AECOM

CCR Closure Plan

Lower AQC Impoundment

La Cygne Generating Station

Kansas City Power & Light Company

October 14, 2016

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La Cygne Generating Station Lower AQC Impoundment
CCR Closure Plan Revision History

Revision Number	Revision Date	Section Revised	Summary of Revision(s)

Revisions are accomplished in accordance with Section 5.

1 Background

The purpose of this CCR Closure Plan (Plan) is to identify and describe the measures needed to close the La Cygne Generating Station (La Cygne) Lower AQC Impoundment consistent with recognized and generally accepted good engineering practices and in accordance with the Coal Combustion Residuals Rule (CCR Rule). The following sections provide background information on the facility and related regulatory requirements.

1.1 Facility Information

Name of Facility	La Cygne Generating Station
Name of CCR Unit	Lower AQC Impoundment
Name of Operator:	Kansas City Power & Light Company (KCP&L)
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, and gypsum. The Lower AQC Impoundment is primarily used as a holding basin for formerly sluiced CCR water and materials from the La Cygne Generating Station; AQC recycling water; gypsum runoff pond discharge; and stormwater management. The watershed for the Lower AQC Impoundment includes the on-site CCR landfill and overflow from the Upper AQC Impoundment, as well as other areas. Related facilities include a groundwater monitoring system, storm water management system, and haul/access roads.

1.2 Regulatory Requirements

This plan has been developed for the La Cygne Generating Station Lower 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). These items and the section of this plan responsive to each follows:

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 2.1).

(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 102 (d) (Section 2.1).

(iv) Estimate of the maximum inventory of CCR ever on-site over the active life of the CCR unit (Section 2.1).

(v) Estimate of the largest area of the CCR unit ever requiring a final cover (Section 2.1).

(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 major milestones and the estimated timeframes to complete each step or phase of CCR unit closure (Section 2.2).

40 CFR 257.102 (b) (1) (iii) requires, when a CCR unit closure is accomplished in place, that the plan describe how the performance standards specified in 40 CFR 102 (d) will be achieved:

40 CFR 257.102 (d) (1)

(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 (not applicable for landfill units)

(i) Free liquids must be eliminated by removing liquid wastes or solidifying the remaining wastes and waste residue (2.1.2).

(ii) Remaining wastes must be stabilized sufficiently to support the final cover system (2.1.2).

40 CFR 257.102 (d) (3) A final cover system must be installed to minimize infiltration and erosion, and at minimum, meets the requirements of (d) (3) (i) (A) through (D) below, or the requirements of an alternative final cover system (Section 4).

(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 than 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 4.2)

(D) The disruption of the integrity of the final cover system must be minimized through a design that accommodates settling and subsidence. (Section 4.3)

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 Lower 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 Description, 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 Description

2.1.1 Description

The final cover system design and basis is described in Section 4, but in general includes: 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 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 and let down structures for removal from the impoundment cover system.

2.1.2 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 impoundment is filled to capacity, the unit will be brought to grade using CCR material and/or earthen material to achieve revised design grades. The infiltration layer will be installed in direct contact with a subgrade of earthen and/or CCR material. 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. 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. Closure will begin by removing any of the free liquids and dewatering the CCR as necessary for accessibility, grading operations, and to stabilize the waste such that the final cover will be supported.

2.1.3 Area and Volume Estimates

The maximum inventory of CCR ever planned on-site over the active life of the Lower AQC Impoundment is approximately 12.7 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 159 acres.

2.2 Closure Schedule

The size of area and time of year closure construction takes place will vary, therefore, closure construction schedules will vary. The schedule provided in this section is therefore a general estimation.

2.2.1 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 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).

2.2.2 Closure Schedule

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

Estimated Closure Schedule

Written Closure Plan	October 17, 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]
Initiation of Closure / Coordinating with and obtaining necessary approvals and permits from other agencies	Year 1
Mobilization	Year 1
Dewater	Year 1 - 4
Year all closure activities will be completed	Year 1 - 5 [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 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)).

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 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 impoundment is minimized by use of minimum crown slopes of approximately 1% and maximum side slopes of approximately 25% coupled with an engineered surface water removal system consisting of terraces and downslope conveyance structures designed with typical side slopes of no more than 25%. Layered compaction of the infiltration layer will also minimize the likelihood of settlement resulting in ponding on the landfill surface. These design features preclude the probability of future impoundment of liquids on the impoundment.

3.3 Slope Stability

The final cover is designed with minimum crown slopes of approximately 1% and maximum side slopes of approximately 25%. Perimeter drainage channels are designed with minimum slopes of 0.5%. Drainage channels and let downs are designed with grass, erosion control mats, riprap, and geotextile where required to reduce the potential for erosion. Geotechnical analyses determined the designed slopes and cover will meet the stability requirements to prevent sloughing or movement of the final cover system.

3.4 Minimization of Maintenance

The final cover will be graded, vegetated, and mowed to minimize erosion and maintenance.

3.5 Minimization of the Closure Period

Final closure is estimated to be completed no later than five years after commencing final closure activities, unless extensions are requested.

4 Cover Design

The La Cygne Lower AQC Impoundment will utilize a 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 Lower AQC Impoundment is designed with:

1. Minimum 18-inch of 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
2. Minimum 6-inch thick erosion layer capable of sustaining native plant growth.

The permeability of the final cover system described above will be designed to be equal to or less than the permeability of the natural subsoils present.

4.2 Erosion Layer

The final cover will include a minimum 6-inch thick layer of an earthen erosion layer that is capable of sustaining native plant growth. Soil used in the erosion layer will be tested to determine if additional nutrients are required for establishing and sustaining vegetation. The erosion layer will be seeded.

4.3 Accommodation of Settling and Subsidence

The final cover is designed with minimum crown slopes of approximately 1% and maximum side slopes of approximately 25%. The foundation materials are primarily shale bedrock and highly over consolidated residual clays. Settlement of these materials will occur as loads are applied; consequently, settlement of the foundation materials will not impact the performance of the final cover. The existing CCR will settle as load is applied, and post-construction settlement is expected. Settlement will be monitored upon completion of grading to final subgrade elevation. Placement of final cover will begin once analysis of settlement data shows that the remaining settlement will be small enough that post-construction settlement will not impact the ability of the final cover to drain properly..

5 Amendment of CCR Closure Plan

This initial or any subsequent written closure plan developed pursuant to 40 CFR 257.102 (b) (1) 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, 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. Substantial changes to this plan will be certified by a Qualified Professional Engineer.

6 Engineering Certification

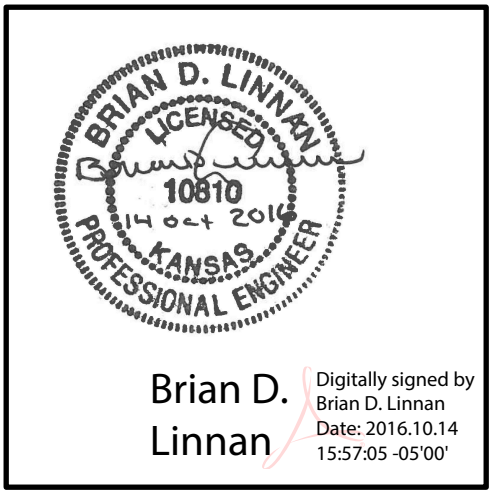
Certification Statement 40 CFR § 257.102(b)(4) –Initial Written Closure Plan - CCR Surface Impoundment

CCR Unit: KCP&L La Cygne Generating Station, Lower AQC Impoundment

I, Brian D. Linnan 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 initial written closure plan dated October 14, 2016 meets the requirements of 40 CFR § 257.102.

Brian D. Linnan
Printed Name

October 14, 2016
Date



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