

# MWG

Midwest Generation, LLC  
Joliet 29 Generating Station

## 2021 Inflow Design Flood Control System Plan for Ash Pond 2



Revision 0

October 15, 2021

Issue Purpose: Use

Project No.: 12661-121

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## TABLE OF CONTENTS

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<b>Table of Contents .....</b>	<b>i</b>
<b>1.0 Purpose &amp; Scope.....</b>	<b>1</b>
1.1 Purpose.....	1
1.2 Scope.....	1
<b>2.0 Inputs.....</b>	<b>2</b>
<b>3.0 Assumptions.....</b>	<b>3</b>
<b>4.0 Hydrologic &amp; Hydraulic Assessment .....</b>	<b>3</b>
4.1 Changes Since Initial Inflow Design Flood Control System Plan .....	3
4.2 Methodology .....	3
4.3 Results .....	4
<b>5.0 Conclusions.....</b>	<b>4</b>
<b>6.0 Certification .....</b>	<b>5</b>
<b>7.0 References .....</b>	<b>6</b>
<b>Appendix A: 2016 Ash Pond 2 Inflow Design Flood Control System Plan</b>	

## 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 inflow design flood control system plan that 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 CCR surface impoundments promulgated by 35 Ill. Adm. Code 845.510.

Ash Pond 2 is 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 plan in accordance with 40 CFR 257.82(c)(1) for Ash Pond 2 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 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 determine whether Ash Pond 2 can manage the inflow design flood,
- Evaluates potential changes to the design inputs used in the initial hydrologic and hydraulic assessment completed for Ash Pond 2 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 Ash Pond 2 meets 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, 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, 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 system for Ash Pond 2 is documented in the pond's 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 its 2021 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) and as a significant hazard potential CCR surface impoundment pursuant to 40 CFR 257.73(a)(2). Therefore, the inflow design flood event used in this hydrologic and hydraulic assessment of Ash Pond 2 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 (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).

### **Ash Pond Conditions**

The operating and physical conditions for Ash Pond 2 were based on discussions with MWG personnel, the history of construction prepared for the CCR surface impoundment in accordance with 40 CFR 257.73(c) (Ref. 8), and the annual inspection reports prepared for the CCR surface impoundment in accordance with 40 CFR 257.83(b) (Refs. 9 through 13).

### **Mean Annual Precipitation Depth**

The mean annual precipitation depth for the site was obtained from NOAA's "Summary of Monthly Normals" (Ref. 14) for a monitoring station at the Brandon Road Lock and Dam in Joliet, Illinois, which is approximately 1.5 miles northeast of the Station. Per this NOAA dataset, the mean annual precipitation depth at the site is 36.8 inches.

### **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**

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. In accordance with the Station's ash pond maintenance practices, the Station then began dewatering and removing CCR from the pond.

Moreover, the Station isolated the pond by capping the inlet pipe from Pond 1. As documented in the pond's annual inspection reports since 2019 (Refs. 12 and 13), minimal CCR remains in Ash Pond 2. During a site visit in September 2021, no CCR and approximately 2 feet of stormwater were visually observed in Ash Pond 2. 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). 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.

Based on reviews of the annual inspection reports (Refs. 9 through 13) and Google Earth aerial images (Ref. 7), there have been no significant modifications to Ash Pond 2 (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 13) and 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 initial inflow design flood control system plan was completed. Therefore, the topographic data collected for the site in 2008 (Ref. 4) and the area-capacity curves documented in Ash Pond 2's history of construction (Ref. 8) remain valid for use in this 2021 assessment.

#### **4.2 METHODOLOGY**

As previously mentioned, approximately 2 feet of water was observed in Ash Pond 2 during a September 2021. Since the pond was taken out of service, the water level in the pond has fluctuated with the net precipitation rate into the pond (*i.e.*, inflow from direct precipitation and stormwater run-on less outflow from evaporation). For the purposes of this assessment, the design operating water level in Ash Pond 2 was

based on the 2 feet of water observed in September 2021 plus 1.5 years' worth of direct precipitation and stormwater run-on to account for a period of time until closure construction activities commence. Evaporation out of the pond was conservatively omitted. No rainfall abstraction was considered, which is also a conservative assumption (*i.e.*, the full design precipitation depth over Ash Pond 2's catchment area was assumed to enter the pond). Because Ash Pond 2 is perched, stormwater entering the pond during storm events is limited to direct precipitation and stormwater run-on from the access roads on the pond's dikes.

After determining the design operating surface water elevation in Ash Pond 2 for this assessment, the inflow flood volume into Ash Pond 2 from the 1000-year, 24-hour storm event was then calculated to determine the rise in the pond's water level. The new surface water elevation was then compared to the pond's outlet weir elevation (EL. 532.85 feet) and berm elevation (EL. 535.00 feet) to verify that Ash Pond 2 could manage direct precipitation and stormwater run-on from the 1000-year, 24-hour storm event without water discharging through the pond's outlet weir or overtopping the pond's dikes.

### 4.3 RESULTS

Table 4-1 summarizes the results from the hydrologic and hydraulic calculations performed for Ash Pond 2 (Ref. 15). 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. The surface water elevation in the pond during the design event was estimated to be 2.30 feet below the pond's outlet weir and 4.45 feet below the pond's dike.

**Table 4-1 – Summary of Hydrologic & Hydraulic Assessment Results for Ash Pond 2**

CCR Surface Impoundment	Illinois Hazard Potential Classification	Federal Hazard Potential Classification	Inflow Design Flood	Maximum Surface Water Elevation	Outlet Weir Elevation	Pond Crest Elevation
Ash Pond 2	Class 2	Significant	1,000 Year	530.55 feet	532.85 feet	535.00 feet

## 5.0 CONCLUSIONS

Based on the hydrologic and hydraulic calculations performed for Ash Pond 2 (Ref. 15), the pond has adequate hydraulic capacity to retain the 1000-year flood event without water discharging from the pond or overtopping the pond's dikes. Therefore, Ash Pond 2 is 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 15, 2021

Seal:



*Th. Dehlin*  
10/15/2021  
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 14, 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 14, 2012.
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6. Aero-Metric, Inc. Aerial Survey of Joliet 29 Generating Station Dated June 17, 2008.
7. Google Earth Pro v7.3.0.3832. Accessed October 14, 2021.
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10. Geosyntec Consultants. "Annual Inspection Report, Ash Pond 2, Joliet 29 Station." October 16, 2017.
11. Civil & Environmental Consultants, Inc. "Annual Inspection Report, Ash Pond 2, Joliet Station." October 16, 2018.
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13. Civil & Environmental Consultants, Inc. "Annual Inspection Report, Ash Pond 2, Joliet Station." October 9, 2020.
14. National Oceanic and Atmospheric Administration. "Summary of Monthly Normals, 1981-2010." Station: Joliet Brandon Rd Dm, IL US USC00114530.
15. Sargent & Lundy. "Ash Pond 2 Hydraulic Capacity Calculation." S&L Calc. No. MG-JS-C001, Rev. 0. S&L Project No. 12661-121. October 2021.



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**APPENDIX A: 2016 ASH POND 2 INFLOW DESIGN FLOOD  
CONTROL SYSTEM PLAN**

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