INITIAL STRUCTURAL STABILITY ASSESSMENT

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Possum Point Power Station CCR Surface Impoundments: Ponds ABC

Dominion Energy℠

Submitted To: Possum Point Power Station
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Golder Associates

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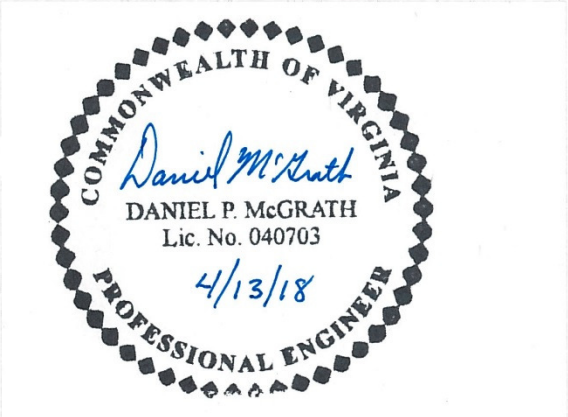
1.0 CERTIFICATION

This Initial Structural Stability Assessment for the Possum Point Power Station's Ponds ABC was prepared by Golder Associates Inc. (Golder). The document and Certification/Statement of Professional Opinion are based on and limited to information that Golder has relied on from Dominion Energy and others, but not independently verified, as well as work products produced by Golder.

On the basis of and subject to the foregoing, it is my professional opinion as a Professional Engineer licensed in the Commonwealth of Virginia that this document has been prepared in accordance with good and accepted engineering practices as exercised by other engineers practicing in the same discipline(s), under similar circumstances, at the same time, and in the same locale. It is my professional opinion that the document was prepared consistent with the requirements in §257.73(d) of the United States Environmental Protection Agency's "Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments," published in the Federal Register on April 17, 2015, with an effective date of October 19, 2015 (40 CFR §257.73), as well as with the requirements in §257.100 resulting from the EPA's "Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals From Electric Utilities; Extension of Compliance Deadlines for Certain Inactive Surface Impoundments; Response to Partial Vacatur" published in the Federal Register on August 5, 2016 with an effective date of October 4, 2016 (40 CFR §257.100).

The use of the word "certification" and/or "certify" in this document shall be interpreted and construed as a Statement of Professional Opinion, and is not and shall not be interpreted or construed as a guarantee, warranty, or legal opinion.

Daniel McGrath	Associate and Senior Consultant
Print Name	Title
Daniel McGrath	4/13/18
Signature	Date



2.0 INTRODUCTION

This Initial Structural Stability Assessment was prepared for the Possum Point Power Station's (Station) Coal Combustion Residuals (CCR) inactive surface impoundments, Ponds ABC. This Initial Structural Stability Assessment was prepared in accordance with 40 CFR Part §257, Subpart D and is consistent with the requirements of 40 CFR §257.73(d) and 40 CFR §257.100(e)(3)(v).

The Station, owned and operated by Virginia Electric and Power Company d/b/a Dominion Energy Virginia (Dominion), is located in Prince William County, Virginia, at 19000 Possum Point Road. The Station includes inactive CCR surface impoundments, Ponds ABC, as defined by the Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule and Direct Final Rule (40 CFR §257; the CCR rule).

3.0 STRUCTURAL STABILITY

3.1 Foundation and Abutments

The Station lies in a geologically stable area with no active (Holocene) faults, karst (limestone, dolomite, or marble) potential, or other geologic conditions of concern. The ponds embankments were originally constructed in 1955 as three embankments forming ponds across three natural drainageways. Prior to site improvements, parts of the site were marshy areas as indicated on historical maps from the United States Geological Service (USGS). Construction drawings for the embankments call for the removal of soft soils under the planned embankments and replacement with suitable soil materials. Stability analysis of the existing embankments indicates satisfactory factors of safety ranging from 1.7 to 1.9.

Subsurface site investigations by Golder and others show the site is underlain by typical alluvial fine-grained and coarse-grained Coastal Plain soils, which is consistent with the site's proximity to Quantico Creek and the Potomac River. Underlying the alluvial soils are Terrace Deposits and Cretaceous Sediments with a moderately high bearing capacity. The depth of these layers exceeds 75 feet below ground surface. Additional information and materials properties are included in the Initial Safety Factor Assessment – Ponds ABC (Golder 2018). Material properties of the embankment soils and underlying strata are presented below.

Table 1: Summary of Geotechnical Strength Properties

Material	Drained Strength		Undrained Strength		Unit Weight (pcf)
	ϕ' (degrees)	c' (psf)	ϕ (degrees)	c (psf)	
Dike Fill	30	100	14	290	125
Fine Grained Alluvium	28	100	14	290	120
Coarse Grained Alluvium	32	200	N/A	N/A	120
Terrace Deposits	34	0	N/A	N/A	130
Cretaceous Sediments	40	0	0	3,000	125

3.2 Slope Protection

The Ponds ABC dike was built with interior and exterior slopes of 2 horizontal to 1 vertical (2H:1V). The exterior slope has a good stand of existing grass and woody vegetation appears stable. Interior slopes have been excavated to remove CCR materials and were backfilled with clean soil fill to reestablish a minimum 2:1 slope.

Protection from interior wave action is not required, as the ponds do not contain a permanent pool of water. On the exterior, the embankments do not meet the high water level of Quantico Creek, nor are they within the mapped 100-year flood elevation, so no provisions for wave action or flooding are required.

Golder also considered the impacts of rapid drawdown of slopes as described in § 257.73(d)(vii) of the USEPA CCR Rule. The mapped (FIRM zone AE) 100-year flood level in the Quantico Creek is elevation 9 ft-msl. The toe areas of the downstream slopes are generally at elevation 6 ft-msl or higher; thus the dikes around the ponds are not expected to be significantly impacted by rapid drawdown. Therefore, additional rapid drawdown analyses are not necessary.

3.3 Compaction of Dikes

In addition to a review of previous exploration work by others, Golder completed one round of Cone Penetrometer Testing (CPT) in late 2017. A total of 6 soundings were made through and near the ponds dike to assess the material strength in the dike and below. Soundings were made to depths up to 75 feet below ground surface (bgs). The dike fill soil contains variations of fine-grained and coarse-grained soils and exhibit sufficient compaction and density to withstand the anticipated range of loading conditions. Additional information and CPT sounding logs are included in Attachment 1 – Material Properties Package of the April 2018 Initial Safety Factor Assessment for Ponds ABC.

3.4 Spillways

The ponds receive stormwater runoff from the adjacent upland areas, where it enters the western side of the ponds in approximately three distinct locations. The discharge structure consists of an approximately 4-foot rectangular concrete riser structure and 30-inch reinforced concrete pipe (RCP) located in the eastern embankment. The RCP has an invert elevation of approximately 6 feet, and an outlet elevation of approximately 4 feet. There are no flow or inlet control devices on this pipe. As shown in the April 2018 Inflow Design Flood Control System Plan for Ponds ABC, the ponds have adequate capacity to store the flow from the 1,000-year storm event. The analysis of the spillway capacity is included in the April 2018 Inflow Design Flood Control System Plan for Ponds ABC.

3.5 Hydraulic Structures

The principal spillway passes through the eastern dike of the ponds, discharging into Quantico Creek; there are no other known structures passing through or underlying the base of the ponds. In accordance with 40 CFR §257.83, the pipe is monitored and inspected periodically for clogging, leaks, erosion around the pipe, movements, or other issues.

4.0 CONCLUSIONS

It is Golder's opinion, based upon a review of available information and the additional analyses performed for this and other assessments, that the Ponds ABC surface impoundments design, construction, operations, and maintenance procedures are consistent with good engineering practices for the volume of CCR and CCR wastewater that is impounded, and meets the requirements of 40 CFR 257.73(d).

Established in 1960, Golder Associates is a global, employee-owned organization that helps clients find sustainable solutions to the challenges of finite resources, energy and water supply and management, waste management, urbanization, and climate change. We provide a wide range of independent consulting, design, and construction services in our specialist areas of earth, environment, and energy. By building strong relationships and meeting the needs of clients, our people have created one of the most trusted professional services organizations in the world.

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