CCR Closure Plan
La Cygne Generating Station
Upper AQC Impoundment

Evergy Metro, Inc.

Project number: 60696120

January 2024
Revision 1

Delivering a better world

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 description of final cover system design, area and volume estimates, closure schedule, and how closure performance standards are achieved.

Revisions are accomplished in accordance with Section 5.

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Tables

1. Background

AECOM Technical Services, Inc. (AECOM) has prepared the following Post-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) Upper AQC Impoundment 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:	Upper AQC Impoundment
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. The Upper AQC Impoundment contains AQC sludge formerly sluiced from the La Cygne Generating Station. The impoundment accepted CCR fill primarily for the purpose of solidifying and dewatering the wet material in the impoundment. Some areas of the impoundment temporarily retain storm water that falls into the unit prior to release to La Cygnes Lake in accordance with NPDES permit requirements. Related facilities include a groundwater monitoring system, storm water management system, and haul/access roads.
Operating Permits:	The Upper AQC Impoundment 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 Upper AQC Impoundment 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 $1x10^{-5}$ 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). (Section 4.1)

(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). (Section 4.1)

(C) The disruption of the integrity of the final cover system must be minimized through a design that accommodates settling and subsidence. (Section 4.2)

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 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 Surface Impoundment means a CCR surface impoundment 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 surface impoundment 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 La Cygne Upper AQC Impoundment at any point during the active life of the unit 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.

The 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 one region at a time, as described in the following sections.

2.1 Closure Activities to Date

The Upper AQC Impoundment has been divided into six regions for construction purposes. Region 1 is the southeastern lobe of the impoundment. Region 2 is the northeastern lobe of the impoundment. Final cover construction for Regions 1 and 2 is complete. Regions 3, 4, 5, and 6 continue counterclockwise around the impoundment, concluding with Region 6 in the southernmost lobe surrounding the existing Principal Spillway. Design for closure of Regions 3 through 6 is ongoing.

The cover system in Region 1 was constructed utilizing two different final cover systems as part of an alternative cover evaluation for the Upper AQC Impoundment. The first system consists of a two-component clay cover that was placed on the east side of Region 1: an 18-inch-thick compacted soil infiltration layer and a six-inch-thick erosion layer, designed and constructed in accordance with Section 257.102 (d)(3)(i) of the CCR Rule. The vegetated erosion layer was replaced with fiber or steel reinforced concrete in isolated locations to facilitate stormwater management of the cap. The second cover system placed on the west side of Region 1 consists of a two-component synthetic cover system: an artificial turf layer infilled with sand and a

synthetic textured geomembrane infiltration layer designed and constructed in accordance with Section 257.102 (d)(3)(ii) of the CCR Rule.

Region 2 was covered with the above described synthetic cover over the majority of the area, with some areas of clay cover under the perimeter road where the unit limits extend into the revised road location. Final cover systems for both the synthetic and clay cover areas were designed to meet or exceed the requirements of Section 257.102 (d)(3) of the CCR Rule.

2.2 Final Cover Description

The final closure of the Upper AQC Impoundment will be accomplished by leaving the CCR material in place and covering the CCR material with a final cover system consisting of either a clay cover or synthetic cover system. The design and basis for each of the two final cover systems are described in Section 4, but generally include the following:

- The clay cover: 1) an infiltration layer consisting of a minimum of an 18-inch-thick layer of compacted 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 synthetic cover: 1) an artificial turf layer, and 2) a synthetic textured geomembrane infiltration layer.

Both the clay cover and synthetic cover systems are designed in accordance with Section 257.102 (d)(3) of the CCR Rule.

The final cover slopes are designed with minimum crown slopes of approximately 1% and maximum side slopes of approximately 25% and will be graded to convey storm water runoff to perimeter drainage channels designed with minimum slopes of 0.3%. The perimeter drainage channels will convey storm water runoff to let down structures for removal from the impoundment cover system.

2.3 Construction Methods and Procedures

Closure in each region will begin by removal of free liquids and dewatering the CCR as necessary for accessibility, grading operations, and to stabilize the waste to achieve a subgrade surface capable of supporting the final cover system. CCR material from within the unit and/or earthen material will be added and graded to achieve final design subgrade slopes and grades using appropriate earthmoving equipment. 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. In-place CCR material will be regraded to achieve design grades.

For the clay cover system, 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 clay 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 will consist of gravel road surfacing or concrete drainage structures.

For the synthetic cover system, the textured geomembrane infiltration layer will be installed in direct contact with a subgrade of earthen and/or CCR material. Manufacturer installation procedures will be followed during construction of the synthetic cover system. The artificial turf layer will be installed on top of the textured geomembrane and sand infill will be spread through the turf as ballast and UV protection for the turf backing and the geomembrane beneath.

2.4 Area and Volume Estimates

The maximum inventory of CCR ever planned on-site over the active life of the Upper AQC Impoundment is approximately 13.2 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 327.7 acres.

2.5 Closure Schedule

The Upper AQC Impoundment 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 that 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 impoundment 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

(iii) 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 surface impoundment 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) In accordance with 40 CFR 257.102 (e) (4) surface impoundment closures due to groundwater exceedances or 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 updated estimates from the initial written closure plan dated October 14, 2016. 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	April 9, 2021
Initiation of Closure / Coordinating with and obtaining necessary approvals and permits from other agencies	April 9, 2021
Cover evaluations, dewater and stabilization	September 2020 – April 2031
Closure Construction of Region 1	Completed July 2022
Closure Construction of Region 2	Completed December 2023
Receive final permit from KDHE for construction of Region 3 through Region 6	2023
Closure Construction Region 3	2023-2025
Closure Construction Region 4	2024-2027
Closure Construction Region 5	2026-2029
Closure Construction Region 6	2028 - 2032
Year all closure construction activities will be completed	2032(1)

Notes: (1) Final closure of Surface Impoundments must be completed within five years of commencing closure unless a demonstration is placed in the operating record document (40 CFR 257.102 (f) (2)). Completion of closure activities may be extended for multiple two-year periods in accordance with 40 CFR 257.102 (f)(2)(i) through (iii). At least three two-year extensions are anticipated to be sought in accordance with 40 CFR 257.102 (f) (2) in order to accommodate the construction schedule for dewatering, limited capacity for construction traffic and completing closure activities for the Upper AQC Impoundment.

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 impoundment is designed with minimum crown slopes of approximately 1% and maximum side slopes of approximately 25% to enhance runoff. The infiltration layer materials 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 final cover of the impoundment is minimized by use of minimum crown slopes of approximately 1% and maximum side slopes of approximately 25%. The final cover will be graded to convey surface water to perimeter drainage channels designed with minimum slopes of 0.3%. The perimeter drainage channels will convey surface water to let down structures for removal from the impoundment. For the clay final cover system, layered compaction of the infiltration layer will also minimize the likelihood of settlement resulting in ponding on the final cover. For the synthetic final cover system, stabilization of the waste through dewatering to achieve a subgrade surface capable of supporting the final cover system will minimize the likelihood of settlement resulting in ponding on the final cover.

3.3 Slope Stability

The final cover will be designed with minimum crown slopes of approximately 1% and maximum side slopes of approximately 25%. Perimeter drainage channels will have minimum slopes of 0.3%. Drainage channels and let downs are designed with grass, concrete, riprap, and artificial turf where required to reduce the potential for erosion. Disposed fly ash, bottom ash, economizer ash, slag and gypsum have been compacted and dewatered to remain stable, in accordance with the site landfill operating plan and construction plans. Geotechnical analyses determined the designed slopes and cover will meet the stability requirements to prevent sloughing or movement of the final cover system. No cases of instability or sloughing of the cover or waste mass have occurred to date, indicating the disposal and cover construction practices will provide a stable cover and waste mass.

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. Maintenance of synthetic cover areas will include visual inspection and timely corrective action when needed. The sand infill will be visually inspected and additional sand placed as necessary to maintain UV protection of artificial turf backing. Deficiencies in the artificial turf or geomembrane layer will be repaired following the same procedures and standards as initial installation.

3.5 Minimization of the Closure Period

Final closure construction is estimated to be completed no later than eleven years after commencing final closure activities unless additional extensions are requested. At this time, it is anticipated that three extensions will be requested due to the size of the Upper AQC Impoundment and the amount of final cover that can reasonably be constructed in a given year as dictated by good engineering practice, allowable construction traffic, experience, and the ability to manage stormwater.

4. Cover Design

The La Cygne Upper AQC Impoundment will utilize either of two final cover design options.

- A clay cover design developed in accordance with 40 CFR 257.102 (d) (3) (i) and meeting the criteria of 40 CFR 257.102 (d) (3) (i) (A) through (D), or
- A synthetic cover design developed in accordance with 40 CFR 257.102 (d) (3) (ii) and meeting the criteria of 40 CFR 257.102 (d) (3) (ii) (A) through (C).

4.1 Permeability and Infiltration

4.1.1 Clay Cover Option

The clay cover design will consist of a minimum 18-inch-thick compacted earthen material with a permeability less than the natural subsoils present, or a permeability no greater than 1×10^{-5} cm/sec, whichever is less. This will be overlain with a minimum 6-inches of soil capable of sustaining vegetation, access roadways covered with gravel, or concrete stormwater management features.

4.1.2 Synthetic Cover Option

The synthetic cover design will consist of two layers, from bottom to top, a textured geomembrane infiltration layer with a permeability less than the natural subsoils present, or a permeability no greater than 1×10^{-5} cm/sec, whichever is less, and an artificial turf layer providing protection from wind and water erosion.

4.2 Accommodation of Settling and Subsidence

The foundation materials are primarily shale bedrock and highly over consolidated residual clays. Settlement of these materials will occur as loads are applied. AECOM has determined settlement of the foundation materials will not impact the performance of the final cover. Since the existing CCR has been compacted and dewatered (Section 3.3), minimal post-construction settlement is expected. The final cover is designed with minimum crown slopes of approximately 1% and maximum side slopes of approximately 25% and will be graded to convey storm water runoff to perimeter drainage channels designed with minimum slopes of 0.3%. The minimum final cover slopes along with compaction and dewatering of the subgrade will accommodate settlement such that any settlement that does occur will not impact the ability of the final cover to drain properly.

5. Amendment of CCR Closure Plan

The 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

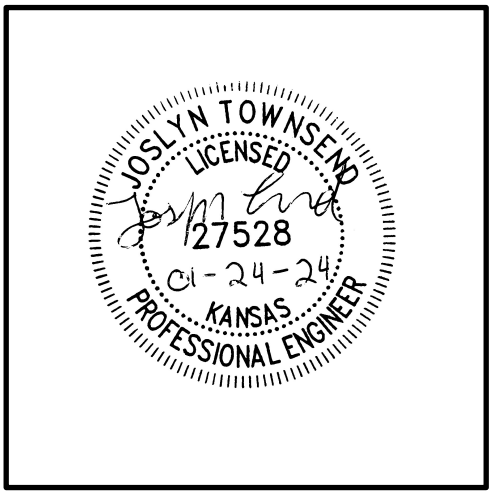
Certification Statement 40 CFR § 257.102(b)(4) –Amended Written Closure Plan - CCR Surface Impoundment

CCR Unit**:** **Evergy Metro, Inc.** La Cygne Generating Station, Upper AQC Impoundment

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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