

SIoux ENERGY CENTER SCPA CCR IMPOUNDMENT – CLOSURE PLAN



Table of Contents

1.0	INTRODUCTION.....	1
2.0	SITE DESCRIPTION.....	1
3.0	CLOSURE PLAN	1
3.1	Overview of Closure Approach	1
3.2	Estimated Maximum Inventory of CCR	2
3.3	Largest Area Requiring Cover Systems.....	2
3.4	Closure Components	2
3.4.1	Process Water/Piping Rerouting.....	2
3.4.2	Impoundment Surface Dewatering	2
3.4.3	Stabilization and Grading.....	2
3.4.4	Design and Installation of Final Cover System	3
3.4.4.1	Alternative Cover System.....	3
4.0	PRELIMINARY SCHEDULE	4
5.0	POST-CLOSURE PLAN	5
5.1	Post Closure Uses	6
6.0	QUALIFIED PROFESSIONAL ENGINEER CERTIFICATION	6
7.0	REFERENCES.....	6

List of Tables

Table 1	SCPA Impoundment Status
Table 2	Anticipated Schedule

List of Appendices

Appendix A	SCPA Conceptual Site and Grading Plan
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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, with respect to the installation method for the final cover system, describe how such cover complies with the designated performance criteria set forth in the CCR Rule. This closure plan was prepared for Ameren Missouri's (Ameren) Sioux Energy Center (SEC) SCPA impoundment, which is an active CCR surface impoundment containing fly ash and wet bottom boiler slag. Ameren will initiate closure of the SCPA impoundment consistent with the requirements of the CCR Rule, leaving the CCR in place. The information contained in this plan describes how Ameren plans to close the unit. Appendix A provides a map showing the location of the SCPA impoundment at SEC. Table 1 (below) provides a summary of the SCPA impoundment, operational status, and anticipated closure date. It is understood that the provided schedule is preliminary in nature and subject to revision based on operational needs, construction progress, budgetary constraints, and future evaluations of methods and materials for closure.

Table 1: SCPA Impoundment Status

CCR Unit	CCR Type	Operational Status	Estimated Closure Date
SCPA	Bottom Ash and Fly Ash	Active	2021

Ameren anticipates closure of the SCPA impoundment at SEC to occur in 2021.

2.0 SITE DESCRIPTION

The SEC is located in Saint Charles County, Missouri at 8501 N. State Route 94, West Alton, MO 63386; north of State Route 94 adjacent to the Mississippi River. The SEC is an active power plant that generates CCRs which are stored in SCPA and other CCR units at the facility. SCPA formerly operated as the primary ash surface impoundment, collecting all CCRs for the plant until 1994. In 1994, SCPB, a lined surface impoundment, was constructed and the SEC's CCR storage strategy changed to impounding only bottom ash in the SCPA and impounding only fly ash in the SCPB. The SCPA impoundment is located west and south of the power plant.

3.0 CLOSURE PLAN

3.1 Overview of Closure Approach

The purpose of this closure plan is to outline the steps to close the impoundment consistent with recognized and generally accepted engineering practices. This plan is designed to minimize the need for long-term maintenance and to control the post-closure release of contaminants. SCPA will be closed in accordance

with the requirements of 40 C.F.R. § 257.102. Closure will occur within the time frames set out in 40 C.F.R. § 257.102(f).

Closure of the SCPA Impoundment at SEC will consist of a cap-in-place cover system consistent with 40 C.F.R. § 257.102 (d)(3). Ameren plans to use CCRs to achieve closure design contours and grade the closure configuration to meet stability requirements and reduce the potential for water infiltration. After proper CCR contours and surface compaction are achieved, the final cover system will be installed. The final closure and cover system will use appropriate materials and could include a composite or alternative cover. The final closure will also use a drainage system to control run-on and run-off for the SCPA. Post-closure monitoring will be performed for SCPA in accordance with the CCR Rule.

3.2 Estimated Maximum Inventory of CCR

The SCPA has an estimated maximum inventory of approximately 3,338,000 cubic yards of CCR.

3.3 Largest Area Requiring Cover Systems

Under 40 CFR § 257, the entire impoundment will require a cover system totaling approximately 49 acres.

3.4 Closure Components

The primary activities and components that Ameren plans to employ to satisfy the requirements of closure for the SEC's SCPA are detailed below.

3.4.1 Process Water/Piping Rerouting

All piping and water systems will be rerouted to prevent future discharge of plant service water systems, stormwater, and other drainage to SCPA. Plant service water systems will be rerouted to an ash dewatering treatment facility and stormwater will be rerouted to the NPDES outfall (002).

3.4.2 Impoundment Surface Dewatering

Grading of the impoundment surface will be performed to promote gravity drainage of surface water to desired and/or designated collection areas within the SCPA. Water collecting in these areas will be removed and used to enhance compaction, dust suppression, or moved to a proper drainage outfall.

3.4.3 Stabilization and Grading

40 C.F.R. § 257 requires closure systems for CCR surface impoundments to prevent the probability of future impoundment of water, sediment or slurry. In addition, the CCR rule requires the stabilization of wastes within an impoundment. A CCR impoundment layer is considered stabilized when it is structurally suitable for use as a base layer and can accommodate future construction activities. Stabilization techniques for the existing CCR within SCPA may include dewatering and compaction.

Minimum design slopes are not established under 40 C.F.R. § 257. However, the Missouri Department of Natural Resources (MDNR) require utility waste landfills to use a minimum slope of one percent (1%) and it is good engineering practice to use a minimum of two percent (2%) so that no ponding occurs after construction. Therefore, the grading of SCPA will follow the industry practice of 2% minimum slope. Grading of SCPA may be accomplished using existing CCR materials for final grading and enhance drainage.

3.4.4 Design and Installation of Final Cover System

In accordance with the CCR Rule, the Final Cover System will meet the requirements of 40 C.F.R. § 257.102.

Final Cover System Design

The cover system will be designed to reduce infiltration into the landfill and to resist erosion. The permeability of the cover system and will be equal to or less than the permeability of the underlying soil below the impoundment and no greater than 1×10^{-5} cm/sec.

The final cover system for closure will be certified by a qualified professional engineer as being designed in accordance with the requirements of 40 C.F.R. § 257.102.

CCRs managed for storage/disposal could have differential settlement and/or subsidence could occur due to the fine grained characteristics and material properties of the CCR. To accommodate potential differential settlement, layers with a high allowance for strain, will be used in the final cover system.

The proposed final cover system will consist of the following from top to bottom and will be placed over the graded CCR:

- 6-inch thick vegetated erosion control layer
- 18-inch thick infiltration layer or a composite system with equivalent properties
- Low permeability layer meeting the permeability requirements of the CCR Rule (such as a geomembrane layer or other layer that meets the CCR Rule requirements)

Appendix A provides conceptual site plans for the final cover system.

3.4.4.1 Alternative Cover System

The CCR Rule authorizes the use of an alternative final cover system for closure, provided such system meets equivalent performance requirements. Alternative final systems comprised of synthetic turf material have demonstrated equivalence with the prescriptive final cover requirements in solid waste applications, and MDNR has approved synthetic turf systems for use as interim covers for use at municipal solid waste landfills. Ameren is evaluating their use for final cover. Benefits of an alternative cover system application

include reduced cover system costs when soils would otherwise be required to be imported, reduced environmental impact from haul trucks, a potential reduced construction timeframe, improvements to stormwater discharge quality, ability to accommodate settling / subsidence, and reductions in post-closure care maintenance.

Consideration of an alternative cover system will be based on interviews with manufacturers, site visits and a field demonstration assessment. Technologies to be considered will prevent contact of CCR materials with percolating rainwater, promote controlled runoff to stormwater detention systems, reduce borrow volume requirements and minimize maintenance. Performance considerations used to evaluate various synthetic products and alternative cover systems include the following: permeability, constructability, longevity, cost, installation time, thickness, puncture strength, wind resistance, flood resistance, CCR compatibility, vehicle traffic, storm flow velocity restrictions, maintenance, erosion control, and UV protection.

4.0 PRELIMINARY SCHEDULE

In accordance with 40 C.F.R. § 257.102(e), the facility will begin closure activities within 30 days after the known final receipt of waste, or if the landfill has remaining capacity and there is a reasonable likelihood that the landfill will receive additional wastes, no later than two years after the most recent receipt of wastes. Contractor mobilization will occur during the initial 30-day period after last known receipt of waste.

It is anticipated that the completion of the CCR final closure will be complete within the 5 years allowed after commencing closure, or by an approved extension deadline. 40 C.F.R. § 257.102(f)(1)]

In accordance with 40 C.F.R. § 257.102(h), within 30 days following completion of closure of the CCR unit, Ameren shall record a notation on the deed to the SCPA property stating that the property has been used as a CCR unit and its use is restricted under the Post-closure plan and the post-closure care requirements as provided by 40 C.F.R. § 257.104(d)(1)(iii).

Within 30 days of recording the notation, Ameren shall prepare a notification stating that that the notation has been recorded and placed it into the facility's operating record. Pursuant to 40 C.F.R. § 257.106(d), Ameren shall send to the appropriate regulatory agency the notification of intent to close, notification of closure completion, and notification of deed notation, within 30 days of placing each such notification in the operating record.

The anticipated schedule for closure activities is as follows:

Table 2: Anticipated Schedule

Time	Activity
Prior to last receipt of waste	Permitting, detailed closure design and contractor selection
30 days after last receipt of waste	Mobilization of contractor
Within 5 years after beginning construction	Grading, install cover system and stormwater controls
2021	Complete closure construction activities
30 days after closure construction completion	Within 30 days following completion of closure of the CCR unit, Ameren shall record a notation on the deed to the SCPA property stating that the property has been used as a CCR Unit and its use is restricted under the Post-Closure Plan and the post-closure care requirements as provided by 40 C.F.R. § 257.104(d)(1)(iii). Place closure documentation into the facility's operating record.

5.0 POST-CLOSURE PLAN

Per 40 C.F.R. § 257.104, all surface impoundments and landfills related to CCR containment are required to provide post-closure care for a minimum of thirty (30) years. These activities will include:

- Periodic inspection of the closed CCR unit
- Maintaining the integrity and effectiveness of the final cover system.
- Making repairs as necessary to correct effects of settlement, subsidence, erosion, and/or other events.
- Preventing run-on and run-off from eroding or otherwise damaging of the final cover.
- Maintaining the groundwater monitoring system.
- Semiannually sampling the groundwater monitoring wells, in accordance with the groundwater monitoring plan

This closure plan requires drainage (pipe rerouting, dewatering, and run-on and run-off plan), stabilization of CCR, placement of fill and grading, and installation of a final cover system over the CCR material to minimize erosion and infiltration. The final cover grades will promote drainage and reduce

cuts and fills (and associated construction costs). Stormwater is planned to be conveyed to an existing NPDES outfall. A conceptual site and grading plan for SCPA is presented in Appendix A.

Contact for post-closure care period:

Contact Name: Ameren Missouri
Contact Address: 1901 Chouteau Avenue
St. Louis, MO 63103
Contact Phone Number: (800) 552-7583
Contact email address: CCR@ameren.com

5.1 Post Closure Uses

Planned uses for the CCR unit property during the post-closure period have not been decided, but will be dependent on the status and operation of the facility at the time of closure. In accordance with the CCR Rule, post-closure use of the property shall not disturb the integrity of the final cover system or components of the containment system unless it complies with the CCR Rule and a demonstration is made that it will not increase the potential threat to human health of the environment.

6.0 QUALIFIED PROFESSIONAL ENGINEER CERTIFICATION

This certification is understood and intended to be an expression of my professional opinion as a Missouri Licensed Professional Engineer, based upon knowledge, information, and belief.

I certify that the Final Closure Cover System, Closure Plan and Post-Closure Plan meet the requirements of 40 CFR 257.102 and 40 CFR 257.104, as appropriate.

Professional Engineer's Seal



Mark N. Haddock, P.E.
License: Missouri PE-2001018745

7.0 REFERENCES

Federal Register; Part II Environmental Protection Agency 40 C.F.R. § 257 and 261; Vol. 80; No. 74; April 17, 2015.

GSE Environmental; <http://www.gseword.com>; 2015.

Hayward Baker Geotechnical Construction; <http://www.haywardbaker.com>; 2015.

Missouri Code of State Regulations; Title 10 - Department of Natural Resources (MDNR); Division 80 – Solid Waste Management; Chapter 11 – Utility Waste Landfill.

National Archives and Records Administration; 40 C.F.R. § 257; United States Environmental Protection Agency (USEPA).

APPENDIX A

**SCPA CONCEPTUAL SITE AND
GRADING PLAN**

NOTE(S)

1. Figure for illustrative purposes only. Does not represent actual final closure plan or contours.



SCPA POND EXTENT OF
PROPOSED COVER SYSTEM



Path: \\nautilus\common\Projects\1547197 - Ameren Sioux Pond Closure\800 - FIGURES\DRAWINGS\PRODUCTION\Task 4 - CCR Closure\1 - File Name: Bottom Ash Pond Zoning 250.dwg

01	10/12/2016	PROPOSED CCR POND CLOSURE	MSG	MSG	MNH	MNH	-
REV.	YYYY-MM-DD	DESCRIPTION	DESIGNED	PREPARED	REVIEWED	APPROVED	-

CLIENT
Ameren Missouri
 8501 North State Route 94
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PROJECT
Sioux Energy Center (SEC) - SCPA Closure Concept

TITLE
SCPA Conceptual Site and Grading Plan

PROJECT NO.
154-7197

REV. 01 of 01
01

Figure
01

1 in. IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B