

Winyah Generating Station Slurry Pond 3&4 Closure Plan

Georgetown, SC

Water & CCR Environmental Services

PREPARED BY SOUTH CAROLINA PUBLIC SERVICE AUTHORITY (SANTEE COOPER)

December 21, 2022

Revision: 1

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Winyah Generating Station

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Document Revision No.	Revision Date	Revision Notes
0	10/14/2016	Original document.
1	12/21/2022	Revised plan to incorporate changes in site conditions and update the closure schedule.

1 Introduction

Santee Cooper prepared this Closure Plan for the Coal Combustion Residuals (CCR) surface impoundment, known as the Winyah Slurry Pond 3&4, at Winyah Generating Station in Georgetown, SC pursuant to the requirements of 40 CFR § 257.102(b). The Winyah Slurry Pond 3&4 (Pond) is an approximately 106-acre impoundment regulated by South Carolina Department of Health and Environmental Control (SCDHEC), NPDES Permit #SC0022471. At the time of this writing, the Winyah Slurry Pond 3&4 is no longer used for industrial wastewater treatment and CCR disposal for the four Winyah Generating Station units. The impoundment ceased receipt of waste and initiated closure on 4/11/2021. Gypsum is being reclaimed from the Pond and beneficially used by the agriculture industry as landplaster and by the wallboard industry. Groundwater monitoring is conducted under a state-approved monitoring program and the CCR Rule. This Closure Plan will be used to assist Santee Cooper in the Closure of the Winyah Slurry Pond 3&4.

The United States Environmental Protection Agency (EPA) promulgated regulations regarding Coal Combustion Residuals which were published in the Federal Register on April 17, 2015 (40 CFR Part 257). Section §257.102(b)(1) requires a written closure plan that describes the steps necessary to close the CCR unit at any point during the active life of the CCR unit consistent with recognized and generally accepted good engineering practices. The initial closure plan for the Winyah Generating Station Slurry Pond 3&4, dated October 14, 2016, was written by Geosyntec, and placed in the operating record prior to the regulatory deadline of October 17, 2016, as required by §257.102(b)(2). This revised version was amended to update the closure schedule, make technical modifications, and reflect the current status of the Pond. This Closure Plan may be additionally amended pursuant to the requirements of § 257.102(b)(3).

2 Narrative of Closure by Removal

Per §257.102(b)(1)(i), the closure plan must include: a *narrative description of how the CCR unit will be closed in accordance with this section.* ⁺

The purpose of this Closure Plan is to describe steps to close the Slurry Pond 3&4 consistent with recognized and generally accepted good engineering practices. Closure is designed to minimize long-term maintenance and control the post-closure release of constituents into environmental pathways of air, surface water and groundwater. The existing Slurry Pond 3&4 at Winyah Generating Station in Georgetown, South Carolina will be closed by removal of CCR pursuant to §257.102(c).

Prior to initiation of closure, station upgrades were implemented to allow FGD gypsum slurry and wastewater inflows to either be eliminated or diverted from entering the Slurry Pond 3&4.

The Slurry Pond 3&4 will be dewatered to remove free water and then the CCR will be hauled to and placed in an onsite lined Class 3 CCR Landfill, or it will be beneficially used. The on-site Class 3 Landfill Area 1 received a Permit to Operate in November 2018. However, the capacity of this landfill will be exhausted with the closure of other on-site ash ponds. Therefore, additional landfill space will require construction in order to complete closure of Slurry Pond 3&4. The success of obtaining appropriate beneficial use markets will support closure by removal.

All dewatering effluent from within the Slurry Pond 3&4 will be pumped to the on-site permitted Industrial Cooling Pond for wastewater treatment after obtaining the required approvals and permits from SC DHEC. Due to the long history of Santee Cooper's beneficial use program, the Pond has been periodically dewatered throughout its lifetime to improve accessibility. However, dewatering efforts were intensified in recent years in preparation for closure initiation. After verification testing confirms that CCR material, predominantly FGD slurry, has been removed, the dikes will be breached in one or more locations, the area stabilized, and graded to provide positive drainage.

3 CCR Removal and Decontamination Procedures

Per §257.102(b)(1)(ii): *if closure of the CCR unit will be accomplished through removal of CCR from the CCR unit, a description of the procedures to remove the CCR and decontaminate the CCR unit in accordance with paragraph (c) of this section.* ⁺

Paragraph §257. 102(c) states: *Closure by removal of CCR. An owner or operator may elect to close a CCR unit by removing and decontaminating all areas affected by releases from the CCR unit. CCR removal and decontamination of*

the CCR unit are complete when constituent concentrations throughout the CCR unit and any areas affected by releases from the CCR unit have been removed and groundwater monitoring concentrations do not exceed the groundwater protection standard established pursuant to §257.95(h) for constituents listed in appendix IV to this part.

The existing Slurry Pond 3&4 contains both CCRs and contact stormwater. At present, the Slurry Pond 3&4 no longer receives any CCR or wastewater inflows which were ceased on April 11, 2021, and rainfall is the only source of stormwater in the Pond. Stormwater exits the Pond via pumps that eventually discharge to the on-site permitted Industrial Cooling Pond, where it is further treated prior to being discharged or recycled for plant use.

The procedure to remove the CCR and decontaminate the CCR unit in accordance with paragraph (c) above is described as follows:

1. All waste and wastewater streams previously pumped to the Slurry Pond 3&4 were re-routed or eliminated by April 11, 2021.
2. The Slurry Pond 3&4 will be dewatered by pumping legacy wastewater and contact stormwater for treatment. Continual dewatering operations are anticipated throughout the duration of closure to minimize the amount of free water present within the CCR impoundment
3. The CCR will be dewatered further using stacking and gravity decanting as required to remove free water until the material is capable of passing EPA Method 9095B (paint filter test). All CCR hauled to the onsite Class Three Landfill must first pass this test. Gypsum for beneficial use must meet a similar standard so that it is dry enough to for transportation in on-road trucks.
4. CCR will be excavated using conventional equipment (e.g., track hoes), placed in off-road trucks, and hauled to (and compacted in) an onsite Class Three CCR Landfill. FGD slurry and/or gypsum meeting quality requirements for beneficial use will be marketed if the demand is available and the required licenses and regulatory approvals are obtained.
5. Soil testing will be performed to verify removal of the CCR is complete. If test results do not indicate that removal of CCR is complete, removal of a thin layer, several inches, of subgrade soil may be required. Testing will be repeated until removal is verified and the closure meets SC DHEC's requirements.
6. Groundwater monitoring will continue throughout the closure process following both a SCDHEC-approved program required under the station's NPDES permit and a CCR Rule groundwater monitoring plan.

7. Erosion and sediment controls will be installed prior to breaching or removing the pond dikes to ensure all non-contact construction stormwater is controlled in a manner to prevent erosion and sedimentation in areas surrounding the pond.
8. The Slurry Pond 3&4 dikes will be breached in one or more locations with the dike material used to partially fill the excavated pond. This will prevent the impoundment of water.
9. Additional soil fill material may be imported to the site and compacted within the pond to raise the overall grade. The area will be graded as required to provide positive drainage and to allow for mowing and maintenance access; and will be permanently seeded for ground stabilization.

4 Maximum Inventory of CCR

Per §257.102(b)(1)(iv), the closure plan must include: *An estimate of the maximum inventory of CCR ever on-site over the active life of the CCR unit.*⁴

The base grades of the pond were estimated based on historical information. Geosyntec relied on the data available on the pre-development drawing set prepared by Lockwood Greene in 1978. The starting bottom surface used was digitized from contours shown on Drawing CV-549 and 550 [Lockwood Greene, 1978]

Geosyntec performed investigations to support the geotechnical evaluation of the ponds. Although not specifically designed for this purpose, these investigations were used to estimate the transition between in-place CCR material and natural soils (i.e., the pond bottom). Three investigations were performed by Geosyntec, in February 2013, October 2013, and December 2013. In addition, Geosyntec reviewed the logs from borings drilled by Paul C. Rizzo and Associates (PCRA) in 1993 and again in 1999 to help us estimate the pond bottoms.

The pond bottom was used to estimate the amount of in-place material by subtracting it from the existing ground surface (topographic survey dated 06/29/2011 and revised 1/14/2012 by Thomas & Hutton). These quantities determined by Geosyntec's investigation were used as a starting point to begin tracking the inventories within the ponds. This has been accomplished by estimating inflows based on plant operating efficiencies and accounting for outflows to beneficial use customers and onsite landfills. The current quantities below reflect the amount of CCRs present in October 2022. The quantities shown are estimates.^{1,2,3}

Table 4-1: Estimated Quantities and Types of CCR Materials – Slurry Pond 3&4

Type	Volume ¹ (cy)	Type of Materials
Historic Max CCR	1,999,727 (2,399,672 tons)	Flue Gas Desulfurization (FGD) Residuals
Current Quantities CCR	1,865,278 (2,238,333 tons)	

Note:

[1] Tons calculated assuming a density of approximately 1.2 tons/cy.

5 Schedule of Closure by Removal

Per §257.102(b)(1)(vi), the closure plan must include: A schedule for completing all activities necessary to satisfy the closure criteria in this section, including an estimate of the year in which all closure activities for the CCR unit will be completed. The schedule should provide sufficient information to describe the sequential steps that will be taken to close the CCR unit, including identification of major milestones such as coordinating with and obtaining necessary approvals and permits from other agencies, the dewatering and stabilization phases of CCR surface impoundment closure, or installation of the final cover system, and the estimated timeframes to complete each step or phase of CCR unit closure. When preparing the written closure plan, if the owner or operator of a CCR unit estimates that the time required to complete closure will exceed the timeframes specified in paragraph (f)(1) of this section, the written closure plan must include the site-specific information, factors, and considerations that would support any time extension sought under paragraph (f)(2) of this section.⁴

To commence closure, station equipment upgrades were required to allow FGD slurry and gypsum along with wastewater inflows to the Slurry Pond 3&4 to cease. The Slurry Pond 3&4 began closure by removal of CCR on April 11, 2021. It is estimated that all closure activities can be completed by April 2026.

The schedule for completing all activities required to close the Slurry Pond 3&4 is as follows:

Table 5-1: Anticipated Closure Schedule

Activity	Estimated Completion Date
Final receipt of stormwater and wastewater flows & Notification of intent to initiate closure ¹	Apr 11, 2021 (Complete)
Beneficial use to reduce volume of CCR material in Slurry Pond 3&4	Apr 2021 – Apr 2026 (in progress)
Intensification of dewatering activities	May 2021
Submit revised Slurry Pond 3&4 State Closure Plan to DHEC for approval	May 28, 2021 (Complete)
Receive Land Disturbance Permit for Borrow Pit (Landfill Foundation Material)	Jun 2021 (Complete)
Landfill Construction & Receive Approval to Operate Landfill Cells 4 & 5 ²	Jul 2021-Dec 20, 2021 (Complete)
Obtain DHEC Approval on State Closure Plan	Dec 2021 (Complete)
Landfill Construction & Receive Approval to Operate Landfill Cells 6 & 7 ²	Jan 2022 - Dec 2022 (in progress)
Initiate Landfill Disposal from Slurry Pond 3&4	Jul 2024
CCR Removal from Slurry Pond 3&4 for landfill disposal	Jan 2024 – Apr 2026
Notification of completion of physical for Slurry Pond 3&4 ^{3,4}	Apr 2026
Post-Closure Activities for Slurry Pond 3&4 (e.g., Grade and remove dikes)	Apr 2026 – Dec 2026

Notes:

- 1) Per §257.102(g), no later than the date the owner or operator initiates closure of a CCR unit, the owner or operator must prepare a notification of intent to close a CCR unit.
- 2) SC DHEC has issued the permit to construct the landfill. The permitted location is in the footprint of the Winyah Ash Pond A. Closure of the specific areas of Ash Pond A must be complete, and certified by SC DHEC, prior to construction of the landfill.
- 3) Per §257.102(f)(1)(ii), the owner or operator must complete closure of the CCR unit, for existing and new CCR surface impoundments and any lateral expansion of a CCR surface impoundment, within five years of commencing closure activities.
- 4) Per §257.102(h), within 30 days of completion of closure of the CCR unit, the owner or

operator must prepare a notification of closure of a CCR unit.

All dates are approximate and are provided to convey the overall sequence and scope of closure activities, and to demonstrate their approximate duration. Activities may commence and/or complete earlier or later than shown. It is estimated that all closure activities will be completed within 5 years, however this schedule is weather dependent. Extended periods of inclement weather will impact the schedule since neither the Slurry Pond 3&4 nor the Winyah Class 3 Landfill are accessible in extreme weather events due to safety. Supply chain management issues impacting equipment purchases and repairs and labor shortages may also affect the closure schedule. Extensions to complete CCR removal may be sought if the schedule is adversely impacted by these or other factors out of Winyah Generating Station's control in accordance with 257.102(f)(2).

Closure completion will be certified by a Professional Engineer licensed in the South Carolina. In accordance with §257.102(h), Santee Cooper will prepare a notification of closure of the Slurry Pond 3&4 within 30 days of completion of closure and place the notification in the operating record.

6 Conclusion

This report satisfies the written closure plan requirements outlined in Title 40 CFR §257.102 for the Slurry Pond 3&4 at Winyah Generating Station in Georgetown, South Carolina. The Slurry Pond 3&4 will be closed by removing all CCR material. Closure by removal commenced on April 11, 2021 and is expected to be completed in April 2026.

7 Certification

I, Aubree L. Decoteau, being a registered Professional Engineer in the State of South Carolina, do hereby certify to the best of my knowledge, information, and belief that the information contained in this Winyah Slurry Pond 3&4 Closure Plan dated December 21, 2022 was developed pursuant to the requirements of 40 CFR 257.102 and has been prepared with recognized and generally accepted good engineering practices.



12/21/2022

Signature

Date

8 References

1. Geosyntec (2014). Pond Bottom Estimate. Winyah Generating Station. Georgetown, South Carolina. Interoffice communication.
2. Lockwood-Greene, (1972), A Drawing Set for Santee Cooper Winyah Generating Station.
3. Thomas and Hutton (2011) Topographic Survey of a Portion of Santee Cooper Winyah Generating Station. Revised 2012.
4. USEPA (2015). "40 CFR Parts 257: Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities," Federal Register, Vol. 80, No. 74, April 2015.