



Cardinal Power Plant

FAR I RSW Landfill Federal CCR Rule Compliance Closure Plan § 257.102(b)

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Issue Purpose: Use

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1.0 PURPOSE & SCOPE

Federal CCR Rule Reference: 40 CFR 257.102(b)

The FAR I Residual Solid Waste (FAR I RSW) Landfill is a coal combustion residual (CCR) landfill at the Cardinal Power Plant, which is operated by the Cardinal Operating Company, Inc. (Cardinal). As a CCR landfill, FAR I RSW Landfill is regulated by the U.S. Environmental Protection Agency's "Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments," which are codified in 40 CFR Part 257 Subpart D (Reference 1) and are also referred to herein as the "Federal CCR Rule." Pursuant to 40 CFR 257.102(b), Cardinal Operating Company must prepare a written closure plan for the FAR I RSW Landfill to document planned actions to be implemented in conjunction with closure of the CCR unit.

This document provides Cardinal's written closure plan for closing the FAR I RSW Landfill at the end of its active life. Cardinal intends to close FAR I RSW Landfill by leaving the CCR in place and installing a final cover system over the landfill in accordance with 40 CFR 257.102(d). This plan describes the steps necessary to close FAR I RSW Landfill in this manner.

2.0 CLOSURE PLAN NARRATIVE DESCRIPTION

Federal CCR Rule Reference: 40 CFR 257.102(b)(1)(i) & 257.102(d)(1)

Cardinal intends to close the FAR I RSW Landfill by leaving the CCR stored in the unit in place and installing a final cover system over the landfill in accordance with the requirements of 40 CFR 257.102(d). The final cover system will be designed in accordance with the performance requirements specified in 40 CFR 257.102(d)(3) and as described in the following sections of this closure plan.

The anticipated closure in-place will be performed in accordance with the following sequential steps:

- Terminating receipt of CCR and any non-CCR waste streams into the unit.
- Installing a final cover system over the graded CCR that meets the infiltration- and erosion-control performance standards of 40 CFR 257.102(d)(3).
- Retaining an independent, qualified professional engineer to evaluate and certify closure of the unit in accordance with the closure plan in effect at the time of closure.

- Restoring and stabilizing areas disturbed during closure activities to establish a self-sustaining vegetative cover as applicable.

During consolidation and grading, the CCR (and any required fill) will be formed to establish the lines and grades of the final cover system. Slopes for the material supporting the final cover will typically range between approximately 100:1 (1%) and 3:1 (33%). The slopes will be steep enough to prevent stormwater ponding over the cap, while remaining flat enough for stability and to limit erosion from run-off. The final grades will be designed to accommodate settlement and subsidence while maintaining positive drainage.

Cardinal utilizes a contact stormwater pond (southeast of Cell 1), to capture stormwater run-off from portions of the active landfill. When the pond is no longer needed to support the landfill operations, the accumulated material in the pond will be removed for disposal. Additionally, the protective liner will be removed and disposed of, and the area will be re-graded to prevent ponding.

Run-on/run-off controls and stabilized drainage features will be maintained throughout closure to protect the integrity of the final cover system and to minimize erosion; stormwater will be directed off the cap into existing site drainage features consistent with recognized and generally accepted good engineering practice.

To complete closure as fast as technically feasible, areas of the unit will be closed as they are prepared; grading (and any necessary fill placement) and installation of the final cover system may proceed in parallel where practicable.

Where CCR is relocated during consolidation, disturbed areas will be inspected and managed in accordance with Cardinal's direction and good engineering practice before installation of the final cover system.

3.0 FINAL COVER SYSTEM DESCRIPTION

Federal CCR Rule References: 40 CFR 257.102(b)(1)(iii) & 257.102(d)(1)

After CCR consolidation, grading, and surface stabilization (as necessary) are completed, the unit's final cover system will be installed. Pursuant to the closure performance standards prescribed in 40 CFR 257.102(d)(3), the final cover system encapsulating the CCR will:

1. Minimize the post-closure infiltration of liquid into the CCR.
2. Minimize the risk of release of CCR or impacted stormwater runoff to groundwater and to the atmosphere.
3. Preclude the probability of future impoundment of water, sediment, or slurry.
4. Provide major slope stability to prevent sloughing of the final cover system during the closure and post-closure care periods.
5. Minimize future maintenance.
6. Allow closure activities to be completed as quickly as practical, consistent with recognized and generally accepted good engineering practices.

As discussed in Section 2.0, the material on which the final cover system is installed will be graded to preclude the probability of future impoundment of water, provide major slope stability, and accommodate settling and subsidence while maintaining positive drainage, in accordance with 40 CFR 257.102(d)(3)(ii)(C). The contact stormwater pond accumulated sediments and liner system will also be removed, when no longer needed.

The following subsections discuss the Landfill closure layers and required performance standards.

3.1 INFILTRATION-CONTROL LAYER

Federal CCR Rule Reference: 40 CFR 257.102(d)(1)(i) & 257.102(d)(3)(ii)(A)

The primary function of the final cover system is to minimize the infiltration of liquids through the cap, thereby minimizing the risk of leaching of the underlying CCR. Per 40 CFR 257.102(d)(3)(ii)(A) (referencing 40 CFR 257.102(d)(3)(i)(A)), the cap's hydraulic conductivity must be no greater than the permeability of the unit's bottom liner system or natural subsoils

present, or no greater than 1×10^{-5} cm/s, unless an alternative cover achieving equivalent performance is demonstrated under 40 CFR 257.102(d)(3)(ii).

To achieve this performance standard, the infiltration-control layer of the FAR I RSW Landfill's final cover system will match the unit's composite liner system. This layer will consist of a lower geosynthetic clay liner (GCL) installed directly over the graded CCR (and any required fill) and an upper 60-mil HDPE geomembrane cap installed directly over the GCL, or an equivalent composite meeting or exceeding these performance characteristics as finalized during detailed engineering.

The GCL is part of the final cover system, not the existing bottom liner. The existing liner consists of an 18-inch-thick recompacted soil liner and a 30-mil PVC geomembrane. The final cover system will meet the requirements of 40 CFR 257.102(d)(3)(ii)(A).

3.2 EROSION-CONTROL LAYER

Federal CCR Rule Reference: 40 CFR 257.102(d)(3)(ii)(B)

To minimize erosion of the FAR I RSW Landfill's final cover system, the uppermost layer of the cap will consist of at least six inches of topsoil seeded with an Ohio Department of Transportation approved roadside seed mix or a similar plant mix native to the area. Regular maintenance of the seeding will take place until a vegetative cover is established and is self-sustaining.

To facilitate installation of the topsoil layer over the composite infiltration-control layer, an 18-inch-thick (minimum) protective soil layer will be placed over the composite infiltration-control layer to preclude damage to the cap during installation of the topsoil layer and from the future vegetation's root network.

The erosion-control layer will be of suitable thickness to protect against wind and water erosion and to sustain vegetation, and vegetation will be managed so it does not impede condition assessments, consistent with 40 CFR 257.102(d)(3)(ii)(B).

4.0 ESTIMATED MAXIMUM INVENTORY OF CCR

Federal CCR Rule Reference: 40 CFR 257.102(b)(1)(iv)

The maximum inventory of CCR expected to be present in the FAR I RSW Landfill throughout its active life is 16,670,000 yd³; this estimate will be finalized during detailed engineering and maintained in the facility operating record in accordance with 40 CFR 257.102(b)(1).

5.0 ESTIMATED COVER SURFACE AREA

The estimated final cover surface area for the FAR I RSW Landfill is 110.27 acres, which is expected to be the largest surface area that will ever require a final cover at any point over the unit's active life. The estimate will be finalized during detailed engineering and maintained in the facility operating record in accordance with 40 CFR 257.102(b)(1).

6.0 CLOSURE SCHEDULE

Federal CCR Rule Reference: 40 CFR 257.102(b)(1)(vi)

Closure activities for the FAR I RSW Landfill will commence following cessation of all waste streams into the unit. Pursuant to 40 CFR 257.102(e)(1)(i), the Cardinal Operating Company will initiate the planned closure activities described herein within 30 days after cessation of incoming waste.

To complete closure as fast as technically feasible, it is expected that the final cover system will be installed as areas of the unit are prepared (i.e., graded and stabilized). In other words, grading the CCR (and any additional fill material) and installing the final cover system will be performed in parallel where practicable.

Table 6-1 lists the major milestones necessary for closing the FAR I RSW Landfill in accordance with this closure plan and the estimated duration for completing each milestone. Dates and durations are planning-level estimates and will be finalized during detailed engineering.

Table 6-1 – Planning-Level Schedule for Closing FAR I RSW Landfill

Task Description	Anticipated Duration
Detailed Engineering and Design for FAR I RSW Landfill Closure	4 months
Procure General Contractor for Closure	3 months
Consolidate CCR and Establish Grade	9 months
Cease receipt of All Waste streams into FAR I RSW Landfill	–
Notification of Intent to Close	1 month
Install Final Cover System	6 months
Certify Closure of FAR I RSW Landfill	–

7.0 AMENDMENTS TO CLOSURE PLAN

Federal CCR Rule Reference: 40 CFR 257.102(b)(3)

At a minimum, and in accordance with 40 CFR 257.102(b)(3), Cardinal Operating Company will amend this closure plan if a change in the operation of the FAR I RSW Landfill would substantially affect this closure plan or if an unanticipated event necessitates a revision to this closure plan. All amendments to this closure plan will be certified by a qualified professional engineer licensed in the State of Ohio in accordance with 40 CFR 257.102(b)(4).

8.0 COMPLETION OF CLOSURE ACTIVITIES

Federal CCR Rule Reference: 40 CFR 257.102(f)

Upon completion of all closure activities for the FAR I RSW Landfill, Cardinal Operating Company will obtain a certification from an independent, qualified professional engineer licensed in the State of Ohio verifying that the unit has been closed in accordance with the closure plan in effect at the time of closure.

9.0 CERTIFICATION

Federal CCR Rule Reference: 40 CFR 257.102(b)(4)

I certify that:

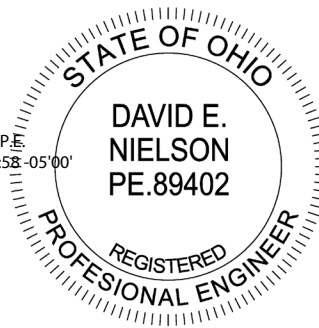
- This written closure plan for FAR I RSW Landfill was prepared in accordance with, and meets the requirements of, 40 CFR 257.102 (b).
- This written closure plan was prepared by me or under my direct supervision
- I am a registered professional engineer under the laws of the State of Ohio.

Certified By: David E. Nielson, PE

Date: See Signature



David E. Nielson, P.E.
2026.08.21 15:30:58 -05'00'



10.0 REFERENCES

1. U.S. Environmental Protection Agency. "Standards for Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments." 40 CFR Part 257 Subpart D.
<https://www.ecfr.gov/current/title-40/chapter-I/subchapter-I/part-257/subpart-D>.