

**ANNUAL STRUCTURAL STABILITY AND FACTOR OF SAFETY ASSESSMENT
METAL CLEANING BASIN
POWERTON STATION
JUNE 2023**

This annual report has been prepared for the Metal Cleaning Basin (MCB) at Powerton Station (site) pursuant to Sections 845.450 - Structural Stability Assessment and 845.460 - Safety Factor Assessment of Title 35 Subtitle G, Chapter I, Subchapter j - Coal Combustion Waste Surface Impoundments. The purpose of this project is to perform the annual structural stability and factor of safety assessments for the MCB by a licensed professional engineer. Civil & Environmental Consultants, Inc. (CEC) completed this structural stability and factor of safety assessment as described in the following sections.

1.0 REGULATION REQUIREMENTS 845.450 AND 845.460

In accordance with Sections 845.450 and 845.460, the owner or operator of a coal combustion residuals (CCR) impoundment is required to (1) conduct initial and annual structural stability assessments and document whether the design, construction, operation, and maintenance of the CCR surface impoundment is consistent with recognized and generally accepted engineering practices for the maximum volume of CCR and CCR wastewater which can be impounded; and (2) conduct an initial and annual safety factor assessment for each CCR surface impoundment and document whether the calculated factors of safety for each CCR surface impoundment achieve the minimum safety factors specified for the critical cross section of the embankment. The following provides a description of the site followed by the assessments and certification.

2.0 SITE DESCRIPTION

The MCB is located at Powerton Station in Pekin, Illinois situated northeast of the main power building, south of the Wastewater Building and between the Ash Surge Basin and former Cooling Water Intake Canal (see Figure 1). Measuring 450 feet long and 225 feet wide, approximately 2.3 acres in size, the MCB is lined with a 60 mil high-density polyethylene (HDPE) liner. Gravel access roads are located along the north, east, and west sides.

Based on information provided by station personnel, the MCB was approved for construction in 1977 and constructed shortly thereafter. Although relined in 2009, the MCB has not undergone significant changes in the geometry. The original operation was designed to receive bottom ash and, twice a year, boiler wash via sluicing with wastewater treated in the wastewater treatment plant. Operation of the MCB has changed to also receive bottom ash and fly ash by end dumping. Wastewater is periodically pumped from the MCB, treated to remove elevated metal concentrations, and discharged into the Ash Surge Basin. The MCB is inspected weekly by the Environmental Specialist including checking the water level in the basin.

3.0 STRUCTURAL STABILITY AND FACTOR OF SAFETY ASSESSMENT

In preparing the annual structural stability and factor of safety assessment assessments, CEC completed the 2023 CCR Surface impoundment inspection in accordance Section 845.540(b). Results of the annual inspection showed no modification to either the configuration or condition of the MCB, nor were structural deficiencies observed or release(s) from the MCB reported. As a result, the conclusions documented in the initial structural stability and factor of safety assessment report prepared by CEC, dated June 8, 2021, remains valid and the MCB is considered stable for the maximum volume of CCR and CCR wastewater which can be impounded.

3.1 Structural Stability Assessment - Section 845.540

The following sections describe the results of the annual structural stability assessment.

3.1.1 Stable Foundation and Abutments - 845.450(a)(1)

Detailed descriptions of the soils forming the earthen dike and foundation soils are provided in the initial structural stability report. Based on results of the annual inspection, there have been no modifications to the MCB since the initial structural stability assessment in 2021. As a result, the conclusions regarding stable foundations and abutment documented in the initial structural stability report remain valid.

3.1.2 Adequate Slope Protection - 845.450(a)(2)

The MCB was constructed with a 60 mil HDPE liner that provides adequate protection of the interior slopes against surface erosion, wave action, and adverse effects of sudden drawdown. No modifications to the slope protection have been observed nor documented. Conclusions regarding adequate slope protection documented in the initial structural stability report remain valid.

3.1.3 Dike Compaction - 845.450(a)(3)

Information regarding dike compaction is outlined in the initial structural stability report. Considering the annual inspection of the dike did not show signs of distress that would be indicative of improperly placed and/or loosely compacted soils, the conclusions regarding dike compaction documented in the initial structural stability report remain valid.

3.1.4 Downstream Slope Protection - 845.450(a)(4)

Consistent with Section 845.430, the MCB slope protection consists of vegetative cover over the downstream slopes and pertinent surrounding areas. Annual inspection shows the grassy vegetation continues to be well maintained and free of woody vegetation. At the time of inspection, the vegetation did not exceed 12 inches in height. Conclusions regarding downstream slope protection documented in the initial structural stability report remain valid.

3.1.5 Spillway - 845.450(a)(5)

Conclusions of the 2022 Inflow Design Flood Control System Plan for the Metal Cleaning Basin prepared by Sargent & Lundy, dated March 29, 2022, shows the MCB has adequate hydraulic capacity to retain a 1,000-year flood event without water overtopping the surrounding dike. Considering the annual inspection shows no modification, the MCB is considered stable for the maximum volume of CCR and CCR wastewater which can be impounded without overtopping.

3.1.6 Structural Integrity of Hydraulic Structures - 845.450(a)(6)

At the time of our annual inspection, wastewater and CCR in the MCB prevented inspection of the 24-inch pipe passing between the incised north end of the MCB and the Basin Discharge Sump. The pipe is reported to be operational, but has not undergone recent inspection. Evidence showing the structural integrity of the pipe free of significant deterioration, deformation, distortion, bedding deficiencies, sedimentation, and debris at the time of inspection could not be made due to the CCR and water in the MCB. Based on discussion with Midwest Generation, LLC personnel, the pipe is operational and has not shown signs of distress.

3.1.7 Down Stream Slopes Adjacent To Water Bodies - 845.450(a)(7)

The former Cooling Water Intake is downstream of the MCB and a stability analysis was performed for both a low pool and rapid draw down condition. Stability analysis shows that the embankment is designed and constructed to maintain stability during both low pool and rapid draw down conditions. Conclusions regarding downstream slope adjacent to water bodies in the initial structural stability report remain valid.

3.1.8 Structural Stability Assessment Deficiencies

Structural deficiencies associated with the MCB were identified in the initial structural stability assessment, and the following corrective actions are required:

- (1) The 24-inch pipe passing between the incised north end of the MCB and the Basin Discharge Sump could not be inspected for signs of distress at the time of inspection. Although our inspection did not identify distress that would suggest the existence of a structural deficiency, the 24-inch diameter pipe should be inspected in accordance with 845.450(a)(6).

3.2 Safety Factor Assessment - Section 845.460

The following sections describe the results of the annual safety factor assessment.

3.2.1 Slope Stability Methodology

The assessment included review of the initial safety factor assessment. The purpose of reviewing the initial 2021 assessment was to confirm the methodology, assumptions and inputs used to complete the safety factor assessment remain relevant. The methodology used for the slope stability analysis reported in the initial safety factor assessment is consistent with Section 845.460 and, considering results of the 2023 CCR surface impoundment inspection showed no modification to either the configuration or condition of the MCB, nor were structural deficiencies observed, the assumptions and inputs used to complete each of the slope stability cases analyzed remain relevant.

3.2.2 Conclusion - 2023 Safety Factor Assessment

The initial safety factor assessment and annual inspections were reviewed and confirm the factors of safety for the 2023 safety factor assessment are valid. We have concluded that the initial safety factor assessment from June 2021 is valid and that the calculated factors of safety for the MCB achieve the minimum safety factors specified for the critical cross section of the embankment

4.0 LIMITATIONS AND CERTIFICATION

The annual structural stability and factor of safety assessment was prepared to meet the requirements of Parts 845.450 and 845.460 of Title 35 Subtitle G, Chapter I, Subchapter j - Coal Combustion Waste Surface Impoundments, and was prepared under the direction of Mr. M. Dean Jones, P.E.

By affixing my seal to this, I do hereby certify to the best of my knowledge, information, and belief that the information contained in this report is true and correct. I further certify I am licensed to practice in the State of Illinois and that it is within my professional expertise to verify the correctness of the information. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment.

Seal:



Signature: 

Name: M. Dean Jones, P.E.

Date of Certification: June 22, 2023

Illinois Professional Engineer No.: 062-051317

Expiration Date: November 30, 2023