CCR Rule Report:

Initial Safety Factor Assessment

GMF Recycle Pond
Coffeen Power Station
Montgomery County, Illinois

Submitted to Illinois Power Generating Company
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HANSON
Engineering | Planning | Allied Services

1. Introduction

The GMF Recycle Pond at the Coffeen Power Station is located in the NW 1/4 of Section 11, Township 7 North, Range 3 West of the Third Principal Meridian in Montgomery County, Illinois, approximately 1.5 miles south of Coffeen, Illinois.

The GMF Recycle Pond is lined with a 60-mil, high-density polyethylene (HDPE) geomembrane, has a maximum embankment height of 16 feet, and has a maximum impounding capacity of 243 acre-feet (measured at the top elevation 629.0 feet). There is an additional 99 acre-feet of incised storage.

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).

2. 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.

The fundamental design criteria of the GMF Recycle Pond is based on the need to provide for safe operation and maintenance of the embankment and the minimization of potential failure mechanisms common to earthen surface impoundments. Additionally, the design must also incorporate hydrologic and hydraulic evaluations to determine that the dimensions of the embankment and appurtenances are adequate to prevent damage to the surface impoundment during normal operations and extreme rainfall events.

Stability analyses were performed for the GMF Recycle Pond design. The analyses were performed using the program PCSTABL5, which was developed at Purdue University, and SlopeW, developed by Geo Studio international. At the location of the GMF Recycle Pond, the critical elements for stability are the earthen berms.

The soil parameters used for the preliminary stability analyses were selected using data obtained during the geotechnical investigation of the GMF Recycle Pond. Soil parameters for the interfaces between manufactured lining materials and soils, at the interfaces between layers of manufactured lining materials, and within lining materials were selected based on values obtained from engineering literature.

During the analyses for the GMF Recycle Pond, the location of the phreatic surface was modeled assuming that there is no synthetic lining within the construction (a highly conservative assumption

because the GMF Recycle Pond is lined with highly impermeable synthetic materials). For this assumption, the phreatic surface would develop through the embankment sections over time.

At the GMF Recycle Pond location, a cross section of the embankment with the highest embankment height was judged to be the critical cross section. Analyses were performed for a long-term, steady-state-seepage condition using drained soil parameters (Maximum Storage Pool Loading using an elevation of 624.0 and Maximum Surcharge Pool Loading using an elevation of 627.4), and a seismic loading condition using rapid load soil parameters and a pool elevation of 624.0 for the downstream slope. Based on evaluation of the engineering characteristic of the embankment and foundation soils, it was determined that the embankment is not susceptible to liquefiable during the design seismic event.

The results of the analyses required by 40 CFR 257.73(e)(1) are provided in the table below. Based on this evaluation, the GMF Recycle Pond meets the safety factor requirements in 40 CFR 257.73(e)(1)(i) though (iv).

Loading Conditions	**40 CFR 257.73(e)(1) Subsection**	**Minimum Required Factor of Safety**	**Calculated Factor of Safety**
Maximum Storage Pool Loading	(i)	1.50	1.55
Maximum Surcharge Pool Loading	(ii)	1.40	1.51
Seismic	(iii)	1.00	1.80
Soils Susceptible to Liquefaction	(iv)	1.20	Not Applicable

3. Certification Statement

COFFEEN POWER STATION - GMF RECYCLE POND
ILLINOIS POWER GENERATING COMPANY
INITIAL SAFETY FACTOR ASSESSMENT CERTIFICATION

As a Qualified Professional Engineer as defined by 40 CFR 257 Subpart D, I certify that I have personally examined and am familiar with the design information referenced below, and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete.

The **Coffeen Power Station GMF Recycle Pond** Initial Safety Factor Assessment, as supported by the Coffeen Power Station GMF Recycle Pond Documentation Report in the operating record was conducted in accordance with the requirements set forth by 40 CFR 257.73 as published on April 17, 2015.

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Seal:

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