Periodic Inflow Design Flood Control System Plan

Chesterfield Power Station CCR Surface Impoundment: Lower Ash Pond

Submitted to:

Chesterfield Power Station

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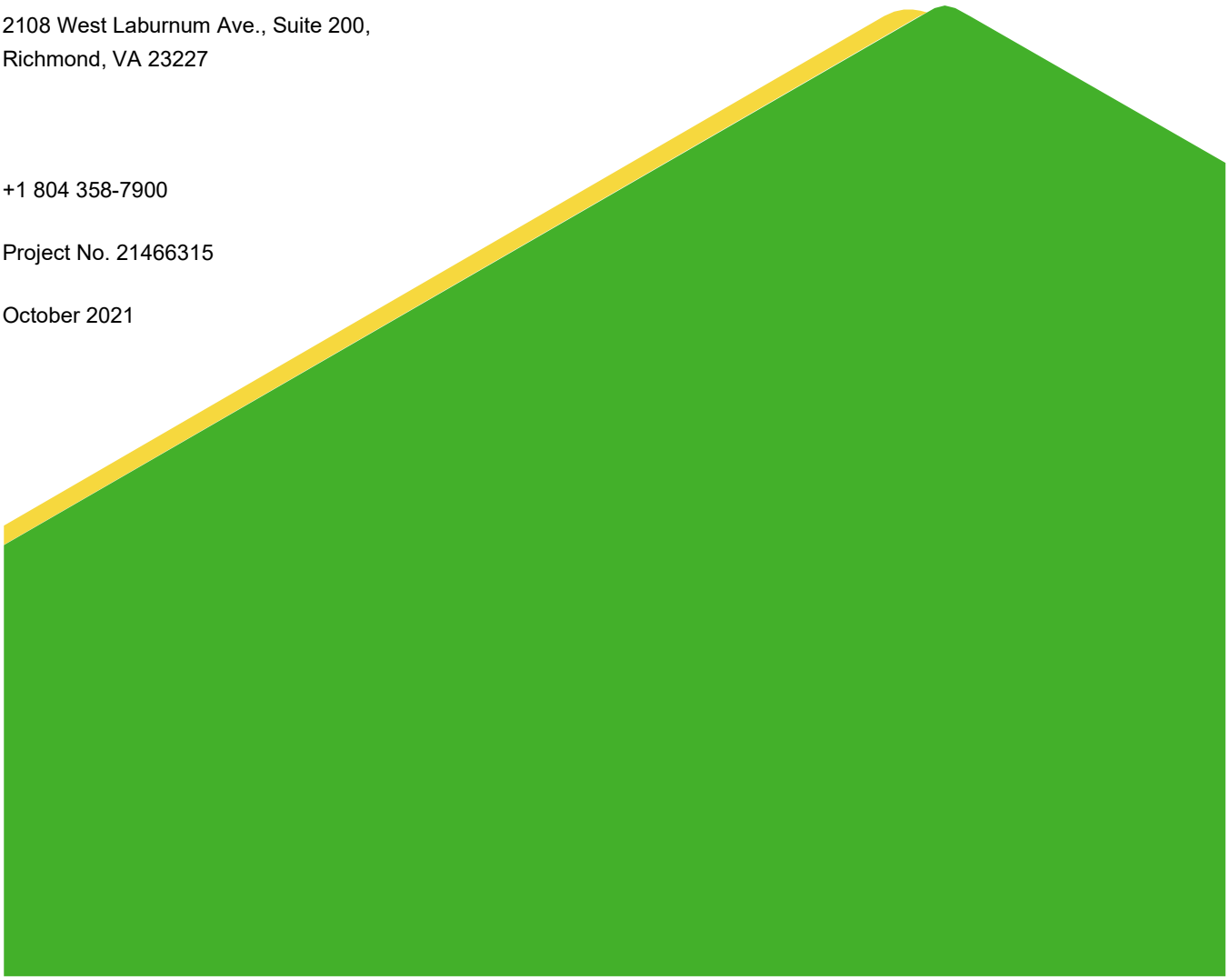

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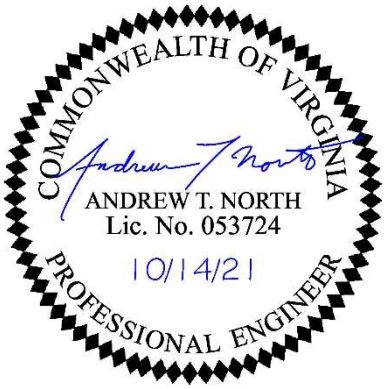
1.0 CERTIFICATION

This periodic Inflow Design Flood Control System Plan for the Chesterfield Power Station's Lower Ash Pond 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 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 §257.82 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 §257.82).

The use of the word "Certification" 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.

Andrew T. North, PE	Senior Civil Engineer
Print Name	Title
Signature	10/14/2021
	Date



2.0 INTRODUCTION

This periodic Inflow Design Flood Control System (PIDFCS) Plan was prepared for the Chesterfield Power Station's (Station) existing Coal Combustion Residuals (CCR) surface impoundment known as the Lower Ash Pond (LAP). This PIDFCS Plan was prepared in accordance with 40 CFR Part §257, Subpart D and is consistent with the requirements of 40 CFR §257.82.

The Station, owned and operated by Virginia Electric and Power Company d/b/a Dominion Energy Virginia (Dominion), is located in Chesterfield County, Virginia, at 500 Coxendale Road, east of I-95 (Richmond-Petersburg Turnpike) and west of the James River. The Station includes an existing CCR surface impoundment, the LAP, as defined by the Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule (40 CFR §257; the CCR rule). The LAP is also regulated as an impounding structure by the Virginia Department of Conservation and Resource (DCR), with Inventory Number 041031. Discharge from the LAP is currently regulated by the Virginia Department of Environmental Quality (DEQ) Virginia Pollutant Discharge Elimination System Permit No. VA0004146 (VPDES Permit).

3.0 PURPOSE

This PIDFCS Plan is prepared pursuant to § 257.82(c) of the CCR Rule [40 CFR § 257.82(c)]. The initial Inflow Design Flood Control System Plan was completed on October 17, 2016, and is required to be updated every five (5) years pursuant to 40 CFR §257.82(c)(4).

4.0 PERIODIC INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN

As required by § 257.82(c)(1), this PIDFCS Plan includes:

- Documentation of how the inflow design flood control system has been designed, constructed, operated, and maintained to adequately manage flow into the LAP during and following the peak discharge of the inflow design flood [§ 257.82(a)(1)];
- Documentation of how the inflow design flood control system has been designed, constructed, operated, and maintained to adequately manage flow from the LAP to collect and control the peak discharge resulting from the inflow design flood [§ 257.82(a)(2)]; and
- Documentation of how the inflow design flood control system has been designed, constructed, operated, and maintained to adequately address the requirements of § 257.3-3 [§ 257.82(b)].

4.1 Hazard Potential Classification

As indicated in Golder's Periodic Hazard Potential Classification Assessment (Golder, 2021), the LAP is assigned a "Significant" hazard potential rating per 40 CFR §257.73.

4.2 Inflow Design Flood

In accordance with 40 CFR §257.82(a)(3)(ii), a CCR impoundment with a significant hazard potential must collect and control the peak discharge resulting from a 1,000-year flood. Based on the DCR criteria, the LAP is considered a significant hazard potential dam; however, Dominion maintains and operates the unit as a high hazard structure. Per the DCR's Impounding Structure Regulations §4VAC50-20-50, the Spillway Design Flood (SDF) for an existing dam with a high hazard potential should be evaluated using 90% of the area's potential max precipitation (PMP). Geosyntec Consultants performed a hydraulic analysis of the LAP stormwater system as part of their 2021 Dam Breach Inundation Analysis. As part of the analyses, the Spillway Design Flood (SDF) evaluated was 90% of the

area's potential max precipitation (PMP). The 6-, 12-, and 24-hour PMP events were analyzed and found to have rainfall totals of 30.3, 34.6, and 34.6, respectively (Geosyntec, 2021). Using 90% of the area's PMP values results in rainfall totals of 27.3, 31.1, and 31.1. Per NOAA Atlas-14, the 1,000-year rainfall event totals for the 6-, 12-, and 24-hour durations are 8.23, 10.8, and 13.1 inches, respectively. Thus, the evaluation of the LAP's hydraulic performance using the SDF in-lieu of the 1,000-year flood provides a more conservative approach to satisfy the requirements of 40 CFR §257.82(a)(3)(ii), therefore, demonstrating adequacy of the inflow design flood control system. Per Geosyntec's April 2021 Dam Breach Inundation Analysis, the 90% 6-hour PMP event results in the largest peak outflow and is utilized as the design storm for this Plan.

4.3 Inflow Control

As required by § 257.82(a)(1), a control system must be in place for the LAP that is designed, constructed, operated, and maintained to adequately manage flow into the LAP during and following the peak discharge of the inflow design flood.

The LAP has a surface area of approximately 99 acres with an embankment height of 18 feet above mean sea level (ft amsl) (Geosyntec, 2021). The CCR within the LAP is currently covered with a geomembrane rain cover to prevent stormwater contact with CCR. Inflow to the LAP consists of stormwater runoff from precipitation that falls directly within the limits of the impoundment. There are no additional contributing drainage areas or pumped inflow.

4.4 Outflow Control

As required by § 257.82(a)(2), an inflow design flood control system must be in place for the LAP that is designed, constructed, operated, and maintained to adequately manage flow from the LAP to collect and control the peak discharge resulting from the inflow design flood.

The principal spillway system, located on the western edge of the LAP, consists of a 17-foot long rectangular, sharp-crested concrete weir (6.5 ft amsl), an 11-inch dewatering orifice set within the weir structure (5.2 ft amsl), and two 58-inch HDPE pipes (4.0 ft amsl) (Geosyntec, 2021). Non-contact stormwater collected in the LAP discharges through the principal spillway to an outfall regulated by the Virginia Stormwater Management Program (Geosyntec, 2021).

The emergency spillway is located on the southwest side of the LAP and consists of a low point in the existing asphalt access road at approximately elevation 17 ft amsl. The emergency spillway does not engage during the inflow design storm.

The LAP's stormwater control systems were modeled as a part of Geosyntec's April 2021 Dam Breach Inundation Analysis. The 90% 6-hour PMP event does not overtop the embankment and is adequately conveyed by the existing control systems (Geosyntec, 2021). Results of the 90% 6-hour PMP event are shown in the table below.

Table 1: LAP Hydraulic Analysis Results

0.9 PMP Event	Rainfall (in)	Peak Water Elevation (ft amsl)	Outflow Rate (cfs)	Freeboard (ft)
6-Hour	27.27	14.34	784.4	3.66

The LAP inflow design flood control system is capable of adequately managing the inflow from the design flood event without overtopping the embankment and has adequate spillway capacity to manage resulting outflow.

4.5 Surface Water Requirements

As required by § 257.82(b), a control system must be in place for the LAP that is designed, constructed, operated, and maintained to meet the requirements of § 257.3-3.

The LAP is operated under VPDES No. VA0004146. The site is routinely inspected and monitored by Dominion personnel to minimize surface water impacts.

Additionally, the CCR within the LAP is currently covered with a temporary geomembrane rain cover to prevent stormwater contact with CCR. The rain cover is inspected on a routine basis by Dominion personnel to ensure the integrity of the cover system and its ability to maintain a non-contact condition.

5.0 CONCLUSIONS

Based on known site conditions, information in this PIDFCS Plan, as well as work performed by Golder including field inspection and document review, it is Golder's opinion that the existing LAP inflow design flood control system complies with the requirements of § 257.82 of the CCR Rule for a significant hazard potential impoundment.

6.0 REFERENCES

Code of Virginia, 4VAC50-20-50. Performance standards required for impounding structures; effective March 23, 2016.

Geosyntec Consultants. Coal Combustion Residuals Inflow Design Flood Control System Plan, Lower Ash Pond. October 2016.

Geosyntec Consultants. Dam Breach Inundation Analysis, Lower Ash Pond and Upper Ash Pond Embankments. April 2021.

Golder Associates. Periodic Hazard Potential Classification Assessment, Chesterfield Power Station CCR Surface Impoundment: Lower Ash Pond. October 2021.

National Oceanic and Atmospheric Administration’s National Weather Service. NOAA Atlas 14 Point Precipitation Frequency Estimates: VA. 2017. Available online: https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=va

Virginia Department of Environmental Quality (VDEQ), Piedmont Regional Office. Virginia Pollutant Discharge Elimination System (VPDES) Permit No. VA0004146.

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