



Closure Plan for Existing CCR Units

East and West Scrubber Ponds

CCR Temporary Storage Pad

Lewis and Clark Station

Prepared for
Montana-Dakota Utilities Co.

October 2016

A handwritten signature in black ink, appearing to read "Paul F. Sullivan".

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Certifications

I hereby certify that this Closure Plan for the existing CCR Units, Temporary CCR Storage Pad and the East and West Scrubber Ponds, at the Lewis & Clark Station meets the requirements of the Coal Combustion Residuals Rule 40 CFR 257 Subpart D. and the requirements of 40 CFR §257.102(b).

Revision	Date	Summary of Revisions
0	October 17, 2016	Initial Plan



A handwritten signature in cursive script that reads "Paul T. Swenson".

Paul T. Swenson
Barr Engineering Co.
MT Registration Number 12805PE

Dated this 14th day of October, 2016

1.0 Introduction

Montana-Dakota Utilities Co. (MDU) operates the Lewis & Clark Station (Lewis & Clark), near Sidney, Montana, a coal-fired steam-electric generating plant that produces coal combustion residuals (CCR). CCR management is subject to the requirements of 40 CFR 257 Subpart D, Standards for Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments (CCR Rule).

This CCR closure plan has been developed to satisfy the requirements of 40 CFR §257.102(b), initial written closure plan for CCR landfill and surface impoundments, as they apply to the existing CCR Temporary Storage Pad (TSP) and the East and West Scrubber Ponds (impoundments). The closure plans for all three CCR Units are combined in one document as all three units are physically connected and closure would be conducted concurrently among the three units.

The CCR Rule for landfill closure apply to the TSP. The TSP receives CCR from Scrubber Ponds prior to be transported off-site.

The East and West Scrubber Ponds are existing surface impoundments that receive sluiced flue-gas desulfurization (FGD) sludge and some fly ash material.

2.0 Approach to TSP and Scrubber Pond Closure

Closure of the TSP will be accomplished through removal of CCR and decontamination of the CCR unit. CCR materials in the TSP will be removed and placed in an off-site permanent disposal facility. Visual inspection of the TSP area will be conducted to verify that CCR and liner materials and have been removed from the site. Following the final removal of the CCR materials, areas affected by releases from the TSP will be decontaminated. Groundwater quality monitoring will continue after closure to determine potential impacts to groundwater. Closure of the TSP will be complete when any areas affected by releases from the CCR unit have been removed and groundwater monitoring concentrations do not exceed the groundwater protection standard established pursuant to §257.95(h) for constituents listed in Appendix IV of the CCR Rule.

The East and West Scrubber Ponds will be closed with CCR in-place by drainage and stabilization of the CCR. Once sluicing of CCR materials is terminated, closure will commence with pond dewatering.

Because the amount of CCR that will remain in place at closure is not known at this time, a final grading plan for closure of the impoundments will be prepared within six months prior to closure of the ponds.

3.0 Final Cover System Design

The Scrubber Pond closures will consist of placement of a low permeability cover system as follows (from the top down in the profile):

- 6 inches erosion control layer; the erosion control layer may consist of vegetated topsoil, an erosion-resistant aggregate material, or other materials to be selected prior to start of closure activities
- 6 inches (minimum) of subsoil as a rooting zone if a vegetated cover is constructed
- Barrier layer consisting of:
 - compacted clay layer, 18 inches thick, with a permeability of approximately 1×10^{-8} cm/sec

or

- 12 inches of granular drainage material, and
- 40-mil geomembrane hydraulic barrier layer

or

- other low permeability material meeting the requirements of the CCR Rule
- Buffer layer over the remaining CCR if needed to provide a suitable subgrade for the geomembrane layer and cover system.

The use of the 40-mil geomembrane is an alternative cover design with a permeability that is less than or equal to the bottom liner system, and has permeability of no greater than 1×10^{-5} cm/sec.

4.0 Impoundment Final Cover System Performance

The final cover design meets the requirements of 40 CFR §257.102(d) as described below:

(d)(1)(i) 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;

The permeability of the final cover system will be less than or equal to the permeability of the bottom liner system and will be graded with a five percent slope to promote surface water run-off. The existing bottom liners of the Scrubber Ponds consist of a 2-foot-thick soil liner with a permeability of approximately 1×10^{-8} cm/sec. The barrier layer will exhibit a permeability that is not greater than the soil liner.

(d)(1)(ii) Preclude the probability of future impoundment of water, sediment, or slurry;

The final cover will be installed with a five percent slope to encourage positive drainage and will tie in to the perimeter embankment, thereby promoting surface water run-off from the site. The barrier layer component of the final cover system will inhibit infiltration of precipitation.

(d)(1)(iii) Include measures that provide for major slope stability to prevent the sloughing or movement of the final cover system during the closure and post-closure care period;

The Scrubber Ponds final cover will be installed with an erosion resistant cover with a stable slope of five percent and a drainage layer above the geomembrane. A cover system constructed with a five percent slope constructed with appropriate materials is not susceptible to sloughing or movement.

(d)(1)(iv) Minimize the need for further maintenance of the CCR unit, and;

The final cover will have an erosion resistant layer at the surface of the final cover system to minimize erosion and the need for maintenance.

(d)(1)(v) Be completed in the shortest amount of time consistent with recognized and generally good engineering practices.

Because the basins are less than six acres total, it is anticipated that closure construction will be completed in one construction season.

(d)(2)(i) Free liquids must be eliminated by removing liquid wastes or solidifying the remaining wastes and waste residues.

Free liquid is removed from the Scrubber Ponds during normal operation. As the ponds reach capacity for CCR placement, the remaining free water will be removed. This system will be used to remove free liquid from the Scrubber Ponds during the closure period for discharge under the plant's Montana Pollutant

Discharge Elimination System (MPDES). Construction of final cover on the impoundments will only be initiated once the CCR in the impoundments has been sufficiently stabilized to support cover construction.

(d)(2)(ii) Remaining wastes must be stabilized sufficient to support the final cover system.

Dry fill will be placed above the sluiced material in incremental lifts to promote uniform settling of the sluiced material. Final cover subgrade filling will be consistently performed prior to final cover construction to allow for visual inspections and subsequent backfilling of any non-uniform settled areas. The dewatering area of the ponds will remain open until the fill material has been placed to assist in the removal of any free water.

(d)(3) Final cover system.

Three alternatives are included for the final cover system, with the differences among them primarily being the barrier layer materials used in the design. The alternative that uses 18 inches compacted clay satisfies the default final cover design described in §257.102(d)(3)(i). The other two final cover systems described in Section 3 are considered alternative final cover system designs meeting the requirements described in 40 CFR §257.102(d)(3)(ii).

(d)(3)(ii)(A) The design of the final cover system must include an infiltration layer that achieves an equivalent reduction in infiltration as the infiltration layer specified in paragraphs (d)(3)(i)(A) and (B) of this section.

The default design assumed by the CCR Rule is an 18-inch-thick compacted soil layer. Since the liners have a permeability of about 1×10^{-8} cm/s, the CCR Rule would require that the cover barrier exhibit the same or slower permeability. Alternative cover systems may be as effective as the default CCR Rule design. A 40-mil geomembrane barrier overlain by a drainage layer may be installed as part of the final cover in lieu of an 18-inch thick earthen infiltration layer. This design achieves an equivalent reduction for infiltration by providing an impermeable barrier. Other alternative final cover system designs that meet the CCR Rule requirements will be considered.

(d)(3)(ii)(B) The design of the final cover system must include an erosion layer that provides equivalent protection from wind or water erosion as the erosion layer specified in paragraph (d)(3)(i)(C) of this section.

Final design of the erosion control layer will be conducted within six months prior to final closure. The erosion control layer will be designed as a vegetated cover or an aggregate stabilization cover to protect against wind and water erosion.

(d)(3)(ii)(C) The disruption of the integrity of the final cover system must be minimized through a design that accommodates settling and subsidence.

The cover subgrade materials will be placed incrementally to allow for settlement and subsequent backfilling of areas where differential settling and subsidence is observed. Construction of the final cover system will not commence until suitable cover subgrade is observed. As a result, minimal differential settlement and subsidence is expected following final cover construction so that performance of the geomembrane cover layer or cover system as a whole will not be affected. A low-density polyethylene (LDPE) membrane possesses excellent elongation and durability characteristics. The differential settlement that might occur at the Lewis & Clark Scrubber Ponds would be accommodated by a 40-mil LDPE geomembrane. The final cover design will allow placement of additional cover materials after closure as necessary to accommodate correction of settling or subsidence.

5.0 Closure Procedures and Methods

Prior to starting closure construction activities, a notification of intent to close the Scrubber Ponds will be prepared. The notification will be complete when it has been placed in the facility's operating record as required by 40 CFR §257.105(i)(7).

Areas to be closed with final cover will be determined in conjunction with preparation of construction plans and specifications for the construction. 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:

1. Remove free liquids from the Scrubber Ponds;
2. Grade and smooth ash fill, used as beneficial reuse, for subgrade surface as needed;
3. Place, grade and smooth surface buffer soil layer (if buffer layer is needed);
4. Install barrier layer;
5. Place drainage layer (if a geomembrane barrier is installed);
6. Place subsoil layer (if a vegetated cover is constructed);
7. Place erosion control layer;
8. Install permanent stormwater run-off controls (if needed).

Closure activities will be carried out by a qualified earthwork contractor and geomembrane liner installer (if a geomembrane barrier is included in the final cover construction). Construction plans and specifications will be prepared for 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 a Construction Quality Assurance/Quality Control Plan for the facility. A closure construction documentation report will be prepared after completion of closure of the Scrubber Ponds. The report will contain descriptions of the construction process, record drawings, survey and material test data, pertinent correspondence, and photographs of important aspects of construction.

A notification of closure of the Scrubber Ponds will be prepared within 30 days of completion of closure of both ponds. 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).

A deed notation will be recorded following closure of the Scrubber Ponds. A statement that the notation has been recorded will be prepared within 30 days of recording a notation on the deed to the property.

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).

Since the TSP will be closed under the provisions of § 257.102 Criteria for conducting the closure or retrofit of CCR units, paragraph (c) Closure by removal of CCR, notifications of closure and deed notations are not required for the TSP.

6.0 CCR Inventory and Maximum Closure Area Estimates

It is estimated at the time of closure the Scrubber Ponds will contain a maximum of 40,000 cubic yards of CCR, including dry ash fill that may be placed to reach closure grades. The top footprint of each of the ponds is approximately 2.1 acres. The largest area of the CCR unit requiring a final cover is a total of 4.2 acres.

7.0 Estimated Closure Schedule

The estimated closure date and schedule is summarized in Table 7-1. The milestones and the associated timeframes are initial estimates and will likely change and some activities are likely to overlap.

Table 7-1 Closure Schedule

Closure Milestone	Estimated Year
Final receipt of ash in Scrubber Ponds	2028
Complete cover subgrade fill to grade on Scrubber Ponds	2029
Prepare notification of intent to close Scrubber Ponds	2029 (prior to initiating closure)
Construct final cover system for Scrubber Ponds	2029
Prepare construction documentation report for Scrubber Ponds closure	2029
Prepare notification of closure of Scrubber Ponds	2029 (within 30 days of closure completion)
Prepare notation on the deed to the property of presence of Scrubber Ponds	2029
Prepare notification stating that the notation has been recorded for Scrubber Ponds	2029 (will be prepared within 30 days of recording a notation on the deed to the property)