

CCR Closure Plan La Cygne Generating Station CCR Landfill

Evergy Metro, Inc.

Project number: 60696120

January 2024
Revision 1

Revision History

Revision No.	Revision date	Section(s) Revised	Summary of Revision(s)
0	10/14/2016	N/A	Initial closure plan developed pursuant to 40 CFR 257.102(b)
1	1/24/2024	Entire Plan	Plan modified to update how closure performance standards are achieved.

Revisions are accomplished in accordance with Section 5.

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1. Background

AECOM Technical Services, Inc. (AECOM) has prepared the following CCR Closure Plan (Plan) on behalf of Evergy Metro, Inc. (Evergy). The purpose of this Plan is to identify and describe the measures needed to close the La Cygne Generating Station (La Cygne) CCR Landfill consistent with recognized and generally accepted good engineering practices and in accordance with the United States Environmental Protection Agency (USEPA) Coal Combustion Residuals Rule (CCR Rule). The following sections provide background information on the facility and related regulatory requirements.

1.1 Facility Information

Table 1. Facility Information

Name of Facility	La Cygne Generating Station
Name of CCR Unit	CCR Landfill
Name of Operator:	Evergy Metro, Inc. (Evergy)
Facility Mailing Address:	25166 E 2200th Road, La Cygne, Kansas
Location:	Approximately seven (7) miles east of La Cygne, Kansas
Facility Description:	The La Cygne Generating Station has two coal-fired units that produce fly ash, bottom ash, economizer ash, slag, and gypsum. CCR not beneficially used is transported to the on-site CCR Landfill for disposal. Related facilities include a groundwater monitoring system, storm water management system, and haul/access roads.
Operating Permits:	The CCR Landfill at La Cygne is regulated under the applicable Federal CCR Rules of 40 CFR 257 and Kansas Industrial Landfill Permit No. 0337 by the Kansas Department of Health and Environment – Bureau of Waste Management (KDHE-BWM), in accordance with Kansas Statutes Annotated (KSA) 65-3407. KDHE modified the solid waste permit, per K.A.R. 28-29-6a, in response to the CCR Rule to include all on-site CCR waste materials management units as disposal areas under the existing solid waste permit for La Cygne.

1.2 Regulatory Requirements

On April 17, 2015, USEPA published the CCR Rule under Subtitle D of the Resource Conservation and Recovery Act (RCRA) as 40 CFR Parts §257 and §261. The purpose of the CCR Rule is to provide a comprehensive set of requirements for the safe disposal of CCR.

This plan has been developed for the La Cygne Generating Station CCR Landfill in accordance with 40 CFR 257.102 (b). The CCR Rule requires preparation of a Closure Plan for all existing CCR landfills and surface impoundments in operation as of October 19, 2015, the effective date of the CCR Rule.

The owner or operator of a CCR unit must prepare a written closure plan that includes, at a minimum, the information specified in 40 CFR 257.102 (b) (1) (i) through (vi). The section of this closure plan which addresses each of the requirements is presented in parentheses after the regulatory citation.

These items and the section of this plan responsive to each follow:

40 CFR 257.102 (b) Written Closure Plan

1. Content of the Plan

- i. Narrative description of how the CCR unit will be closed in accordance with 40 CFR 257.102 (Section 2.2).
- 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 in accordance with 40 CFR 257.102 (c). This section is not applicable since the unit will be closed in place (N/A).
- iii. If closure of the CCR unit will be accomplished by leaving CCR in place, a description of the final cover system and methods and procedures used to install the final cover. The closure plan must also discuss how the final cover system will achieve the performance standards specified in 40 CFR 257.102 (d) (Section 2.2, Section 2.3, and Section 3).
- iv. Estimate of the maximum inventory of CCR ever on-site over the active life of the CCR unit (Section 2.4).
- v. Estimate of the largest area of the CCR unit ever requiring a final cover (Section 2.4).
- vi. Schedule for completing all activities necessary to satisfy the closure criteria in this section, including an estimate of the year in which all closure activities for the CCR unit will be completed. The schedule should provide sufficient information to describe the sequential steps that will be taken to close the CCR unit, including identification of major milestones such as coordinating with and obtaining necessary approvals and permits from other agencies, the dewatering and stabilization phases of CCR surface impoundment closure, or installation of the final cover system, and the estimated timeframes to complete each step or phase of CCR unit closure (Section 2.5).

40 CFR 257.102 (d)

40 CFR 257.102 (d) (1) - The owner or operator of a CCR unit must ensure that, at a minimum, the CCR unit is closed in a manner that will:

- 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 (Section 3.1).
- ii. Preclude the probability of future impoundment of water, sediment, or slurry (Section 3.2).
- 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 (Section 3.3).
- iv. Minimize the need for further maintenance of the CCR unit (Section 3.4).
- v. Be completed in the shortest amount of time consistent with recognized and generally accepted good engineering practices. (Section 3.5)

40 CFR 257.102 (d) (2) – Drainage and Stabilization of CCR Surface Impoundments must meet the requirements of (d)(2)(i) and (ii) below prior to installing the final cover system required under paragraph (d)(3).

- i. Free liquids must be eliminated by removing liquid wastes or solidifying the remaining wastes and waste residue (Section 2.3).
- ii. Remaining wastes must be stabilized sufficiently to support the final cover system (Section 2.3).

40 CFR 257.102 (d) (3) (i) - A final cover system must be installed to minimize infiltration and erosion, and at minimum, meet the requirements of (d) (3) (i) (A) through (D) below, or the requirements of an alternative final cover system specified under paragraph (d)(3)(ii).

- (A) The permeability of the final cover system must be less than or equal to the permeability of any bottom liner system or natural subsoils present, or a permeability no greater than 1×10^{-5} cm/sec, whichever is less. (Section 4.1)
- (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. (Section 4.1)
- (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. (Section 4.1)
- (D) The disruption of the integrity of the final cover system must be minimized through a design that accommodates settling and subsidence. (Section 4.2)

40 CFR 257.102 (d) (3) (ii) - The owner or operator may select an alternative final cover system design, provided the alternative final cover system is designed and constructed to meet the criteria of (d)(3)(ii)(A) through (C) below.

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

Selected definitions from the CCR Rule are provided below.

Closed means placement of CCR in a CCR unit has ceased, and the owner or operator has completed closure of the CCR unit in accordance with § 257.102 and has initiated post-closure care in accordance with § 257.104.

CCR (coal combustion residuals) means fly ash, bottom ash, boiler slag, and flue gas desulfurization materials generated from burning coal for the purpose of generating electricity by electric utilities and independent power producers.

CCR Landfill means an area of land or an excavation that receives CCR and which is not a surface impoundment, an underground injection well, a salt dome formation, a salt bed formation, an underground or surface coal mine, or a cave. For purposes of this subpart, a CCR landfill also includes sand and gravel pits and quarries that receive CCR, CCR piles, and any practice that does not meet the definition of a beneficial use of CCR.

CCR Surface Impoundment or Impoundment means a natural topographic depression, man-made excavation, or diked area, which is designed to hold an accumulation of CCR and liquids, and the unit treats, stores, or disposes of CCR.

CCR Unit means any CCR Landfill, CCR surface impoundment, or lateral expansion of a CCR unit, or a combination of more than one of these units, based on the context of the paragraph(s) in which it is used. This term includes both new and existing units, unless otherwise specified.

Existing CCR Landfill means a CCR landfill that receives CCR both before and after October 14, 2015, or for which construction commenced prior to October 14, 2015 and receives CCR on or after October 14, 2015. A CCR landfill has commenced construction if the owner or operator has obtained the federal, state, and local approvals or permits necessary to begin physical construction and a continuous on-site, physical construction program had begun prior to October 14, 2015.

Qualified Professional Engineer means an individual who is licensed by a state as a Professional Engineer to practice one or more disciplines of engineering and who is qualified by education, technical knowledge, and experience to make the specific technical certifications required under this subpart. Professional engineers making these certifications must be currently licensed in the state where the CCR unit(s) is located.

2. Closure Description

This Plan describes the steps needed to close the existing La Cygne CCR Landfill at any point during the active life of the unit (existing footprint) in accordance with the CCR Rule and recognized and generally accepted good engineering practices. Plan items required under the CCR Rule described in this section fall into the general categories of Closure Activities to Date, Final Cover Description, Construction Methods and Procedures, Area and Volume Estimates, and Closure Schedule.

This initial or any subsequent Plan may be amended pursuant to 40 CFR 257.102 (b) (3) at any time as discussed in Section 5. The current plan is to close the unit in place.

2.1 Closure Activities to Date

Closure has not yet commenced.

2.2 Final Cover Description

The final closure of the CCR Landfill will be accomplished by leaving the CCR material in place and covering the CCR material with a final cover system. The final cover system design and basis is described in Section 4, but in general consists of a clay cover system including: 1) an infiltration layer consisting of a minimum of an 18-inch-thick layer of earthen material; and 2) an erosion layer consisting of a minimum of a 6-inch-thick layer of earthen material capable of sustaining native plant growth. The final cover slopes will be designed with a maximum side slope of approximately 33%, a minimum crown slope of approximately 1%, and will be graded to convey stormwater runoff to perimeter terraces and downslope conveyance structures to convey the surface water to perimeter drainage channels for removal from the landfill cover system. Perimeter drainage channels will be designed with minimum slopes of approximately 0.5%.

2.3 Construction Methods and Procedures

CCR material and/or earthen material will be added and graded to achieve final design subgrade slopes and grades using appropriate earthmoving equipment. In the event closure is required before the landfill is filled to capacity, the unit will be brought to grade using CCR material and/or earthen material to achieve revised design grades. The CCR subgrade will be evaluated for suitability and accepted by the Certifying Engineer for the cover project during and prior to construction of the final cover.

The infiltration layer will be installed in direct contact with a subgrade of earthen and/or CCR material under the observation of construction quality assurance personnel. The infiltration layer will be placed and graded in approximate 6-inch-thick compacted layers using earthmoving equipment. Soil will be tested during construction to meet moisture, density, and permeability requirements. Thicknesses will be surveyed on a 100-ft grid before and after construction of the 18-inch-thick infiltration and 6-inch-thick erosion layers to confirm that minimum layer thicknesses are achieved. The surface of preceding compacted layers will be scarified before the next layer is constructed. Earthen material will then be placed over the infiltration layer to create a minimum 6-inch-thick erosion layer that will be capable of sustaining native plant growth. The final cover surface will be fertilized, mulched, and seeded as necessary to sustain native plant growth. In some areas, the erosion layer may consist of gravel road surfacing or concrete drainage structures. A discussion of how this system meets the performance standards of 40 CFR 257.102 (d) is provided in Section 3.

2.4 Area and Volume Estimates

The maximum inventory of CCR ever planned on-site over the active life of the CCR Landfill is approximately 21.3 million cubic yards. The largest area of the unit that may ever require final cover at any time during the unit's active life is estimated to be approximately 136 acres.

2.5 Closure Schedule

The CCR Landfill will be sequentially closed in phases as dictated by good engineering practice, allowable construction traffic, experience, and the ability to manage stormwater. The size of the construction phase and time of year closure construction takes place will vary. Therefore, closure construction schedules will vary. The schedule provided in this section is an estimation.

2.5.1 Commencement of Closure

Commencement of final closure has occurred if placement of waste in the landfill has ceased and any of the following actions or activities has been completed (40 CFR 257.102 (e) (3)):

- (i) Steps necessary to implement this closure plan;
- (ii) Submittal of a completed application for any required state or agency permit or permit modification; or
- (i) Steps necessary to comply with any state or other agency standards that are a prerequisite, or are otherwise applicable, to initiating or completing the closure.

There are three regulatory timeframes within which a unit may be required to close:

- (i) In accordance with 40 CFR 257.102 (e) (1), a landfill has 30 days after the date the unit receives the known final receipt of waste, either CCR or non-CCR waste stream; or removes the known final volume of CCR from the CCR unit for the purpose of beneficial use of CCR.

- (ii) In accordance with 40 CFR 257.102 (e) (2), for idled units with additional capacity that expect to resume CCR or non-CCR waste disposal operations, or CCR removal operations for beneficial use, closure must be initiated within two years unless a written demonstration prepared in accordance with 40 CFR 257.102 (e) (2) (ii) is placed in the unit’s operating record, which would provide an additional two year extension(s).
- (iii) If a landfill is required to close due to technical siting criteria (i.e. location in an unstable area), closure must be initiated within six months.

Extensions to complete the closure activity may be allowed under 40 CFR 257.102 (f) (2).

2.5.2 Closure Schedule

The milestones and the associated timeframes in this section are initial estimates. Some of the activities associated with the milestones will overlap.

Table 2. Estimated Closure Schedule

Activity	Date
Initial Written Closure Plan	October 14, 2016
Notification of Intent to Close Placed in Operating Record	No later than the date closure of the CCR unit is initiated. Closure will commence per applicable timeframes in 40 CFR 257.102 (e) ⁽¹⁾ .
Coordinating with and obtaining necessary approvals and permits from other agencies	Prior to initiation of final closure phase
Initiation of Final Closure Phase	Month 0
Mobilization	Month 1
Installation of the final closure phase	Month 1 – 6
Month all closure construction activities for the final closure phase of the CCR unit will be completed	Month 6 ⁽²⁾

Notes: (1) Initiation of Closure may be extended for multiple two-year periods in accordance with 40 CFR 257.102 (e)(2)(ii) and (iii).

(2) Final closure of CCR landfills must be completed within six months of commencing closure unless a demonstration is placed in the operating record document (40 CFR 257.102 (f)(2)).

3. Closure Performance Standards

3.1 Liquid Infiltration Control

Post-closure infiltration of liquids is minimized by use of side slopes coupled with a surface water management system and a constructed infiltration barrier. The top surface of the landfill will be designed with a minimum crown slope of approximately 1% and maximum side slopes of approximately 33% to enhance runoff. The infiltration layer includes 18-inches of earthen material. The earthen material will be installed with a permeability that is less than or equal to the permeability of the natural subsoils present, or a permeability no greater than 1×10^{-5} cm/sec, whichever is less.

3.2 Liquid Impoundment Control

The probability of future impoundment of liquids on the landfill is minimized by use of minimum crown slopes of approximately 1% and maximum side slopes of approximately 33% coupled with an engineered surface water removal system consisting of terraces and downslope conveyance structures. Layered compaction of the underlying CCR material and infiltration layer will also minimize the likelihood of settlement resulting in ponding on the landfill surface.

3.3 Slope Stability

The final cover will be designed with a minimum crown slope of approximately 1% and maximum side slopes of approximately 33%. Perimeter drainage channels will be designed with minimum slopes of approximately 0.5%. Drainage channels and let downs will include grass, concrete, erosion control mats, riprap, and geotextile where required to reduce the potential for erosion. Disposed fly ash, bottom ash, economizer ash, slag and gypsum will be compacted and dewatered in accordance with the site landfill operating plan and construction plans to promote stability of the waste mass. Geotechnical analyses will be performed during final design to ensure the impoundment slopes and cover system meet the stability requirements to prevent sloughing or movement of the final cover system.

3.4 Minimization of Maintenance

Maintenance of the vegetated final cover areas will include periodic mowing in accordance with the post-closure plan, but not less than once per year and reseeding as necessary. The grass will be maintained at such a level as to facilitate inspections and maintain health of the desired vegetation.

3.5 Minimization of the Closure Period

Final closure is estimated to be completed no later than six months after commencing final closure activities.

4. Cover Design

The La Cygne CCR Landfill will utilize a final cover design developed in accordance with 40 CFR 257.102 (d) (3) (i). This design meets the criteria of 40 CFR 257.102 (d) (3) (i) (A) through (D).

4.1 Permeability and Infiltration

The final cover system for the La Cygne CCR Landfill will consist, from bottom to top, of:

- a. A minimum 18-inch-thick compacted earthen material with a permeability that is less than or equal to the permeability of the natural subsoils present, or a permeability no greater than 1×10^{-5} cm/sec, whichever is less; and
- b. A minimum 6-inch-thick erosion layer capable of sustaining native plant growth. This layer will be seeded. In isolated areas, the erosion layer may consist of gravel surfacing for access roadways or concrete in stormwater management areas.

4.2 Accommodation of Settling and Subsidence

The final cover will be designed with minimum crown slopes of approximately 1% and maximum side slopes of approximately 33%. Perimeter drainage channels will be designed with minimum slopes of approximately 0.5%. The minimum final cover slopes along with compaction of the subgrade will accommodate settlement such that any settlement that does occur is not expected to impact the ability of the final cover to drain properly. During final design, an analysis of the foundation materials and consolidated CCR materials will be performed to ensure that final slopes will not be significantly impacted by settling.

5. Amendment of CCR Closure Plan

This initial or any subsequent written closure plan developed pursuant to 40 CFR 257.102 (b) (1) may be amended at any time.

The Plan must be amended whenever:

- There is a change in the operation of the CCR unit that would substantially affect the written closure plan in effect; or
- Before or after closure activities have commenced and unanticipated events necessitate a revision of the written closure plan.

The written closure plan must be amended at least 60 days prior to a planned change in the operation of the facility or CCR unit, or no later than 60 days after an unanticipated event requires the need to revise an existing written closure plan. If a written closure plan is revised after closure activities have commenced for a CCR unit, the current closure plan must be amended no later than 30 days following the triggering event.

A written certification from a qualified professional engineer that the initial and any amendment of the written closure plan meets the requirements of § 257.102 (b) must be obtained.

Plan changes will be documented using the Revision History which prefaces this Plan.

6. Professional Engineer Certification

Certification Statement 40 CFR § 257.102(b)(4) –Amended Written Closure Plan - CCR Landfill

CCR Unit: **Evergy Metro, Inc.** La Cygne Generating Station, CCR Landfill

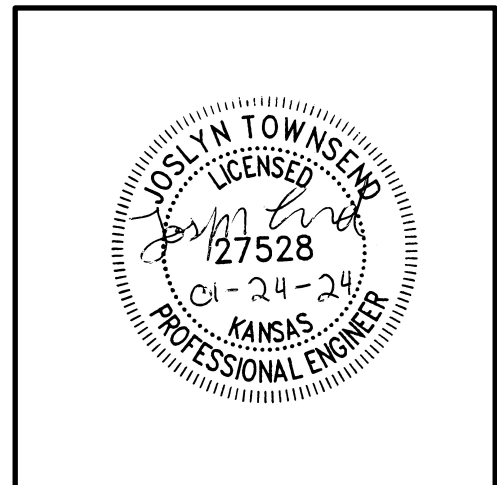
I, Joslyn Townsend, being a Registered Professional Engineer in good standing in the State of Kansas, do hereby certify, to the best of my knowledge, information, and belief that the information contained in this certification has been prepared in accordance with the accepted practice of engineering. I certify, for the above-referenced CCR Unit, that the information contained in the amended written closure plan dated January 24, 2024 meets the requirements of 40 CFR § 257.102.

Joslyn Townsend

Printed Name

January 24, 2024

Date



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