



Submitted to  
Dynergy Midwest Generation,  
LLC  
1500 Eastport Drive  
Collinsville, IL 62234

Submitted by  
AECOM  
1001 Highlands Plaza Drive West  
Suite 300  
St. Louis, MO 63110

October 2016

# CCR Rule Report: Initial Safety Factor Assessment

For

Bottom Ash Pond

At Baldwin Energy Complex

# 1 Introduction

This Coal Combustion Residual (CCR) Rule Report documents that the Bottom Ash Pond at the Dynegy Midwest Generation, LLC Baldwin Energy Complex meets the safety factor assessment requirements specified in 40 Code of Federal Regulations (CFR) §257.73(e). The Bottom Ash Pond is located near Baldwin, Illinois in Randolph County, approximately 0.9 miles southwest of the Baldwin Energy Complex. The Bottom Ash Pond serves as the primary wet impoundment for sluiced bottom ash and other non-CCR wastewaters produced at the Baldwin Energy Complex.

The Bottom Ash Pond is an existing CCR surface impoundment as defined by 40 CFR §257.53. The CCR Rule requires that the initial safety factor assessment for an existing CCR surface impoundment be completed by October 17, 2016.

The owner or operator of the CCR unit must obtain a certification from a qualified professional engineer stating that the initial safety factor assessment meets the requirements of 40 CFR § 257.73(e). The owner or operator must prepare a safety factor assessment every five years.

## 2 Initial Safety Factor Assessment

### 40 CFR §257.73(e)(1)

The owner or operator must conduct initial and periodic safety factor assessments for each CCR unit and document whether the calculated factors of safety for each CCR unit achieve the minimum safety factors specified in (e)(1)(i) through (iv) of this section for the critical cross section of the embankment. The critical cross section is the cross section anticipated to be the most susceptible of all cross sections to structural failure based on appropriate engineering considerations, including loading conditions. The safety factor assessments must be supported by appropriate engineering calculations.

(i) The calculated static factor of safety under the long-term, maximum storage pool loading condition must equal or exceed 1.50.

(ii) The calculated static factor of safety under the maximum surcharge pool loading condition must equal or exceed 1.40.

(iii) The calculated seismic factor of safety must equal or exceed 1.00.

(iv) For dikes constructed of soils that have susceptibility to liquefaction, the calculated liquefaction factor of safety must equal or exceed 1.20.

A geotechnical investigation program and stability analyses were performed to evaluate the design, performance, and condition of the earthen dikes of the Bottom Ash Pond. The exploration consisted of hollow-stem auger borings, solid-stem auger borings, piezometer installation, cone penetration tests, and laboratory program including strength and index testing. Data collected from the geotechnical investigation, available design drawings, construction records, inspection reports, previous engineering investigations, and other pertinent historic documents were utilized to perform the safety factor assessment and geotechnical analyses.

In general, the subsurface conditions at the Bottom Ash Pond consist of soft to very stiff embankment fill (clay) intermittently overlying soft to stiff loess (clay), overlying medium stiff to hard residual soils (clay), which in turn overlies shale and limestone bedrock. Phreatic water is typically several feet above the bottom of the embankment.

A representative cross section was analyzed using limit equilibrium slope stability analysis software to evaluate stability of the perimeter dike system and foundations. The cross section was located at the maximum embankment height for the Bottom Ash Pond. Due to the relatively short height of the Bottom Ash Pond embankments and uniform slope orientations, subsurface stratigraphy, and phreatic conditions, a single cross section at the maximum embankment height is sufficient to represent the critical cross section. The cross section was evaluated for each of the loading conditions stipulated in §257.73(e)(1).

A liquefaction susceptibility evaluation did not find soils susceptible to liquefaction within the Bottom Ash Pond dikes or foundation. As a result, the Soils Susceptible to Liquefaction loading condition (§257.73(e)(1)(iv)) is not applicable to the Bottom Ash Pond at the Baldwin Energy Complex.

Results of the Initial Safety Factor Assessments are listed in Table 1.

**Table 1 – Summary of Initial Safety Factor Assessments**

Loading Conditions	§257.73(e)(1) Subsection	Minimum Factor of Safety	Calculated Factor of Safety
Maximum Storage Pool Loading	(i)	1.50	2.04
Maximum Surcharge Pool Loading	(ii)	1.40	2.04
Seismic	(iii)	1.00	1.43
Soils Susceptible to Liquefaction	(iv)	1.20	Not Applicable

Based on this evaluation, the Bottom Ash Pond meets the requirements in §257.73(e)(1).

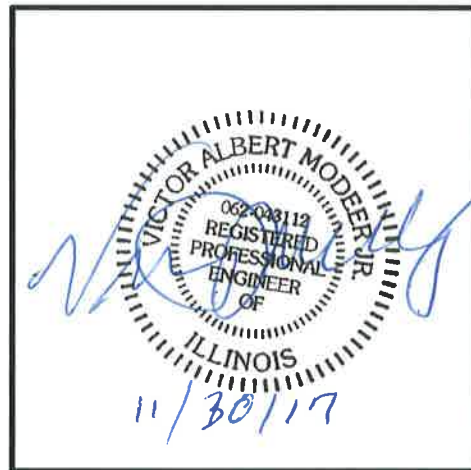
### 3 Certification Statement

**CCR Unit:** Dynegey Midwest Generation, LLC; Baldwin Energy Complex; Bottom Ash Pond

I, Victor A. Modeer, being a Registered Professional Engineer in good standing in the State of Illinois, do hereby certify, to the best of my knowledge, information, and belief that the information contained in this CCR Rule Report, and the underlying data in the operating record, has been prepared in accordance with the accepted practice of engineering. I certify, for the above-referenced CCR Unit, that the initial safety factor assessment dated October 13, 2016 meets the requirements of 40 CFR §257.73(e).

VICTOR A. MODEER JR.  
Printed Name

10/13/16  
Date



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1001 Highlands Plaza Drive West  
Suite 300  
St. Louis, MO 63110  
1-314-429-0100