

# **CCR Rule Report: Initial Safety Factor Assessment**

**West Emergency Pond  
Laramie River Station  
Wheatland, Wyoming**

**Basin Electric Power Cooperative  
Bismarck, North Dakota**

October 2016  
Project No.: 60429243

## 1 Introduction

This Coal Combustion Residual (CCR) Rule Report documents that the West Emergency Pond at the Basin Electric Power Cooperative Laramie River Station meets the safety factor assessment requirements specified in 40 Code of Federal Regulations (CFR) §257.73(e).

The West Emergency Pond is an existing CCR surface impoundment as defined by 40 CFR §257.53. The CCR Rule<sup>1</sup> 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.

The owner or operator must prepare a safety factor assessment every five years.

---

<sup>1</sup> U.S. Environmental Protection Agency. (USEPA). (2015). *Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals From Electric Utilities; Final Rule*, 40 CFR §257. Federal Register, Volume 80, Subpart D, April 17, 2015.

## 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.*

An initial safety factor assessment has been performed to document that the calculated factors of safety for the West Emergency Pond achieve the minimum factors of safety listed in §257.73(e)(1)(i) through (iv). The assessment included evaluating multiple cross-sections and performing analyses at the critical (i.e. most susceptible) cross section, based on appropriate engineering considerations and calculations. The analyses used subsurface information collected from recent and historic subsurface investigations, including laboratory testing data. Engineering properties for the various material strata were selected based on the results of available field and laboratory data. The results of the safety factor assessment are listed in Table 1.

**Table1 – Summary of Initial Safety Factor Assessment**

<b>Loading Conditions</b>	<b>§257.73(e)(1) Subsection</b>	<b>Minimum Factor of Safety</b>	<b>Calculated Factor of Safety</b>	
			<b>West Dike</b>	<b>South Dike</b>
Maximum Storage Pool Loading	(i)	1.50	1.83	1.79
Maximums Surcharge Pool Loading	(ii)	1.40	1.82	1.80
Seismic	(iii)	1.00	1.13	1.30
Soils Susceptible to Liquefaction	(iv)	1.20	2.00	2.00

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

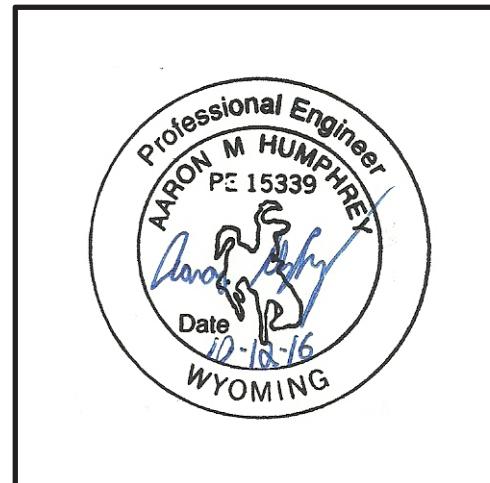
### 3 Certification Statement

**CCR Unit:** Basin Electric Power Cooperative; Laramie River Station; West Emergency Pond

I, Aaron M Humphrey, being a Registered Professional Engineer in good standing in the State of Wyoming, do hereby certify, to the best of my knowledge, information, and belief that the information contained in this CCR Rule Report 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 as included in the Reconstitution of the CCR Surface Impoundment Design Subsurface and Geotechnical Engineering Analysis dated October 2016 meets the requirements of 40 CFR § 257.73.

Aaron M Humphrey  
*Printed Name*

October 12, 2016  
*Date*



#### About AECOM

AECOM is built to deliver a better world. We design, build, finance and operate infrastructure assets for governments, businesses and organizations in more than 150 countries. As a fully integrated firm, we connect knowledge and experience across our global network of experts to help clients solve their most complex challenges. From high-performance buildings and infrastructure, to resilient communities and environments, to stable and secure nations, our work is transformative, differentiated and vital. A Fortune 500 firm, AECOM companies had revenue of approximately US\$18 billion during the 12 months ended September 30, 2015. See how we deliver what others can only imagine at [aecom.com](http://aecom.com) and @AECOM.