Closure Plan
Scrubber Solids Pond No. 3
Sherburne County Generating Plant

Introduction

This plan describes the closure requirements for Scrubber Solids Pond No. 3 (Pond 3) at the Sherburne County Generating Plant (Sherco) in Becker, Minnesota. Pond 3 is an existing coal combustion residual (CCR) surface impoundment permitted under the National Discharge Elimination System (NPDES) Permit Number 0002186. This document complies with the requirements of 40 CFR §257.102 and Permit No 0002186.

§257.102 (b)(1) Written Closure Plan

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

Pond 3 in-place closure will occur over 4 separate phases. CCR will be sluiced to each phase until the design elevation is reached. Sluice pipes will then be moved to a new phase while CCR from the Bottom Ash Pond is hauled in, graded, and compacted to crown the closure phase and control stormwater drainage.

This process will be repeated for each phase, working from south to north towards the Pond 3 discharge structure and proposed decant pipe. Deposition of CCR into the pond will displace free liquids; free liquids will be either returned for reuse in the plant or routed to a separate lined pond.

Each phase of final cover will commence within 30 days of last receipt of CCR and will be completed within that construction season, generally 60 to 120 days.

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

Pond 3 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

Pond 3 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.

Pond 3 has a capacity of 8.9 Million Cubic Yards. 7.8 Million Cubic Yards of CCR can be placed from the base to the top of the liner, at elevation 1010 feet MSL. An additional 1.1 Million Cubic Yards of CCR will be placed above the deposited CCR to crown Pond 3.

(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 largest area of CCR requiring final cover will be 91.7 acres.

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

Pond 3 will be closed in 4 separate phases. The closure of each phase will commence no later than 30 days after receiving final CCR for that phase. Once construction on a phase begins it will be completed within the same construction season, generally 60 to 120 days.

There are no necessary approvals or permits that need to be obtained prior to commencing closure. All phases 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	Spring/Summer 2025	Fall 2025
Phase 2	Spring/Summer 2028	Fall 2028
Phase 3	Spring/Summer 2032	Fall 2032
Final Phase	Spring/Summer 2037	Fall 2037

Note: The number of phases and dates of closure are based on CCR generation, rainfall data, plant outage schedules, and can vary from year to year. The phases and dates above are assumptions based on presently available information.

§257.102 (c) Closure by Removal of CCR

Not applicable, Pond 3 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 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 x 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

All final cover phases will be designed and constructed to capture and convey stormwater off the pond, down to perimeter infiltration basins. Run-on from the active filling area will not enter the final cover stormwater control system. Stormwater modeling software will be used to verify the performance of the final cover stormwater control system.

Active filling areas of Pond 3 will continue to be operated in accordance with §257.82, and will contain a 1,000 year design flood event to prevent contaminated run-off from reaching the ground.

(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 crowned and graded to drain stormwater off the pond, preventing future impoundment.

As areas of Pond 3 reach designed elevation, the CCR sluice pipes will be moved to establish a new active filling area of the pond. Once the final phase of Pond 3 has reached the design CCR deposition volume, the sluice 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% slope. Small slopes, less than 10 feet high, 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.

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

Maintenance on the Pond 3 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 assist vegetative growth. 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

Pond 3 final cover phases will generally be completed within five months of final receipt of CCR for that phase.

§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

In 2017, a decant pipe will be constructed in the northeast corner of the pond. The invert elevation of the decant pipe will be above the ponded water elevation at the time of construction and approximately 8 feet lower than the dike crest. Once ponded water reaches the elevation of the decant pipe invert, sluiced CCR will displace and decant pond water to a separate lined facility.

CCR deposition began in the southwest quadrant of Pond 3 (Phase 1), and will continue until the design elevation is attained. CCR sluice pipes will then be moved to the next phase to establish a new active filling area. Pond phases will progress from south to north, decanting free liquids displaced by CCR in the process.

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

As areas of Pond 3 reach the designed operating elevation, CCR from the Bottom Ash Pond will be mechanically excavated, hauled to Pond 3, shaped with a dozer, and compacted to 95% standard proctor density. This provides the crown and a stable base for 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 Pond 3 final cover and bottom liner systems both feature a polyethylene geomembrane. Flow through geomembrane is essentially zero and thus both are equivalent.

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.

A Minnesota Pollution Control Agency (MPCA) prepared Statement of Need and Reasonableness (SONAR) regarding state rules regulating waste management facilities determined that a final cover system consisting of a 40 mil LLDPE geomembrane with 24-inches of cover soil, adequate slopes, and stormwater control systems is capable of preventing migration of stormwater through the final cover system.

(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 Pond 3 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)

Pond 3 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 less than 18 inches earthen material and is equivalent to the Pond 3 base liner geomembrane.

(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 within 30 days after the known final receipt of CCR for each phase is attained.

§257.102(f) Completion of Closure Activities

Each Pond 3 closure phase will be completed within 120 days of commencement.

§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 final phase of Pond 3, 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

Pond 3 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.

Daniel J. Riggs, PE
License No. 49559

October 17, 2016
Date

References

Minnesota Pollution Control Agency (February 1988). “Statement of Need and Reasonableness, In the Matter of Proposed Rules Governing Solid Waste Management Facility Permits, and the Design, Construction and Operation of Solid Waste Management Facilities”, St. Paul, Minnesota.

References (included in Operating Record and Website)

Barr Engineering Company (March 31, 1995). “Northern States Power Company Sherburne County Generating Plan Scrubber Solids Pond No. 3 Site Closure/Postclosure Care Plan”, MPCA Permit Application Document, Minneapolis, Minnesota.