



Submitted to  
Illinois Power Generating  
Company  
6725 North 500<sup>th</sup> Street  
Newton, IL 62448

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

October 2016

# CCR Rule Report: Initial Structural Stability Assessment

## For

### Primary Ash Pond

### At Newton Power Station

# 1 Introduction

This Coal Combustion Residual (CCR) Rule Report documents that the Primary Ash Pond at the Illinois Power Generating Company Newton Power Station meets the structural stability assessment requirements specified in 40 Code of Federal Regulations (CFR) §257.73(d). The Primary Ash Pond is located near Newton, Illinois in Jasper County, approximately 0.2 miles southwest of the Newton Power Station. The Primary Ash Pond serves as the wet impoundment basin for CCR produced by the Newton Power Station.

The Primary Ash Pond is an existing CCR surface impoundment as defined by 40 CFR §257.53. The CCR Rule requires that an initial structural stability assessment for an existing CCR surface impoundment be completed by October 17, 2016. In general, the initial structural stability assessment must document that the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering practices.

The owner or operator of the CCR unit must obtain a certification from a qualified professional engineer stating that the initial structural stability assessment was conducted in accordance with the requirements of 40 CFR § 257.73(d). The owner or operator must prepare a periodic structural stability assessment every five years.

## 2 Initial Structural Stability Assessment

### *40 CFR §257.73(d)(1)*

*The owner or operator of the CCR unit must conduct initial and periodic structural stability assessments and document whether the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering practices for the maximum volume of CCR and CCR wastewater which can be impounded therein. The assessment must, at a minimum, document whether the CCR unit has been designed, constructed, operated, and maintained with [the standards in (d)(1)(i)-(vii)].*

An initial structural stability assessment has been performed to document that the design, construction, operation and maintenance of the Primary Ash Pond is consistent with recognized and generally accepted good engineering practices and meets the standards in 257.73(d)(1)(i)-(vii). 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 the Primary Ash Pond were found to be consistent with recognized and generally accepted good engineering practices.

### **2.1 Foundations and Abutments (§257.73(d)(1)(i))**

*CCR unit designed, constructed, operated, and maintained with stable foundations and abutments.*

The stability of the foundations was evaluated using soil data from field investigations and reviewing design drawings, operational and maintenance procedures, and conditions observed in the field by AECOM. Additionally, slope stability analyses were performed to evaluate slip surfaces passing through the foundations. The Primary Ash Pond is a ring dike structure and does not have abutments.

The foundation consists of stiff to hard soil, which indicates stable foundations. Slope stability analyses exceed the criteria listed in §257.73(e)(1) for slip surfaces passing through the foundation. The slope stability analyses are discussed in the *CCR Rule Report: Initial Safety Factor Assessment for Primary Ash Pond at Newton Power Station* (October 2016). A review of operational and maintenance procedures as well as current and past performance of the dikes has determined appropriate processes are in place for continued operational performance.

Based on the conditions observed by AECOM, the Primary Ash Pond was designed and constructed with stable foundations. Operational and maintenance procedures are in place to address any issues related to the stability of foundations; therefore, the Primary Ash Pond meets the requirements in §257.73(d)(1)(i).

### **2.2 Slope Protection (§257.73(d)(1)(ii))**

*CCR unit designed, constructed, operated, and maintained with adequate slope protection to protect against surface erosion, wave action and adverse effects of sudden drawdown.*

The adequacy of slope protection was evaluated by reviewing design drawings, operational and maintenance procedures, and conditions observed in the field by AECOM.

Based on this evaluation, adequate slope protection was designed and constructed at the Primary Ash Pond. No evidence of significant areas of erosion or wave action were observed. The interior and exterior slopes are protected with vegetation. Where the exterior slopes are adjacent to Newton Lake, they are protected with crushed stone erosion protection. Crushed stone erosion protection is also located on the interior slopes in limited areas. Operational and maintenance procedures are in place to repair the vegetation as needed to protect against

surface erosion or wave action. Sudden drawdown of the pool in the Primary Ash Pond is not expected to occur due to operational controls associated with lowering the pool level. Therefore, slope protection to protect against the adverse effects of sudden drawdown is not required as sudden drawdown conditions are not expected to occur. Therefore, the Primary Ash Pond meets the requirements in §257.73(d)(1)(ii).

### **2.3 Dike Compaction (§257.73(d)(1)(iii))**

*CCR unit designed, constructed, operated, and maintained with dikes mechanically compacted to a density sufficient to withstand the range of loading conditions in the CCR unit.*

The density of the dike materials was evaluated using soil data from field investigations and reviewing design drawings, operational and maintenance procedures, and conditions observed in the field by AECOM. Additionally, slope stability analyses were performed to evaluate slip surfaces passing through the dike over the range of expected loading conditions as defined within §257.73(e)(1).

Based on this evaluation, the dike consists of stiff material, with isolated zones of soft, medium stiff, and very stiff material, which is indicative of mechanically compacted dikes. Slope stability analyses exceed the criteria listed in §257.73(e)(1) for slip surfaces passing through the dike; therefore, the original design and construction of the Primary Ash Pond included sufficient dike compaction. The slope stability analyses are discussed in the *CCR Rule Report: Initial Safety Factor Assessment for Primary Ash Pond at Newton Power Station* (October 2016); Operational and maintenance procedures are in place to identify and mitigate deficiencies in order to maintain sufficient density and compaction of the dikes to withstand the range of loading conditions. Therefore, the Primary Ash Pond meets the requirements in §257.73(d)(1)(iii).

### **2.4 Vegetated Slopes (§257.73(d)(1)(iv))<sup>1</sup>**

*CCR unit designed, constructed, operated, and maintained with vegetated slopes of dikes and surrounding areas, except for slopes which have an alternate form or forms of slope protection.*

The adequacy of slope vegetation was evaluated by reviewing design drawings, operational and maintenance procedures, and conditions observed in the field by AECOM.

Based on this evaluation, the vegetation on the interior and exterior slopes is adequate as no substantial bare or overgrown areas were observed. Crushed stone erosion protection is present on portions of the exterior slopes adjacent to Newton Lake and is used as an alternative form of slope protection, which is adequate as significant areas of erosion were not observed. Therefore, the original design and construction of the Primary Ash Pond included adequate vegetation of the dikes and surrounding areas. Adequate operational and maintenance procedures are in place to regularly manage vegetation growth, including mowing and seeding any bare areas, as evidenced by the conditions observed by AECOM. Therefore, the Primary Ash Pond meets the requirements in §257.73(d)(1)(iv).

---

<sup>1</sup> As modified by court order issued June 14, 2016, *Utility Solid Waste Activities Group v. EPA*, D.C. Cir. No. 15-1219 (order granting remand and vacatur of specific regulatory provisions).

## 2.5 Spillways (§257.73(d)(1)(v))

*CCR unit designed, constructed, operated, and maintained with a single spillway or a combination of spillways configured as specified in [paragraph (A) and (B)]:*

*(A) All spillways must be either:*

- (1) of non-erodible construction and designed to carry sustained flows; or*
- (2) earth- or grass-lined and designed to carry short-term, infrequent flows at non-erosive velocities where sustained flows are not expected.*

*(B) The combined capacity of all spillways must adequately manage flow during and following the peak discharge from a:*

- (1) Probable maximum flood (PMF) for a high hazard potential CCR surface impoundment; or*
- (2) 1000-year flood for a significant hazard potential CCR surface impoundment; or*
- (3) 100-year flood for a low hazard potential CCR surface impoundment.*

The spillways were evaluated using design drawings, operational and maintenance procedures, and conditions observed in the field by AECOM. Additionally, hydrologic and hydraulic analyses were completed to evaluate the capacity of the spillway relative to inflow estimated for the 1,000-year flood event for the significant hazard potential Primary Ash Pond. The hazard potential classification assessment was performed by Stantec in 2016 in accordance with §257.73(a)(2).

The spillways are comprised of concrete and sliplined corrugated metal pipes, which are non-erodible materials designed to carry sustained flows. The capacity of the spillway was evaluated using hydrologic and hydraulic analysis performed per §257.82(a). The analysis found that the spillways can adequately manage flow during peak discharge resulting from the 1,000-year storm event without overtopping of the embankments. The hydrologic and hydraulic analyses are discussed in the *CCR Rule Report: Initial Inflow Design Flood Control System Plan for Primary Ash Pond at Newton Power Station* (October 2016). Operational and maintenance procedures are in place to repair any issues with the spillways and remove debris or other obstructions from the spillways, as evidenced by the conditions observed by AECOM. As a result, these procedures are appropriate for maintaining the spillways. Therefore, the Primary Ash Pond meets the requirements in §257.73(d)(1)(v).

## 2.6 Stability and Structural Integrity of Hydraulic Structures (§257.73(d)(1)(vi))

*CCR unit designed, constructed, operated, and maintained with hydraulic structures underlying the base of the CCR unit or passing through the dike of the CCR unit that maintain structural integrity and are free of significant deterioration, deformation, distortion, bedding deficiencies, sedimentation, and debris which may negatively affect the operation of the hydraulic structure.*

The stability and structural integrity of the slip-lined corrugated metal pipe (CMP) outflow pipes passing through the dike of the Primary Ash Pond were evaluated using design drawings, operational and maintenance procedures, closed-circuit television (CCTV) pipe inspection, and conditions observed in the field by AECOM. No other hydraulic structures are known to pass through the dike of or underlie the base of the Primary Ash Pond.

The CCTV pipe inspection of the slip-lined CMP outflow pipes covered the complete length of both pipes and found the pipes to be free of significant deterioration, deformation, distortion, bedding deficiencies, sedimentation, and debris that may negatively affect the operation of the hydraulic structure. Operational and maintenance procedures are in place to repair any issues with the spillway and remove debris or other obstructions from the spillways, as evidenced by the conditions observed by AECOM. As a result, these procedures are appropriate for maintaining the spillway. Therefore, the Primary Ash Pond meets the requirements in §257.73(d)(1)(vi).

## **2.7 Downstream Slope Inundation/Stability (§257.73(d)(1)(vii))**

*CCR unit designed, constructed, operated, and maintained with, for CCR units 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 structural stability of the downstream slopes of the Primary Ash Pond was evaluated by comparing the location of the Primary Ash Pond relative to adjacent water bodies using published Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM), aerial imagery, conditions observed in the field by AECOM, and sudden drawdown slope stability analyses.

Based on this evaluation, Newton Lake is adjacent to the southern downstream slopes of the Primary Ash Pond. No other rivers, streams, or lakes are adjacent to the downstream slopes of the Primary Ash Pond. Sudden drawdown slope stability analyses were performed at 4 cross sections adjacent to Newton Lake, and considered a drawdown from a normal pool to empty pool condition, thereby evaluating both sudden drawdown and empty and low pool conditions. The resulting factors of safety were found to satisfy the criteria listed in United States Army Corps of Engineers Engineer Manual 1110-2-1902 for drawdown from normal to low pool, as factor of safety criteria for sudden drawdown slope stability is not expressly stated as a requirement of §257.73(d)(1)(vii). Therefore, the Primary Ash Pond meets the requirements listed in §257.73(d)(1)(vii).

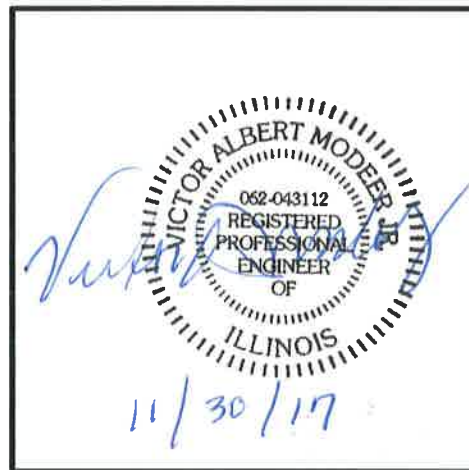
### 3 Certification Statement

**CCR Unit:** Illinois Power Generating Company; Newton Power Station; Primary 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 structural stability assessment dated October 13, 2016 was conducted in accordance with the requirements of 40 CFR § 257.73(d).

VICTOR A MODEER JR.  
Printed Name

10/13/16  
Date



## About AECOM

AECOM (NYSE: ACM) is a global provider of professional technical and management support services to a broad range of markets, including transportation, facilities, environmental, energy, water and government. With nearly 100,000 employees around the world, AECOM is a leader in all of the key markets that it serves. AECOM provides a blend of global reach, local knowledge, innovation, and collaborative technical excellence in delivering solutions that enhance and sustain the world's built, natural, and social environments. A Fortune 500 company, AECOM serves clients in more than 100 countries and has annual revenue in excess of \$19 billion.

More information on AECOM and its services can be found at [www.aecom.com](http://www.aecom.com).

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