# STRUCTURAL STABILITY ASSESSMENT
# PERIODIC 5-YR REVIEW

**OAC 252:517-11-4(d)**

Bottom Ash Pond

Northeastern 3&4 Power Station
Oologah, Oklahoma

October, 2021

Prepared for: Public Service Company of Oklahoma

Prepared by: American Electric Power Service Corporation

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# STRUCTURAL STABILITY ASSESSMENT
# Periodic 5-Yr Review
# OAC 252:517-11-4(d)
# NORTHEASTERN 3&4 POWER STATION
# BOTTOM ASH POND

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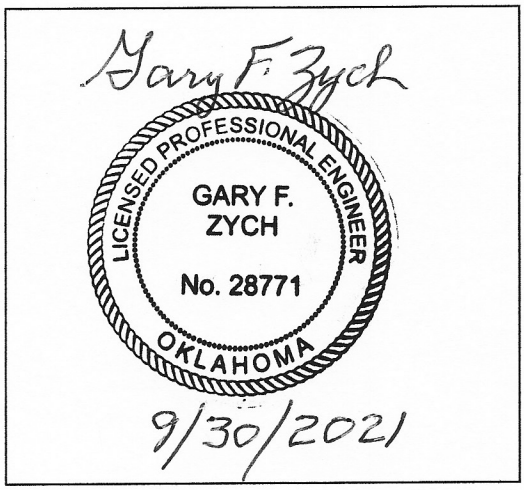


I certify to the best of my knowledge, information and belief that the information contained in this structural stability assessment meets the requirements of OAC 252:517-11-4(d)

Structural Stability Assessment
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## 1.0 OBJECTIVE 252:517-11-4(d)

This report was prepared by AEP- Geotechnical Engineering Services (GES) section to fulfill requirements of OAC 252:517-11-4(d) and document whether the design, construction, operations, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering practices.

Note: There has not been any change to the diking structure, sludge discharge structure, or auxiliary spillway since the initial assessment.

## 2.0 NAME AND DESCRIPTION OF CCR SURFACE IMPOUNDMENT

The Northeastern 3&4 Power Station is located near the City of Oologah, Rogers County, Oklahoma.
It is owned and operated by Public Service Company of Oklahoma (PSO). The facility operates one surface impoundment for storing CCR called the Bottom Ash Pond.

The embankment is about 4,200 feet long, encompassing about 72 acres with about 34 acres of surface water. The dam crest gradually increases in elevation from about 630 feet-msl at the north berm east of the auxiliary spillway, to about elevation 639 feet-msl at the south berm where it meets the coal storage area on the east side. The embankment was constructed across a first order tributary to Fourmile Creek leaving the site to the south where the embankment is at its highest, 38 feet from the crest to the toe of the dam. A railroad track extends the length of the crest, typically used to remove empty coal cars from the site.

## 3.0 STABLE FOUNDATION AND ABUTMENTS 252:517-11-4(d)(1)(A)

***[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, a foundation key was constructed along the centerline of the dam. The key was excavated 4 feet below existing ground or to the top of rock whichever was shallower. The foundation was stripped and the subgrade was prepared prior to construction of the embankment.

The construction specifications required stripping of the soil including all organics and vegetation beneath the extent of the dike. The stripped material was then replaced with suitable embankment material and thoroughly compacted. The subgrade was required to be accepted by an engineer prior to construction of the embankment. Any soft or otherwise unsuitable materials that were encountered were removed to a depth as recommended by an Engineer and replaced with suitable embankment material. Prior to embankment fill being placed over native soils, the natural ground was required to be cut or plowed into benches having level beds and vertical sides, and each layer of new fill was terminated in such a bench.

Based on recent subsurface investigations, the foundation materials of the Bottom Ash Pond consist of a thin layer of native soils overlaying limestone bedrock. The native soils are generally described as dark brown, gray and tan silty to sandy clay with trace amounts of gravel noted in some locations. Boring logs describe the bedrock as soft to medium to medium-hard limestone with shale clay lenses. RQD values were between 86 and 100-percent for the limestone encountered. Based on

the findings of the subsurface investigations the foundations materials are suitable for this CCR unit.

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 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 252:517-11-4(d)(1)(B)

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

The Bottom Ash Pond was designed and constructed with inboard slopes which are primarily protected by riprap against wave action with upper portions protected by grass vegetation. The outboard slopes primarily consist of grass vegetation and a riprap blanket that run 12 foot up the slope from the toe. The current condition of the riprap and grassed slopes is adequate.

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

## 5.0 EMBANKMENT CONSTRUCTION 252:517-11-4(d)(1)(C)

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

The construction specifications required the embankment materials and inner core to be compacted to 92% of the maximum density at optimum moisture content. The final in-place moisture content was required to be within a range of 0 to 4 percent above optimum. Soil borings through the embankment indicate that the material is stiff and representative of a compacted earthen material.

## 6.0 VEGETATION CONTROL 252:517-11-4(d)(1)(D)

***[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 252:517-11-4(d)(1)(E)

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

The Bottom Ash Pond has been determined to be a Low Hazard potential CCR impoundment. Based on this hazard classification, the design flood was determined by section OAC 252:517-13-3(a)(3)(C) to be the 100-year storm which corresponds to 8.85 inches in 24 hours for this site. An analysis was performed for the 40% PMF (Probable Maximum Flood), which looks at 40% of the runoff from PMP storm of 45.87 inches in 72 hours. This produces significantly more runoff than the 100-year storm and therefore exceeds the requirements of section OAC 252:517-13-3(a)(3)(C).

Results of the analysis show that the impoundment can safely pass this storm event.

The Bottom Ash Pond was designed and constructed with no principal spillway. The water level is controlled by pumping and recirculating water through the power station for reuse. The auxiliary spillway is a broad-crested weir, with a concrete chute and stilling basin. The overflow crest is 25-feet wide with a design invert elevation of 625.0 ft msl. The auxiliary spillway is located on the west side of the north embankment. Overflow from the spillway discharges to a low area on site. The low area is drained by two culverts under the adjacent railroad track, which discharge off site into a tributary to Fourmile Creek on the northeast side of the ash pond. Fourmile Creek is located along the south side of the ash pond, and discharges into the Verdigris River 1.5 miles downstream from the tributary. Drainage is diverted around the Bottom Ash Pond by natural drainage channels and grass lined ditches.

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

## 8.0 BURIED HYDRAULIC STRUCTURES 252:517-11-4(d)(1)(F)

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

There are no pipes that are buried within or beneath the embankment.

## 9.0 SUDDEN DRAWDOWN 252:517-11-4(d)(1)(G)

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

The downstream slope of the Bottom Ash Pond will not be inundated since the downstream slopes are not adjacent to any water bodies.