



Post-Closure Plan for Fly Ash Reservoir II Amendment Certification

Cardinal Operating Company

The Post-Closure Plan for Fly Ash Reservoir II dated October 2019 and prepared by TRC is a revision to original post-closure plan prepared by AEP dated August 2016. I, the undersigned Ohio Professional Engineer, hereby certify that I am familiar with the technical requirements of 40 CFR 257.104 and that the revised closure plan meets the requirements of 257.104(d) and 257.104(d)(4).



Michael Amstadt, P.E.
Professional Engineer

Michael
Amstadt

Digitally signed by
Michael Amstadt
Date: 2020.11.03
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Mike DeWine, Governor
Jon Husted, Lt. Governor
Laurie A. Stevenson, Director

February 20, 2020

Buckeye Power Inc
Attn: Tom Alban

6677 Busch Blvd
Columbus, OH 45229

RE: Buckeye Power Inc
Permit-Long Term
Approval
Surface Water Permit to Install
Jefferson
DSWPTI1313440

Subject: Cardinal Plant Fly Ash Reservoir II Closure Project, Wells Twp.
Plans Received on October 30, 2019
Plans Revised on February 7, 2020
From: TRC Engineers, Inc.

Ladies and Gentlemen:

Enclosed is an approved Ohio EPA Permit to Install. This permit contains several conditions and restrictions; I urge you to read it carefully. A general condition of your permit states that issuance of the permit does not relieve you of the duty of complying with all applicable federal, state, and local laws, ordinances, and regulations. You are hereby notified that this action of the Director is final and may be appealed to the Environmental Review Appeals Commission pursuant to Section 3745.04 of the Ohio Revised Code. The appeal must be in writing and set forth the action complained of and the grounds upon which the appeal is based. The appeal must be filed with the Commission within thirty (30) days after notice of the Director's action. The appeal must be accompanied by a filing fee of \$70.00, made payable to "Treasurer State of Ohio", which the Commission, in its discretion, may reduce if by affidavit you demonstrate that payment of the full amount of the fee would cause extreme hardship. Notice of the filing of the appeal shall be filed with the Director within three (3) days of filing with the Commission. Ohio EPA requests that a copy of the appeal be served upon the Ohio Attorney General's Office, Environmental Enforcement Section. An appeal may be filed with the Environmental Review Appeals Commission at the following address: Environmental Review Appeals Commission, 30 East Broad Street, 4th Floor, Columbus, OH 43215. If you have any questions, please contact the Ohio EPA District Office.

Ohio EPA has developed a customer service survey to get feedback from regulated entities that have contacted Ohio EPA for regulatory assistance, or worked with the Agency to obtain a permit, license or other authorization. Ohio EPA's goal is to provide our customers with the best possible customer service, and your feedback is important to us in meeting this goal. Please take a few minutes to complete this survey and share your experience with us at <http://www.surveymonkey.com/s/ohioepacustomersurvey>. If you have any questions, please contact the Ohio EPA district office to which you submitted your application.

Sincerely,

A handwritten signature in black ink, appearing to read "Kevin J. Fowler".

Kevin J. Fowler, Supervisor
Permit Processing Unit, Division of Surface Water

KJF/bd

9489 0090 0027 6053 8201 65

Enclosure
CERTIFIED MAIL

cc: Southeast District Office

TRC Engineers, Inc.

This permit shall expire if construction has not been initiated by the applicant within eighteen months of the effective date of this permit. By accepting this permit, the applicant acknowledges that this eighteen month period shall not be considered or construed as extending or having any effect whatsoever on any compliance schedule or deadline set forth in any administrative or court order issued to or binding upon the permit applicant, and the applicant shall abide by such compliance schedules or deadlines to avoid the initiation of additional legal action by the Ohio EPA.

The director of the Ohio Environmental Protection Agency, or his authorized representatives, may enter upon the premises of the above named applicant during construction and operation at any reasonable time for the purpose of making inspections, conducting tests, examining records, or reports pertaining to the construction, modification, or installation of the above described source of environmental pollutants.

Issuance of this permit does not relieve you of the duty of complying with all applicable federal, state, and local laws, ordinances, and regulations.

Any well, well point, pit or other device installed for the purpose of lowering the ground water level to facilitate construction of this project shall be properly abandoned in accordance with the provisions of Section 3745-9-10 of the Ohio Administrative Code or in accordance with the provisions of this plan or as directed by the Director or his representative. For more information please contact: Division of Drinking and Ground Water - Lazarus Government Center, 50 West Town Street, Suite 700, Columbus, Ohio 43215 (614) 644-2752.

Any person installing any well, well point, pit or other device used for the purpose of removing ground water from an aquifer shall complete and file a Well Log and Drilling Report form with the Ohio Department of Natural Resources, Division of Water, within 30 days of the well completion in accordance with the Ohio Revised code Section 1521.01 and 1521.05. In addition, any such facility that has a capacity to withdraw waters of the state in an amount greater than 100,000 gallons per day from all sources shall be registered by the owner with the chief of the Division of Water, Ohio Department of Natural Resources, within three months after the facility is completed in accordance with Section 1521.16 of the Ohio Revised Code. For copies of the necessary well log, drilling report, or registration forms, please contact:

Ohio Department of Natural Resources
2045 Morse Road Bldg. E
Columbus, OH 43229-6693
(614) 265-6717

1. The proposed wastewater disposal system shall be constructed in strict accordance with the plans and application approved by the director of the Ohio Environmental Protection Agency. There shall be no deviation from these plans without the prior express, written approval of the agency. Any deviations from these plans or the above conditions may lead to such sanctions and penalties as provided for under Ohio law. Approval of these plans and issuance of this permit does not constitute an assurance by the Ohio Environmental Protection Agency that the proposed facilities will operate in compliance with all Ohio laws and regulations. Additional facilities shall be installed upon orders of the Ohio Environmental Protection Agency if the proposed sources are inadequate or cannot meet applicable standards.

2. Permittee shall submit notice of final closure to Ohio EPA's, Southeast District Office upon completion of the cover system. The intention for the notice is to establish a date of completion to be used for assessing the term of post-closure care.

**Report on the Permit to Install Application
and Detailed Plans for Cardinal Operating Company
Fly Ash Reservoir II Closure Project
Wells Twp., Jefferson County
PTI No. 1313440
February 10, 2020**

On October 30, 2019, an application for Permit to Install (PTI No. 1313440) was received in the Southeast District Office. The submittal included four 3-ring binders titled Volume 3 – Final Closure/Post-Closure Plan. The binders included applications for permit to install, post closure care plan, and 10-sheet plan set (C1-C10). Ohio EPA requested a revision on December 12, 2019. The revision was submitted as a 3-ring binder that included a comment letter, 5 additional sheets (1-5) to supplement the original plan set, and additional information. Three additional copies were requested on January 31, 2020 and received on February 7, 2020.

Consultant/Representative of Owner:

Nakia Addison, P.E., Project Manager Ph: (864) 275-1285
TRC Engineers, Inc.
1382 West Ninth Street, Suite 400
Cleveland, OH 44113

Michael Amstadt, P.E. certified the Plan Drawings

Owner:

Tom Alban, V.P. Power Generation PH: (614) 430-7814
Cardinal Operating Company
6677 Busch Boulevard
Columbus, OH 43229

Location Description:

Cardinal Plant – 306 County Road 7 East. Village of Brilliant in Wells Township, Jefferson County.

General/Background Information:

The project is focused on the closure of the Fly Ash Reservoir II (FAR II) which contains coal combustion residuals.

Method of Closure:

Applicant had pre-application meeting.

Facility plans to close the unit in place by regrading the ash, installing a cover and providing drainage channels to the existing dam. The existing dam and emergency spillway are proposed to remain. Storm water is proposed to exit from the FAR II area through modifying

the existing 54" diameter inlet associated with Outfall 01B00009019.

Groundwater Monitoring Consideration:

For groundwater monitoring, the revision comment letter stated:

For the purposes of monitoring all three units (FAR I, FAR II, and FGD Landfill), the groundwater monitoring plan currently in place in accordance with OAC 3745-30-08 will continue to be sampled and remain unchanged throughout closure and post-closure.

For the purposes of monitoring FAR II during closure and post-closure in accordance with Federal Coal Combustion Residual Rule (40 CFR 257.90 through 98), groundwater monitoring will be conducted following Cardinal's CCR Groundwater Monitoring Design Network and Statistical Analysis Plan, which are provided,

Post Closure Care Consideration:

The submitted plan includes statement that Cardinal will submit written certification that the closure was completed in accordance with plans and specifications. A post-closure care period of 30 years is included unless the CCR Unit is operating under assessment monitoring in accordance with 40 CFR 257.95, then post-closure will continue until the unit returns to detection monitoring.

Estimated Cost(s):

Construction - \$40,000,000


Special Conditions:

The permit will have the following special condition:

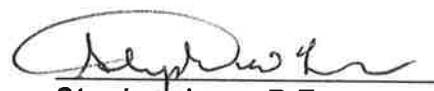
1. Permittee shall submit notice of final closure to Ohio EPA's, Southeast District Office upon completion of the cover system. The intention for the notice is to establish a date of completion to be used for assessing the term of post-closure care.

Conclusion:

The detailed plans for the Cardinal Operating Company Fly Ash Reservoir II Closure project have been reviewed, appear to be satisfactory and are recommended for approval.



Aaron Pennington
District Representative
SEDO, Division of Surface Water



Stephen Lear, P.E.
Reviewer
SEDO, Division of Surface Water



Post-Closure Plan for Fly Ash Reservoir II

Cardinal Operating Company

*Cardinal Plant
Brilliant, Ohio*

October 2019

*Prepared For
Cardinal Operating Company*



Michael Amstadt
10/11/19

Nakia Addison

Nakia Addison
Project Manager

Michael Amstadt, P.E.
Principal Project Engineer

TRC Engineers, Inc. | Cardinal Operating Company
Post-Closure Plan for Fly Ash Reservoir II

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Section 1

Introduction

The Cardinal Power Plant (Plant) is owned by Buckeye Power and AEP Generation Resources (GENCO) and is operated by the Cardinal Operating Company (Cardinal). The Plant operates two surface impoundments for managing CCR; the Bottom Ash Complex and Fly Ash Reservoir II (FAR II). FAR II meets the definition of a coal combustion residual (CCR) surface impoundments under the United States Environmental Protection Agency (USEPA) Disposal of Coal Combustion Residuals From Electric Utilities Final Rule (CCR Rule). This Post-Closure Plan (Plan) describes the activities associated with the post closure of FAR II to meet the requirements of 40 Code of Federal Regulations (CFR) 257.104(d) in the CCR Rule. This Plan was prepared for Cardinal by TRC Engineers, Inc. (TRC).

1.1 Description of the Unit

FAR II is a valley filled reservoir with a unique structure whose current configuration is the result of the original earth fill dam and two separate raisings. The original earth fill dam (Stage 1) consisted of a 180 feet high arched earth embankment incorporating a zoned cross section. At 925 feet NGVD, the dam featured a 70-foot wide by 1,055-foot long crest. The maximum operating pool that could be achieved with the original configuration was El. 913. In 1997, the original dam was raised, referred to as Stage 2. Following this raising, the dam was 237 feet high with a 30-foot wide crest. In 2013, the dam was raised 13 feet using back-to-back Mechanically Stabilized Earth (MSE) walls, bringing the dam to its current, Stage 3 configuration. The principle features of the typical section are the MSE wall themselves and a vinyl sheet pile wall extending from the existing clay core to the top of the Probably Maximum Flood (PMF) level for seepage cutoff purposes. FAR II receives sluiced fly ash and waste water from the plant via the bottom ash/recirculation pond, as well as leachate and storm water from the landfill and FAR I. Storm water run-on from the upgradient valleys also flows into the FAR II.

1.2 Site Information

The Plant is located within Wells Township, Jefferson County, near the town of Brilliant in eastern Ohio. FAR II is located approximately 1.5 miles north of the Plant and is located about 6,500 feet northeast of the intersection of Riddles Run Road (Township Road 163) and Township Road 164.

Section 2

Post-Closure Plan

2.1 Post-Closure Description

FAR II will be closed by closure in place in accordance with 40 CFR 257.102(d). Below is a description of the post-closure monitoring and maintenance activities as required by 40 CFR 257.104(d)(1)(i).

2.1.1 40 CFR 257.104(b)(1) - Maintaining the integrity and effectiveness of the final cover system, including making repairs to the final cover as necessary to correct the effects of settlement, subsidence, erosion, or other events, and preventing run-on and run-off from eroding or otherwise damaging the final cover.

Inspections are performed for the items below. The inspection frequencies are scheduled to properly detect any issues so that repairs can be performed before significant harm occurs.

- Soil Dike: The soil dike will be inspected for slide, displacement, seepage, and erosion.
- Cover: The final cover will be inspected for erosion and for the condition of the vegetated cover, i.e., gaps in vegetation or presence of undesirable trees or brush. The integrity of the cover drainage system will also be inspected.
- Final Cover Surface: The final cover surface will be inspected for any ponding of water or flat areas. Due to the design contours required to achieve the final cap grade, special attention will be focused to ensure that no settlement, subsidence, erosion, depressions or flat areas exist and that no water is allowed to pond above the cap system.
- Surface Drainage System: The surface drainage system, including channels, culverts, slope drains, etc., will be inspected for erosion, integrity of channel lining, ponding, and accumulated sediment.

Maintenance during the post-closure care period will be performed as discussed below, based upon the facility inspections described above.

- Erosion Damage Repair: Any areas exhibiting erosion will be repaired by replacing and compacting the material in-kind to design grade/specifications and reseeding the area to the specifications. Applications of additional fertilizer, selective herbicides, rodent control measures, etc. will be implemented as necessary. Fertilizers and herbicides will be selected and applied consistent with manufacture's application instructions. Follow-up monitoring of the repaired area(s) will be conducted to ascertain the integrity of the repair.

- Settlement, Subsidence, Displacement: Any areas at the closed site exhibiting evidence of settlement, subsidence, or displacement will be examined to determine the cause of the movement. If backfilling or placing additional fill material is needed to maintain the integrity of the closed structure, it will be performed in accordance with the site/closure specifications, including seeding. If the condition reoccurs or persists, or if the severity of the condition initially is judged to warrant it, a detailed investigation of the cause will be performed and remedial action will be performed. Similarly, any areas of the soil dike exhibiting sliding, displacement, or seepage will be investigated. Repairs will be made as necessary. Follow-up monitoring of the area will be performed to ascertain that the problem has been corrected.
- Closure Cap Surface: Any areas that show signs of ponding water or flat contours will be examined and rectified. Due to the design contours required to achieve the final cap grade, special attention will be focused on the cap surface to ensure that any areas that hold water are regraded to promote drainage, reseeded to promote vegetative growth, and maintained to ensure that the ponding of water does not persist.
- Surface Water Drainage System: The channel linings are designed to withstand the design velocities. Maintenance of the surface water drainage system will consist of removing sediment and/or undesirable vegetation from the surface water runoff control system (channels and culverts) as required. Eroded areas will be repaired by back-filling and reseeding according to the specifications. Damage to culverts will be repaired; structure replacement will be performed if needed.

2.1.2 40 CFR 257.104(b)(3) - Maintaining the groundwater monitoring system and monitoring the groundwater in accordance with the requirements of 40 CFR 257.90 through 257.98.

The groundwater monitoring system will be inspected for the general integrity of the wells, well casings and well protective casings. Any damaged portions of the monitoring wells and/or their protective casings will be replaced in-kind.

Monitoring the groundwater will be in accordance with the groundwater monitoring plan for this facility and in accordance with the requirements of 40 CFR 257.90 through 257.98.

2.2 Post-Closure Contact

The name, address, and telephone number of the person to contact about the Plant during the post-closure period shall be provided upon notice of closure.

2.3 Post Closure Planned Use

The post-closure use of the property will be undisturbed vacant land space. The only activities occurring on the closed CCR unit will be related to the post-closure care activities. All other activities will be prohibited.

2.4 Post-Closure Care Period

The post-closure care period required under the CCR Rule (40 CFR 257.104(c)) is 30 years. If at the end of post-closure care period the CCR unit is operating under assessment monitoring in accordance with 40 CFR 257.95, post-closure care will continue until the unit returns to detection monitoring.

2.5 Post-Closure Completion Notification

No later than 60 days following the completion of the post-closure care period, Cardinal will prepare a notification verifying that post-closure care has been completed. The notification will include a certification by a qualified professional engineer verifying that post-closure care has been completed in accordance with this Plan. Notification is complete when it has been placed in the Plant's operating record.

Section 3 Certification

I, the undersigned Ohio Professional Engineer, hereby certify that I am familiar with the technical requirements of 40 CFR 257.104. I also certify that it is my professional opinion that, to the best of my knowledge, information, and belief, that the activities outlined in this post-closure plan are in accordance with current good and accepted engineering practice(s) and standard(s) appropriate to the nature of the project and the technical requirements of 40 CFR 257.104(d).

For the purpose of this document, “certify” and “certification” shall be interpreted and construed to be a “statement of professional opinion”. The certification is understood and intended to be an expression of my professional opinion as an Ohio Registered Professional Engineer, based upon knowledge, information, and belief. The statement(s) of professional opinion are not and shall not be interpreted or construed to be a guarantee or a warranty of the closure activities.

Michael Amstadt, P.E.

Printed Name of Professional Engineer

64361

State of Ohio License Number

