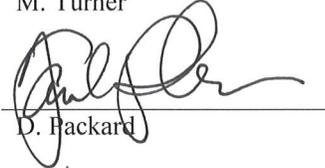
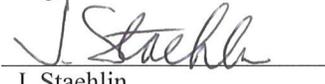




# Closure Plan for CCR Surface Impoundments

Prepared for Wisconsin Power and Light Company  
Columbia Energy Center

Issue Date: September 14, 2016  
Issue Purpose: For Use

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I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Wisconsin:

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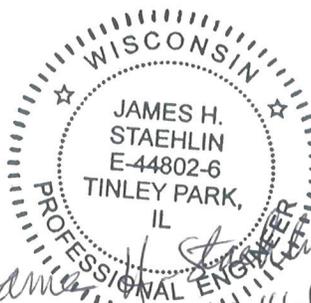
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9-14-16



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## 1. INTRODUCTION AND PURPOSE

**40 CFR 257.102(b)** – “Written closure plan – (1) Content of the plan. The owner or operator of a CCR unit must prepare a written closure plan that describes the steps necessary to close the CCR unit at any point during the active life of the CCR unit consistent with recognized and generally accepted good engineering practices. The written closure plan must include, at a minimum, the information specified in paragraphs (b)(1)(i) through (vi) of [section 257.102].”

Pursuant to 40 CFR 257.102(b), Sargent & Lundy (S&L), on behalf of Wisconsin Power and Light Company (WPL), has prepared the following Closure Plan for the two CCR surface impoundments – Primary Pond (existing CCR surface impoundment) and Secondary Pond (inactive CCR surface impoundment) – at the Columbia Energy Center located near Pardeeville, WI. Closure plan for the existing CCR landfill is addressed in a separate document. WPL intends to close the two CCR surface impoundments by removal of CCR (Secondary Pond) and leaving the CCR in place and providing a final cover system (Primary Pond) in compliance with the requirements of 40 CFR 257.102(c) and 40 CFR 257.102(d) respectively. An annotated aerial photograph of the Station’s surface impoundments and CCR storage locations is included in Figure 1 for reference.



**Figure 1: Columbia Energy Center Surface Impoundments and CCR Storage Locations**

## 2. CLOSURE PLAN NARRATIVE DESCRIPTION

**40 CFR 257.102(b)(1)(i)** – “A narrative description of how the CCR unit will be closed in accordance with [section 257.102].”

**40 CFR 257.102(b)(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 [section 257.102(c)].”

The Columbia Energy Center consists of 2 coal-fired units – Units 1 and 2. All CCR sluice piping routed from Units 1 and 2 to the existing CCR surface impoundments will be capped and/or removed. Low Volume Wastewater (LVW) discharge pipes that currently discharge into the Primary Pond will be abandoned in place or removed as required. The ash handling system will be modified to dispose of dry ash to the landfill or to beneficial use markets, and will recycle all water used in ash handling processes in other plant systems. All interconnected culvert piping between the existing CCR surface impoundments will be removed or abandoned in place.

Once the existing CCR surface impoundments cease to receive ash and wastewater from the station, the surface impoundments will be dewatered. All water will be discharged through existing permitted outfalls, reused by other closed-loop plant systems, or treated offsite. Free liquids will be eliminated by removing liquid wastes or solidifying the remaining wastes and waste residue.

Following dewatering of the ponds, material located in the Primary and Secondary Ponds that can be beneficially used will be transferred offsite and then remaining CCR material will be removed from the Secondary Pond and placed in the Primary Pond. Material will be removed with excavators and dozers down to the base grades established when the pond was constructed. Removal of material down to base grades, where native soils are present, will indicate that the unit is decontaminated. Following removal of CCR from the Secondary Pond, groundwater samples will be collected to verify that no groundwater protection standards established pursuant to 40 CFR 257.95(h) are exceeded. Following removal and decontamination of CCR, the area will be graded and filled as required to achieve final grades utilizing soil stockpiles adjacent to the pond. No borrowed soil is anticipated from offsite sources to achieve final grades at the Secondary Pond.

After stabilizing the CCR material in the Primary Pond, and filling the pond using soil borrow from the adjacent Soil Stockpile and Material Management Areas as noted on Figure 1, the final cover system on the Primary Pond will be installed. The final cover system will be placed over the graded CCR and fill materials in the Primary Pond as required per 40 CFR 257.102(d)(3). The intended final cover system is described in Section 3. During detailed design, the design engineer will determine the required level of compaction and final grade elevations, and confirm surface drainage and slope stability. No borrowed soil is anticipated from offsite sources to achieve final grades at the Primary Pond.

All areas that are disturbed during the surface impoundment closure activities that are not part of the final cover system will be restored, either by providing a vegetative cover or an aggregate surface.

### 3. FINAL COVER SYSTEM DESCRIPTION

**40 CFR 257.102(b)(1)(iii)** – *“If the closure of the CCR unit will be accomplished by leaving CCR in place, a description of the final cover system designed in accordance with paragraph (d) of [section 257.102], and methods and procedures to be used to install the final cover. The Closure Plan must also discuss how the final cover system will achieve the performance standards specified in paragraph (d) of [section 257.102].”*

The final cover system to be installed on the Primary Pond shall meet the minimum requirements of 40 CFR 257.102(d)(3)(i)(A) through (D). It shall consist, from bottom to top layers, of a compacted 18” thick “infiltration layer” of appropriate low-permeability material having a hydraulic conductivity of no more than  $10^{-5}$  cm/s, followed by a 6” thick “erosion layer” of uncompacted soil capable of sustaining a vegetative cover, and a suitable seed mixture.

The cover system materials will be placed and compacted so as to minimize infiltration, limit erosion and future maintenance, and maintain positive drainage. Soil properties, compaction, permeability, and thickness testing will be performed to confirm compliance with the CCR Rule. Final surface slopes will be designed to accommodate settling and subsidence while maintaining proper drainage. Regular maintenance of the seeding will take place until the vegetative cover is established and self-sustaining, in order to limit erosion of the topmost layer.

### 4. MAXIMUM INVENTORY OF CCR ESTIMATE

**40 CFR 257.102(b)(1)(iv)** – *An estimate of the maximum inventory of CCR ever on-site over the active life of the CCR unit.*

The volume of CCR in the surface impoundments is conservatively calculated using the bottom of the pond elevation per original design drawings as the base and top of berm elevation as the top. As some of this volume is occupied by water, and the water elevation is below the top of berm, the volume is conservative. Based on these inputs, the estimated volume of the maximum inventory of CCR ever on-site is presented in Table 1.



**TABLE 1 – ESTIMATED CCR INVENTORY ESTIMATE**

<b>Surface Impoundment</b>	<b>CCR Volume (CY)</b>
Primary Pond	900,000
Secondary Pond	209,120 (Reference 2)
<b>Total</b>	<b>1,109,120</b>

## 5. FINAL COVER SURFACE AREA ESTIMATE

**40 CFR 257.102(b)(1)(v)** – “An estimate of the largest area of the CCR unit ever requiring a final cover as required by paragraph (d) of [section 257.102] at any time during the CCR unit’s active life.”

The final cover system required to close the CCR surface impoundments will encapsulate an area of approximately 22.3 acres, which is the estimated closure area of the Primary Pond.

## 6. SCHEDULE

**40 CFR 257.102(b)(1)(vi)** – “A 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.”

Closure of the existing CCR surface impoundments is anticipated to require approximately 20 months. The schedule provided in Table 2 assumes an initiation date of January 1, 2021 with completion of closure by September 1, 2022.



**TABLE 2 – PLANNING LEVEL SCHEDULE FOR CLOSURE OF  
 CCR SURFACE IMPOUNDMENTS**

<b>Task Description</b>	<b>Anticipated Start Date</b>	<b>Anticipated Completion Date</b>
Place this Initial Closure Plan in the Station's Operating Record	10/16/2016	10/16/2016
Post this Document to the Station's Internet Web Site and Send to the Relevant State Director a Notification of Availability of this Written Closure Plan	10/16/2016	11/16/2016
Place a Post-Closure Care Plan in the Station's Operating Record	10/16/2016	10/16/2016
Post to the Station's Internet Web Site and Send to the Relevant State Director a Notification of Availability of A Written Post-Closure Care Plan	10/16/2016	11/16/2016
Initiation of CCR Impoundment Closure Operation	01/01/2021	01/01/2021
Place a Notification of Intent to Close the Existing CCR Surface Impoundments in the Station's Operating Record	01/01/2021	01/01/2021
Post to the Internet Web Site and Send to the Relevant State Director a Notification of Intent to Close the Existing CCR Surface Impoundments	01/01/2021	01/31/2021
Preparation of Bid Documents	01/01/2021	04/01/2021
Preparation of SWPPP and other State and Local Municipality Permits	03/01/2021	04/30/2021
Bids Due	07/01/2021	07/01/2021
Issue Award and Notice to Proceed	08/01/2021	08/01/2021
Contractor Mobilization	09/01/2021	09/15/2021
Dewatering of Existing CCR Surface Impoundments	09/16/2021	02/28/2022
CCR Material Removed From Secondary Pond	03/01/2022	03/31/2022
Independent Clean Closure Completion Certification for Secondary Pond	04/01/2022	04/30/2022
Grading and Placement of Fill within the Existing CCR Surface Impoundments	03/01/2022	06/01/2022
Placement of Final Cover Material for Primary Pond	04/01/2022	07/01/2022
Completion of Final Site Grading and Vegetation for Primary Pond	06/01/2022	08/01/2022
Independent Close-In-Place Completion Certification for Primary Pond	06/01/2022	08/01/2022
Place a Notification of Pond Closure Completion in the Station's Operating Record	08/01/2022	09/01/2022
Post to the Station's Internet Web Site and Send to the Relevant State Director a Notification of Closure Completion	08/01/2022	09/01/2022
Record a Notation of the CCR Impoundment Closure on the Deed of the Property	08/01/2022	09/01/2022
Place a Notification of the Deed Notation in the Station's Operating Record	08/01/2022	09/01/2022
Post to the Station's Internet Web Site and Send to the Relevant State Director a Notification of the Deed Notation	08/01/2022	09/01/2022
Place a Notification of Completion of the Post-Closure Care in the Station's Operating Record	10/01/2052	11/01/2052
Post to the Station's Internet Web Site and Send to the Relevant State Director a Notification of Completion of the Post-Closure Care	10/01/2052	11/01/2052

## 7. COMPLETION OF CLOSURE ACTIVITIES

**40 CFR 257.102(f)(3)** – “Upon completion, the owner or operator of the CCR unit must obtain a certification from a qualified professional engineer verifying that closure has been completed in accordance with the closure plan specified in paragraph (b) of [section 257.102] and the requirements of [section 257.102].”

To confirm completion of the close-in-place operation of the Primary Pond and closure by removal of CCR material from the Secondary Pond, WPL will retain a qualified professional engineer licensed in the State of Wisconsin to verify that the existing CCR surface impoundments have been closed in accordance with this closure plan and the requirements of 40 CFR 257.102(c) and 40 CFR 257.102(d). The qualified professional engineer will provide WPL with a written certification stating compliance as required in 40 CFR 257.102(f)(3).

## 8. CERTIFICATIONS

**40 CFR 257.102(b)(4)** – “The owner or operator of the CCR unit must obtain a written certification from a qualified professional engineer that the initial and any amendment of the written closure plan meets the requirements of [section 257.102].”

It is S&L’s opinion that this written closure plan meets the requirements of 40 CFR 257.102(b).

**40 CFR 257.102(d)(3)(iii)** – “The owner or operator of the CCR unit must obtain a written certification from a qualified professional engineer that the design of the final cover system meets the requirements of [section 257.102].”

It is S&L’s opinion that the proposed final cover system as described herein meets the design requirements specified by 40 CFR 257.102(d)(3).

## 9. REFERENCES

1. 40 CFR Part 257; Environmental Protection Agency Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals From Electric Utilities; Final Rule, Federal Register, Vol. 80, No. 74, Friday, April 17, 2015, as amended by the Technical Amendments published in the Federal Register on July 2, 2015 Page 37988.
2. SCS Engineers, Sediment Assessment Secondary Ash Pond Columbia Energy Center – Pardeeville, Wisconsin, August 18, 2016. File No. 25215157.00