

Coal Combustion Residual Surface Impoundment Closure Plan

**Basin Electric Power Cooperative
Leland Olds Station**

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Purpose

The purpose of this document is to demonstrate compliance with 40 CFR § 257.102 (Criteria for conducting the closure or retrofit of Coal Combustion Residual (CCR) units) for Ash Pond 2 and Pond 3 at Leland Olds Station (LOS). LOS is a lignite coal-fired power plant consisting of two units that generate about 669 megawatts (MW) combined. The power plant, owned and operated by Basin Electric Power Cooperative (Basin Electric), is located approximately four miles southeast of Stanton in Mercer County, North Dakota.

40 CFR § 257.102 requires the owner or operator of a CCR unit to prepare a written closure plan that describes the steps necessary to close the CCR unit at any point during the active life of the unit consistent with recognized and generally accepted good engineering practices.

Inactive Status

A temporary bottom ash handling system consisting of above-ground concrete weirs, ash collection, and dewatering areas was placed into operation ending the transport of CCRs to the surface impoundments prior to effective date of the CCR Rule (October 19, 2015). Accordingly, the LOS surface impoundments are considered “inactive” under the federal regulations. A “Notification of Intent to Initiate Closure of CCR Surface Impoundment” for Ash Pond 2 and Pond 3 was completed on December 15, 2015, in accordance with § 257.100. On April 18, 2016 the U.S. Environment Protection Agency (EPA) filed a motion to remand and vacate the provisions of the CCR Rule exempting inactive surface impoundments from the CCR Rule requirements. The DC Circuit Court of Appeals issued an order approving the motion on June 14, 2016. Since the exemption for inactive surface impoundments was no longer effective, EPA issued the “Extension Rule” on August 5, 2016. The Extension Rule became effective on October 4, 2016 providing a timeline for inactive units to comply with CCR Rule requirements.

Ash Pond 2 was partially closed in 2017. Approximately 23 acres in the south and southwest areas of the pond were closed in accordance with the design standards specified in 40 CFR § 257.102 and North Dakota Department of Health (NDDoH) permit requirements. The remainder of the pond complex is scheduled to be closed in 2019.

Closure Narrative

The ash ponds will be dewatered and existing CCRs will be stabilized and regraded. Soil fill materials will be placed to achieve the subgrade elevations required for the final cover system (described in detail below). The perimeter dike on the north side of the pond complex will be excavated to the approximate bottom of the existing Pond 3 and graded in order to provide positive drainage, precluding the possibility of the future impoundment of liquids. The final cover will be graded with slopes less than 15 percent in accordance with NDDoH rules and guidance. Portions of the site will have slopes of less than 3 percent; these areas, however, are underlain by a minimal thickness of waste materials and will be monitored for differential settlement to prevent future impoundment of liquids.

The final cover system will be 3 feet thick and will consist of the following:

- An 18-inch thick compacted clay barrier layer, with a hydraulic conductivity less than or equal to 1×10^{-7} cm/sec;
- A 12-inch thick plant root zone layer; and
- A 6-inch thick vegetative layer.

Clay-rich materials suitable for use as a low permeability barrier layer have been identified onsite during previous geotechnical investigations. The barrier layer would be moisture-conditioned and compacted to achieve permeabilities of 1×10^{-7} cm/sec or less. Construction Quality Assurance/Quality Control (QA/QC) methodologies consistent with the NDDoH guidelines would be utilized so that the final cover is constructed to meet the requirements set forth in the CCR Rule and in NDDoH rules and guidance. After the barrier layer has been constructed, an additional 18 inches of cover materials will be placed over filled areas.

Once the final cover material has been placed, closed areas will be seeded with shallow-rooted native vegetation. The closed landfill will not be used for cultivated crops, heavy grazing or any other use which might disturb the protective vegetative and soil cover.

Final Cover System Design and Performance

The cover system will be constructed, from bottom to top, of a barrier layer consisting of a minimum of 18 inches of compacted clay-rich soil with a hydraulic conductivity of 1×10^{-7}

cm/second or less overlain by a minimum of 18 inches of earthen material to serve as a vegetation growth medium and rooting zone. Total thickness of the cover system will be a minimum of 36 inches. In addition to the basic description of the final cover system, the CCR Rule requires the closure plan to address both performance and design standards for closure of the CCR unit.

CCR Rule design standards require a low permeability barrier layer (infiltration layer) with a permeability less than or equal to the bottom liner system or natural subsoils present, or a permeability of no greater than 1×10^{-5} cm/sec, whichever is less. The design standards also require that the infiltration layer have a minimum thickness of 18 inches and the infiltration layer be overlain by an erosion layer capable of sustaining native plant growth with a minimum thickness of six inches.

The surface impoundments were constructed without an engineered bottom liner and are underlain by natural subsoils of glacial and alluvial origin, with hydraulic conductivities ranging from about 1×10^{-6} to 1×10^{-4} cm/sec based on the data from laboratory testing of similar onsite soils. The permeability of the cover system barrier (infiltration layer) will be no greater than 1×10^{-7} cm/sec, which is less than permeability of the natural subsoils present. Accordingly, the cover system meets the design criteria for permeability.

The final cover system is designed with an infiltration layer thickness of 18 inches which is consistent with the minimum requirement of 18 inches. The erosion layer has a minimum thickness of 18 inches, much greater than the minimum required thickness of six inches. As such, the cover system meets the minimum thickness design criteria for both the infiltration layer and for the erosion layer.

Performance standards include ensuring the CCR unit closure system controls, minimizes or eliminates, to the maximum extent feasible, post-closure infiltration of liquids into the waste; precludes the probability of impoundment of water, sediment, or slurry; addresses slope stability; minimizes the need for further maintenance; and that closure be completed in a time consistent with recognized and generally accepted good engineering practices.

The various components of the cover system work synergistically to meet CCR Rule performance standards. Infiltration is minimized by using a combination of slope to promote

run-off, shallow-rooted native vegetation to enhance evapotranspiration, and a low permeability barrier layer to further limit infiltration. The closed pond complex will be sloped to promote positive drainage away from the pond footprint, thus limiting the probability of impounding liquids, slurry or sediment. The relatively gentle slopes (typically 3 to 15 percent) and native vegetation on the cover system contributes to structural stability and helps minimize the need for future maintenance. The cover system is consistent with NDDoH rules and guidance and generally accepted good engineering practices.

CCR Inventory and Maximum Closure Area Estimates

The current volume of CCRs in Ash Pond 2 and Pond 3 is estimated to be 750,000 cubic yards, which reflects the maximum inventory of CCRs present on-site during the active life of the CCR unit. No additional CCRs are expected to be placed in the LOS pond complex. The largest area of the CCR unit ever requiring final cover at any time during the CCR unit's life is estimated to be 22.7 acres, reflecting current conditions at the site.

Closure Schedule

Final closure of the LOS pond complex is expected to occur over a six to nine month period during the 2019 construction season. Exact dates for final closure are unknown at this time, dependent on contractor availability and weather. In any event, final closure will be completed within the closure window specified in §257.102(f)(ii) (five years after commencement of closure activities).

Recordkeeping and Reporting

A copy of this document will be placed into the facility's operating record in accordance with 40 CFR § 257.105 (Recordkeeping Requirements) and will be posted to Basin Electric Power Cooperative's CCR Web site in accordance with 40 CFR § 257.107 (Publicly accessible internet site requirements). Notification will be sent to the relevant State Director in accordance with 40 CFR § 257.106 (Notification Requirements).

Certification Statement

I certify that the design of the final cover system meets the requirements of 40 CFR § 257.102 as specified in the *Standards for the Disposal of Coal Combustion Residuals in Landfills and Impoundments*.



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