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October 2016

CCR Rule Report: Initial Safety Factor Assessment

For

GMF Pond

At Duck Creek Power Station

1 Introduction

This Coal Combustion Residual (CCR) Rule Report documents that the Gypsum Management Facility (GMF) Pond at the Illinois Power Resources Generating, LLC Duck Creek Power Station meets the safety factor assessment requirements specified in 40 Code of Federal Regulations (CFR) §257.73(e). The GMF Pond is located near Canton, Illinois in Fulton County, approximately 2.5 miles north of the Duck Creek Power Station. The GMF Pond serves as the wet impoundment basin for gypsum produced by the wet scrubber system at the Duck Creek Power Station.

The GMF 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 GMF Pond. The exploration consisted of hollow-stem auger borings 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 GMF Pond consist of stiff to very stiff embankment fill (clay) intermittently overlying medium stiff to stiff loess (clay), which in turn overlies medium stiff to very stiff glacial till (clay) with trace sand and gravel. Phreatic water is within the foundation of the GMF Pond.

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 GMF Pond. Due to the relatively short height of the GMF 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 GMF Pond dikes. As a result, the Soils Susceptible to Liquefaction loading condition (§257.73(e)(1)(iv)) is not applicable to the GMF Pond at the Duck Creek Power Station.

Results of the Initial Safety Factor Assessment, for the critical cross-section, 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	4.27
Maximum Surcharge Pool Loading	(ii)	1.40	4.26
Seismic	(iii)	1.00	2.37
Soils Susceptible to Liquefaction	(iv)	1.20	Not Applicable

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

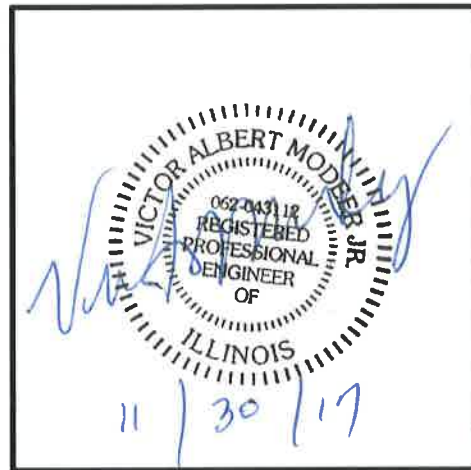
3 Certification Statement

CCR Unit: Illinois Power Resources Generating, LLC; Duck Creek Power Station; GMF 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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