



Bottom Ash Pond Closure Plan



**Kansas City
Board of Public Utilities**

Nearman Creek Power Station
Project No. 87813

Revision 0
10/17/2016



Bottom Ash Pond Closure Plan

prepared for

**Kansas City
Board of Public Utilities
Nearman Creek Power Station
Kansas City, Kansas**

Project No. 87813

**Revision 0
10/17/2016**

prepared by

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

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INDEX AND CERTIFICATION

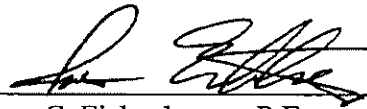
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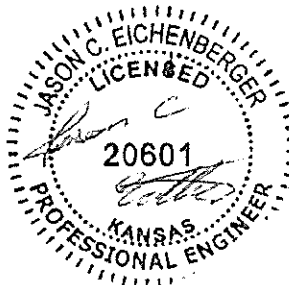
Certification

I hereby certify, as a Professional Engineer in the state of Kansas, that the information in this document was assembled under my direct personal charge. This report is not intended or represented to be suitable for reuse by the Kansas City Board of Public Utilities or others without specific verification or adaptation by the Engineer.



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Date: 10/17/2016



This document has been digitally
signed and sealed. October 17, 2016

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LIST OF ABBREVIATIONS

<u>Abbreviation</u>	<u>Term/Phrase/Name</u>
BMcD	Burns & McDonnell
Nearman Creek	Nearman Creek Power Station
CCR	Coal Combustion Residual
CFR	Code of Federal Regulations
KCBPU	Kansas City Board of Public Utilities
CY	Cubic Yards
EPA	Environmental Protection Agency
KDHE	Kansas Department of Health and Environment
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.

The Kansas City Board of Public Utilities (KCBPU) Nearman Creek Power Station (Nearman Creek) is subject to the CCR Rule. As such, KCBPU is required to develop a Closure Plan for the surface impoundment present at Nearman Creek (herein referred to as the Bottom Ash Pond) per 40 Code of Federal Regulations (CFR) §257.102. This report serves as the Closure Plan for the Bottom Ash Pond at Nearman Creek.

This closure plan is in addition to, not in place of, any other applicable site permits, environmental standards, or work safety practices.

2.0 PLAN OBJECTIVES

Per §257.102, the Closure Plan must contain the following:

- A description of how the CCR unit will be closed.
 - For closure through leaving CCR in place: A description of the final cover system and methods used to install the final cover, including methods for achieving performance standards specified 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.
- A schedule for completing closure activities, including the anticipated year of closure and major milestones for permitting and construction activities.

Additionally, KCBPU is required to develop a Post-Closure Plan per §257.104, which will be covered in a separate document.

Per §257.102(b)(4), KCBPU must obtain certification from a qualified professional engineer that the closure plan, and subsequent updates to the plan, meet the requirements of §257.102. This sealed document serves as that certification.

3.0 EXISTING CONDITIONS

KCBPU operates a single, coal-fired unit at Nearman Creek, which is located on the south bank of the Missouri River in Wyandotte County, Kansas. The facility contains one CCR surface impoundment, the Bottom Ash Pond, which is used as a settling pond for wet-sluiced bottom ash. The operation of the Bottom Ash Pond is permitted under Kansas Department of Health and Environment (KDHE) Solid Waste Permit Number 413. The Bottom Ash Pond was constructed in 1979 with a three-foot thick compacted soil liner. Riprap was added to the interior slopes of the pond at the recommendation of Terracon Engineers in 2008.

The Bottom Ash Pond is hydraulically connected to the adjacent Clear Water Pond via a 24-inch reinforced concrete pipe. The Clear Water Pond is used to store “clean water” which is eventually recycled back to the plant. In this way, the pond system operates in a closed loop. The two ponds are operated to maintain a normal pool elevation of 758.8 feet. Each pond is bounded by earthen dikes which crest at an elevation of 763 feet. A site plan is included in Appendix A.

3.1 CCR Inventory

The Bottom Ash Pond and Clear Water Pond cover approximately 21.5 acres and have approximately 300,000 cubic yards (CY) of storage capacity. This volume is an estimate of the maximum inventory of material that could potentially be stored in the impoundment over its active life. This estimated area is the largest area of the impoundment that should ever require a final cover. KCBPU removes and dewateres CCR material from the Bottom Ash Pond periodically for beneficial use.

4.0 CLOSURE METHOD

The Bottom Ash Pond will be closed in place as noted in the most recent version of the permit documentation. Procedures planned for closing the surface impoundment are described in detail herein.

4.1 Final Cover System Requirements

Per the CCR Rule, the final cover system must be designed and constructed to meet the following criteria pursuant to §257.102(d):

- 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 1×10^{-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 owner or operator may select an alternative final cover system design, provided the alternative final cover system meets the above requirements.

4.1.1 Drainage / Stabilization of CCR Material

Prior to installing the final cover system, KCBPU must perform the following activities outlined in §257.102(d) of the CCR Rule:

- Eliminate free liquids by removing liquid wastes or solidifying the remaining wastes and waste residues
- Stabilize remaining wastes sufficiently in order to support the final cover system.

Free liquids will be removed initially, with excess water discharged under the current NPDES Permit. The Bottom Ash Pond will be segregated from the Clear Water Pond by isolating or removing the 24-inch pipe connecting the basins. Free liquid removal will be performed throughout construction, as necessary, to manage surface water and storm water runoff.

Additional dewatering may be required to remove entrained water. This can be accomplished through mechanical means such as double-handling and/or discing, or potentially through methods such as the use of a well point system, wick drains, or other means determined by the Contractor, Engineer, or Owner. Once stabilized, the impoundment will be backfilled, compacted and graded to drain.

4.1.2 Geometry and Stormwater Management

The geometry and stormwater management controls of the closed impoundment will allow the CCR unit to meet the following requirements as outlined in §257.102(d) of the CCR Rule:

- 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, sediment, or slurry;
- Provide for slope stability to protect against sloughing or movement of the final cover system;
- Minimize the need for further maintenance of the CCR unit; and
- Be completed in the shortest amount of time consistent with recognized and generally accepted good engineering practices.

The closure system will be designed to provide adequate drainage during storm events. Material will be graded in order to promote stability of the cover system, to prevent the collection of standing water, to limit the velocity of storm water runoff, and to reduce the potential for soil erosion. Intermediate swales will be utilized to limit the maximum overland flow distance, thereby limiting the chance for ponding water, as well as limiting the infiltration of run-off.

4.1.3 Permeability and Infiltration

Once the grade of the backfilled CCR impoundment is established, the final cover system will be placed over the maximum extents of the impoundment to minimize infiltration into the consolidated waste material and erosion of the cap. The final cover system will consist of a 18-inch infiltration layer and a 6-inch (minimum) erosion layer as required by the CCR Rule, and will 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 1×10^{-5} cm/sec, whichever is less.

During installation of the cover soils, proper quality control methods will be used to ensure the following:

- The selected cover material is suitable;
- The material meets the minimum federal and state thickness and permeability requirements;

- The material is properly placed and compacted; and
- The material is properly protected before, during, and after construction.

The erosion layer will consist of topsoil and will be seeded with native vegetation. The period of time for greatest soil erosion concern will be immediately after placement of the topsoil material, before vegetation is established. Manufactured erosion control products, as well as a seed mix containing quick-growth seed varieties, will aid in erosion prevention during this critical timeframe.

4.1.4 Integrity of the Final Cover

Settling and subsidence of the final cover system is expected to be minimal. The underlying natural subsoils are not prone to long-term settlement. Settlement would potentially be caused by consolidation of the CCR material or general fill material under new loads from construction activities; however, this settlement will occur for the duration of site grading activities and is expected to be minimal, if at all, after the cover soil is installed. General fill, if necessary, will be installed in a controlled manner to minimize post-fill installation settlement.

5.0 CLOSURE SCHEDULE

Burns & McDonnell (BMcD) developed a preliminary schedule (see Table 5-1) outlining the critical scope and timeline necessary for the CCR surface impoundment closure at Nearman Creek. Per §257.102(f) of the CCR Rule, closure must be completed within five years of initiating closure activities. At this time, the anticipated closure trigger for the Bottom Ash Pond is the final receipt of waste, including either CCR or non-CCR streams, or removal of the known final volume of CCR from the Bottom Ash Pond for the purpose of beneficial use. Should KCBPU elect to beneficially reuse CCR material in the Bottom Ash Pond, KCBPU may revise the contents of this plan to reflect that of a closure through removal of CCR from the CCR unit. The anticipated date of closure for the Bottom Ash Pond is 2030, but this date is subject to change dependent on plant operations.

Table 5-1: Preliminary Closure Schedule

Closure Activity	Timeframe (Working Days)	Accumulated Duration (Working Days)
Preparation for Closure		
Permitting / design	260	260
Final placement of CCR material	0	260
Submit Notification of Intent to Close	20	280
Design documents issued for bid	20	300
Bid period	30	330
Bid evaluation	20	350
Municipal Bond Effort	260	610
Contract Award	30	640
Commence construction / mobilization	30	670
Closure Construction		
Dewatering / stabilization	260	930
Grading / backfill of impoundment	80	1010
Install compacted clay layer	90	1100
Install erosion layer (topsoil)	20	1120
KDHE inspection	20	1140
Seeding	30	1170
Site clean-up / demobilization	20	1190
Closure Completion		
Submit Notification of Completion of Closure	20	1210

Closure of the existing CCR surface impoundment will commence no later than 30 days after the known final receipt of waste or removal of the known final volume of CCR for beneficial reuse [§257.102(e)], or

no later than six months following the date on which a closure event is triggered [§257.101]. No later than the date KCBPU commences closure of the existing CCR surface impoundment, a Notification of Intent to Close the CCR surface impoundment will be issued to KDHE and placed in the facility's CCR Operating Record. The notification will then be placed on KCBPU's CCR public website within 30 days.

For the purposes of this Closure Plan, closure of the Bottom Ash Pond is considered complete after the erosion layer has been seeded and stabilized. From there, the Post-Closure Care period for the Bottom Ash Pond will commence.

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

6.0 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 State of Kansas for meeting the requirements of §257.102 of the CCR Rule. All amendments and revisions will be placed on the CCR publicly accessible internet site within 30 days following placement in the facility's CCR Operating Record. A record of revisions made to this document is included in Section 7.0 of this document.

7.0 RECORD OF AMENDMENTS

Revision Number	Date	Revisions Made	By Whom
0	10/17/2016	Initial Closure Plan	Burns & McDonnell

APPENDIX A - SITE PLAN



**BURNS
MEDONNELL**

date 9/22/2016
designed A. MYERS

KCBPU
NEARMAN CREEK POWER STATION
EXISTING POND SYSTEM
SITE PLAN

project	87813
contract	-
drawing no.	SK - CIVIL - 001
rev.	0



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