Closure Plan
Unit 3 Landfill
Sherburne County Generating Plant

Introduction

This plan describes the closure requirements for the Unit 3 Landfill (Landfill) at the Sherburne County Generating Plant (Sherco) in Becker, Minnesota. U3LF is an existing coal combustion residual (CCR) Landfill currently permitted by the Minnesota Pollution Control Agency under Permit Number SW-293. This document complies with the requirements of 40 CFR §257.102 and Permit Number SW-293.

Disposal of CCR in the Landfill has been regulated by the Minnesota Pollution Control Agency (MPCA) since 1986. All Landfill disposal has occurred in lined cells. Cells constructed after 1994 utilized composite liners.

§257.102 (b)(1) Written Closure Plan

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

Closure will occur in stages as areas of the Landfill reach final grade. Current fill progression is from south to north, but will begin moving east to west once the current cell has reached capacity. Future phases of closure will continue as Cells 3, 4 and 5 are filled to final ash grades.

Closure is generally conducted biennially and will occur during the summer and fall months. Areas without final cover during a given construction season, but brought to final grade, will have temporary erosion controls placed as necessary until final cover is installed.

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 Landfill 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

The Landfill 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 MPCA has permitted a Landfill capacity of 14.6 million cubic yards.

(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 permitted area for disposal is 138 planimetric areas.

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

Closure is set to occur in 2017, then biennially after that until scheduled plant closure in 2035. Final closure is estimated to occur in 2037, approximately 2 years after plant closure to service the needs of plant demolition and/or refurbishment.

There are no necessary approvals or permits that need to be obtained prior to commencing closure. The MPCA will be notified 10 working days in the advance of construction and all notifications will be placed in the operating record and CCR website as described below.

§257.102 (c) Closure by Removal of CCR

Not applicable, the Landfill 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

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

All final cover phases will be designed and constructed to capture and convey stormwater off the Landfill, down to infiltration basins. Run-off from the active filling area will be handled in accordance with §257.81, and will collect and contain the run-off from a 25-year, 24-hour storm event.

Stormwater modeling software will be used to verify the performance of the final cover stormwater control system.

Future impoundment of water will be prevented by placing the CCR at either 4:1 Horizontal to Vertical (4H:1V) or 5H:1V slope along the side slopes of the Landfill and a minimum 4% slope along the top to shed stormwater off closed portions of the Landfill.

(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.

All 5H:1V or steeper slopes will utilize textured LLDPE geomembrane. Granular drainage material located on the 4 or 5H:1V slopes will be placed from the toe of the slope upward. A coarse aggregate channel or drain-tile will be installed along the toe of the slope to reduce the saturation of the drainage layer, improving veneer stability.

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

Maintenance on the Landfill 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, annual mowing will occur to prevent growth of woody vegetation.

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

Landfill closure will commence as sufficient areas of final grades are reached. Closure is scheduled to occur biennially.

§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

Run-off from the active area of the Landfill is captured by the leachate collection system and removed from the active area.

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

The CCR in the Landfill is compacted with a vibratory smooth drum roller shortly after placement. This creates a very stable surface capable of supporting the final cover system.

§257.102(d)(3)(i) Final Cover System

The final cover system was 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 Landfill final cover and bottom liner system 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.

An MPCA-prepared a 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 Landfill 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 Landfill 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 the final cover and base liner geomembranes are equivalent.

(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 has been received. Plant closure is expected to occur in 2035, but CCR may be disposed of for an additional 2 years as facilities are demolished or refurbished.

§257.102(f) Completion of Closure Activities

Closure of the Landfill will occur within 2 years of commencing the final phase of closure.

§257.102(g) Notification of Intent to Close

A notice of intent (NOI) to closure will be submitted to the MPCA 10 working days prior to the start of closure construction. The NOI will also 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 submit a notification of closure to the MPCA and place it in the operating record and CCR website. The report will summarize the documentation the construction process and will be signed by a qualified professional engineer.

§257.102(i) Deed Notations

Following closure of the Landfill, 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.

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)

Carlson McCain, Inc. (October 2013). "Closure/Post-Closure Plan, Application for Permit Reissuance, Unit 3 AQCS Solids Landfill", MPCA Permit Application Document, Maple Plain, Minnesota.