

Prepared for

Dynegy Midwest Generation, LLC

1500 Eastport Plaza Drive

Collinsville, Illinois 62234

CCR INITIAL STRUCTURAL STABILITY ASSESSMENT

**VERMILION POWER PLANT
OLD EAST ASH POND AREA
NORTH ASH POND AREA
OAKWOOD, ILLINOIS**

Prepared by

Geosyntec 
consultants

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Project Number CHE8404A

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1. INTRODUCTION

Dynegy Midwest Generation, LLC (Dynegy) is the owner of inactive coal-fired Vermilion Power Station Plant (VPP), also referred to as Vermilion Power Station, located approximately 13 miles Northwest of Danville, Illinois. The Old East Ash Pond Area (OEAP) and North Ash Pond Area (NAP) are inactive surface impoundments storing coal combustion residuals (CCR). OEAP and NAP must meet the requirements of 35 Ill. Admin. Code 845, Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments (Part 845).

The OEAP and NAP are existing CCR surface impoundment as defined by Section 845.120. Although OEAP was designed to hold liquids, it has been filled with CCR and soil and does not hold water. This Initial Structural Stability Assessment addresses the requirements of Part 845.450 for the OEAP and NAP.

1.1. Facility Information

Facility:	Vermilion Power Plant 10188 East 2150 North Rd Oakwood, IL 61858
Owner/Operator:	Dynegy Midwest Generation, LLC 1500 Eastport Plaza Drive Collinsville, IL 62234

2. INITIAL STRUCTURAL STABILITY ASSESSMENT

Section 845.450(a): The owner or operator of a CCR surface impoundment must 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 that can be impounded in the CCR surface impoundment. The assessment must, at a minimum, document whether the CCR surface impoundment has been designed, constructed, operated, and maintained with: [the standards in (a)(1)-(7)].

An initial structural stability assessment has been performed to document that the design, construction, operation, and maintenance of OEAP and NAP is consistent with recognized and generally accepted good engineering practices. The results of the structural stability assessment are discussed in the following sections.

Based on the assessment and its results, the design, construction, operation, and maintenance of OEAP and NAP were found to be consistent with recognized and generally accepted good engineering practices and meets the standards in Section 845.450(a)(1)-(7), except as noted herein.

2.1. Foundations and Abutments

Section 845.450(a)(1): The assessment must, at a minimum, document whether the CCR surface impoundment has been designed, constructed, operated, and maintained with: 1) Stable foundations and abutments;

The stability of the OEAP and NAP foundation and abutments were evaluated based on the review of History of Construction, review of observations from the 2019 annual inspection forms, review of available geotechnical data, and performing slope stability analyses.

The foundation of OEAP and NAP and abutments are deemed to be stable after the review of geotechnical investigations, laboratory data, and safety factors for slip surfaces meeting or exceeding the minimum requirements specified by Section 845.460.

2.2. Slope Protection

Section 845.450(a)(2): The assessment must, at a minimum, document whether the CCR surface impoundment has been designed, constructed, operated, and maintained with: ... 2) Adequate slope protection to protect against surface erosion, wave action, and adverse effects of sudden drawdown;

Procedures for operation and maintenance were reviewed. The adequacy of slope protection present at OEAP and NAP was evaluated by reviewing inspection reports and conditions observed in the field during the 2019 annual inspection, and subsequent visits made by Geosyntec in 2020 and 2021.

The perimeter dike slopes are generally 3H:1V and are covered with vegetation for slope protection. Dynegy regularly maintains the slopes, including repairing observed surface erosion and addressing areas of poor vegetation growth, as required.

Based on this evaluation, OEAP and NAP meet the requirements of Section 845.450(a)(2).

2.3. Dike Compaction

Section 845.450(a)(3): The assessment must, at a minimum, document whether the CCR surface impoundment has been designed, constructed, operated, and maintained with: ... 3) Dikes mechanically compacted to a density sufficient to withstand the range of loading conditions in the CCR surface impoundment;

Compaction of the OEAP and NAP perimeter dike was evaluated using field data obtained from the various geotechnical investigation. In OEAP, the standard penetration test (SPT) N-values for the cohesive component of the perimeter dike ranges from 5 to 93, with an average of 18; the range corresponds to a consistency of soft to hard, with the average value corresponding to very stiff. The SPT N-values for the coal ash component of the OEAP perimeter dike ranges from 8 to 30, with an average of 17; the range corresponds to a consistency of medium stiff to very stiff with the average value corresponding to very stiff. In NAP, the standard penetration test (SPT) N-values for the cohesive component of the perimeter dike ranges from 6 to 51, with an average of 18; the range corresponds to a consistency of soft to hard, with the average value corresponding to very stiff.

The consistencies based on average values are indicative of mechanically compacted dikes. Further, slope stability analyses as required by Section 845.460 result in acceptable safety factors. Therefore, the dike compaction and density are sufficient for withstanding required ranges in loading conditions.

2.4. Vegetated Slopes

Section 845.450(a)(4): The assessment must, at a minimum, document whether the CCR surface impoundment has been designed, constructed, operated, and maintained with: ... 4) Slope protection consistent with Section 845.430;

The adequacy of slope vegetation at OEAP and NAP was evaluated by reviewing conditions observed from the 2019 annual inspection forms, and visual observations obtained from additional

field visits conducted by Geosyntec in 2020 and 2021. At the time of the 2019 annual inspection, and site visits in 2020 and 2021, the exterior slopes were vegetated and well-maintained. Some woody vegetation was observed on lower portions of the perimeter dike.

Based on this evaluation, OEAP and NAP meet the requirements of Section 845.450 with the exception of limited areas where woody vegetation exists. Dynegy has an operation and maintenance plan to remove the woody vegetation in accordance with Section 845.430(b)(4).

2.5. Spillways

Section 845.450(a)(5): The assessment must, at a minimum, document whether the CCR surface impoundment has been designed, constructed, operated, and maintained with: ... 5) A single spillway or a combination of spillways configured as specified in subsection (a)(5)(A). The combined capacity of all spillways must be designed, constructed, operated, and maintained to adequately manage flow during and following the peak discharge from the event specified in subsection (a)(5)(B);

The OEAP is inactive and does not have a reservoir or a spillway. Therefore, Section 845.450(a)(5) is not applicable to the OEAP. However, the spillway at the NAP was evaluated using hydrologic and hydraulic analyses, and historic design and construction information provided by Dynegy. The NAP is a Class 2 CCR surface impoundment; therefore, the 1,000-year storm event is the design flow event for NAP, per Section 845.510(a)(3)(B).

Per the June 22, 2021 Illinois Attorney General (IAG) Interim Order (Order), *II. Interim Injunction Relief (2)(b); Within forty-five (45) days of the entry of this Order, Defendant shall submit to Illinois EPA, for its review and approval, a written scope of work for the removal of free water and dewatering of the Ponds at the Site, including a proposed schedule for implementation.* Therefore, the starting water surface elevation was set at the bottom elevation of the NAP (585.0 feet) when evaluating the 1,000-year storm event as the IAG Order requires removal of free water from NAP as part of its normal operating condition.

The NAP has a single spillway that consists of an 18-inch diameter corrugate metal pipe (CMP) through the divider dike which discharges into the secondary pond. The spillway pipe is constructed of metal, which is a non-erodible material designed to carry sustained flows. The capacity of the spillway was evaluated using hydrologic and hydraulic analyses. The analysis found that the spillway adequately manages flow during peak discharge resulting from the 1,000-year storm event to prevent overtopping of the embankments with a starting water surface elevation at the bottom of NAP. The hydrologic and hydraulic analysis did not consider additional outflow from a portable pump.

Based on these evaluations, the OEAP and NAP meet the requirements in Section 845.450(a)(5).

2.6. Stability and Structural Integrity of Hydraulic Structures

Section 845.450(a)(6): The assessment must, at a minimum, document whether the CCR surface impoundment has been designed, constructed, operated, and maintained with: ... 6) Hydraulic structures underlying the base of the CCR surface impoundment or passing through the dike of the CCR surface impoundment that maintain structural integrity and are free of significant deterioration, deformation, distortion, bedding deficiencies, sedimentation, and debris which may negatively affect the CCR surface impoundment;

The OEAP is inactive and does not have a reservoir or a spillway. Therefore, Section 845.450(a)(6) is not applicable to the OEAP. The discharge pipe for the NAP will be removed as part of the upcoming closure. Dynegy is in the process of submitting the construction permit for the closure activities.

2.7. Downstream Slope Inundation/Stability

Section 845.450(a)(7): The assessment must, at a minimum, document whether the CCR surface impoundment has been designed, constructed, operated, and maintained with: ... 7) For CCR surface impoundments with downstream slopes which can be inundated by the pool of an adjacent water body, such as a river, stream or lake, downstream slopes that maintain structural stability during low pool of the adjacent water body or sudden drawdown of the adjacent water body.

The river level is generally around elevation 573 ft with ordinary high-water mark being at an approximate elevation of 580 ft. The toe of the perimeter dike is around 590 ft for OEAP and 580 ft NAP. It is unlikely that the river level would rise over the toe of perimeter dikes and stay there for a considerable amount of time to saturate the cohesive soils that could reduce the stability of the perimeter dike. Therefore, it is unlikely that a rapid drawdown condition would occur at the OEAP and NAP perimeter dike. Based on this evaluation, Section 845.450(a)(7) is not applicable for OEAP and NAP.

3. CERTIFICATION

CCR Unit: Dynegy Midwest Generation, LLC; Vermilion Power Plant, Old East Ash Pond Area and North Ash Pond Area

I, John Seymour, being a Registered Professional Engineer in good standing in the State of Illinois, do hereby certify in accordance with Section 845.450(c), to the best of my knowledge, information, and belief, that the information contained in this plan has been prepared in accordance with the accepted practice of engineering and meets the requirements of Section 845.450, with the exception for Section 845.450(a)(4) where woody vegetation was identified.

John Seymour

Printed Name

John Seymour 10/22/2021

Signature

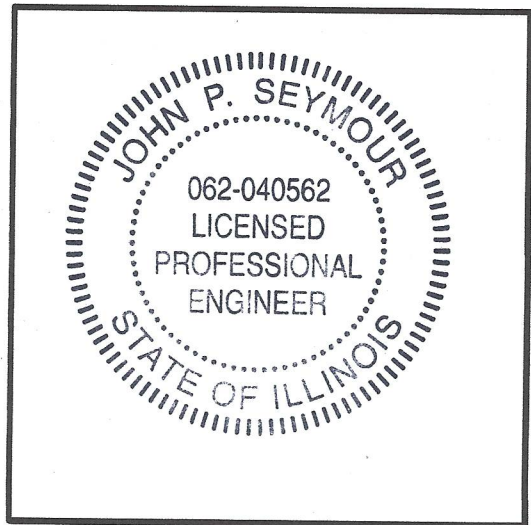
Date

062.040562 Illinois 30 November 2021

Registration Number

State

Expiration Date



Affix Seal