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COAL COMBUSTION RESIDUAL IMPOUNDMENT INSPECTION – CROSS GENERATING STATION

Pineville, South Carolina

santee cooper®

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**Please note that the terms "embankment", "berm", "dike", and "dam" are used interchangeably within this report, as are the terms "pond", "basin", and "impoundment".*

Executive Summary

This assessment of the stability and functionality of the Cross Generating Station (CGS) coal combustion residual (CCR) management unit is based on a review of available documents and an on-site assessment conducted by Santee Cooper engineering staff on March 4, 2026. The supporting technical information was found to be generally adequate.

In summary, the CGS CCR management unit, the Bottom Ash Pond, is in generally satisfactory condition for continued safe and reliable operation. No recognized existing or potential management unit safety deficiencies were identified within the parameters of design and operation, given the unit's low hazard potential classifications.

Summary of Recommendations

Bottom Ash Pond

1. Minor ruts and bare soil areas on the downstream slope along the northwest side of the pond should be reseeded and continue to be monitored as part of routine maintenance.

This assessment of dam safety reported herein is based on field observations and review of readily available information provided to the inspection team of the subject CCR management unit at Cross Generating Station. Qualified Santee Cooper engineering staff performed the field observations and the review of pertinent information and made the assessment in conformance with the requirements of Section 257.83 of the Code of Federal Regulations and in accordance with reasonable and generally accepted engineering practices.

Coal Combustion Residual Impoundment Inspection – Cross Generating Station

1.0 General Information and Introduction

1.1 Purpose and Scope

The purpose of this report is to fulfill the requirements of Section 257.83(b) of the Code of Federal Regulations and Part V.15.d.2 of the facility National Pollutant Discharge Elimination System (NPDES) Permit SC0037401 regarding the safety and inspection of CCR surface impoundments. Section 257.83(b) states that "If the existing or new CCR surface impoundment or any lateral expansion of the CCR surface impoundment is subject to the periodic structural stability assessment requirements under Section 257.73(d) or 257.74(d), the CCR unit must additionally be inspected on a periodic basis by a qualified professional engineer to ensure that the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering standards." The inspection must, at a minimum, include:

i. A review of available information regarding the status and condition of the CCR unit, including, but not limited to, files available in the operating record (e.g., CCR unit design and construction information required by Section 257.73(c)(1) and 257.74(c)(1), previous periodic structural stability assessments required under Section 257.73(d) and 257.74(d), the results of inspections by a qualified person, and results of previous annual inspections,
ii. A visual inspection of the CCR unit to identify signs of distress or malfunction of the CCR unit and appurtenant structures, and
iii. A visual inspection of any hydraulic structures underlying the base of the CCR unit or passing through the dike of the CCR unit for structural integrity and continued safe and reliable operation.

The inspection report must also be written by a qualified professional engineer and must address the following (required information on the CCR impoundments at CGS included in bold below the Code of Federal Regulations excerpt):

i. Any changes in geometry of the impounding structure since the previous annual inspection,

- **No change noted in the geometry of the Bottom Ash Pond**

ii. The location and type of existing instrumentation and the maximum recorded readings of each instrument since the previous annual inspection,

- **The Bottom Ash has no formal dam performance monitoring instrumentation (see Section 4.3.3)**

iii. The approximate minimum, maximum, and present depth and elevation of the impounded water and CCR since the previous annual inspection,

- **See Table 1.1 below for information on Bottom Ash Pond**

iv. The storage capacity of the impounding structure at the time of inspection, and

- **See Table 1.1 below for information on Bottom Ash Pond**

v. The approximate volume of the impounding water and CCR at the time of inspection.

- **See Table 1.1 below for information on Bottom Ash Pond**

Table 1.1 – Impoundment Capacity Information

Bottom Ash Pond	
Surface Area (acre)[1]	*79.0*
Approx. Current CCR & Water Volume (acre-feet)[2]	*504*
Total Storage Capacity (acre-feet)	*1,158*
Crest Elevation (feet)	*91.00*
Current Pond Elevation/Depth (feet)	*Below[3]*
Maximum Pond Elevation/Depth (feet)	*Below[3]*
Minimum Pond Elevation/Depth (feet)	*Below[3]*

1. *From Santee Cooper response to EPA's RFI dated March 17, 2009.*
2. *A topographic survey of the remaining CCR in the pond was performed by AECOM in December 2025.*
3. *In preparation of coal ash removal, efforts were made to dewater the pond in early 2023. The impoundment maintains a constant, "near-dry" status in which water levels are kept drawn down to the lowest extents possible.*

vi. Any appearances of an actual or potential structural weakness of the CCR unit, in addition to any existing conditions that are disrupting or have the potential to disrupt the operation

and safety of the CCR unit and appurtenant structures.

- **Current conditions of the pond do not show any concerns with structural weakness nor concerns with disruption of the operation and safety of the impounding structure.**

vii. Any other change(s) which may have affected the stability or operation of the impounding structure since the previous annual inspection.

- **No other changes noted on the Bottom Ash Pond that impact the stability or operation of the impounding structure**

2.0 Description of Coal Combustion Residual Management Units

2.1 Location and General Description

The Cross Generating Station (CGS) is located on the east bank of the Diversion Canal in Berkeley County, South Carolina, approximately 5.2 miles northeast of Cross, South Carolina. CGS is located on Cross Station Road, Pineville, South Carolina, 29468. Lake Marion is northwest of CGS, and Lake Moultrie is southeast of the station.

CGS has one CCR management impoundment, the Bottom Ash Pond. The Bottom Ash Pond is adjacent to the station's Wastewater Decant Pond. A trapezoidal weir served as the connection to the Wastewater Decant Pond in the past; however, in 2020 the weir was raised to match the elevation of the perimeter dike. Table 2.1 below shows a summary of the size and general dimensions of the pond:

Table 2.1: Summary of Dam Dimensions and Size

Bottom Ash Pond	
Dam Height (ft)	14
Crest Width (ft)	15 to 24
Length (ft)	6,899
Design Side Slopes (upstream) H:V	3:1
Design Side Slopes (downstream) H:V	3:1

2.2 Amount and Type of CCRs Currently Stored in Unit and Maximum Capacity

The amount of CCRs currently stored in the Bottom Ash Pond and its maximum capacity are summarized in Table 1.1. The Bottom Ash Pond was designed to contain bottom ash and boiler slag. The Pond stopped receiving material in 2020. Currently, all CCR material generated by the plant goes directly to the onsite landfill or is beneficially reused. CCR material from the Bottom Ash Pond is currently being excavated, dried in windrows and hauled to the onsite landfill. The adjacent decant pond receives plant stormwater and blowdown water from the cooling towers and boilers. Beginning in 2025, landfill leachate

and FGD process blowdown are routed through the new ELG wastewater treatment process, per conditions of the NPDES Permit.

2.3 Principal Project Structures

2.3.1 Earth Embankments

The Bottom Ash Pond consists of a perimeter dike embankment that has geometric features and crest elevations as shown above in Tables 1.1 and 2.1. The dimensions and elevations are from construction drawings for the pond. The wider crests occur on the embankments along the southwest side of the Bottom Ash Pond (24 feet wide) to accommodate the layout of several pipelines from the power block. As discussed in Section 2.1, the Bottom Ash Pond was previously connected to the Wastewater Decant Pond via a trapezoidal weir. This connection was removed in 2020. No CCRs are stored in the Wastewater Decant Pond. The Bottom Ash Pond is lined with Bentomat, which is a thin geocomposite of bentonite sandwiched between and contained by fabric layers. The inside slopes are also armored with Fabriform revetment (grout-filled cellular fabric form) to protect the liner and slope from wave erosion and exposure. No internal drainage blankets or toe drains for seepage control were included in the design of the dikes, but such seepage control features would not be warranted or expected for low perimeter dikes impounding a lined pond.

2.3.2 Outlet Structures

The former 10-foot bottom width trapezoidal weir located between the ponds was raised in 2020 to match the perimeter dike elevation. Therefore, the Bottom Ash Pond no longer contains an outlet structure. Stormwater collected in the Bottom Ash Pond is currently being pumped to the adjacent decant pond via temporary pumps, to maintain a near-dry condition in the pond in order to remove the CCR material.

The Wastewater Decant Pond contains an emergency outlet. This outlet consists of a reinforced concrete box structure with an overflow section set at 92.5 feet. Emergency overflow discharges from the bottom of the overflow structure through an 18-inch diameter steel pipe.

3.0 Summary of Relevant Reports and Incidents

3.1 Summary of Reports on the Safety of CCR Unit

Furnished reports of weekly inspections, conducted by CGS personnel for the reporting period indicated no major structural or operational problems. No significant deterioration was indicated in the documentation reviewed. In 2021, Worley performed the required quinquennial CCR assessments, including a structural stability assessment of the pond. The Bottom Ash Pond was found to be in acceptable condition.

4.0 Field Observations

4.1 Project Overview and Significant Findings

Santee Cooper qualified engineer Michelle Crocker, P.E. performed a site visit to CGS on March 4, 2026. Weather conditions during the visit were approximately 70 degrees Fahrenheit and sunny.

The overall condition of the CCR impoundment dikes appeared to be satisfactory with no significant findings noted.

4.2 Bottom Ash Pond

4.2.1 Crest

The crest of the Bottom Ash Pond perimeter dike was generally found to be in satisfactory condition. No major sags, depressions, or other signs of significant settlement were observed in the crest. No tension cracks or other signs of insipient mass soil movement were observed in the crest or along the edge of the crest.

4.2.2 Upstream/Inside Slope

The upstream/inside slope of the Bottom Ash Pond perimeter dike was generally found to be in satisfactory condition. The Fabriform revetment on the upstream inside slopes was in serviceable condition. A few areas of the revetment were observed to have uplift cracking of over 3 inches. No slumps, slides or other signs of shear failure were observed.

4.2.3 Downstream/Outside Slope and Toe

The downstream slope and toe of the Bottom Ash Pond was found to be in generally satisfactory condition. Several areas of bare earth and ruts were observed along the northwest side. No obvious signs of slumps, slides, bulges, tension cracks, seepage or animal holes were observed on the outside slope.

4.2.4 Abutments and Groin Areas

There are no abutments or groins in the dike embankment.

4.2.5 Abutments and Groin Areas

The former trapezoidal weir located between the ponds was raised in 2020 to match the perimeter dike elevation.

4.2.6 Outlet Conduit

There is no outlet conduit from or through the Bottom Ash Pond perimeter dike.

4.2.7 Emergency Spillway

There is no emergency spillway within the Bottom Ash Pond; however, as discussed in Section 2.3.2 and Section 5.2, the pond is being maintained at a near-dry condition.

4.2.8 Other Conduits

The Bentomat liner in the Bottom Ash Pond was installed during initial construction of the pond. Due to high groundwater in the vicinity of CGS, an underdrain system consisting of slotted 12" HDPE pipe installed in sand-lined trenches was used to dewater the area, allowing the liner to be safely installed without uplift concerns during construction. Upon filling of the pond, the underdrain system was abandoned in-place and the outfall (consisting of a sump area and pump) was closed using grout. Because the underdrain system utilized small pipes installed in controlled backfill, and because the invert of the outfall is over ten (10) feet below grade, this system presents minimal risk to the integrity of the Bottom Ash Pond. Closure of the sump area further minimizes the risk of any sediment transport. This structure is completely below grade, preventing visual inspection of the structure itself; however, the vicinity of the outfall is in satisfactory condition.

The formerly used intake lines enter the pond through two (2) concrete bridge structures at the top of the perimeter dike. These structures were found to be in satisfactory condition.

4.3 Adequacy of Maintenance, Operating and Surveillance Procedures

4.3.1 Adequacy of Maintenance Procedures

Overall, maintenance of the impounding embankments appears to be adequate. No major maintenance issues were noted during the field inspection or in the weekly inspection reports completed by CGS personnel and reviewed by the inspection team.

4.3.2 Adequacy of Operating Procedures

Based on field observations and discussions with CGS personnel, the operating procedures for the Bottom Ash Pond appear to be adequate.

4.3.3 Adequacy of Surveillance Procedures

CGS personnel complete daily informal inspections and weekly formal inspections on the Bottom Ash Pond dikes in accordance with good engineering practice and Section 257.83 of the Code of Federal Regulations. These inspections are being properly documented and should continue as they are currently being conducted.

The Bottom Ash Pond has no formal dam performance monitoring instrumentation. The staff gauge placed in the Bottom Ash Pond in 2021 has been removed as the material inside the pond in that area has been excavated. However, the pond continues to operate in a near-dry state. The Wastewater Decant Pond water levels are monitored by ultrasound level detectors.

5.0 Conclusions and Recommendations

Conclusions are based on visual observations from a one-day site visit on March 4, 2026, and review of technical documentation provided to the inspection team.

5.1 Conclusions Regarding the Structural Soundness of the Management Unit

Based on a review of the engineering data provided and the observations of the inspection team during the site visit, the embankments of the Bottom Ash Pond appear to be structurally sound under static loading conditions. The dike embankments are also indicated to be stable under moderate seismic loading conditions, provided no excessive loss of shear strength occurs in the Pleistocene foundation soils. Isolated layers of very loose to loose sands and some layers of very soft to soft silty clays occur at depth in the foundation soil profile beneath the dikes. However, localized liquefaction or deformations most likely would not be reflected through the firmer and stiffer overlying soils in sufficient magnitude to create unacceptable displacements in the dike embankments under moderate earthquake shaking.

5.2 Conclusions Regarding the Hydrologic/Hydraulic Safety of the Management Unit

A Periodic Inflow Design Flood Control System Plan was written by Worley in October 2021 for the Bottom Ash Pond. Since the Bottom Ash Pond no longer receives CCR, only direct rainfall affects water levels within the pond. The current operating condition involves an authorized dewatering process which maintains the water level in the Bottom Ash Pond to a near-dry state via temporary pumps that pump the water to the adjacent decant pond.

5.3 Conclusions Regarding Field Observations

The inspector was provided access to all areas in the vicinity of the Bottom Ash Pond as required to conduct a thorough field inspection. The visible portions of the embankment dikes were observed to have no signs of overstress, significant settlement, shear failure or other signs of instability. No changes to the geometry of the impounding structures at the Bottom Ash Pond were noted.

5.4 Recommendations for the Bottom Ash Pond

1. Minor ruts and bare soil areas on the downstream slope along the northwest side of the pond should be reseeded and continue to be monitored as part of routine maintenance.