Santee Cooper
Cross Generating Station
Pineville, SC

Cross Bottom Ash Pond
Closure Plan

August 21, 2019
Revision: 1

Contents

I. Introduction

Santee Cooper prepared this Closure Plan for the Coal Combustion Residuals (CCR) surface impoundment, known as the Cross Bottom Ash Pond, at Cross Generating Station in Pineville, SC pursuant to the requirements of 40 CFR § 257.102(b). The Cross Bottom Ash Pond (Pond) is an approximately 79 acre impoundment regulated by SC DHEC, NPDES Permit #SC0037401. At the time of this writing, the Cross Bottom Ash Pond is used for industrial wastewater treatment and disposal for the four Cross Generating Station units. Concurrently, gypsum is being reclaimed from the Pond for beneficial use. 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 Cross Bottom Ash Pond.

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 Cross Generating Station Bottom Ash Pond, dated October 14, 2016, was written by WorleyParson 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 and make technical modifications. This Closure Plan may be additionally amended pursuant to the requirements of 40 CFR § 2657.102(b)(3).

II. 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 Cross Bottom Ash Pond 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 Cross Bottom Ash Pond (Pond) at Cross Generating Station in Pineville, South Carolina will be closed by removal of CCR pursuant to 40 CFR § 102(c).

Prior to initiation of closure, plant upgrades have been, and will continue to be, implemented to eliminate or divert existing waste and wastewater from entering the Cross Bottom Ash Pond. As of April 2019, pyrites and bottom ash are dry-handled and no longer enter the Cross Bottom Ash Pond. Current inflows to the Pond include coal pile run-off, stormwater, and FGD wastewater. To facilitate removal of CCRs in the Cross Bottom Ash Pond, the material will be excavated and dewatered to remove free water. It will then be either beneficially used or hauled to and placed in the existing onsite Class 3 CCR Landfill. All dewatering effluent from within the Cross Bottom Ash Pond will be pumped to the existing wastewater decant pond for treatment. The existing liner and revetment materials will either be left in place or disposed of in a suitable landfill. After verification testing confirms that all the CCRs have been removed, the dikes will be leveled and graded to provide positive drainage.

III. 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 Cross Bottom Ash Pond contains both CCRs and wastewater. At present, FGD wastewater containing gypsum from all four of the Cross Station Generating units, industrial stormwater and coal pile runoff wastewater enters the Pond. Wastewater exits the Pond via a shallow weir in the Pond dike that is hydraulically connected to the Cross Decant 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 existing waste and wastewater streams currently pumped to the Cross Bottom Ash Pond will be re-routed or eliminated by October 31, 2020.

2. The hydraulic connectivity between the Cross Bottom Ash Pond and the Decant Pond will be removed by raising the dike separating the two ponds to full height at the weir location.

3. The Cross Bottom Ash Pond will be dewatered by pumping wastewater to the

Decant Pond for treatment. Continual dewatering operations are anticipated throughout the duration of closure to minimize the amount of free water.

4. CCR material will be dewatered further using stacking and gravity decanting as required to remove free water in order to pass EPA Method 9095B (paint filter test). All CCR hauled to the onsite Class 3 Landfill Area must first pass this test. CCR that is beneficially used must be suitably dry for hauling.

5. CCR material is and will be excavated using conventional equipment (e.g. track hoes). CCR material intended for beneficial is excavated and placed in temporary storage piles within the Cross Bottom Ash pond for loading. The gypsum purchaser enters the pond, loads the marketable material and exits following a specified route. The trucks are weighed and recorded on certified scales prior to leaving the station. CCR material that is not beneficially used either due to the quality or to regulatory time constraints will be landfilled by means of placement in off-road trucks, hauled to, and compacted in the onsite Class 3 Landfill.

6. After CCR material is removed to expose the existing concrete erosion control revetment along the side slopes and the existing geosynthetic clay liner (GCL) across the pond bottom, the concrete revetment will be evaluated and a determination will be made to either leave in place or remove it. If removed, the waste will be characterized and then it will be hauled to either a suitable off-site landfill or the existing on-site Class 3 Landfill.

7. The existing GCL provides a physical barrier to prevent releases of CCRs. Once exposed, the GCL will be observed to determine if there are any areas that appear compromised. Any such areas will be noted for further investigation after liner removal.

8. If removal of the existing GCL is selected, it will be removed working from the top of the pond dikes downward, then from the perimeter of the pond inward towards the low point in the bottom of the pond. This overall approach will prevent contact stormwater runoff from draining onto areas where the liner has already been removed. The work area will remain pumped down during closure. Care will be taken to ensure any CCR remnants on top of the GCL are removed with the GCL and not released to the surrounding area.

9. Representative soil samples will be visually evaluated and tested to verify decontamination of the CCR unit is complete. If test results do not indicate that decontamination of the CCR unit is complete, removal of a thin layer of liner subgrade soil may be required.

10. 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.

11. The Cross Bottom Ash Pond dikes will be breached and the dikes leveled, with the dike material used to partially fill the pond excavation.

12. If necessary, additional fill material will 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 maintenance access. The area will be permanently seeded.

13. Existing appurtenant structures, such as ditches, culverts, and miscellaneous piping, will be either abandoned in place, or removed and disposed of in a permitted disposal facility or recycled.

14. Groundwater monitoring will continue until concentrations do not exceed the applicable groundwater protection standard established pursuant to 40 CFR §257.95(h) for constituents listed in Appendix IV to 40 CFR §257.

IV. 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.*

The Cross Bottom Ash Pond contains an estimated 964,773 cubic yards of CCR material per the October 2018 CCR Annual Impoundment Inspection Report. The total storage capacity of the pond is 1,868,240 cubic yards (Reference 1).

The estimated volume of CCR in the Bottom Ash Pond was approximately 1,200,000 cubic yards as of April 27, 2016 (Reference 2). The revised inventory is a reduction from 2016 even though the Pond continued to receive CCRs. The reduction was due to on-going beneficial use to avoid disposal of CCRs into the Pond and to reclaim CCR from the Pond. Since 2016, 520,842 tons of CCRs were reclaimed from the Pond. Approximately 155,000 cubic yards of bottom ash and pyrites are produced in a given year with all four Cross Station Generating units running, which is typically not the case. The amount of solids (gypsum and FGD slurry) in the FGD wastewater discharged to the pond is unknown. Even though FGD wastewater is currently discharged to the Pond, the inflow of bottom ash and pyrites from all four Cross Generating units ceased by April 2019.

Reclaiming ponded CCRs for beneficial use will continue during closure. Since Year 2010, 344,954 tons of bottom ash has been removed from the Pond and used to produced concrete blocks. It was also used in the construction of the Class 3 landfill, as a protective layer over the drainage layer above the liner. Since Year 2015, 378,645 tons of gypsum has been reclaimed from the Pond

and beneficially used by the agriculture industry as landplaster and by the cement industry as a cement additive.

V. Schedule for 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.*

A project is currently underway to upgrade plant equipment that will allow for all current FGD wastewater and other wastewater inflows to the Cross Bottom Ash Pond to cease October 31, 2020. The Bottom Ash Pond is scheduled to begin closure by removal of CCR at that time. It is estimated that all closure activities will be completed within 5 years and this schedule is weather dependent. Extended periods of inclement weather will impact the schedule since neither the Cross Bottom Ash Pond nor the Cross Class 3 Landfill are accessible in extreme weather events due to safety. The schedule for completing all activities required to close the Bottom Ash Pond is as follows:

- SC DHEC Closure Plan and Verification Sampling Plan Approval – 6 months
- SC DHEC Permitting Approvals (NPDES, Solid Waste, Air)– 6 months (overlaps with Closure Plan & Verification Sampling Plan approvals)
- Dewatering and Stabilization – 6 months
- CCR Excavation for Beneficial Use and Landfilling– 3 years
- Post-excavation removals (dikes and appurtenant structures) 1 year

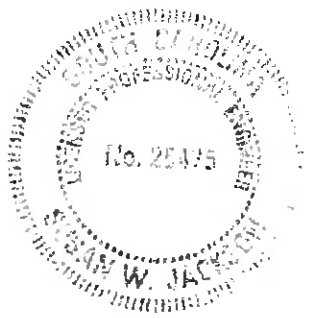
Closure is complete when the elements of this Closure Plan, the SC DHEC approved Closure Plan, and the SC DHEC approved Verification Sampling Plan are complete as certified by a Professional Engineer licensed in the South Carolina. In accordance with 40 CFR §257.102(h), Santee Cooper will prepare a notification of closure of the Cross Bottom Ash Pond within 30 days of completion of closure and place the notification in the operating record.

V. CONCLUSIONS

This report satisfies the written closure plan requirements outlined in Title 40 CFR §257.102 for the Cross Bottom Ash Pond at Cross Generating Station in Pineville, South Carolina. Closure by removal of CCR material is expected to commence October 31, 2020 and be completed October 31, 2025.

VI. CERTIFICATION

I, Susan W. Jackson, 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 Cross Bottom Ash Pond Closure Plan dated August 20, 2019 was developed pursuant to the requirements of 40 CFR 257.102 and has been prepared with recognized and generally accepted good engineering practices.



Signature Susan W. Jackson, PE Date August 21, 2019

VII. REFERENCES

1. CCR Impoundment Inspection – Cross Generating Station, October 2019
2. WorleyParsons Document CROSS-O-LI-044-0009, Bottom Ash Pond Initial Structural Stability Assessment
3. WorleyParson Document CROSS-O-LI-044-0011, Bottom ash Pond closure plan Rev 0 Document: 14 Oct 2016