

MWVG

Midwest Generation, LLC

Will County Generating Station

2022 Hazard Potential Classification Assessment for South Ash Pond 2 & South Ash Pond 3



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TABLE OF CONTENTS

Table of Contents	i
1.0 Purpose & Scope	1
1.1 Purpose.....	1
1.2 Scope	1
2.0 Inputs	2
3.0 Assumptions	4
4.0 Methodology	4
5.0 Assessment	5
5.1 Summary of 2021 Hazard Potential Classification Assessment.....	5
5.2 Summary of Initial Federal Hazard Potential Classification Assessment	5
5.3 Changes in Bases for Initial federal Hazard Potential Classifications	6
5.3.1 Changes in Ash Pond Operations & Embankment Geometry.....	6
5.3.2 Changes in Site Topography	6
5.3.3 Changes in Downstream Property Developments.....	7
5.3.4 Changes in USBR Depth-Velocity Flood Danger Levels.....	7
5.4 2022 Hazard Potential Classification Assessment	7
6.0 Conclusions	8
7.0 Certification	9
8.0 References	10
Appendix A: 2016 Fed. Hazard Potential Classification Assessment for South Ash Ponds 2 & 3	

1.0 PURPOSE & SCOPE

1.1 PURPOSE

South Ash Pond 2 and South Ash Pond 3 at Midwest Generation, LLC's (MWG) Will County Generating Station ("Will County" 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 845.440(a)(1), MWG must conduct and complete an annual hazard potential classification assessment that documents the hazard potential classifications for South Ash Ponds 2 and 3 in accordance with the hazard potential classifications defined in 35 Ill. Adm. Code 845.120.

This report documents the 2022 hazard potential classification assessment conducted and completed in accordance with the Illinois CCR Rule by Sargent & Lundy (S&L) on behalf of MWG for South Ash Ponds 2 and 3 at Will County. This report:

- Lists the inputs and assumptions used in the 2022 hazard potential classification assessment,
- Lists and compares the definitions for the hazard potential classifications for CCR surface impoundments promulgated by the Illinois CCR Rule and by the U.S. Environmental Protection Agency's regulations for CCR surface impoundments,
- Discusses the methodology used to conduct the 2022 hazard potential classification assessment,
- Provides the 2022 hazard potential classifications for South Ash Ponds 2 and 3 in accordance with 35 Ill. Adm. Code 845.440(a)(1).

1.2 SCOPE

In addition to being regulated under the Illinois CCR Rule, South Ash Ponds 2 and 3 at Will County 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, 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. However, the scope of this 2022 structural stability assessment is strictly limited to demonstrating compliance with the Illinois CCR Rule. Pursuant to 40 CFR 257.73(f)(3), the next hazard potential classification assessment for demonstrating compliance with the Federal CCR Rule will be completed in 2026, five years after the last federal assessment was completed (2021).

2.0 INPUTS

Hazard Potential Classifications

The Illinois CCR Rule (Ref. 1, § 845.120) defines “hazard potential classification” as “the possible adverse incremental consequences that result from the release of water or stored contents due to failure of the diked CCR surface impoundment or mis-operation of the diked CCR surface impoundment or its appurtenances.” The Illinois CCR Rule (Ref. 1, § 845.440(a)(1)) requires a CCR surface impoundment be designated as either a Class 1 CCR surface impoundment or a Class 2 CCR surface impoundment. Per 35 Ill. Adm. Code 845.120, the two Illinois hazard potential classifications are defined as follows:

- *Class 1 CCR surface impoundment* means a diked surface impoundment where failure or mis-operation will probably cause loss of human life.
- *Class 2 CCR surface impoundment* means a diked surface impoundment where failure or mis-operation results in no probable loss of human life, but can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns.

The Federal CCR Rule (Ref. 2, § 257.53), has the same definition for “hazard potential classification” as the Illinois CCR Rule. However, the Federal CCR Rule has three hazard potential classifications instead of the two designations promulgated by the Illinois CCR Rule. Per 40 CFR 257.53, the three federal hazard potential classifications are defined as follows:

- *High hazard potential CCR surface impoundment* means a diked surface impoundment where failure or mis-operation will probably cause loss of human life.
- *Low hazard potential CCR surface impoundment* means a diked surface impoundment where failure or mis-operation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the surface impoundment owner’s property.
- *Significant hazard potential CCR surface impoundment* means a diked surface impoundment where failure or mis-operation results in no probable loss of human life, but can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns.

Per the preceding sets of definitions for the federal and Illinois hazard potential classifications, a high hazard potential CCR surface impoundment per the Federal CCR Rule is the same as a Class 1 CCR surface impoundment per the Illinois CCR Rule. Similarly, a CCR surface impoundment that is classified as a low or significant hazard potential per the Federal CCR Rule is considered to be a Class 2 CCR surface impoundment per the Illinois CCR Rule.

Site Topography

Two topographic datasets for South Ash Pond 2, South Ash Pond 3, and the surrounding areas were obtained: one from the U.S. Geological Survey’s (USGS) National Elevation Dataset (NED) (Ref. 4) and one

from the U.S. Department of Agriculture's (USDA) National Digital Elevation Program (NDEP) (Ref. 5). The USGS dataset was published in 2011 and was utilized in the initial federal hazard potential classification assessment and the 2016 dike breach analysis. The USGS topography reflects elevation data collected in 2004 at a resolution of approximately 3 meters. Based on a review of the USGS NED, the 2004 USGS elevation dataset is the most recent topographic dataset in the NED at a 3-meter or better resolution for the Station and surrounding areas. Meanwhile, the USDA topography reflects elevation data collected in 2010 at a 1-meter resolution and was utilized in this 2022 assessment to determine whether the site topography referenced in the initial federal hazard potential classification assessment and the 2016 dike breach analysis should be updated.

Impacted Areas

Areas impacted by a hypothetical failure at either South Ash Pond 2 or South Ash Pond 3 were obtained from the ponds' initial federal hazard potential classification assessment (Ref. 3), the dike breach analysis conducted in 2016 for the ponds' eastern dikes (Ref. 6), and the dike breach inundation maps prepared for the ponds' Emergency Action Plan (Ref. 7). The inputs, assumptions, and methodology utilized to identify areas impacted by failures at each of the ponds' dikes were evaluated to determine whether any updates to these analyses were warranted.

Appendix A provides the initial federal hazard potential classification assessment conducted by Geosyntec Consultants in 2016 for South Ash Ponds 2 and 3.

Aerial Images

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

Property Boundaries

Boundaries for the Station's property and adjacent properties were obtained from the geographic information system (GIS) for Will County, Illinois (Ref. 9).

100-Year Floodway & Floodplain

Delineations for the floodway and floodplain for the 1% annual chance flood ("100-year flood") at and downstream from the Will County site were obtained from the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Map (FIRM) for the subject area (Ref. 10).

Ash Pond Conditions

The operating and physical conditions for South Ash Ponds 2 and 3 were based on a March 2022 site visit by S&L, on discussions with MWG personnel, and on the 2021 annual inspection report prepared for the CCR surface impoundments in accordance with 35 Ill. Adm. Code 845.540(b) (Ref. 11).

3.0 ASSUMPTIONS

There are no assumptions in this document that require verification.

4.0 METHODOLOGY

As documented in last year's hazard potential classification assessment, the 2021 hazard potential classifications assigned to South Ash Ponds 2 and 3 were based on the initial federal hazard potential classifications assigned in 2016 pursuant to the Federal CCR Rule after it was determined that the bases for the initial federal hazard potential classifications were still valid. Accordingly, the bases for South Ash Pond 2's and South Ash Pond 3's initial federal hazard potential classifications as documented within the ponds' initial federal hazard potential classification assessment were re-evaluated to determine if any changes have occurred since the initial assessment was completed. Identified changes were then evaluated to determine if the ponds' 2021 hazard potential classifications warrant adjustments. 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 initial federal hazard potential classification assessment, the previous evaluation of that input was considered to still be valid for this 2022 assessment.

In instances where changes to one or more factors used as the bases for the 2021 hazard potential classifications that were identified (*e.g.*, downstream development that was not present in 2016), hypothetical dike breaches were considered at each of the two CCR surface impoundments to evaluate the impacts that a release of CCR and CCR wastewater would have on the identified factor(s). These hypothetical dike breaches were evaluated regardless of potential causes and/or apparent dike stability. When evaluating a hypothetical dike breach at a subject CCR surface impoundment, the solid waste materials in the CCR surface impoundment were conservatively considered as an equivalent volume of liquid, and the CCR surface impoundment was assumed to be entirely filled with liquid.

When evaluating the downstream impacts from a hypothetical dike breach at a CCR surface impoundment, the primary consideration examined was whether a loss of human life is probable under the given hypothetical failure scenario. Loss of human life is the critical aspect of the Class 1 hazard potential classification. If a loss of human life is unlikely to occur, then the CCR surface impoundment was not considered to be a Class 1 hazard potential and was instead classified as a Class 2 hazard potential.

It should be noted that a CCR surface impoundment's hazard potential classification is not a reflection of the probability of a hypothetical failure event associated with the surface impoundment. Hazard potential classifications are not contingent upon a CCR surface impoundment's structural stability; they only classify the potential impacts should a hypothetical failure occur. For example, a well-maintained CCR surface

impoundment with appropriate factors of safety may be classified as a Class 1 hazard potential solely because a loss of human life would be probable if a hypothetical failure event did occur.

5.0 ASSESSMENT

5.1 SUMMARY OF 2021 HAZARD POTENTIAL CLASSIFICATION ASSESSMENT

The previous hazard potential classification assessment for South Ash Ponds 2 and 3 was completed on October 14, 2021. Ultimately, the 2021 hazard potential classifications for South Ash Ponds 2 and 3 were based on the initial federal hazard potential classifications that were assigned to the ponds in 2016 after it was determined that the bases for the initial federal hazard potential classifications were still valid. Per the initial federal hazard potential classification assessment for South Ash Ponds 2 and 3, the ponds were classified as significant hazard potential CCR surface impoundments pursuant to 40 CFR 257.53. Based on the comparison between the Federal and Illinois CCR Rules' definitions for hazard potential classifications in Section 2.0, a significant hazard potential CCR surface impoundment under the Federal CCR Rule is the equivalent of a Class 2 CCR surface impoundment under the Illinois CCR Rule. Therefore, South Ash Ponds 2 and 3 were classified as Class 2 CCR surface impoundments in the 2021 hazard potential classification assessment.

5.2 SUMMARY OF INITIAL FEDERAL HAZARD POTENTIAL CLASSIFICATION ASSESSMENT

The initial federal hazard potential classification assessment for South Ash Ponds 2 and 3 was completed in October 2016 and is included in its entirety in Appendix A. This assessment evaluated the potential consequences of hypothetical dike failures for both ponds. A quantitative dike breach analysis was also conducted for each pond's eastern dike which was determined to pose the most risk to human life due to the eastern dikes' proximities to occupied buildings and the adjacent topography sloping towards occupied buildings. The 2016 dike breach analysis also assumed that South Ash Pond 2, South Ash Pond 3, and other nearby, non-CCR surface impoundments were at capacity at the time of the hypothetical failure.

Per Figures 2 and 3 in Appendix A, the 2016 dike breach analysis concluded that the flood released through a hypothetical breach in the eastern dike of either South Ash Pond 2 or South Ash Pond 3 could impact several unoccupied buildings and one occupied building. The 2016 dike breach analysis also concluded that the combination of the estimated flood velocity and depth at the occupied building is within the U.S. Department of the Interior, Bureau of Reclamation's (USBR) "Low Danger Zone" (see Figure 4 in Appendix A). In its "Downstream Hazard Classification Guidelines" (Ref. 14), the USBR states that if the depth-velocity combination of a hazard (e.g., flood) for a given area plots within the "Low Danger Zone," "the number of lives-in-jeopardy associated with possible downstream hazards is assumed to be zero." In other words, floods plotting within the USBR's "Low Danger Zone" are unlikely to cause a probable loss of human life.

Therefore, the initial federal hazard potential classification assessment concluded that a failure at the eastern dike of either South Ash Pond 2 or South Ash Pond 3 would not result in a probable loss of human life.

Although a hypothetical failure at either South Ash Pond 2 or South Ash Pond 3 was determined to not cause a probable loss of human life, it was also determined that wastewater released from a breach at either pond's western dike would flow directly into the Des Plaines River and cause offsite environmental impacts. Therefore, South Ash Ponds 2 and 3 were both classified as significant hazard potential CCR surface impoundments.

5.3 CHANGES IN BASES FOR INITIAL FEDERAL HAZARD POTENTIAL CLASSIFICATIONS

5.3.1 CHANGES IN ASH POND OPERATIONS & EMBANKMENT GEOMETRY

Following the retirement of Unit 4 in June 2022, South Ash Pond 2 now receives only stormwater overflow from the South Area Runoff Basin and intermittent CCR wastestreams associated with decommissioning the Station (equipment washdown, etc.). Upon completion of decommissioning activities and an ongoing project to re-route the aforementioned outflow from the South Area Runoff Basin to the North Area Runoff Basin, MWG will file a notice of intent to close South Ash Pond 2. Closure construction 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.

Based on reviews of Google Earth aerial images (Ref. 8) and the 2021 annual inspection report (Ref. 11), there have been no significant modifications to South Ash Ponds 2 and 3 (mass excavations, major embankment modifications, etc.) since the initial federal hazard potential classification assessment was completed. Therefore, there is no basis to re-evaluate the embankment geometry for this 2022 assessment.

5.3.2 CHANGES IN SITE TOPOGRAPHY

When comparing the 2004 USGS topography (Ref. 4) used in the initial federal hazard potential classification assessment and the 2010 USDA elevation dataset for the area (Ref. 5), no significant differences in the topography adjacent to the ash ponds and within the dike breach impact areas were identified. This observation is further supported by Google Earth aerial images (Ref. 8), which indicate that there have been no significant modifications to the ground surfaces (mass excavations, mass fill placement, etc.) adjacent to South Ash Ponds 2 and 3 or within the dike breach impact areas since 2010. Based on these observations, the topographic data used by the initial federal hazard potential classification assessment remains valid for this 2022 assessment.

5.3.3 CHANGES IN DOWNSTREAM PROPERTY DEVELOPMENTS

Based on reviews of Google Earth aerial images (Ref. 8) and the Will County, Illinois GIS (Ref. 9), no new buildings or transport corridors (roads, rail lines, etc.) have been constructed in the past five years within the dike breach impact areas identified in the initial federal hazard potential classification assessment. Thus, there is no basis to re-evaluate the potential impacts to the areas downstream of South Ash Ponds 2 and 3 for this 2022 assessment.

5.3.4 CHANGES IN USBR DEPTH-VELOCITY FLOOD DANGER LEVELS

The USBR has not updated the depth-velocity flood danger level relationships presented in its “Downstream Hazard Classification Guidelines” (Ref. 14) since the initial federal hazard potential classification assessment for South Ash Ponds 2 and 3 was completed in 2016. Therefore, there is no basis to re-evaluate the danger levels assigned to the occupied buildings identified within the inundation area downstream of the eastern dikes for South Ash Ponds 2 and 3 following a hypothetical breach at either pond.

5.4 2022 HAZARD POTENTIAL CLASSIFICATION ASSESSMENT

Other than the changes in the operational statuses of South Ash Ponds 2 and 3, there have been no significant modifications to South Ash Ponds 2 and 3; no significant modifications to the topography adjacent to and downstream of these CCR surface impoundments; and no significant buildings or transport corridors that have been constructed in the areas downstream of the CCR surface impoundments that would be impacted by a hypothetical dike breach. There have also been no changes to the USBR’s depth-velocity flood danger level relationships, which were used in the 2016 hazard potential classification assessment. Moreover, the Federal Energy Regulatory Commission’s *Engineering Guidelines for the Evaluation of Hydropower Projects*, which references FEMA’s *Federal Guidelines for Dam Safety* (Ref. 15), states that “the consequences of failure are not expected to cause a probable loss of human life when incremental effects on downstream structures are approximately two feet or less.” FEMA’s *Federal Guidelines for Inundation Mapping of Flood Risks Associated with Dam Incidents and Failures* (Ref. 13) also states that an incremental rise in flood depth of two feet or less caused by a dike breach is not considered to be a concern to human life. These two federal guidelines further support the conclusion that the loss of human life at the occupied building is not probable given that the initial dike breach analysis results show the estimated flood depth at this building is less than two feet. Therefore, the initial federal hazard potential classification assessment completed in 2016 for these CCR surface impoundments remains valid. In addition, the 2016 dike breach analysis for the ponds’ eastern dikes still represents the worst-case failure scenario for each pond since these dikes are the closest to occupied Station buildings.

Based on the preceding observations, the significant hazard potential classifications assigned to South Ash Ponds 2 and 3 in 2016 pursuant to the Federal CCR Rule and the bases for these assignments remain valid

for this 2022 assessment. A loss of human life is unlikely to result from a hypothetical failure at these CCR surface impoundments, but potential offsite environmental damage could occur to the Des Plaines River. As discussed in Section 2.0, a CCR surface impoundment classified as a significant hazard potential per the Federal CCR Rule is considered to be an Illinois Class 2 CCR surface impoundment. Therefore, South Ash Ponds 2 and 3 remain classified as Class 2 CCR surface impoundments pursuant to 35 Ill. Adm. Code 845.440(a)(1).

6.0 CONCLUSIONS

This assessment re-evaluated the factors and design inputs used as the bases for the initial federal hazard potential classification assessment completed in 2016 in accordance with the Federal CCR Rule for Will County's South Ash Ponds 2 and 3. It was determined that no significant operational or physical changes to these CCR surface impoundments and no new downstream developments within the dike breach inundation areas have occurred within the last six years that would necessitate changing either pond's initial federal hazard potential classification. Therefore, because the 2021 Illinois hazard potential classifications for South Ash Ponds 2 and 3 were based on their respective 2016 federal hazard potential classifications, the 2021 Illinois hazard potential classifications assigned to South Ash Ponds 2 and 3 and the bases for these assignments remain valid for 2022.

Table 6-1 presents the 2022 hazard potential classifications assigned to South Ash Ponds 2 and 3 at Will County in accordance with 35 Ill. Adm. Code 845.440(a)(1).

Table 6-1 – 2022 Illinois Hazard Potential Classifications for South Ash Pond 2 & South Ash Pond 3 at the Will County Generating Station

CCR Surface Impoundment	2022 Illinois Hazard Potential Classification
South Ash Pond 2	Class 2
South Ash Pond 3	Class 2

7.0 CERTIFICATION

I certify that:

- This hazard potential classification assessment was prepared by me or under my direct supervision.
- The work was conducted in accordance with the requirements of 35 Ill. Adm. Code 845.440.
- 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

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**APPENDIX A: 2016 FED. HAZARD POTENTIAL
CLASSIFICATION ASSESSMENT FOR
SOUTH ASH PONDS 2 & 3**

