

Closure Plan

Bottom Ash Pond No. 2

Sherburne County Generating Plant

Introduction

This plan describes the steps necessary to close the Bottom Ash Pond No. 2 (BAP2) at the Sherburne County Generating Plant (Sherco) in Becker, Minnesota. The BAP2 is a “new coal combustion residual (CCR) surface impoundment” according to 40 CFR §257.53. This document addresses the requirements of 40 CFR §257.102.

§257.102 (b)(1) Written Closure Plan

(i) A narrative description of how the CCR unit will be closed in accordance with this section

In-place BAP2 closure will be conducted in one phase. CCR will be sluiced to the BAP2 until the Sherco plant closure date is reached. Following a 2-year period of excavation for beneficial use, closure will commence.

BAP2 free water will be eliminated utilizing the discharge piping and dewatering system to discharge or pump the free water to separate facilities. CCR will be leveled and BAP2 embankment material will be used to shape the CCR to shed the stormwater off the final cover system to infiltration ponds.

Details of the maximum inventory, maximum area, schedule, final cover design, notification timelines, and certification can be found below.

(ii) If closure of the CCR unit will be accomplished through removal of CCR from the CCR unit, a description of the procedures to remove the CCR and decontaminate the CCR unit

The BAP2 will be closed by leaving CCR in-place.

(iii) If closure of the CCR unit will be accomplished by leaving CCR in place, a description of the final cover system design in accordance with paragraph (d) of this section

BAP2 will be closed in accordance with paragraph §257.102(d). A description of the design is provided below.

(iv) An estimate of the maximum inventory of CCR ever on-site over the active life of the CCR unit.

The BAP2 has a capacity of approximately 991,000 Cubic Yards to the top of the geomembrane liner at the east end of the pond at elevation 993 feet MSL. It is possible that the final closure volume will be less than full capacity following removal of CCR for beneficial use.

(v) An estimate of the largest area of the CCR unit ever requiring a final cover as required by paragraph (d) of this section at any time during the CCR unit's active life

The BAP2 closure will consist of 18.1 acres.

(vi) A schedule for completing all activities necessary to satisfy the closure criteria

CCR from the BAP2 may be periodically excavated for beneficial use in lined areas around the plant, so it is not likely it will reach ultimate capacity prior to the scheduled plant closure date in 2030. Following plant closure, BAP2 CCR will continue to be beneficially used for approximately 2 more years.

Closure activities will commence in 2032 and will be completed within 2 years in accordance §257.102(f)(ii).

There are no necessary approvals or permits that need to be obtained prior to commencing closure. CCR will be stabilized in accordance with §257.102(d)(2)(i) as described below. Once construction is complete, a construction certification report, signed by a qualified professional engineer, will be placed in the operating record.

Timeframes for closure will be as follows:

Closure Phase	Begin Date	End Date
Phase 1/Final Phase	Spring 2032	Fall 2033

§257.102 (c) Closure by Removal of CCR

Not applicable, the BAP2 will be closed in-place.

§257.102 (d)(1) Closure Performance Standard

The owner or operator of a CCR unit must ensure that, at a minimum they:

(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

Post closure infiltration will be minimized or eliminated by installing a Municipal Solid Waste Landfill-style final cover system as described in Minnesota Pollution Control Agency (MPCA) waste management facility rules. The final cover profile from bottom to top will consist of:

- 3 to 6-inch granular buffer layer free of large or angular rock to prevent CCR particles from damaging the geomembrane
- 40-mil linear low-density polyethylene (LLDPE) geomembrane (alternative infiltration layer)
- A minimum two-foot thick soil cover (erosion layer) consisting of:
 - 12 inches of granular drainage layer (soil with a permeability of 1×10^{-3} centimeters per second or faster to promote subsurface drainage off the geomembrane)
 - 12 inches of topsoil (soil capable of sustaining vegetative growth)

- Vegetation

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

All deposited CCR will be sufficiently stabilized to support the final cover system, as described in §257.102(d)(2)(ii), and will be graded to drain stormwater off the pond, preventing future impoundment. Stormwater modeling software will be used to verify the performance of the final cover stormwater control system.

Upon final receipt of CCR, the slurry pipes will be removed.

(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 majority of the final cover system will be constructed at a 2 to 3% slope. The side slopes of the final cover system will be constructed at a 3:1 horizontal to vertical ratio (3H:1V) and will utilize textured LLDPE geomembrane. Granular drainage material located on the 3H:1V slopes will be placed from the toe of the slope upward. Drain tile will be installed in the drainage layer along draws or at the toe of slopes to reduce saturation and improve veneer stability.

(iv) Minimize the need for further maintenance of the CCR unit

Maintenance on the BAP2 final cover system will be minimized by establishing and supporting vegetation. Erosion control products appropriate for the slope and expected stormwater run-off velocity will be implemented to prevent soil erosion until vegetation is established. Areas of concentrated run-off will utilize rip-rap or turf reinforcement mat. Once vegetation is established, mowing will occur as needed to prevent growth of woody and deep-rooted vegetation.

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

BAP2 closure will be completed within 2 years of commencing closure activities.

§257.102(d)(2) Drainage and Stabilization

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

Any free liquids will be drained with the discharge pipe installed through the pond embankment. Once the water level is lowered below the discharge pipe, remaining free water will be pumped from BAP2 to a separate facility utilizing the dewatering system installed at the toe of the slopes. The dewatering system features perforated pipes, aggregate filter packs, and solid cleanout riser pipes which will allow removal of pore water down to the base of the liner.

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

Once the free liquids are removed from the BAP2, coarse bottom ash deposits from the west end of the BAP2 will be pushed east to level the BAP2. Once leveled, embankment material will be used to shape the BAP2 and promote drainage off the final cover system. Coarse bottom ash and embankment material will be compacted as it is placed to ensure the CCR is stable enough to support the final cover system.

§257.102(d)(3)(i) Final Cover System

The final cover system will be designed and constructed to meet the criteria in paragraphs §257.102(d)(3)(i) and §257.102(d)(3)(ii) (Alternative Final Cover System) and is described herein;

(A) The permeability of the final cover system must be less than or equal to the permeability of any bottom liner system.

The BAP2 base liner was constructed with a composite liner consisting of geosynthetic clay liner (GCL) overlain a 60-mil high density polyethylene geomembrane liner in accordance with §257.72. Geomembrane liners are virtually impermeable when installed without defects or damages. Electrical leak detection locating was completed on the BAP2 base liner before the pond was placed into service, ensuring there were no leaks or defects in the base liner. The BAP2 final cover system will feature a polyethylene geomembrane which is equal to the permeability of the base geomembrane liner, as both are virtually impermeable.

Final cover geomembrane installation will be continuously monitored by on-site construction quality assurance staff to verify that construction is performed in accordance with specifications and that testing is conducted in accordance with the Geosynthetic Institute standard specifications for LLDPE geomembrane (GM17) or geomembrane seams (GM19).

Once the final cover geomembrane is installed, tested, and all of the quality control documentation is complete, a GPS-guided dozer utilizing as-built geomembrane elevation data will place the granular drainage layer over the geomembrane.

(B) 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

An alternative infiltration layer will be used in accordance with §§257.102(d)(3)(ii)(A) through (C)

(C) 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.

As stated above, the BAP2 erosion layer will consist of 24 inches of earthen material. The bottom 12 inches of the erosion layer will consist of a granular drainage material and the top 12 inches will be topsoil, capable of sustaining native plant growth.

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

The final cover system utilizes a 40-mil LLDPE geomembrane, which can elongate more than 800% before breakage occurs. This accommodates settling and subsidence, while maintaining the integrity of infiltration barrier.

§257.102(d)(3)(ii) Alternative Final Cover System Design

(A) The design of the final cover system must include an infiltration layer that provides equivalent reduction in infiltration as the infiltration layer specified in §257.102(d)(3)(i)(B)

The BAP2 will feature a 40-mil LLDPE geomembrane infiltration layer and a 24-inch erosion layer in lieu of 18 inches of earthen material and six inches of erosion layer. The permeability of 40-mil LLDPE is equal to the BAP2 base liner.

(B) The design of the final cover system must include an erosion layer that provides equivalent protection as specified in §257.102(d)(3)(i)(C)

The final cover erosion layer exceeds the requirements for §257.102(d)(3)(i)(C) as described above.

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

The integrity of the final cover system meets the requirements for §257.102(d)(3)(i)(D) as described above.

§257.102(d)(3)(iii) Certification

Certification for the entire closure plan under §257.102 can be found at the end of this compliance report.

§257.102(e) Initiation of Closure Activities

As stated in paragraph §257.102(b)(1)(vi) above, initiation of closure activities will commence once the last known volume of CCR for the purpose of beneficial use is removed.

§257.102(f) Completion of Closure Activities

The BAP2 will be closed within 2 years of commencing closure activities.

§257.102(g) Notification of Intent to Close

A notice of intent (NOI) will be placed in the operating record no later than the date the operator or owner initiates the first phase closure. The NOI will include the certification of a qualified professional engineer for the design of the final cover system in accordance with §257.102(d)(3)(i) or (ii).

§257.102(h) Notification of Closure

Within 30 days of completion of the final phase of closure, the owner or operator will place notification of closure in the operating record. The notification of closure will be signed by a qualified professional engineer.

§257.102(i) Deed Notations

Following closure of the BAP2, a notation on the deed to the property, or some other instrument that is normally examined during title search, will be recorded in accordance with §257.102(i)(1) and (2).


Within 30 days of recording a notation on the deed to the property, the owner or operator will place the notation in the operating record.

§257.102(k) Criteria to Retrofit an Existing CCR Surface Impoundment

The BAP2 will not be retrofitted.

Certification

I hereby certify under penalty of law that this report was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based upon my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment.



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Date