



WINYAH GENERATING STATION

Closure Plan Narrative for New Class 3 CCR Landfill Area 1

40 CFR Part 257
Operating Criteria
§257.102(b)



WINYAH GENERATING STATION
CLOSURE PLAN NARRATIVE FOR NEW CLASS 3 CCR LANDFILL AREA 1

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1. INTRODUCTION

The United States Environmental Protection Agency (EPA) promulgated regulations (40 CFR Part 257) regarding coal combustion residuals (CCRs). The CCR rule was published in the Federal Register on April 17, 2015 and became effective on October 19, 2015. The Class Three CCR Landfill is subject to the CCR Rule as a new landfill as defined in 40 CFR §257.53. A requirement of the CCR rule is to prepare a written closure plan (§257.102(b)) for new CCR landfills. This plan must be placed in the facility operating record no later than the date of the initial receipt of CCR in the CCR unit as required by §257.102(b)(2)(ii).

This document serves as certification that the written closure plan for the new CCR landfill Area 1 at Winyah Generating Station in Georgetown, South Carolina meets the requirements of §257.102(b). The closure plan is documented in the Winyah Generating Station Class Three Landfill Permit Application approved by the South Carolina Department of Health and Environmental Control (DHEC) on 15 September 2017 (Permit #LF3-00042). The written closure plan meets the requirements of the South Carolina solid waste management regulation R.61-107.19 as certified by the design engineer-of-record, Scott M. Graves, P.E., Geosyntec Consultants, Inc.. The South Carolina Department of Health and Environmental Control issued a permit to construct on September 15, 2017 with an effective date of September 30, 2017.

2. DISCUSSION

Title 40 CFR §257.102(b)(1) requires that the owner or operator of a CCR unit must prepare 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 written closure plan must include, at a minimum the information listed below:

257.102(b)(1)(i) A narrative description of how the CCR unit will be closed in accordance with this section

Refer to Section 5 of Appendix A for a narrative description of how the new Class Three CCR Landfill Area 1 will be closed. In general, the final cover system will be installed in phases as CCR waste placement reaches threshold elevations that generally correspond to each bench elevation. Over time, this phased approach will reduce the exposed surface of the waste, reduce the leachate generation, and minimize the remaining area to be closed upon final receipt of waste.

257.102(b)(1)(ii) If the 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



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The above requirement is not applicable, as the closure will not be accomplished by removal of CCR.

257.102(b)(1)(iii) If closure of the CCR unit will be accomplished by leaving CCR in place, a description of the final cover system, designed in accordance with paragraph (d) of this section, and the methods and procedures to be used to install the final cover. The closure plan must also discuss how the final cover system will achieve the performance standards specified in paragraph (d) of this section

Paragraph (d) of this section (§257.102(d)(1) through (3)) specifies the minimum performance standards for closure when leaving CCR in place, including:

- (1) The owner or operator of a CCR unit must ensure that, at a minimum, the CCR unit is closed in a manner that will:

(1)(i) Control, minimize or eliminate, to the maximum extent feasible, post-closure infiltration of liquids into the waste and releases of CCR, leachate, or contaminated run-off to the grounds or surface waters or to the atmosphere;

Per Section 2 of Appendix A, the final cover system is designed to provide a maximum permeability less than or equal to the bottom liner system of the landfill, to minimize stormwater infiltration through the closed landfill, and to resist erosive forces. This will minimize post-closure infiltration of liquids into the waste and releases of CCR, leachate, or contaminated run-off to the ground or surface waters or to the atmosphere.

(1)(ii) Preclude the probability of future impoundment of water, sediment, or slurry;

Per Section 2 of Appendix A, the final cover system shall promote positive drainage with final design grades of the top surface inclined at a nominal 3 to 5 percent slope. This will prevent the impoundment of water, sediment, or slurry.

(1)(iii) Include measures that provide for major slope stability to prevent the sloughing or movement of the final cover system during the closure and post-closure care period.

Per Section 2 of Appendix A, the side slopes will not exceed three horizontal feet to one vertical foot (3H:1V). Furthermore, slope stability analyses have been performed on the permitted final cover system described in this closure plan (including all system components and the maximum side slopes) to ensure that sloughing or movement of the final cover system will not occur during the closure and post-closure care periods.



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(1)(iv) Minimize the need for further maintenance of the CCR unit:

Per Section 2 of Appendix A, the upper-most component of the final cover system includes a soil layer capable of supporting native vegetation. The native vegetation will minimize erosion and therefore minimize the amount of further maintenance required.

(1)(v) Be completed in the shortest amount of time consistent with recognized and generally accepted good engineering practices.

Per Section 5 of Appendix A, the final cover system will be installed in phase to minimize the time required to complete closure upon the final receipt of waste. Per Section 5.7 of Appendix A, closure must be completed within 180 days.

(2) Drainage and Stabilization of CCR surface impoundments. The owner or operator of a CCR surface impoundment or any lateral expansion of a CCR surface impoundment must meet the requirements of paragraphs (d)(2)(i) and (ii) of this section prior to installing the final cover system required under paragraph (d)(3) of this section.

The above requirement is not applicable, as the existing Class Three CCR Landfill Area 1 is not a surface impoundment.

(3) Final cover system. If a CCR unit is closed by leaving CCR in place, the owner or operator must install a final cover system that is designed to minimize infiltration and erosion, and at a minimum, meets the requirements of paragraph (d)(3)(i) of this section, or the requirements of the alternative final cover system specified in paragraph (d)(3)(ii) of this section.

(3)(i) The final cover system must be designed and constructed to meet the criteria in paragraphs (d)(3)(i)(A) through (D) of this section. The design of the final cover system must be included in the written closure plan required by paragraph (b) of this section.

(A) The permeability of the final cover system must be less than or equal to the permeability of any bottom liner system or natural subsoils present, or a permeability no greater than 1×10^{-5} cm/sec, whichever is less

Per Section 2 of Appendix A, final cover system Option 1 (Standard Final Cover System) will provide a maximum permeability less than or equal to the bottom liner system. The Standard Final Cover System will have a permeability less than 1×10^{-5} cm/sec.



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(B) The infiltration of liquids through the closed CCR unit must be minimized by the use of an infiltration layer that contains a minimum of 18 inches of earthen material

Per Section 2 of Appendix A, the Standard Final Cover System satisfies this requirement.

(C) The erosion of the final cover system must be minimized by the use of an erosion layer that contains a minimum of six inches of earthen material that is capable of sustaining native plant growth

Per Section 2 of Appendix A, the upper-most component of the Standard Final Cover System includes an 18-inch thick layer of protective soil and a 6-inch thick layer of topsoil capable of supporting native vegetation.

(D) The disruption of the integrity of the final cover system must be minimized through a design that accommodates settling and subsidence

Per Section 2 of Appendix A, post-closure differential settlement is not anticipated with this waste mass because it consists of compacted CCR. The integrity of the Standard Final Cover System will not be disrupted due to settling or subsidence.

(3)(ii) The owner or operator may select an alternative final cover system design, provided the alternative final cover system is designed and constructed to meet the criteria in paragraphs (f)(3)(ii)(A) through (D) of this section. The design of the final cover system must be included in the written closure plan required by paragraph (b) of this section.

(A) The design of the final cover system must include an infiltration layer that achieves an equivalent reduction in infiltration as the infiltration layer specified in paragraphs (d)(3)(i)(A) and (B) of this section

Per Section 2 of Appendix A, the final cover system Option 2 (Alternate Final Cover System) will provide a maximum permeability less than or equal to the bottom liner system. The Alternate Final Cover System will have a permeability less than 1×10^{-5} cm/sec, and meet or exceed the performance of the Standard Final Cover System.



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(B) The design of the final cover system must include an erosion layer that provides equivalent protection from wind or water erosion as the erosion layer specified in paragraph (d)(3)(i)(C) of this section.

Per Section 2 of Appendix A, the upper-most component of the Alternate Final Cover System includes an 18-inch thick layer of protective soil and a 6-inch thick layer of topsoil capable of supporting native vegetation.

(C) The disruption of the integrity of the final cover system must be minimized through a design that accommodates settling and subsidence

Per Section 2 of Appendix A, post-closure differential settlement is not anticipated with this waste mass because it consists of compacted CCR. The integrity of the Alternate Final Cover System will not be disrupted due to settling or subsidence.

(3)(iii) The owner or operator of the CCR unit must obtain a written certification from a qualified professional engineer that the design of the final cover system meets the requirement of this section

Refer to Section 4 of this document.

257.102(b)(1)(iv) An estimate of the maximum inventory of CCR ever on-sit over the active life of the CCR unit.

Per Section 4 of Appendix A, an estimate of the maximum inventory of CCR ever on-site in Landfill Area 1 is 2,191,000 cubic yards.

257.102(b)(1)(v) An estimate of the largest area of the CCR unit ever requiring a final cover as required by paragraph (d) of this section at any time during the CCR unit's active life.

Per Section 3 of Appendix A, an estimate of the largest area of Landfill Area 1 ever requiring a final cover is 31.3 acres. Because the landfill will be closed in phases, this is likely a conservative estimate of the maximum area.

257.102(b)(1)(vi) 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 the final cover system, and the estimated timeframes



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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 consideration that would support any time extension sought under paragraph (f)(2) of this section.

For the purpose of this section, the schedule for completing closure is based on the permitted maximum annual CCR waste placement rate, which is 2,777,800 cubic yards. This maximum annual tonnage limit is based on the facility’s design capacity (2,191,000 cubic yards), operational capacity, and expected operational life. The actual annual waste placement rate may be less, which will result in a later closure date.

Landfill Area 1 is expected to begin receiving waste on or after November 1, 2018. The earliest possible date for final receipt of waste is August 2019. On this basis, the schedule for completing all activities necessary to satisfy the closure criteria in this section is as follows:

EVENT	TIMEFRAME
Notify SC DHEC of intent to close a given increment	Just prior to receipt of final wastes within that area
Prepare closure construction plans, obtain bids, and select contractor	90 days following provision of SC DHEC notice
Construct final cover system	Within 180 days following initiation of construction
Submit closure certification to SC DHEC	60 days following construction of each increment
Place notation on the deed to the landfill facility property that the land was used as a landfill and that its use is restricted	30 days following SC DHEC issuance of landfill facility final closure

3. CONCLUSIONS

The existing permitted closure plan for the new Class Three CCR Landfill Area 1 at Winyah Generating Station I Georgetown, South Carolina, and supplemental information included in this report, satisfy the written closure plan requirements outlined in Title 40 CFR §257.102.



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4. CERTIFICATION

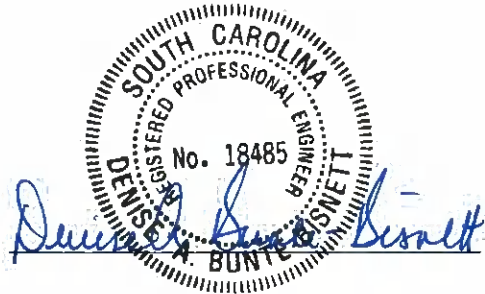
Certification for Closure Plan

Federal CCR Rule: 40 CFR §257.102

CCR Unit: WGS Class Three Landfill Area 1 - New CCR Landfill

I, the undersigned Professional Engineer registered in good standing in the State of South Carolina, do hereby certify under penalty of law that I have personally examined and am familiar with the information submitted in this demonstration, and that, based on my inquiry of the individuals responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. I certify, for the above-referenced CCR Unit, that the written closure plan contained herein is in accordance with the requirements of Title 40 CFR §257.102, and that the proposed design of the final cover system meets the requirements of Title 40 CFR §257.102(d)(3).

Seal and Signature:



Printed Name: Denise A. Bunte-Bisnett

P.E. License Number: 18485 State of South Carolina



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APPENDIX A

Permitted Closure Plan



Prepared for

Santee Cooper Power
1 Riverwood Drive
Moncks Corner, South Carolina 29461

CLOSURE PLAN

WINYAH GENERATING STATION PERMIT APPLICATION NON-COMMERCIAL CLASS THREE LANDFILL Georgetown, South Carolina

Prepared by

Geosyntec 
consultants

engineers | scientists | innovators

104 South Main Street, Suite 115
Greenville, South Carolina 29601

Project Number GSC5242

August 2016



Scott M. Graves

8/9/2016

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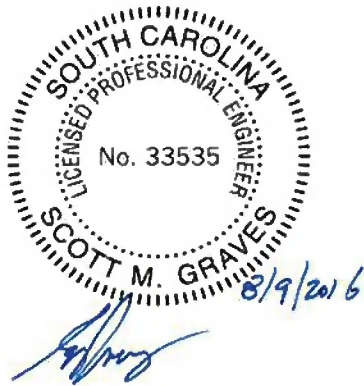
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1. INTRODUCTION

1.1 Terms of Reference

This Closure Plan (Plan) has been prepared by Geosyntec Consultants (Geosyntec) for the Class Three Landfill at Santee Cooper's Winyah Generating Station (WGS) located in Georgetown County, South Carolina. Geosyntec prepared this Plan on behalf of the permit applicant – the South Carolina Public Service Authority doing business as (d.b.a.) Santee Cooper (Santee Cooper). The Class Three Landfill will be composed of two areas, referred to as "Landfill Area 1" and "Landfill Area 2". Collectively these areas are referred to as the "Class Three Landfill".

Detailed drawings illustrating the Class Three Landfill features including the components described herein are presented on the Engineering Drawings that accompany the permit application.

1.2 Purpose of This Closure Plan

This Plan serves as the Closure Plan required for Class Three Landfills by Part V, Subpart H.5.b.(15) of South Carolina Department of Health and Environmental Control (DHEC) Regulation R.61-107.19. The purpose of this Plan is to provide a description of the activities to be performed to satisfy the requirements of Part V, Subpart F, Section 258.60 of R.61-107.19. A closure cost estimate is also included, pursuant to Part I, Section E.1 of R.61-107.19.

Following DHEC approval of this Plan, Santee Cooper will amend this Plan within 60 days prior to a planned change in the operation of the Class Three Landfill that would substantially affect the approved Plan, or no later than 60 days after an unanticipated event necessitates a revision of the approved Plan. Once closure activities have commenced at the Class Three Landfill, amendments to the approved Plan will be completed no later than 30 days following the triggering event. Plan amendments will be certified by a qualified professional engineer and submitted to DHEC for review and approval prior to implementation. Any updates to this Plan, and any monitoring, testing, or analytical data as required by Part V, Subpart F, Section 258.60 of R.61-107.19, will be placed in the Class Three Landfill Operating Record.

1.3 Overall Contents of This Closure Plan

The remainder of this Plan provides the following:

- a description of final cover system and the methods and procedures that will be used to install the cover;
- an estimate of the largest area of the Class Three Landfill ever requiring a final cover at any time during the active life;
- an estimate of the maximum inventory of waste ever on-site over the active life of the Class Three Landfill;
- a description of the steps necessary to close all Class Three Landfill areas at any point during their active life, including the closure sequence and schedule of closure milestones, as needed to satisfy the applicable closure criteria.

Additionally, as mentioned the closure cost estimate is presented in Attachment A to this Plan.

2. FINAL COVER SYSTEM

2.1 Design

The final cover system for the Class Three Landfill is designed to:

- provide long-term minimization of infiltration of precipitation into disposed wastes within the landfill;
- promote drainage while minimizing erosion of final cover soils; and
- function with minimal maintenance over the post-closure period.

Two types of final cover system options are proposed to be allowed: (i) “Option 1”, a standard (prescriptive) final cover system for Class Three Landfills having liner systems, and meeting the requirements of Subpart F, Section 258.60.k; and (ii) “Option 2”, an alternative composite liner design as allowed by 258.60.b (that has a composite cover barrier infiltration layer that achieves an equivalent reduction in infiltration as the prescribed infiltration layer and thereby meets or exceeds the environmental and public health protection standards). The components of each option are presented below.

Final Cover System – Option 1 (from top to bottom):

- a 2-ft thick layer of soil capable of supporting native vegetation (further subdivided into an upper 6-inch thick topsoil layer and a lower 18-inch thick protective cover soil layer);
- a geocomposite drainage layer (geotextile filters bonded to both sides of a geonet drainage core);
- a flexible membrane liner (FML), which will be a 20-mil (minimum) thick linear low-density polyethylene (LLDPE) geomembrane liner, textured on both sides; and
- an 18-inch thick infiltration layer of compacted soil with a maximum hydraulic conductivity of 1×10^{-5} cm/sec and capable of providing a suitable foundation for the FML.

Final Cover System – Option 2 (from top to bottom):

- a 2-ft thick layer of soil capable of supporting native vegetation (further subdivided into an upper 6-inch thick topsoil layer and a lower 18-inch thick protective cover soil layer);
- a geocomposite drainage layer (geotextile filters bonded to both sides of a geonet drainage core);
- a flexible membrane liner (FML), which will be a 20-mil (minimum) thick LLDPE geomembrane liner, textured on both sides; and
- a needlepunched reinforced geosynthetic clay liner (GCL) infiltration layer.

Inspection of the above shows that both final cover system options will use the same components from the FML and above. The alternative final cover system (Option 2) uses a GCL infiltration layer in place of the prescribed (Option 1) 18-inches of low permeability compacted soil infiltration layer.

It is also noted that the final cover system does not include a gas management layer or layers, or other gas management system design. As discussed in the Engineering Report and O&M Plan, the large majority of the wastes that will be disposed of at the facility are coal combustion product (CCP) wastes. The wastes will be non-putrescible and not of a type expected to biodegrade; municipal solid waste will not be accepted. Thus, the composition of the waste that will be disposed at the landfill is not expected to generate methane or other explosive landfill gases.

The landfill cover will have a nominal sideslope of 3 horizontal to 1 vertical (3H:1V) between drainage terraces, and with top surface slopes (top-deck areas) inclined at a nominal 3 to 5 percent slope. Drainage terraces and downdrain pipe features will be constructed to intercept storm water and convey it to the perimeter drainage channels. This drainage terraces are designed to ensure that the hydraulic head at any point in the terrace does not exceed one foot for a 24-hour period as the result of a 24-hr, 25-year storm event.

2.2 Construction

Installation of the final cover system shall be performed in accordance with the design presented on the Engineering Drawings and the standards outlined in Technical Specifications pertaining to the final cover components, which are included as part of the permit application. These specifications include the required material properties, as well as construction/installation requirements. Further, third-party construction quality assurance (CQA) shall be performed during final closure in order to ensure that the final cover system is completed in accordance with applicable requirements and as set forth in the CQA Plan included as part of the permit application. The CQA Plan provides the requirements for monitoring, testing, and documenting the materials and construction/installation of the final cover system components.

The materials to be used for construction of the final cover system soil components will be obtained from either on-site and/or off-site borrow areas. The source(s) will be selected based on ability to provide material conforming to project specifications, availability of the required volumes and proximity to the landfill. Appendix B of the Engineering Report provides an estimate of the total landfill final cover surface areas, and resulting estimated final cover system soil quantities.

A schedule of required closure activities, including construction notification and certification, is provided subsequently in Section 5 of this Plan.

3. ESTIMATE OF LARGEST AREA REQUIRING FINAL COVER

The Class Three Landfill is composed of two distinct areas (Landfill Area 1 and Landfill Area 2). The final cover system for each area will be constructed incrementally in phases as cells/phases of filling are brought to final grade. Initially, the lower elevations of outer sideslopes of a given area or portion thereof will be brought to final grades and will receive a final cover; followed later by installing final cover on the upper sideslopes, and finally the top deck. In this manner, the maximum area requiring final closure at the Class Three Landfill at any given point in time can be kept to a fraction of the total acreage permitted for landfilling.

The total landfill areas, and an estimate of the largest area of the Class Three Landfill ever requiring final cover at a given time at any time during the active life is summarized below in Table 1.

Table 1
Final Cover Areas

Class Three Landfill Area	Total Area (acres)	Largest Area Requiring Final Cover at Any Time (acres)
Landfill Area 1	31.3	31.3 ⁽¹⁾
Landfill Area 2	75.3	31.0 ⁽²⁾
Total	106.6	31.3 ⁽³⁾

Notes:

- (1) Largest area of Landfill Area 1 that could require closure at any time is estimated to occur soon after initial operations, when all cells are open and no incremental closures have taken place.
- (2) Largest area of Landfill Area 2 that could require closure at any time is estimated to be during the early waste placement activities in Cells 4 and 5, when no incremental closures have taken place.
- (3) Landfill Areas 1 and 2 will not have their largest areas open simultaneously. The "Total" largest area value is the larger of the two areas.

A series of landfilling progression drawings are included with the Engineering Drawings that accompany the permit application. These drawings illustrate the approximate phased construction of the Class Three Landfill, and were used to estimate the largest area requiring cover at any time during the active life.

4. ESTIMATE OF MAXIMUM INVENTORY OF WASTE

The estimated maximum inventory of wastes ever on-site during the active life of the landfill facility is summarized below in Table 2.

Table 2
Maximum Waste Inventory

Class Three Landfill Area	Waste Disposal Volume (CY)
Landfill Area 1	2,191,000
Landfill Area 2	9,684,000
Total	11,875,000

Note that these volumes refer to the calculated volume between the top of the protective cover layer component of the liner system vs. the bottom of the final cover system. These values do not include the possible volume of bottom ash which may be used as an allowable material within the 2-ft liner drainage/protective cover layer. A calculation package further describing the volume computations is provided in Appendix B of this Engineering Report.

5. CLOSURE SCHEDULE AND SEQUENCE

5.1 Schedule of Closure Milestones

Partial closure refers to the closure of a portion (increment) of the Class Three Landfill. Final closure is achieved upon closure of the entire Class Three Landfill. The landfill will be closed incrementally in phases as cells/areas of filling are brought to final waste grades. The schedule of closure milestones is presented below in Table 3, and details of the closure sequence are provided in the remainder of this section.

Table 3
Schedule of Closure Milestones
 (the first four entries apply to each partial closure increment, and all entries apply to final closure)

Event	Timeframe
Notify DHEC of intent to close a given increment	Just prior to receipt of final wastes within that area
Prepare closure construction plans, obtain bids, and select contractor	90 days following provision of DHEC notice
Construct final cover system	Within 180 days following initiation of construction
Submit closure certification to DHEC	60 days following construction of each increment
Place notation on the deed to the landfill facility property that the land was used as a landfill and that its use is restricted	30 days following DHEC issuance of landfill facility final closure

5.2 Landfill Closure Sequence

As described above, the landfill will be closed incrementally in phases, consistent with the sequence of filling shown on the Engineering Drawings. Partial closure events will occur as cells/areas of filling are brought to final waste grades so that a significant

portion of the landfill has reached the final waste grades. When the Class Three Landfill is at total capacity, or once the last remaining active area achieves final waste grades, closure activities for final closure of the Class Three Landfill will begin. The steps for implementing the closure process are described in the following subsections. The steps are the same for partial closure and final closure.

5.3 Determination of Closure Area

Santee Cooper will determine the number of closure events and size of each closure event. Closure construction will not be initiated until final grades of a suitable sized landfill area are achieved based on factors such as construction logistics and economics. The landfill will be surveyed periodically to determine the status and estimate areas that have reached the final waste grades

5.4 Construction Contract Documents

Construction documents, including drawings, specifications, and bid documents, will be prepared for each closure event. The drawings and specifications will be in accordance with the design presented on the Engineering Drawings and the standards and requirements given in the permitted Technical Specifications.

5.5 Notification of Intent to Close

Prior to the beginning of a closure event, Santee Cooper will submit a Notice of Intent to Close to DHEC. The notice will include a description of the area to be closed, acreage, and a schedule outlining the closure activities to be performed.

5.6 Initiation of a Closure Event

Santee Cooper requests an exemption from the 30 day limit for beginning closure activities as outlined in the schedule for closure in Section 258.60.c. of Part V, Subpart F. Specifically, Santee Cooper requests that up to 90 days be allowed for completion of necessary construction drawings and selection of a qualified contractor to perform the work for each closure event. It is our experience that a period of 30 days is not enough to allow proper pre-construction preparation work following notification of DHEC of intent to close. Closure construction activities will begin a closure event within 90 days of receiving the final waste to be placed within the area/increment represented by that

closure event, or if the cell/area is to receive additional wastes, no more than one year after the most recent receipt of wastes.

5.7 Completion of a Closure Event

As outlined in the schedule of closure milestones in Table 3, the facility will complete closure construction activities within 180 days of initiation for a given closure event. Should an extension to this limit be required, Santee Cooper will request an extension from DHEC at that time. In all cases Santee Cooper will maintain landfill slopes and cover as needed to prevent threats to human health or the environment.

5.8 Certification of Closure

Within 60 days of completion of each final system construction event, a certification of closure construction (construction certification report as specified in the CQA Plan) will be prepared and submitted to DHEC for approval. This construction certification report will be sealed by a duly licensed South Carolina professional engineer other than the design engineer, verifying that the closure has been completed in accordance with this Closure Plan (and the DHEC-approved Technical Specifications and CQA Plan referenced herein). A copy of all closure construction certification reports shall be placed in the Operating Record.

5.9 Record Notation to Deed

Within 30 days of DHEC's issuance of final closure approval of the last area of the Class Three Landfill, and using a form approved by DHEC, Santee Cooper shall record with the appropriate Register of Deeds, a notation in the record of ownership of the property - or some other instrument which is normally examined during title search - that will in perpetuity notify any potential purchaser of the property that the land or a portion thereof was used for the disposal of solid waste. This notice shall define the final boundaries of the waste disposal area including the latitude and longitude, identify the type, location, and quantity of solid waste disposed on the property, and advise potential owners of the property that there are land use restrictions.

Santee Cooper may request permission from DHEC to remove this notation from the deed if all wastes are properly removed from the landfill facility and there is no environmental impact.

6. CLOSURE COST ESTIMATE AND FINANCIAL ASSURANCE

A detailed written cost estimate for closure activities is provided as Attachment A of this Closure Plan. This cost estimate is in current dollars and is based on hiring a third party to close the largest area of the landfill ever requiring final cover at any time during the active life (when the extent and manner of its operation would make closure the most expensive), based on the planned incremental closure sequence and this Closure Plan. Santee Cooper will adjust the closure cost estimate and corresponding amount of financial assurance annually for inflation and any changes to this Closure Plan or landfill conditions that would increase the cost to close the landfill.

Santee Cooper will provide a demonstration of financial assurance, using an allowable mechanism, for the Class Three Landfill in accordance with the requirements of Part I, Section E.1 of R.61-107.19. If conditions call for a reduction in the amount to be financially assured, Santee Cooper will submit justification to DHEC for review and approval prior to officially reducing the amount.

Financial assurance for closure activities will be maintained until final closure activities at the Class Three Landfill have been completed, certification of final closure is submitted to and approved by DHEC, a deed notation identifying the Class Three Landfill and associated restrictions is recorded, and Santee Cooper is released from financial assurance requirements.

Santee Cooper Winyah Generating Station
Class Three Landfill Permit Application
Closure Plan

ATTACHMENT A

CLOSURE COST ESTIMATE

**Attachment A
Closure Cost Estimate**

**Class Three Landfill - Largest and Most Expensive Area Requiring Closure
Winyah Generating Station, Georgetown County, South Carolina**

Item Number	Description	Estimated Quantity	Unit	Unit Price	Total Closure Cost
	Largest landfill area requiring closure at any time:	31.3	AC		August 2016
1	Bonds, Insurance, Mobilization and Demobilization	5%	LS	\$ 267,979	\$ 267,979
2	Temporary Stormwater Water Management	31.3	AC	\$ 3,000	\$ 93,900
3	Cover Subgrade Preparation	31.3	AC	\$ 9,000	\$ 281,700
4	Reinforced Geosynthetic Clay Layer (GCL) ¹	1,363.428	SF	\$ 0.60	\$ 818,057
5	20-mil LLDPE Flexible Membrane Liner	1,363.428	SF	\$ 0.35	\$ 477,200
6	Geocomposite Drainage Layer	1,363.428	SF	\$ 0.45	\$ 613,543
7	24-Inch Erosion/Vegetative Layer (Cover Soil + Topsoil)	100,995	CY	\$ 5.00	\$ 504,973
9	18" HDPE Downdrain Pipe	2,000	LF	\$ 40.00	\$ 80,000
10	Waste Excavation and Disposal for Downdrain Pipes	1,375	CY	\$ 8.00	\$ 11,000
11	Structural Fill for Downdrain Pipes	1,250	CY	\$ 5.00	\$ 6,250
12	Downdrain Inlets	27	EA	\$ 2,500	\$ 67,500
14	Downdrain Outlet Concrete Pads with Energy Dissipators	5	EA	\$ 2,250	\$ 11,250
16	Gravel Final Cover Access Road	6,100	SY	\$ 27.00	\$ 164,700
17	Seeding & Mulching	31.3	AC	\$ 2,750	\$ 86,075
18	Erosion Control Matting	151,492	SY	\$ 5.00	\$ 757,460
19	Miscellaneous Work & Cleanup	31.3	AC	\$ 7,500	\$ 234,750
20	Engineering and CQA Services	31.3	AC	\$ 15,000	\$ 469,500
21	5% Contingency of Above Items	5%	LS	\$ 281,378	\$ 281,378
				Total Closure Cost ¹	\$ 5,227,214
				<i>Closure Cost per Acre²</i>	<i>\$ 167,004</i>

Notes:

- This cost estimate is conservatively based on Final Cover System Design Option 2 (which is the more expensive of the two options).
- Closure cost per acre may be used to calculate the estimated closure cost for other areas requiring closure by taking this per-acre rate multiplied by the number of acres.