STRUCTURAL STABILITY ASSESSMENT
PERIODIC 5-YR REVIEW

CFR 257.73(d)

Bottom Ash Pond Complex

Mitchell Plant
Marshall County, West Virginia

October, 2021

Prepared for: Wheeling Power Company & Kentucky Power Company

Prepared by: American Electric Power Service Corporation

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AMERICAN ELECTRIC POWER
BOUNDLESS ENERGY™

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STRUCTURAL STABILITY ASSESSMENT
CFR 257.73(d)
MITCHELL POWER PLANT
BOTTOM ASH POND COMPLEX

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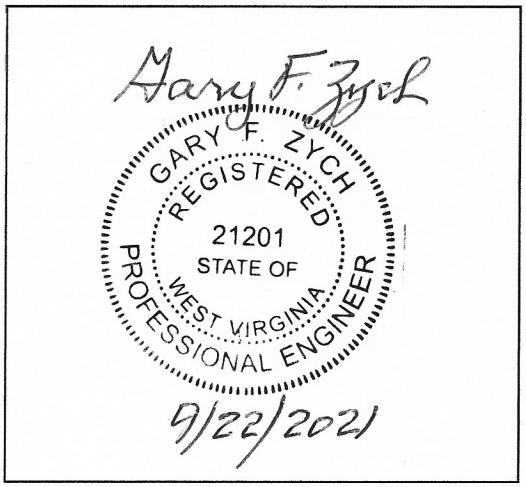

I certify to the best of my knowledge, information and belief that the information contained in this structural stability assessment meets the requirements of 40 CFR 257.73(d)

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1.0 OBJECTIVE 257.73(d)

This report was prepared by AEP- Geotechnical Engineering Services (GES) section to fulfill requirements of CFR 257.73(d) – document whether the design, construction, operations, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering practices. This is the first periodic 5-year review of the initial assessment as per the Rule.

Note: There has not been any change to the diking structure or discharge structure through the dike system since the initial assessment.

2.0 NAME AND DESCRIPTION OF CCR SURFACE IMPOUNDMENT

The Mitchell Bottom Ash Pond Complex is located at the Mitchell Power Plant in Marshall County, West Virginia. The impoundment was constructed in 1977 and is comprised of a Bottom Ash Pond and a Clear Water Pond. The purpose of the pond is for the disposal of Bottom Ash produced at the Mitchell Power Plant.

The complex is surrounded by the Mitchell Power Plant on its north side, West Virginia State Route 2 on its east side, the adjacent wallboard facility and ancillary structures on its south side, and the metal cleaning tank, railroad tracks, and the Ohio River on its west side. The Bottom Ash Pond Complex is approximately 17 acres in size and consists of two impounding facilities, the Bottom Ash Pond which is approximately 10 acres, and the Clear Water Pond which is approximately 7 acres. The Bottom Ash Pond comprises the north portion of the complex and the Clear Water Pond comprises the southern portion. The Mitchell Bottom Ash Pond Complex is regulated by the West Virginia Division of Water and Waste Management (WVDWWM) as a Hazard Class "2" Structure.

3.0 STABLE FOUNDATION AND ABUTMENTS 257.73(d)(1)(i)

[Was the facility designed for and constructed on stable foundations and abutments? Describe any foundation improvements required as part of construction.]

Based on the design drawings, the Bottom Ash Pond and Clear Water Pond were constructed partially as incised ponds and partially using raised dike construction.

Based on past subsurface investigations, the foundation materials of the Bottom Ash Pond Complex consist of a primarily loose to very dense sands and gravels with N-values ranging from 3 to 50. Laboratory testing concluded that foundation soils exhibit an effective cohesion (c') of 0 and an internal friction angle (Φ) of 34. Based on the findings of the subsurface investigations the foundations materials are suitable for this CCR unit. A stability analysis was performed for the facility which includes an evaluation of the dike system including foundation materials for static, seismic conditions and liquefaction potential. The analysis demonstrates that facility has adequate factors of safety.

Operation of the impoundment is performed so as to not adversely affect the foundation and abutments. As required by the CCR rules the Bottom Ash Pond Complex is inspected at least every 7 days by a qualified person. Also as a requirement of the CCR rules, the impoundment is also inspected annually by a professional engineer. Maintenance items are addressed as they are discovered as a part of those inspections.

4.0 SLOPE PROTECTION 257.73(d)(1)(ii)

[Adequate slope protection to protect against surface erosion, wave action, and adverse effects of sudden drawdown.]

The Bottom Ash Pond Complex was designed and constructed with inboard slopes which are lined with a geomembrane liner overlaid with 3 feet of soil fill. Above the soil fill the inboard slopes are primarily lined with vegetation with portions covered with coarse aggregate. At the portion of the pond where bottom ash removal is managed there is a layer of bottom ash built up along the inboard slopes providing further protection. The outboard slopes primarily consist of grass vegetation with portions of the outboard slope protected by coarse riprap.

Operation and maintenance of the aggregate primarily includes periodic spraying for vegetation control. Grassed slopes are mowed regularly. Any erosion or slips that may occur are repaired within a timely period.

5.0 EMBANKMENT CONSTRUCTION 257.73 (d)(1)(iii)

[Describe the specifications for compaction and/or recent boring to give a relative comparison of density.]

Past subsurface investigations indicate that the embankment was constructed primarily of loose to very dense clayey, silty, sands that exhibit Standard Penetration Test blow counts (N-values) ranging from 7 to 67. Further laboratory testing on the embankment material was conducted. Recent borings through the embankment and laboratory testing indicate that the material is stiff and representative of a compacted earthen material. A stability analysis of the diking system was also conducted which demonstrates that the facility has a factor of safety greater than minimum values required by the CCR rule.

6.0 VEGETATION CONTROL 257.73 (d)(1)(iv)

[Describe the maintenance plan for vegetative cover.]

The vegetative areas are mowed to facilitate inspections and promote the growth of the vegetative layer; and prevent the growth of woody vegetation.

7.0 SPILLWAY SYSTEM 257.73(d)(1)(v)

[Describe the spillway system and its capacity to pass the Inflow Design Flood as per its Hazard Classification.]

The Bottom Ash Pond Complex has been determined to be a Significant Hazard potential CCR impoundment. Based on this hazard classification the design flood is determined by section 257.82(a)(3) to be the 1000-year storm which corresponds to 7.10 inches in 24 hours for this site. An analysis was performed which demonstrates the Bottom Ash Pond Complex can safely pass the 1/2 PMP (Probable Maximum Precipitation), which is equivalent to 13.45 inches in 6 hours and therefore exceeds the requirements of section 257.82(a)(3).

The Bottom Ash Pond Complex is a raised dike structure with no offsite contributing drainage area. As runoff enters the Bottom Ash Pond is conveyed to the Clear Water Pond via a concrete overflow shaft and a 30-inch diameter reinforced concrete pipe to a 30-inch diameter perforated distribution pipe in the

Clear Water Pond. Runoff entering the Clear Water Pond is conveyed through an overflow tower into a 36-inch diameter reinforced concrete pipe through the embankment and then a series of 36-inch diameter corrugated metal pipes which discharge into a riprap-lined channel leading to the Ohio River.

Maintenance of the conveyance structures is performed as needed based on periodic 7-day and annual inspections.

8.0 BURIED HYDRAULIC STRUCTURES 257.73 (d)(1)(vi)

[Describe the condition of the sections of any hydraulic structure that in buried beneath and/or in the embankment.]

The principal outlet pipe from the Clear Water Pond passes though the dike near the southwestern side of the impoundment. The portion of the outlet pipe that passes though the embankment is reinforced concrete pipe and was installed in 1977 as part of the original impoundment construction. The pipe was primarily installed within natural ground through the incised portion of the dike. There are no performance issues with the outlet pipe that would indicate plugging or failure of the pipe. Given that this portion of pipe is reinforced concrete, structural integrity is not considered to be an issue. In general reinforced concrete pipes have a long service life under a range of conditions and is an appropriate design for this application.

Clear water overflow from the BAP discharges through a 30-inch diameter reinforced concrete pipe that passes into the clearwater pond. The 30-inch diameter reinforced concrete pipe passes under the embankment that separates the bottom ash pond from the clear water pond. Based on the continuing dike surface inspection, the 30 CMP appeared to be in stable and functional condition.

In 2015 a two 6" cooling tower blowdown water drain lines were installed along the northern embankment of the bottom ash pond. The lines were installed within a shallow trench excavation within the crest of the embankment. The project was designed by a professional engineer and permitted through the West Virginia Department of Environmental Protection – Division of Water and Waste Management (WVDWWM).

9.0 SUDDEN DRAWDOWN 257.73 (d)(1)(vii)

[If the downstream slope is susceptible to inundation, discuss the stability due to a sudden drawdown.]

The downstream slope of the Bottom Ash Pond Complex dikes will not be inundated by any adjacent water bodies.