. October 2024.

APPENDIX A: RETROFITTED BYPASS BASIN AREA-CAPACITY CURVE