Coal Combustion Residuals Landfill Closure Plan – Revision 2

Laramie River Station Landfill

Prepared for
Basin Electric Power Cooperative

Prepared by
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January 2026

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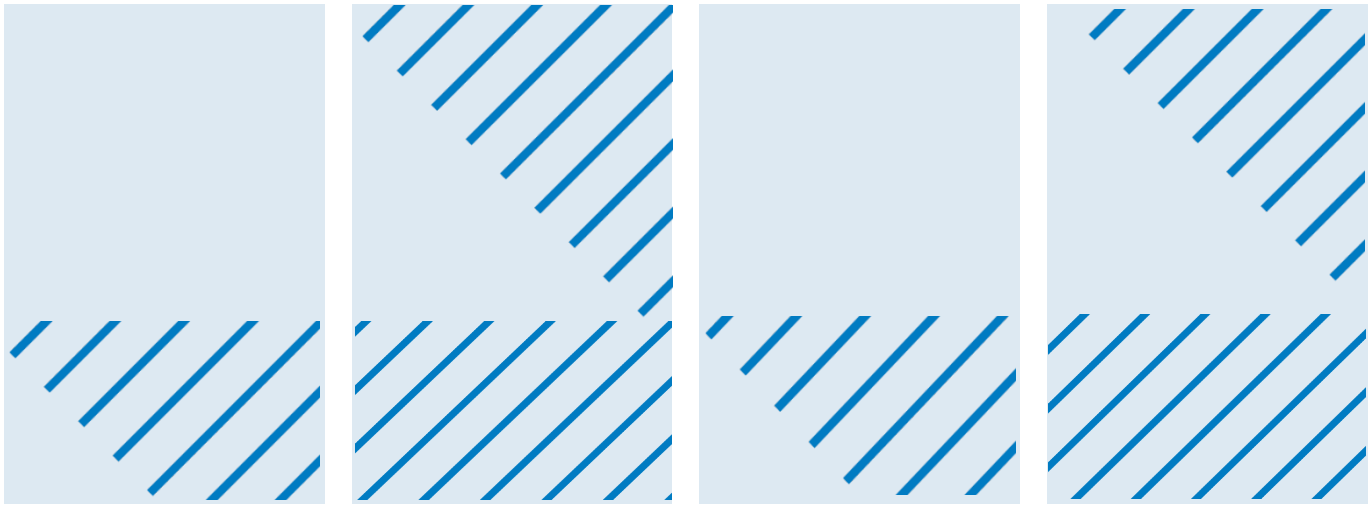
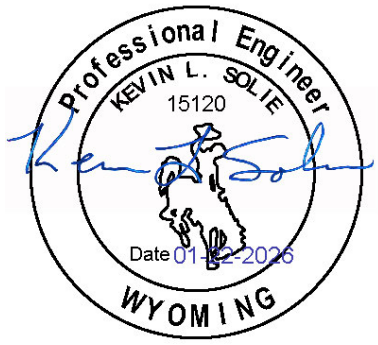


Certification

I hereby certify that I have, or my agent has examined the facility and, being familiar with the provisions of 40 CFR 257 Subpart D, attest that this Coal Combustion Residuals landfill closure plan has been prepared in accordance with good engineering practice, including consideration of applicable industry standards and the requirements of 40 CFR § 257.102. I certify that the plan and final cover system design is adequate for this facility and that procedures for recordkeeping and reporting have been established.

Kevin L. Solie
Wyoming PE #: 15120

January 22, 2026
Date



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1 Introduction

Laramie River Station (LRS) is a coal-fired power plant consisting of three units. The power plant, owned by the Missouri Basin Power Pool (MBPP) and operated by Basin Electric Power Cooperative (BEPC), is located northeast of Wheatland in Platte County, Wyoming. Fly ash generated at LRS is disposed at the onsite landfill, regulated as a coal combustion residuals (CCR) landfill under Permit No. 20.066 issued by the Wyoming Department of Environmental Quality (WDEQ). CCR management is subject to Federal Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments per 40 CFR 257 Subpart D. This CCR run-on and run-off control system plan has been developed to satisfy the requirements described in 40 CFR § 257.81, run-on and run-off controls for CCR landfills, as they apply to LRS's Landfill.

LRS's existing CCR landfill consists of nine cells, Cells 1-9, that were originally permitted in 1978 for the disposal of coal ash and other industrial wastes generated at the station. The landfill was placed into operation in April 1980 and has been in continuous service since its initial construction. Partial sequential closure has been conducted on areas of the landfill that had been filled to the current permitted final waste grade, with the most recent phase of sequential closure being completed in 2023 resulting in the partial closure of Cell's 7 and 6. Cells 1-7 have now been partially closed with an earthen cover previously approved by the WDEQ. Cells 1-9 comprise an area of approximately 164 acres. Approximately 102 acres have been sequentially closed, leaving approximately 62 acres open and actively receiving ash.

The lateral expansion of Cell 10 will include a composite liner system constructed with a geosynthetic clay liner (GCL) overlain by a 60-mil high density polyethylene (HDPE) geomembrane liner. Cell 10 will cover an area of approximately 20 acres, increasing the facility total acreage to approximately 184 acres.

Because the Cell 10 lateral expansion is underlain by a geomembrane liner and Cells 1-9 are not, two distinct cover system designs are required for the facility. The cover system for the Cell 10 lateral expansion will include a geomembrane component while the cover system for areas of Cells 1-9 affected by the vertical expansion will include a geosynthetic clay liner (GCL) to limit infiltration. The change in cover system design requires the revision of the written closure plan for the landfill. The purpose of this document is to demonstrate compliance with 40 CFR § 257.102 (Criteria for conducting the closure or retrofit of CCR units) which 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.

2 Closure Narrative

Once CCRs have reached final elevation in the landfill, the area to be closed will be graded and rolled to provide a smooth surface for the installation of the cover system. Materials suitable for use as a low permeability infiltration layer are not typically locally available or in sufficient quantity; as such, a GCL or geomembrane liner (40-mil linear low-density polyethylene (LLDPE)) will be utilized to minimize infiltration potential. Prior to deployment of the GCL or geomembrane, the subgrade surface will be inspected to ensure no deleterious materials are present that could affect the integrity of the GCL or geomembrane. Construction Quality Assurance/Quality Control (QA/QC) methodologies consistent the industry guidelines will be utilized so that the final cover is constructed to meet the requirements set forth in the CCR Rule.

The GCL will be covered with at least 18 inches of cover soil material to serve as a deep rooting zone overlain by 6 inches of topsoil. The geomembrane will be covered with 12 inches of granular drainage material or equivalent geocomposite drainage layer, 6 or 18 inches of cover soil, and 6 inches of topsoil. Both cover systems will be a minimum 24 inches thick and will have significant field capacity to store and hold water for later use by vegetation. In essence, the soil cover system acts as a sponge to store water for subsequent use by vegetation thus reducing the potential for infiltration. Closed areas will be seeded with a climatically adapted seed mix of shallow-rooted native vegetation. Final cover slopes of about two percent are present at the crest of the filled area while 10 to 20 percent slopes are present on the landfill flanks to help promote run-off. The side slopes are designed with terraced benches spaced approximately every 200 feet along the slope to prevent excessive erosion. 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.

3 Final Cover System Design

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 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 x 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 must be overlain by an erosion layer capable of sustaining native plant growth with a minimum thickness of 6 inches. The CCR Rule also allows an owner or operator to select an alternate cover system, provided it includes an infiltration later that achieves an equivalent reduction in infiltration as the prescriptive infiltration layer and includes an erosion layer that provides equivalent protection from wind or water erosion as the prescriptive erosion layer. Alternative covers may include a GCL or other materials approved by the owner.

Landfill closure will be accomplished with a cover system design that includes a GCL for the existing landfill (Cells 1-9) and a geomembrane barrier layer for the lateral expansion (Cell 10). Both final cover sections are designed to contain or divert precipitation from filled areas of the site and meet the requirements of 40 CFR § 257.102(d)(3).

Closure of Cells 1-9 that are impacted by vertical expansion will consist of placement of a 2-foot-thick (minimum) low permeability cover system as follows (from the top down):

- Vegetative cover consisting of 6 inches (minimum) of topsoil;
- 18 inches (minimum) of plant rooting zone soil (cover soil);
- GCL hydraulic barrier layer; and
- Buffer layer over the waste subgrade to provide a suitable subgrade for the geosynthetic components of the cover system if needed.

Closure of Cell 10 will consist of placement of a 2-foot-thick (minimum) low permeability cover system as follows (from the top down):

- Vegetative cover consisting of 6 inches (minimum) of topsoil;
- 6 inches (minimum) of plant rooting zone soil (cover soil) or 18 inches (minimum) of plant rooting zone soil if a geocomposite drainage layer is utilized;
- 12 inches of granular drainage material or equivalent geocomposite drainage layer;
- 40-mil (minimum) linear low density polyethylene (LLDPE) geomembrane hydraulic barrier layer; and
- Buffer layer over the subgrade soils to provide a suitable subgrade for the geomembrane layer and cover system, if needed.

The final cover topsoil layer will be mulched and seeded with shallow-rooted, drought-tolerant grasses.

Approximately 45 acres of existing final cover over Cells 1-4 and 5-6 will be sequentially removed to facilitate landfill vertical expansion. The existing earthen final cover materials will be stripped, stockpiled, and re-used in future landfill construction activities.

The final cover side slopes are designed at 20 percent. The side slopes are designed with terraced benches spaced approximately every 200 feet along the slope to prevent excessive erosion. A 100-foot-wide (minimum) area with a minimum slope of 2 percent is located on the top of the landfill expansion, crowned to drain off the crest area.

Soils present at the site are of colluvial (sand, gravel, etc.) or loessal (silty or clayey fine sand, silt, etc.) origin, with permeabilities ranging from approximately 1×10^{-5} to 1×10^{-3} cm/sec. The landfill base for Cells 1-9 were constructed using these in-situ soils. The permeability of the cover system including a GCL barrier (infiltration) layer is no greater than 5×10^{-9} cm/sec, which is less than or equal to the permeability of the natural subsoils underlying the CCRs. The Cell 10 expansion area will be underlain by a geomembrane liner and will be closed with a geomembrane component in the cover system. Accordingly, the cover system designs (including a GCL component) for Cells 1-9 and the cover system design for Cell 10 (including a geomembrane component) meet the design criteria for permeability.

The final cover system is designed with a cover soil/drainage/infiltration layer thickness of 18 inches which meets the minimum requirement of 18 inches. The erosion layer has a minimum thickness of 6 inches, which meets the minimum required thickness of 6 inches. Total cover system thickness will be a minimum of 2 feet. As such, the cover system meets the minimum thickness design criteria for both the infiltration layer and for the erosion layer.

4 Final Cover System Performance

Final cover 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 design 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 geomembrane or GCL barrier layer to further limit infiltration. The closed landfill will be sloped to promote run-off thus limiting the probability of impounding liquids, slurry, or sediment. Landfill side slopes limited to approximately 20 percent contributes to structural stability and shallow-rooted native vegetation on the cover system minimizes the need for future maintenance. The pozzolanic properties of the CCRs also promote structural stability and reduce the likelihood of settling and subsidence. Consistent with generally accepted good engineering practices, the cover system will be constructed in phases as areas are filled and brought up to grade (partial sequential closure).

5 Closure Procedures and Methods

5.1 Final Cover Construction

Partial sequential closure will be completed when discrete areas (typically 10 to 20 acres) are filled to final grade and when it is reasonable to mobilize construction equipment and crews to implement closure. Areas to be closed during each final cover construction event will be determined in conjunction with preparation of construction plans and specifications. As discrete areas filled to final grade, final cover will be placed as soon as practical, factoring in the timing constraints imposed by late fall, winter and early spring weather conditions. Construction of the final cover system will proceed as follows:

- Grade and smooth ash fill subgrade surface as needed;
- Place, grade and smooth surface buffer sand or soil layer (if buffer layer is needed);
- Install GCL or geomembrane;
- For areas closed with GCL, place 18-inch-thick plant rooting zone;
- For areas closed with geomembrane, place combination of drainage layer and cover soil totaling at least 18 inches thick;
- Place 6-inch-thick topsoil layer;
- Install temporary stormwater run-off controls; and
- Seed, fertilize and mulch.

Once the final cover topsoil layer has been placed and the seedbed has been prepared, seeding will generally be performed along the contour using a grass seed drill. Climatically adapted, shallow-rooted native vegetation seed would typically be drilled to a depth of 1 inch or less. In some situations, a broadcast seeder would be used, followed by light harrowing and/or a mulched cover. Depending on the planting season, a nurse crop of rye or oats may also be utilized. 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.

Closure activities will be carried out by a qualified earthwork contractor and GCL/geomembrane installer. Construction plans and specifications will be prepared for each phase of closure to direct the contractor's work. The construction of the various components of the final cover will be tested and documented in accordance with the testing requirements presented in the facility's Construction Quality Assurance Plan. A closure construction documentation report will be prepared and submitted to the WDEQ after completion of an incremental closure event. The report will be signed by a professional engineer, registered in the state of Wyoming, stating that to the best of their knowledge and according to their records, cover construction has been completed in accordance with the approved plans, specifications, and permit requirements except for any deviations that have been noted in the report.

5.2 Final Closure

A notification of closure will be prepared within 30 days after completion of the last final cover construction event. The notification will include the certification by a qualified professional engineer

verifying that closure has been completed in accordance with the closure plan as required by 40 CFR § 257.102(f)(3). The notification will be complete when it has been placed in the facility's operating record as required by 40 CFR § 257.105(i)(8).

A notation will be recorded on the deed to the property following complete closure of the landfill to notify any potential purchaser that: (i) The land has been used as a CCR unit; and (ii) Its use is restricted under the post-closure care requirements (40 CFR § 257.104(d)(1)(iii)). A notification stating that the notation has been recorded will be prepared within 30 days after filing the deed with the appropriate local official. The notification will be complete when it has been placed in the facility's operating record as required by 40 CFR § 257.105(i)(9).

6 CCR Inventory and Maximum Closure Area Estimates

The maximum inventory of CCR ever onsite (design capacity) during the active life of the CCR unit, including the lateral and vertical expansion, is estimated to be 26,629,190 cy. The largest area of the CCR unit requiring final cover at any time during the CCR unit's life is estimated to be 82 acres (current condition and Cell 10 expansion area).

7 Estimated Closure Schedule

As of September 2024, the CCR unit has an estimated remaining capacity of approximately 10,130,000 cubic yards, including 2,000,000 cy existing capacity and planned 8,130,000 cy for the lateral and vertical expansion. The anticipated volumetric fill rate is approximately 300,000 cy per year, yielding an operational life of approximately 33 years for the entire landfill. The remaining life of the facility (filled to maximum capacity in 2058) may vary depending on factors such as ash content of coal, diversion of CCRs for beneficial use, and electrical generation rates, among others. Since sequential partial closure is periodically completed on the CCR unit, it is anticipated that the final area requiring final cover would be 45 acres or less. This relatively small area would easily be closed in one construction season. In any case, final closure would not take longer than 180 days.

8 Recordkeeping & Reporting

Basin Electric will maintain a copy of the most recent version of the closure plan in the facility's operating record in accordance with 40 CFR § 257.105, Recordkeeping Requirements, and the plan will be made publicly available on the Basin Electric CCR web site in compliance with 40 CFR § 257.107, Publicly Accessible Internet Site Requirements. Notification will be sent to the WYDEQ State Director in compliance with 40 CFR § 257.106 (Notification Requirements). 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).