



**Labadie Energy Center
Closure Plan
LCPA (Bottom Ash Pond)
CCR Surface Impoundment**

**Labadie Energy Center
Closure Plan
(LCPA) Bottom Ash Pond
CCR Surface Impoundment
Franklin County, Missouri**

October 2016

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Professional Engineer's Certification

By means of this certification, I have reviewed this CCR Unit Closure Plan for Surface Impoundment LCPA (Bottom Ash Pond) at Ameren Missouri's Labadie Energy Center. Such plan describes the steps necessary to close the CCR unit and such activities are in accordance with general accepted and good engineering activities, and it meets the requirements of 40 CFR §257.102(b). Such plan may be amended as authorized by 40 CFR §257.102(b)(3).

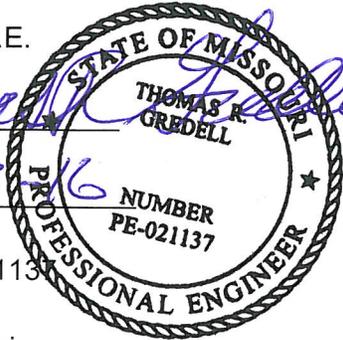
Name: Thomas R. Gredell, P.E.

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Registration Number: PE-021137

State of Registration: Missouri



1.0 Introduction

Pursuant to 40 CFR §257.102 (2), the owner or operator of a Coal Combustion Residual (CCR) unit must prepare a closure plan identifying the manner and timing of closure and describe such cover compliance with the designated performance criteria set forth in the CCR Rule with respect to the installation method for the final cover system.

Stormwater, CCR transport water and other low volume wastewaters discharge from the active CCR unit through NPDES permitted Outfall 002 of Missouri Operating Permit No. MO-0004812. A map showing the location of the active CCR surface impoundment is appended hereto as Figure 2.

The active CCR surface impoundment is referred to as Surface Impoundment LCPA (Bottom Ash Pond). Surface Impoundment LCPA receives CCR transport water, plant service water and other plant drainage. Stormwater currently collects on Surface Impoundment LCPB, which discharges to Surface Impoundment LCPA. The coal pile stormwater runoff is routed to LCPA via a pump station. This closure plan will focus on Surface Impoundment LCPA (Bottom Ash Pond).

2.0 Closure Plan

Pursuant to 40 CFR §257.102, a surface impoundment can be closed by leaving the CCR material in place and installing a final cover system, or through removal of the CCR. Surface impoundments at the Labadie Energy Center will be closed by capping and leaving the CCR materials in place as contemplated and authorized by the regulations. This report describes the process which Ameren Missouri will use to close Surface Impoundment LCPA at Labadie. LCPA is a 165-acre, unlined impoundment constructed in the late 1960's during the initial construction of the Labadie Energy Center. Surface Impoundment LCPA does not include a compacted soil liner or approved equivalent base liner and, therefore, does not comply with the liner performance criteria set forth in the CCR Rule.

Primary activities common to most impoundment closures are listed below. Initial project schedules are presented in Section 5 and Appendix B.

2.1 Reroute Process Water/Piping Modifications

The various piping systems to Surface Impoundment LCPA have not yet been physically removed. To preclude the probability of future impoundment of water, water systems and piping will be rerouted to prevent future discharge of plant service water systems or other drainage to the closed ash pond. A new, low volume wastewater treatment plant will be built at the Labadie Energy Center to manage non-CCR wastewaters currently discharged

into Surface Impoundment LCPA. A part of this wastewater treatment plant will be a detention basin that will be built on top of a portion of the closed Surface Impoundment LCPA. Stormwater from the coal pile will be routed to the detention basin, then routed to the low volume wastewater treatment system. A portion of Surface Impoundment LCPA will continue to discharge stormwater to Outfall 002 following closure of the unit.

2.2 Dewater Surface Water

Liquid from Surface Impoundment LCPA will be removed either passively (by gravity drainage) or actively (by extraction wells, pumps or trenches). To dewater portions of the surface impoundment, the CCR material may be moved and stockpiled to allow water to drain from the ash.

2.3 Installation of Drainage and Stormwater Management

Stormwater management systems will be designed and constructed to adequately manage flow during peak discharge of the design flood event and collect and control runoff during the same design storm. The design flood event is based on the CCR unit's flood hazard potential rating. The inflow design flood control system plan and calculations are certified by a professional engineer and updated every five years.

2.4 Stabilization and Grading

The CCR Rule requires closure systems for CCR units to preclude the probability of future impoundment of water, sediment or slurry and the stabilization of wastes within an impoundment. A CCR layer is considered stabilized when it is structurally suitable for use as a base layer and can accommodate construction activities. Stabilization techniques could include dewatering and/or compaction via tracking by earth moving equipment.

Minimum design slopes are not established within the CCR Rule. However, a slope of one percent (1%) will be used as a practical minimum for final slopes of the surface impoundments. Additional slopes will be provided, as feasible, in areas where settlement due to saturated CCR is anticipated. Ameren Missouri will optimize the use of existing onsite CCR materials to achieve final grade, reduce the overall footprint of the CCR units and enhance drainage.

The boundaries of Labadie's CCR surface impoundments do not overlap, but they are adjacent and separated by a common berm. Therefore, they will require a coordinated approach to grading to properly manage stormwater runoff. Grading modifications related to Surface Impoundment LCPA will consider drainage from Surface Impoundment LCPB to the east and other locations of the plant. As currently anticipated, no CCR material will be removed from within the footprint of Surface Impoundment LCPA during final grading operations. An additional quantity of CCR material may be imported from other onsite CCR

units at the LEC site to achieve the necessary final grades. Using conventional earth moving, this CCR material will be placed in approximate 8-inch loose lifts and compacted. A site plan for Surface Impoundment LCPA is provided as Figure 3 in Appendix A.

2.5 Closure Documentation

A construction quality assurance plan, engineering drawings, bid specifications and as-built construction drawings will be developed to demonstrate that appropriate closure activities were successfully implemented. Additional closure documentation will include the following:

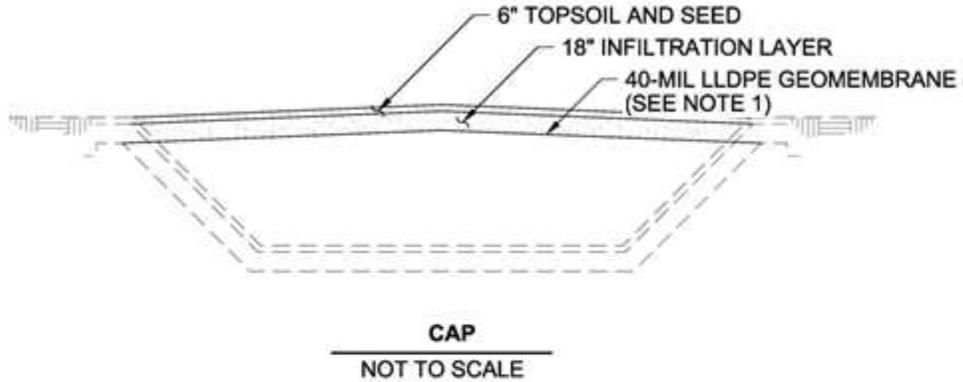
- The annual progress reports summarizing closure progress and projected closure activities;
- Notification of completion of closure will be finalized within 60 days of the actual closure completion date.

The closure notices and progress reports will be placed in Labadie Energy Center's Operating Record, sent to the Director of Missouri Department of Natural Resources (MDNR) before close of business on the required compliance date and placed on Ameren's CCR public website within 30 days of placing said information in the Operating Record.

3.0 Final Cover System

Minimum standards for cover include an 18-inch infiltration layer and 6 inches of topsoil to support the growth of vegetation. The final cover is required to have permeability less than or equal to that of the bottom layer, or 1×10^{-5} centimeters per second (cm/s). Alternative cover systems are authorized provided that such design meets or exceeds the CCR Rule performance standards. As a part of the engineering design, geotechnical assessments of the CCR materials in the surface impoundment will be performed. A typical final cover system will have sufficient soil cover to support vegetative growth and minimize erosion.

A typical cross section of the final cover system is shown in Figure 1.



NOTES:

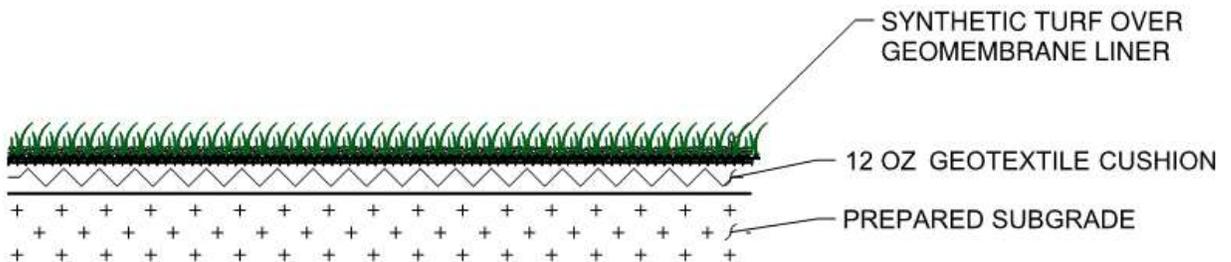
1. GEOMEMBRANE MAY NOT BE REQUIRED IF THE FINAL COVER SYSTEM MEETS THE PERMEABILITY REQUIREMENTS OF THE RULE.

Figure 1: Typical CCR Unit Cap

3.1 Alternative Cover System

The CCR Rule authorizes the use of an alternative final cover system for closure, provided the system meets equivalent performance requirements.

A typical cross section of an alternative cover system is set forth below.



Ameren Missouri is considering using an engineered synthetic turf system at Labadie CCR unit closures, depending upon the ease of constructability and design performance experienced at LEC.

3.2 Settlement and Subsidence of Cover System

Settlement on the impoundment may occur during consolidation of the CCR material, general fill material or underlying natural subsoils under new loads from grading activities. A portion of the CCR material within the impoundment contains cemented material that may have minimal settlement. The saturated, un-cemented CCR material encountered may settle under the additional loading. This settlement may occur for the duration of

grading activities and is expected to be minimal after the final cover system is installed. General fill will be installed in a controlled manner to minimize post-cover system installation settlement.

Slope stability and mass stability of the covered-in-place material will be analyzed after completion of the final design, which is currently ongoing. Instability of the cover system is not anticipated, based on the relatively flat sloping grades. The stable cover system design concept will minimize the need for extensive future maintenance.

3.3 Method of Installation

Closure construction will consist of erosion and sediment control installation, clearing and grubbing, dewatering, grading and compaction of CCR, construction of a compacted clay layer and erosion layer or alternative cover system, installation of stormwater controls and performance of final seeding and restoration.

4.0 CCR Unit Inventory and Area Estimate

Set forth below in Table 1 is Ameren Missouri’s estimate of CCR materials within Surface Impoundment LCPA, along with the currently expected final cover area. Note that actual cover areas may be reduced as the footprint of various units is consolidated as part of closure.

Table 1: Estimated CCR Inventory and Cover Area

CCR Unit	Estimated Inventory (CY)	Estimated Capacity (CY)	Estimated Final Cover Area (Ac)
LCPA (Bottom Ash Pond)	12,000,000	15,836,000	165+/-

5.0 Closure Schedule

Table 3 below identifies the impoundment and anticipated closure date. This schedule is preliminary and subject to revision based upon operational needs, construction progress and budgetary constraints.

Ameren has developed preliminary work schedules based on project milestones and estimated completion dates reflected in Table 2. See the Closure Schedule in Appendix B.

Table 2: Estimated Closure Date

CCR Unit	CCR Type	Estimated Closure Date
LCPA (Bottom Ash Pond)	Bottom Ash and Fly	2023

6.0 Miscellaneous Requirements

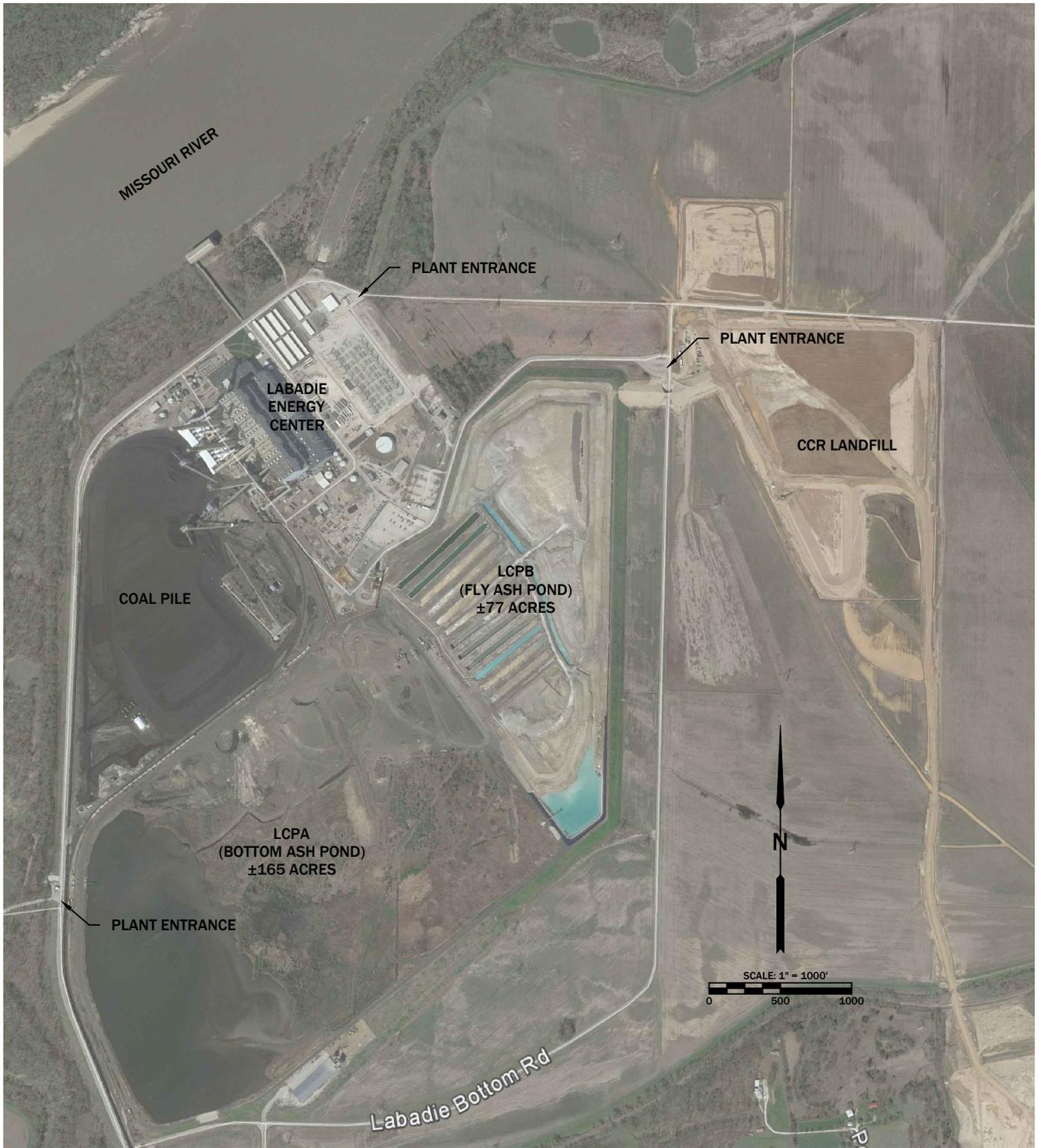
CFR §257 Section 257.102 includes other requirements that Ameren Missouri must comply with, as listed below:

- Section 257.102 (i) includes specific requirements related to *deed notations* following completion of closure.

Appendix A

Figures

M:\Share\CADD\Files\CONFIDENTIAL\SCHIFF-HARDIN 2014\ASH POND PRELI GRADING\CLOSURE PLANS.dwg, FIGURE 2 - LABADIE ENERGY CENTER, 10/13/2016 11:41:23 AM



**CCR SURFACE IMPOUNDMENT CLOSURE
LABADIE ENERGY CENTER**

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**FIGURE 2 - LABADIE ENERGY CENTER
AERIAL VIEW**

DATE 10/2016	SCALE AS NOTED	PROJECT NAME ASH POND PRELIM	REVISION
DRAWN AJK	APPROVED TRG	FILE NAME CLOSURE PLANS	SHEET # 1 OF 1

Appendix B

Closure Schedule

**AMEREN MISSOURI - LABADIE ENERGY CENTER
LCPA CCR SURFACE IMPOUNDMENT (BOTTOM ASH POND)
CLOSURE SCHEDULE**

