Spurlock Station Landfill Closure Plan

East Kentucky Power Cooperative

Coal Combustion Residual Rule Compliance

Revision 0
October 13, 2016

Spurlock Station Landfill
Closure Plan

Prepared for

East Kentucky Power Cooperative
Coal Combustion Residual Rule Compliance
Winchester, Kentucky

Revision 0
October 13, 2016

Prepared by

Burns & McDonnell Engineering Company, Inc.
Kansas City, Missouri

INDEX AND CERTIFICATION

East Kentucky Power Cooperative
Spurlock Station Landfill
Closure Plan

Report Index

Certification

I hereby certify, as a Professional Engineer in the Commonwealth of Kentucky, that the information in this document was assembled under my direct supervisory control. This report is not intended or represented to be suitable for reuse by the East Kentucky Power Cooperative or others without specific verification or adaptation by the Engineer.

10/13/16 8:57 AM

Kira E. Wylam

Kira Wylam, P.E. (KY #30195)

Date: 10/13/2016

TABLE OF CONTENTS

Page No.

LIST OF FIGURES

Page No.

LIST OF ABBREVIATIONS

Abbreviation	Term/Phrase/Name
BMcD	Burns & McDonnell
CCR	Coal Combustion Residual
CFR	Code of Federal Regulations
cm/sec	Centimeter Per Second
CQA	Construction Quality Assurance
EKPC	East Kentucky Power Cooperative
EPA	Environmental Protection Agency
KDEP	Kentucky Department of Environmental Protection
KDWM	Kentucky Division of Waste Management
MW	Megawatt
RCRA	Resource Conservation and Recovery Act
U.S.C.	United States Code

1.0 INTRODUCTION

On April 17, 2015, the Environmental Protection Agency (EPA) issued the final version of the federal Coal Combustion Residual Rule (CCR Rule) to regulate the disposal of coal combustion residual (CCR) materials generated at coal-fired units. The rule will be administered as part of the Resource Conservation and Recovery Act (RCRA, 42 United States Code [U.S.C.] §6901 et seq.), using the Subtitle D approach.

East Kentucky Power Cooperative (EKPC) is subject to the CCR Rule and as such will develop a Closure Plan per 40 Code of Federal Regulations (CFR) §257.102. This document serves as EKPC's Closure Plan for the existing CCR Landfill (as defined in §257.53) at Spurlock Station. The Closure Plan will contain the following as required in §257.102(b)(1):

- A description of how the CCR unit will be closed.
  - For in-place closure:
    - A description of the final cover system, methods for installing final cover system, and methods for achieving compliance with the standards outlined in §257.102(d)
- An estimate of the maximum inventory of CCR material ever stored in the CCR unit over its active life.
- An estimate of the largest area of the CCR unit ever requiring a final cover as required by §257.102(d) at any time during the CCR unit's active life.
- A schedule for completing closure activities, including the anticipated year of closure and major milestones for permitting and construction activities.

2.0 CLOSURE PLAN

2.1 Landfill Description

Spurlock Station (Spurlock) is owned and operated by EKPC. Spurlock is a 1,346 net megawatt (MW) coal-fired power plant located in Mason County, approximately five miles Northwest of Maysville, Kentucky. The Spurlock CCR Landfill (Landfill) is a special waste landfill permitted by the Kentucky Department of Environmental Protection (KDEP Permit No. 081-00005). The Landfill is located on the west side of the plant site. Construction drawings prepared by Kenvirons, Inc., dated 2002, were reviewed along with the permit application to gain an understanding of the Landfill design and geometry. The final grading plans included in the permit drawings can be found in Appendix A.

The Landfill design permit submittal prepared by Kenvirons, Inc. was reviewed and accepted by the Kentucky Division of Waste Management (KDWM) on March 28, 2003. The construction drawings were deemed to be in general accordance with conventional landfill design and permitting standards.

The following is a summary of information within the permit application and construction drawings applicable to this Closure Plan.

2.1.1 CCR Inventory

The permitted total volume for the Landfill is 37,868,625 cubic yards. At the time the Landfill was permitted, the Landfill life was estimated to be 81.8 years. However, the life of the Landfill may be extended depending on the capacity factor of the generating units.

2.1.2 CCR Extent

The final cover slope of the west face of Area C is to be 3H:1V. All other final cover slopes are to be 4H:1V. The maximum crest elevation for the final landfill grading plan is 1,171 feet. Per the permit application, the waste boundary is 176.67 acres, while the permitted landfill area is 388.6 acres. The waste boundary is for CCR waste disposal only, while the permitted landfill area includes all CCR material handling areas, soil borrow areas, sedimentation ponds, buffer zones, and the unaffected land between these areas.

2.2 Closure Method

The Landfill Closure Plan is described in this document and within Permit No. 081-00005. Construction drawings for closure were prepared by Kenvirons, Inc. in 2003. The Landfill is permitted and required to be capped and closed in place as described in this document and in the permit documents. The final cover system as required by the CCR Rule and noted herein is more stringent than the final cover system

described in the Landfill permit. Minor modifications to the permit documents are required for the final cover to be in compliance with the CCR Rule as noted in Section 2.2.1.

2.2.1 Final Cover System

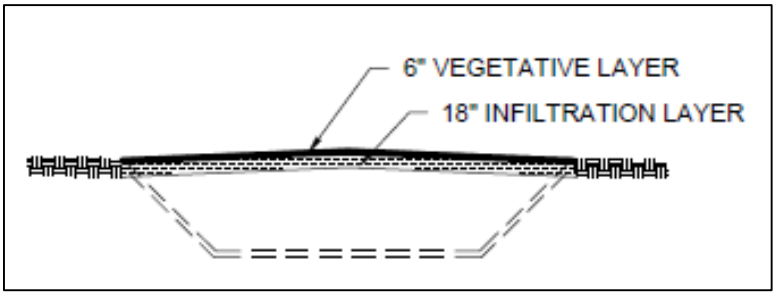
The final cover system will be designed and constructed to meet the following criteria pursuant to §257.102(d)(3)(i):

- Have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present, or a permeability no greater than $1x10^{-5}$ centimeters per second (cm/sec), whichever is less.
- 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.
- 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.
- The disruption of the integrity of the final cover system must be minimized through a design that accommodates settling and subsidence.

The final cover system consists of an 18-inch infiltration layer and six-inch vegetative soil layer. The CCR materials will form a suitable subgrade for installation of the final cover material. The physical properties of coal ash material should result in minimal settling. Furthermore, settling would occur during the prolonged period of filling up the Landfill and minimal settling would occur after installation of the cover.

The cover will prevent infiltration of the waste, thus preventing leachate production and migration from the Landfill site. Precipitation that penetrates the vegetative layer will be directed to drainage ditches. Vegetation will be established within the vegetative layer to prevent erosion of the soil from the slopes. A typical cross section of the final cover is shown in Figure 2-1.

Figure 2-1: Typical Cover System



The final cover system is designed to minimize the infiltration of liquids through the CCR unit and provides a vegetative erosion control layer. The Landfill bottom liner was designed to provide a permeability of $1x10^{-7}$ cm/sec. A cross section of the permitted landfill liner is shown in Appendix B. In order to comply with the CCR Rule, the construction drawings within the Landfill permit will be revised to provide a final cover design that meets or exceeds the permeability of the bottom liner system specified herein. The permit modification will be submitted to and approved by the KDEP prior to commencement of closure.

2.2.2 Installation of Final Cover

Installation of the final cover will include the following general steps:

- Development of construction plans and specification.
- Final cover construction bidding and procurement.
- Final cover construction.
- Documentation of final cover construction quality assurance activities.

Prior to development of the final cover construction plans and specification, a ground or aerial survey will be conducted to develop a detailed surface topography. If vegetation exists on the surface of the CCR material or the intermediate cover, the vegetation will be removed. The soil subgrade will be prepared and the final cover system will be installed. The maximum area requiring final cover is estimated to be 176.67 acres, which is the permitted waste boundary area for CCR waste disposal as indicated in Section 2.1.2.

Construction Quality Assurance (CQA) activities will be conducted in accordance with an approved CQA Plan. The final cover installation will be closely documented in a CQA documentation report.

2.2.3 Methods to Achieve Closure Performance Standards

As outlined in in §257.102(d), the Closure Plan will at a minimum:

- 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 ground or surface waters or to the atmosphere.
- Prevent future impoundment of water.
- Provide for slope stability to protect against sloughing or movement of the final cover system.
- Minimize future maintenance of the CCR unit.
- Be completed in the shortest amount of time consistent with recognized and generally accepted good engineering practices.

The following sections describe performance standards by which closure of the unit will meet these listed criteria.

2.2.3.1 Sediment Control Ponds

The Landfill utilizes two sediment control ponds. The Landfill construction and final cover is designed to utilize a network of channels and diversion ditches to route runoff into one of these two ponds. The system was designed to minimize soil erosion.

2.2.3.2 Soil Borrow Areas

Soil borrow areas identified in the permit documents will be utilized to support the construction of the final cover. Soil removed from these borrow areas will be amended as necessary to promote vegetative growth in the final cap. Borrow areas will be graded and seeded to prevent erosion.

2.2.3.3 Methods of Revegetation

All areas that require seeding, both for final cover and in soil borrow areas, will be mulched at a rate of 1.5 tons/acre. Soil samples may be obtained prior to seeding to determine if amendments are necessary to promote growth. Seeding requirements are described in the permit documents.

Vegetation is planned to provide 90 percent ground cover. Vegetation ground coverage will be evaluated during routine landfill inspections.

2.3 Closure Commencement

Closure of the Landfill will commence no later than 30 days after the date on which the Landfill receives the known final receipt of waste. At the time of development of this Closure Plan, assuming the initial receipt of waste occurred in September of 1982 and the life expectancy of the Landfill indicated in Section 2.1.1 does not change, the estimated year of final receipt of CCR material is 2064. For purposes of this plan, and in accordance with the CCR Rule, closure of the Landfill has commenced when EKPC ceases placing waste and completes any of the following actions or activities:

- Takes any steps necessary to implement the written Closure Plan.
- Submits a completed application for any required state or agency permit or permit modification.
- Takes any steps necessary to comply with any state or other agency standards that are a prerequisite, or are otherwise applicable, to initiating or completing the closure of a CCR Unit.

No later than the date EKPC initiates closure of the Landfill, a notification of intent to close the Landfill will be prepared. The intent to close will include a certification by a qualified professional engineer in the

Commonwealth of Kentucky for the design of the final cover system. The notification has been completed when it has been placed in the facility's CCR Operating Record. The notification will then be placed on EKPC's CCR public website 30 days.

The planned closure schedule for the Landfill is included within Appendix C of this plan.

2.4 Closure Completion

Closure for the Landfill will be completed within six months of commencing closure activities per the CCR Rule and Section 2.3 of this plan. The timeframe for completing closure of the CCR unit may be extended if EKPC can demonstrate that it is not feasible to complete closure of the CCR unit within the required timeframe due to factors beyond the facility's control. A request for the extension of closure timeframe will be completed pursuant to §257.102(f)(2).

Within 30 days of completion of closure of the Landfill, a notification of closure of the Landfill will be prepared and placed in the facility's CCR Operating Record and on EKPC's CCR public website. This notification will include a certification by a qualified professional engineer in the Commonwealth of Kentucky verifying that closure has been completed in accordance with this Closure Plan and the requirements of §257.102.

The CCR Rule does not define "closure complete" for CCR Landfills. For the purpose of this Closure Plan, closure of the Landfill is considered complete when the final cover system is installed and applicable construction completion documentation is completed. Based on the estimated year of final receipt of CCR waste as noted in Section 2.3 and the closure schedule provided in Appendix C, it is estimated that the closure of the Landfill will be complete in 2064.

3.0 REVISIONS AND AMENDMENTS

The initial Closure Plan will be placed in the CCR Operating Record by October 17, 2016. The plan will be amended whenever there is a change in operation of the CCR unit that affects the current or planned closure operations. The Closure Plan will be amended 60 days prior to a planned change in operation, or within 60 days following an unplanned change in operation. If a written Closure Plan is revised after closure activities have commenced, the written Closure Plan will be amended no later than 30 days following the triggering event. The initial Closure Plan and any amendment will be certified by a qualified professional engineer in the Commonwealth of Kentucky for meeting the requirements of §257.102 of the CCR Rule. All amendments and revisions will be placed on the CCR public website within 30 days following placement in the facility's CCR Operating Record. A record of revisions made to this document is included in Section 4.0 of this document.

4.0 RECORD OF REVISIONS AND UPDATES

Revision Number	Date	Revisions Made	By Whom
0	10/13/2016	Initial Closure Plan	Burns & McDonnell

APPENDIX A – SITE PLAN

EAST KENTUCKY POWER COOPERATIVE, INC.
SPURLOCK STATION LANDFILL
MASON COUNTY, KENTUCKY
MODIFICATION TO PERMIT NO. 081-00005

LEGEND

- Existing Contours
- Proposed Final Grade Contour — 960
- Approximate Property Boundary
- Approximate Limits of Proposed Permit Boundary — P
- Approximate Limits of Proposed Property and Permit Boundary — PP
- Approximate Limits of Proposed Waste
- 100' Buffer Zone
- Proposed Access Road
- Existing Access Road
- Existing Groundwater Monitoring Point — ● IW-8
- Proposed Groundwater Monitoring Point — ○ MW-2A
- Proposed Surface Water Monitoring Point — ▲ SW-1
- Diversion Ditches:
  - Class I
  - Class II
  - Class III
  - Berm
  - Terrace
  - Downdrain

NORTH

▲ SW-1

Site Entrance

Proposed Access Road

Karst Feature
(To be excavated and sealed off prior to waste placement. See Details, Sheet 22 of 68.)

▲ SW-3

PROPOSED POND 2

EXISTING ACCESS ROAD

EXISTING HAUL ROAD

● IW-8 (MW-1)

STA. 47+00
N 255597.8986
E 1616486.9374

Baughby Creek Road

KY 576

Proposed Waste Limits

EXISTING ACCESS ROAD

STA. 3+50
N 252837.8946
E 1619928.8669

○ MW-2A

SW-2

○ MW-3A

PROPOSED POND 1

EXISTING ACCESS ROAD

GRAPHIC SCALE

200 0 100 200 400 800

(IN FEET)
1 inch = 200 ft.

GENERAL FINAL GRADING PLAN

Topography from Aerial Survey on March 13, 2001 by Photo Science, Inc., Lexington, Kentucky.

STATE OF KENTUCKY
RANDALL W. HASSELL
LICENSED PROFESSIONAL ENGINEER

DRAWN BY:	WJL JT
CHECKED BY:	STO
DATE:	February 2002
SCALE:	1" = 200'

REVISIONS	
6-28-02	Karst Buffer

KENVIRONS, INC.
FRANKFORT, KENTUCKY

PROJECT NO.
2000015

SHEET NO.
17 of 68

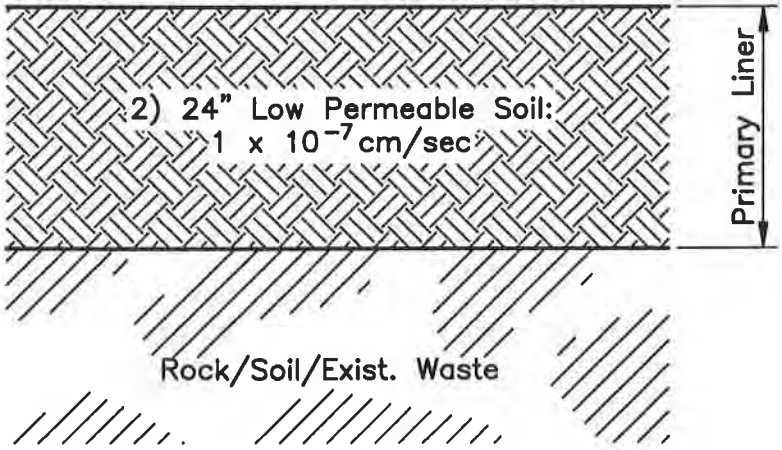
APPENDIX B – PERMITTED LINER DESIGN

PRIMARY LINER DESIGN

SPURLOCK STATION LANDFILL

MASON COUNTY, KENTUCKY

1) Drainage Layer: 1 x 10^{-2} cm/sec



1) A granular or synthetic drainage layer will be placed above the soil liner in the valley bottoms, drainage lines, and pathways.

2) See Liner Details, Sheet 23 of 68 of the Engineering Drawings.

EAST KENTUCKY POWER COOPERATIVE

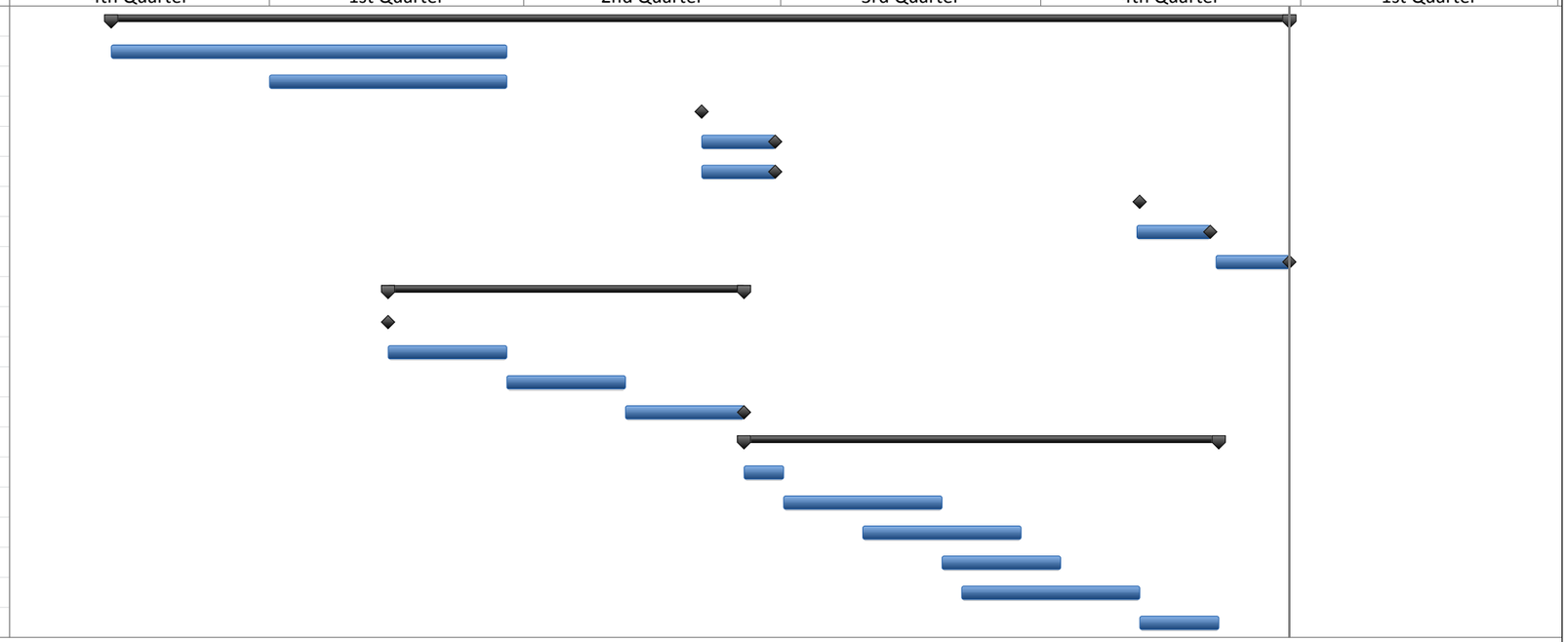
KENVIRONS, INC.

452 VERSAILLES ROAD, FRANKFORT, KENTUCKY

(502) 695-4357

APPENDIX C – CLOSURE SCHEDULE

ID	Task Mode	Task Name	Duration
1		**Permitting & Design Support**	**299 days**
2		Design documents developed	100 days
3		Borrow sources identified / material prequalified	60 days
4		Final placement of CCR material*	0 days
5		Notification of Intent to Close	20 days
6		Commence closure	20 days
7		Closure complete	0 days
8		Notification of Completion of Closure	20 days
9		Record Deed Notification	20 days
10		**Preparation for Closure**	**90 days**
11		Design documents issued for bid	0 days
12		Bid period	30 days
13		Bid evaluation	30 days
14		Contract award	30 days
15		**Construction**	**120 days**
16		Mobilization	10 days
17		Grade waste material to drain	40 days
18		Placement of 18-inch infiltration layer	40 days
19		Placement of 6-inch erosion layer	30 days
20		Final seeding	45 days
21		Site cleanup and demobilization	20 days



Project: Spurlock Landfill Closure
Date: Fri 6/3/16

Task		Project Summary		Inactive Milestone		Manual Summary Rollup		Deadline	
Split		External Tasks		Inactive Summary		Manual Summary		Progress	
Milestone		External Milestone		Manual Task		Start-only			
Summary		Inactive Task		Duration-only		Finish-only			

*Assumed closure trigger event.

BURNS McDONNELL

CREATE AMAZING.

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