

CLOSURE PLAN

CLOSURE PLAN

Lakeland Electric – C.D. McIntosh Power Plant Byproduct Storage Area

Submitted to: Lakeland Electric
C.D. McIntosh Power Plant
3030 East Lake Parker Drive
Lakeland, FL 33805 USA

Submitted by: Golder Associates Inc.
9428 Baymeadows Road, Suite 400
Jacksonville, FL 32256 USA

October 2016

15-45454.3

A world of
capabilities
delivered locally





PROFESSIONAL ENGINEER CERTIFICATION

I, Samuel F. Stafford, being a registered Professional Engineer in the state of Florida, do hereby certify to the best of my knowledge, information, and belief, that the information contained in this Closure Plan dated October 12, 2016 meets the requirements of 40 CFR §257.102, is true and correct, and had been prepared in accordance with recognized and generally accepted good engineering practices.

S.F.S.

Samuel F. Stafford, PE No. 78648
Florida Professional Engineer No. 78648
Certificate of Authorization No. 0670

12 OCT 2016

Date

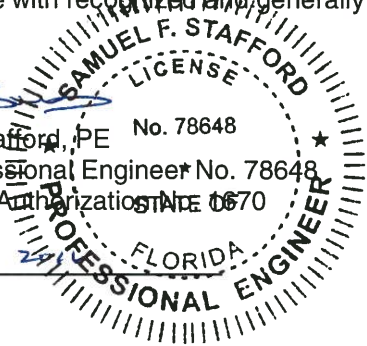




Table of Contents

PROFESSIONAL ENGINEER CERTIFICATION	PE-1
1.0 INTRODUCTION.....	1
2.0 CLOSURE PLAN	1
2.1 Overview of Closure Approach	1
2.2 Estimated Maximum Inventory of CCR	1
2.3 Largest Area Requiring Cover System	1
2.4 Final Cover System.....	2
2.4.1 Performance Standard.....	2
2.4.2 Final Cover.....	2
2.4.3 Stability.....	3
2.4.4 Closure Time Frame	3
2.5 Schedule	3
3.0 CLOSING	4



1.0 INTRODUCTION

This Closure Plan was prepared for the Byproduct Storage Area (BSA) at the Lakeland Electric's (LE) C.D. McIntosh Power Plant (MPP). This plan was prepared in accordance with Title 40, Part 257, Subpart D of the Code of Federal Regulations to meet the requirements of §257.102(b) for closure of coal combustion residual (CCR) landfills. LE will use the information contained in this plan for the closure of the BSA.

2.0 CLOSURE PLAN

2.1 Overview of Closure Approach

The BSA (formerly referred to as the South Landfill) will be closed by leaving CCRs in place and installing a final cover system, as required by §257.102(a). The BSA will be closed in accordance with the requirements of §257.102 and within the timeframes as stated in §257.102(e) and (f). The BSA final cover system is designed to control the post-closure release of contaminants and to minimize the need for long term maintenance. Closure activities may be revised as appropriate for materials, specifications, technology advances or changes in regulations. LE may elect to conduct closure in a phased approach; closing segments of the BSA as they reach design grades. Closure will be conducted in accordance with this Closure Plan and the State of Florida Conditions of Certification for MPP and the Combustion By-Product Storage Facility Operations Manual.

The steps necessary to complete closure of BSA are as follows:

- Determine the area to receive final cover;
- Prepare construction documents;
- Secure a contractor unless self-performing work;
- Secure an independent professional engineer to provide construction quality assurance and closure certification;
- Prepare notification of intent to close the CCR unit and place in operating record as required by §257.102(g);
- Secure materials necessary for final cover system construction;
- Construct final cover system; and
- Complete construction certification and notification of closure and place such in the operating record.

2.2 Estimated Maximum Inventory of CCR

The current BSA design provides approximately 3.6 million cubic yards of CCR storage capacity.

2.3 Largest Area Requiring Cover System

The BSA has a total footprint of approximately 45 acres that would require closure under this plan.



2.4 Final Cover System

The final cover system for the BSA is designed to meet the requirement of §257.102(d)(3)(i), namely, to (1) reduce infiltration, (2) resist erosion, (3) prevent contact water run-off, (4) promote controlled drainage (limit impoundment of water) and (5) minimize the need for future maintenance: The permeability of the final cover system will be no greater than 1×10^{-5} centimeters per second (cm/sec) since the BSA is an unlined facility.

Minimal, if any, settlement is expected given (1) the type of materials placed in the BSA (2) the method of fill placement, and (3) the non-decomposable nature of the CCR materials. The final cover systems are expected to accommodate the minimal differential settlement that may occur in the waste during the post closure care period.

2.4.1 Performance Standard

In accordance with §257.102(d), closure of the BSA will be conducted in a manner that minimizes to the extent feasible the post-closure release of uncontrolled leachate, surface runoff or waste decomposition products to groundwater, surface water, or the atmosphere.

The final cover system will incorporate a vegetative support layer with run-on and run-off controls to minimize the need for post-closure maintenance. The final slopes of the landfill will promote runoff. On side-slopes, 20-foot wide benches will be constructed at 25 to 30-foot vertical intervals. These bench ditches will convey runoff to slope drain channels. The top deck area will be graded to prevent ponding at a slope of approximately 0.5 percent to convey runoff to a slope drain channel. An adequate stand of vegetation will be established, which along with the benches and stormwater conveyance features, will minimize erosion of the final cover system.

Infiltration of liquids into the closed CCR unit will be minimized through the construction and operation of a low-permeability final cover system. The permeability of the final cover systems will be no greater than 1×10^{-5} cm/sec.

2.4.2 Final Cover

The side-slope final cover system will consist of the following from top to bottom:

- 6-inch vegetative support layer (erosion layer);
- 18-inch infiltration layer; and
- Byproduct (CCR materials).

The infiltration layer will consist of 18 inches of earthen material that has a hydraulic conductivity of no greater than 1×10^{-5} cm/sec. The earthen material used for the infiltration layer will be free of rocks, clods, debris, cobbles, rubbish, and roots that may promote preferential pathways thereby decreasing the hydraulic conductivity of the material. If the soils available locally do not meet the hydraulic conductivity



requirement, soil amendments (i.e. bentonite, lime, cement) may be mixed with local soils to meet the hydraulic conductivity requirements. The upper 6 inches of the final cover system will consist of soil which can support a healthy stand of grass to minimize erosion. The surface of the side-slope final cover system will be vegetation by placement of sod.

2.4.3 Stability

The BSA will be closed in a manner that will provide adequate slope stability to prevent the sloughing or movement of the final cover system. The interface and internal friction angle of all the components must be greater than the slope angle to maintain stable final cover slopes. The side-slopes are designed at a maximum slope of 3H:1V, therefore, only materials with friction angles greater than 26.6° will be used in order to provide a factor of safety of 1.5. To ensure the stability of the vegetative support layer in the final cover system, adequate drainage will be provided to prevent the soil from becoming saturated and subject to seepage forces. Global slope stability calculations are provided in the facility Operations Manual dated January 2006.

2.4.4 Closure Time Frame

As required by §257.102(f)(1)(i), construction of the final cover system will be completed within 180 days following the start of closure activities unless an extension demonstration is completed in accordance with §257.102(f)(2) LE estimates that closure construction could begin in 2025 based on projected plant operation, CCR materials exported off-site for beneficial use, and the remaining capacity of the BSA.

2.5 Schedule

The BSA closure activities will be initiated within 30 days after the final known receipt of CCR or removal of CCR for beneficial use in accordance with §257.102(e). If the BSA has remaining capacity and may receive or reclaim additional CCR materials sometime in the future, closure activities will be initiated no later than two years after the final receipt or removal of CCR. In accordance with §257.102(f), the final cover system will be completed within six months following the beginning of closure construction or by an approved deadline extension.

LE will prepare a notification of intent to close the unit no later than the date on which closure is initiated, in accordance with §257.102(g). This notification will be certified by a qualified professional engineer that the final cover design meets the requirements of §257.102. This notification will be placed in the facility's operating record and the Florida Department of Environmental Protection (FDEP) will be notified.

LE will prepare a notification of closure of the CCR unit and place it in the facility's operating record within 30 days of closure construction completion pursuant to §257.102(h). In accordance with §257.106(i), FDEP will also be notified. The closure completion notification will include a closure construction certification by a qualified professional engineer in accordance with §257.102(f)(3).



Following completion of closure construction, LE will record a notation on the deed of the property in accordance with §257.102(i) identifying that the land has been used as a CCR unit and its use is restricted under the Post-Closure Plan and post-closure care requirements. Within 30 days of recording the notation, LE will prepare and place in the facility's operating record a notification stating that the notation has been recorded and FDEP will also be notified.

An expected schedule for closure activities is as follows:

<u>Time</u>	<u>Activity</u>
Prior to last receipt or reclamation of CCRs	Permitting (if necessary), detailed design, construction documents, and contractor selection
Initial 30 days after last receipt of CCRs	Mobilization of contractor
Months 0-3 after beginning construction	Grading and construction of side-slope benches
Months 2-5 after beginning construction	Placement of infiltration layer and top soil and installation of final cover stormwater management features
Months 5-6	Placement of top soil and sod (or seed) to establish vegetative cover

3.0 CLOSING

This Closure Plan was prepared to meet the requirements of §257.102. If operational changes or unanticipated events that would necessitate a revision to the closure plan occur, this Closure Plan will be amended in accordance with §257.102(b)(3).

GOLDER ASSOCIATES INC.

Samuel F. Stafford, PE
Senior Project Engineer

Gregory M. Powell, PhD, PE
Practice Leader and Principal

SFS/GMP/ams

FN: G:\Projects\15-15-45454.3\Final\Closure\LE MPP CCR Closure Plan.docx