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Wisconsin Power and Light Company

Columbia Energy Center
CCR Surface Impoundment Annual Inspection Report
154.018.020.006
Report issued: December 16, 2019

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Executive Summary

This annual inspection report has been prepared in accordance with the requirements of the United States Environmental Protection Agency published Final Rule for Hazardous and Solid Waste Management System - Disposal of Coal Combustion Residual (CCR) from Electric Utilities (40 CFR Parts 257 and 261, also known as CCR Rule) published on April 17, 2015 and effective October 19, 2015 and Extension of Compliance Deadlines for Certain Inactive Surface Impoundments.

This annual inspection report has been prepared to assess the condition of existing and inactive CCR surface impoundments. Primarily, the annual inspection report is focused on the structural stability of the CCR surface impoundments and to ensure that the operation and maintenance of the CCR surface impoundments is in accordance with recognized and generally accepted good engineering standards.

After conducting the annual inspection, as well as review of available information provided by the Columbia Energy Center pertaining to the status and condition of the CCR surface impoundments, and discussions with facility personnel who oversee and maintain the operation, maintenance, and inspection activities of the CCR surface impoundments, there are no operating deficiencies and there have been no changes that have affected the stability or operation of the CCR surface impoundments since the previous annual inspection.

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1. INTRODUCTION

This annual inspection report has been prepared in accordance with the requirements of §257.83(b) and §257.100(a) of the United States Environmental Protection Agency (USEPA) published Final Rule for Hazardous and Solid Waste Management System – Disposal of Coal Combustion Residual (CCR), herein referenced as the CCR Rule.

1.1 CCR Rule Applicability

The CCR Rule requires annual inspections by a qualified professional engineer (PE) for both existing and inactive CCR surface impoundments with a height of 5 feet or more and a storage volume of 20 acre-feet or more or the CCR surface impoundment has a height of 20 feet or more (40 CFR §§ 257.73(b), 257.73(d), 257.83(b) and 257.100(a)).

1.2 Annual Inspection Applicability

The Wisconsin Power and Light Company (WPL), Columbia Energy Center (COL) in Pardeeville, Wisconsin has two CCR surface impoundments, one existing and one inactive, that meet the requirements of Section 1.1. The existing CCR surface impoundment is identified as the COL Primary Ash Pond and the inactive CCR surface impoundment is identified as the COL Secondary Ash Pond.

The annual inspection of the CCR surface impoundments at COL was completed by a qualified PE on September 11th, 2019. The annual inspection was completed to ensure that the design, construction, operation, and maintenance of the CCR surface impoundments at COL are consistent with recognized and generally accepted good engineering standards.

The annual inspection of the CCR surface impoundments at COL included a review of available information regarding the status and condition of the CCR surface impoundments. The information reviewed included all relevant files available in the operating record at the time of the annual inspection, as well as the Alliant Energy CCR Rule Compliance Data and Information website entries for COL (ccr.alliantenergy.com). These files for the CCR surface impoundments at COL include, but is not limited to, CCR surface impoundment design and construction information (history of construction), hazard potential classification, structural stability assessment, safety factor assessment, hydrologic and hydraulic capacities (inflow flood control plan), results of 7-day inspections and instrumentation monitoring by a qualified person, and results of the previous annual inspection.

The annual inspection also included a visual inspection of the CCR surface impoundments to identify signs of distress or malfunction of the CCR surface impoundments and appurtenant structures. Additionally, the visual inspection included hydraulic structures underlying the base of the CCR surface impoundments or passing through the dikes of the CCR surface impoundments for structural integrity and continued safe and reliable operation.

2. ANNUAL INSPECTION REPORTING CRITERIA

The following sub-sections address the annual inspection reporting criteria per §257.83(b)(2) and §257.100(a) of the CCR Rule for the existing and inactive CCR surface impoundments located at COL.

2.1 COL Primary Ash Pond (Existing CCR Surface Impoundment)

2.1.1 Changes in Geometry (§257.83(b)(2)(i))

After conducting the annual inspection, as well as review of available information provided by COL pertaining to the status and condition of the existing CCR surface impoundment, and discussions with COL facility personnel who oversee and maintain the operation, maintenance, and inspection activities of the existing CCR surface impoundment, there have been no identified changes in the geometry since the previous annual inspection.

2.1.2 Existing Instrumentation (§257.83(b)(2)(ii))

Instrumentation that supports the operation of the COL Primary Ash Pond includes a submersible hydrostatic level transducer for monitoring water elevations in the eastern portion of the COL Primary Ash Pond (CCR settling pond area). The instrumentation equipment is located in the northeast corner of the COL Primary Ash Pond. The submersible hydrostatic level transducer was installed in 2010 and provides measurement readings from the elevation of the ultrasonic gauge (805.16 feet) to the elevation of the water surface of the COL Primary Ash Pond.

The water elevation data from the submersible hydrostatic level transducer, since the previous annual inspection, was provided by WPL from August 1, 2018 through July 31, 2019. Reviewing the provided water elevation data, the

maximum water elevation recorded within the COL Primary Ash Pond was 798.73 feet (Feb 2019).

2.1.3 Depth and Elevation of Impounded CCR and Water (§257.83(b)(2)(iii))

The approximate minimum, maximum, and present depths and elevations of the impounded CCR and water in the COL Primary Ash Pond since the previous annual inspection were determined using information that was collected during the annual inspection, as well as from historical information that was previously provided from WPL.

At the time of the annual inspection a survey was completed to determine the present surface water elevation of the CCR surface impoundment. Additionally, depth measurements from the water surface to the top of CCR/sediment were obtained to determine present depths/elevations.

The historical information provided from WPL included original design drawing contours of the COL Primary Ash Pond prepared by Sargent & Lundy (1975), as well as the most recent topographic/bathymetric survey of the COL Primary Ash Pond completed by Cornerstone Surveying and Mapping (2016). Reviewing the information provided within the above-mentioned documents, as well as the data collected during the annual inspection, the following minimum, maximum, and present depths and elevations were approximated for the impounded CCR and water:

- **Eastern Portion of COL Primary Ash Pond (CCR Settling Pond Area)**
 - At the time of the annual inspection, the water surface elevation was surveyed to be 792.15 feet, 9.85 feet below the crest of the east embankment of the CCR surface impoundment, which had an

elevation of approximately 802 feet at the lowest point of the embankment.

- At the time of the annual inspection, the water depth that was measured within the CCR surface impoundment varied between 0.8 feet in the western portion and 11.8 feet in the eastern portion.
- From the water depth measurements at the time of the annual inspection, the elevation of the top of CCR/sediment that was measured varied between an elevation of 791.35 feet in the western portion and 780.35 feet in the eastern.
- From the submersible hydrostatic level transducer water surface elevation data provided by WPL since the previous annual inspection, the minimum water surface elevation within the eastern portion of the COL Primary Ash Pond was recorded to be 791.08 feet (August 2018). The maximum water surface elevation within the eastern portion of the COL Primary Ash Pond was recorded to be 798.73 feet (February 2019).
- From the 1975 original design drawing contours of the COL Primary Ash Pond, the original design bottom contour elevation of the CCR surface impoundment was approximately 780 feet. The depth of the COL Primary Ash Pond varied between elevation 791.35 feet in the western portion to an elevation of 780.35 feet in the eastern portion. Comparing the results from the water depth measurements at the time of the annual inspection to the 1975 original design drawing contours, the deposition thickness varied between 11.35 feet in the western portion to 0.35 feet in the eastern portion.

- **Western Portion of COL Primary Ash Pond (CCR Handling Area)**
 - At the time of the annual inspection, the surveyed water surface elevations of the channel that surrounded the CCR handling area along the west and north sides of the western portion of the CCR surface impoundment varied between 798.53 feet along the western channel and 794.46 feet along the northern channel. The elevation of the crests of the north and west embankments were 804 feet at the lowest point of the embankments, which was 5.47 feet above the highest surveyed water surface elevation in the western portion of the CCR surface impoundment.
 - At the time of the annual inspection, the water depth that was measured within the CCR surface impoundment was 0.7 feet in the western channel and 0.8 feet in the northern channel.
 - From the water depth measurements at the time of the annual inspection, the elevation of the top of CCR/sediment was 797.83 feet in the western channel and 793.66 feet in the northern channel.
 - From the 1975 original design drawing contours of the COL Primary Ash Pond, the original design bottom contour elevation of the CCR surface impoundment was approximately 780 feet. The depth of the north and west channels of the COL Primary Ash Pond varied between an elevation of 797.83 feet in the western channel and 793.66 feet in the northern channel. Comparing the results from the water depth measurements at the time of the

annual inspection to the 1975 original design drawing contours, the deposition thickness varied between 17.83 feet and 13.66.

- o From the 2016 topographic/bathymetric survey, as well as observations made during the annual inspection, the average top of CCR/sediment in the CCR handling area of the western portion of the CCR surface impoundment was approximately 802 feet. Comparing the average top of CCR/sediment at the time of the 2016 topographic/bathymetric survey to the 1975 original design drawing contours, the deposition thickness was approximately 22 feet in the western portion of the CCR surface impoundment.

2.1.4 Storage Capacity of Impounding Structure (§257.83(b)(2)(iv))

The storage capacity (i.e. water volume) of the CCR surface impoundment at the time of the annual inspection was calculated based on the acreage of the eastern portion of the CCR surface impoundment in the large open area where water was present, and the approximate depth of water within that area of the eastern portion of the CCR surface impoundment.

From the 2016 topographic/bathymetric survey data, as well as observations made during the annual inspection, the area of the water surface of the CCR surface impoundment was approximately 6.82 acres. From the water depth data that was collected during the annual inspection, the average water depth within the CCR surface impoundment was 7.8 feet. Thus, the water volume within the COL Primary Ash Pond at the time of the annual inspection was approximately 85,800 cubic yards.

2.1.5 Volume of Impounded CCR and Water (§257.83(b)(2)(v))

The volume of impounded CCR and water (i.e. total volume, not including freeboard) within the COL Primary Ash Pond at the time of the annual inspection was determined using information that was collected during the annual inspection, as well as from historical information that was previously provided from WPL. Historical information provided from WPL included original design drawing contours of the COL Primary Ash Pond prepared by Sargent & Lundy (1975), as well as the most recent topographic/bathymetric survey of the COL Primary Ash Pond completed by Cornerstone Surveying and Mapping (2016).

The water surface elevation of the eastern portion of the CCR surface impoundment (CCR settling area) that was surveyed at the time of the annual inspection was 792.15 feet. From the 2016 topographic/bathymetric survey of the COL Primary Ash Pond, as well as observations made during the annual inspection, the average elevation of the top of CCR/sediment in the western portion of the CCR surface impoundment (CCR handling area) was estimated to be approximately 802 feet. From the 1975 original design drawing contours of the COL Primary Ash Pond, the original design bottom contour elevation of the CCR surface impoundment was approximately 780 feet. Thus, the interior storage height of the eastern portion of the COL Primary Ash Pond (CCR settling area) was approximately 12.15 feet and the interior storage height of the western portion of the COL Primary Ash Pond (CCR handling area) was approximately 22 feet.

The surface area of the eastern portion of the COL Primary Ash Pond (CCR settling area), in the area where both water and CCR were present, was approximately 7.6 acres. Thus, the volume of impounded CCR and water within

the eastern portion of the COL Primary Ash Pond was approximately 149,000 cubic yards. The surface area of the western portion of the COL Primary Ash Pond (CCR handling area) was approximately 10 acres. Thus, the volume of impounded CCR and water within the western portion of the COL Primary Ash Pond was approximately 355,000 cubic yards. Therefore, the total volume, not including freeboard, of impounded CCR and water within the COL Primary Ash Pond at the time of the annual inspection was approximately 504,000 cubic yards.

2.1.6 Structural Weaknesses and Disruptive Conditions (§257.83(b)(2)(vi))

After review of available information provided by COL pertaining to the status and condition of the existing CCR surface impoundment, discussions with COL facility personnel who oversee and maintain the operation, maintenance, and inspection activities of the existing CCR surface impoundment, as well as conducting the on-site visual inspection of the existing CCR surface impoundment, there have been no identified appearances of an actual or potential structural weakness of the existing CCR surface impoundment. Additionally, there were no visual inspection issues with the structural integrity of the hydraulic structures (permanently closed 18-inch corrugated metal pipe) associated with the COL Primary Ash Pond.

Regarding the existing conditions of the COL Primary Ash Pond, there were no existing conditions identified along the upstream and downstream slopes of the embankments that were disrupting or have the potential to disrupt the operation and safety of the existing CCR surface impoundment.

2.1.7 Other Changes Affecting Stability or Operation of Impounding Structure (§257.83(b)(2)(vii))

After review of available information provided by COL pertaining to the status and condition of the existing CCR surface impoundment, as well as discussions with COL facility personnel who oversee and maintain the operation, maintenance, and inspection activities of the existing CCR surface impoundment, there have been no other identified changes that have affected the stability or operation of the COL Primary Ash Pond since the previous annual inspection.

2.2 COL Secondary Ash Pond (Inactive CCR Surface Impoundment)

2.2.1 Changes in Geometry (§257.83(b)(2)(i) and §257.100(a))

After conducting the annual inspection, as well as review of available information provided by COL pertaining to the status and condition of the inactive CCR surface impoundment, and discussions with COL facility personnel who oversee and maintain the operation, maintenance, and inspection activities of the inactive CCR surface impoundment, there have been no identified changes in the geometry since the previous annual inspection.

2.2.2 Existing Instrumentation (§257.83(b)(2)(ii) and §257.100(a))

The COL Secondary Ash Pond does not have permanent instrumentation that supports the operation of the inactive CCR surface impoundment. Water surface elevation data was not collected between August 1, 2018 through July 31, 2019. WPL has interviewed the staff who conducted the inspections and based on these interviews, the impoundment has fluctuated about one foot in elevation. Therefore, the approximate maximum water surface elevation recorded within the COL Secondary Ash Pond was 787 feet.

2.2.3 Depth and Elevation of Impounded CCR and Water (§257.83(b)(2)(iii) and §257.100(a))

The approximate minimum, maximum, and present depths and elevations of the impounded CCR and water in the COL Secondary Ash Pond since the previous annual inspection were determined using information that was collected during the annual inspection, as well as from historical information that was previously provided from WPL.

At the time of the annual inspection a survey was completed to determine the present surface water elevation of the CCR surface impoundment. Additionally, depth measurements from the water surface to the top of CCR/sediment were obtained to determine present depths/elevations.

The historical information provided from WPL included original design drawing contours of the COL Secondary Ash Pond prepared by Sargent & Lundy (1975), as well as the most recent topographic/bathymetric survey of the COL Secondary Ash Pond completed by Cornerstone Surveying and Mapping (2016). Reviewing the information provided within the above-mentioned documents, as well as the data collected during the annual inspection, the following minimum, maximum, and present depths and elevations were approximated for the impounded CCR and water:

- At the time of the annual inspection, the water surface elevation of the COL Secondary Ash Pond was surveyed to be 785.82 feet, 16.18 feet below the crest of the west embankment of the CCR surface impoundment, which had an elevation of approximately 802 feet at the lowest point of the embankment.

- At the time of the annual inspection, the water depth that was measured within the CCR surface impoundment varied between 4.0 feet and 4.7 feet.
- From the water depth measurements at the time of the annual inspection, the elevation of the top of CCR/sediment that was measured varied between an elevation of 781.82 feet and 781.12 feet.
- WPL has interviewed the staff who conducted the inspections and based on these interviews, the impoundment has fluctuated about one foot in elevation. Therefore, the approximate minimum water surface elevation recorded within the COL Secondary Ash Pond was 785 feet.
- WPL has interviewed the staff who conducted the inspections and based on these interviews, the impoundment has fluctuated about one foot in elevation. Therefore, the approximate maximum water surface elevation recorded within the COL Secondary Ash Pond was 787 feet.
- From the 1975 original design drawing contours of the COL Secondary Ash Pond, the original design bottom contour elevation of the CCR surface impoundment was approximately 780 feet. Comparing the results from the water depth measurements at the time of the annual inspection to the 1975 original design drawing contours, the deposition thickness varied between 1.12 feet to 1.82 feet.

2.2.4 Storage Capacity of Impounding Structure (§257.83(b)(2)(iv) and §257.100(a))

The storage capacity (i.e. water volume) of the CCR surface impoundment at the time of the annual inspection was calculated based on the acreage of the

CCR surface impoundment in the area where water was present, and the approximate depth of water within that area of the CCR surface impoundment.

From the 2016 topographic/bathymetric survey data, as well as observations made during the annual inspection, the area of the water surface of the CCR surface impoundment was approximately 10.1 acres. From the water depth data that was collected during the annual inspection, the average water depth within the CCR surface impoundment was 4.45 feet. Thus, the water volume within the COL Secondary Ash Pond at the time of the annual inspection was approximately 72,500 cubic yards.

2.2.5 Volume of Impounded CCR and Water (§257.83(b)(2)(v) and §257.100(a))

The volume of impounded CCR and water (i.e. total volume, not including freeboard) within the COL Secondary Ash Pond at the time of the annual inspection was determined using information that was collected during the annual inspection, as well as from historical information that was previously provided from WPL. Historical information provided from WPL included original design drawing contours of the COL Secondary Ash Pond prepared by Sargent & Lundy (1975), as well as the most recent topographic/bathymetric survey of the COL Secondary Ash Pond completed by Cornerstone Surveying and Mapping (2016).

The water surface elevation of the CCR surface impoundment that was surveyed at the time of the annual inspection was 785.82 feet. From the 1975 original design drawing contours of the COL Secondary Ash Pond, the original design bottom contour elevation of the CCR surface impoundment was approximately 780 feet. Thus, the interior storage height of the COL Secondary Ash Pond was approximately 5.82 feet

The surface area of the COL Secondary Ash Pond, in the area where both water and CCR were present, was approximately 10.1 acres. The total volume of impounded CCR and water within the COL Secondary Ash Pond at the time of the annual inspection was approximately 94,800 cubic yards.

2.2.6 Structural Weaknesses and Disruptive Conditions (§257.83(b)(2)(vi) and §257.100(a))

After review of available information provided by COL pertaining to the status and condition of the inactive CCR surface impoundment, discussions with COL facility personnel who oversee and maintain the operation, maintenance, and inspection activities of the inactive CCR surface impoundment, as well as conducting the on-site visual inspection of the inactive CCR surface impoundment, there have been no identified appearances of an actual or potential structural weakness of the inactive CCR surface impoundment. Additionally, there were no visual inspection issues with the structural integrity of the hydraulic structures (permanently closed 18-inch corrugated metal pipe) associated with the COL Primary Ash Pond.

Regarding the existing conditions of the COL Secondary Ash Pond, there were no existing conditions identified along the upstream and downstream slopes of the embankments that were disrupting or have the potential to disrupt the operation and safety of the inactive CCR surface impoundment.

2.2.7 Other Changes Affecting Stability or Operation of Impounding Structure (§257.83(b)(2)(vii) and §257.100(a))

After review of available information provided by COL pertaining to the status and condition of the inactive CCR surface impoundment, as well as discussions with COL facility personnel who oversee and maintain the operation, maintenance, and inspection activities of the inactive CCR surface

impoundment, there have been no other identified changes that have affected the stability or operation of the COL Secondary Ash Pond since the previous annual inspection.

3. CERTIFICATION

To meet the requirements of 40 CFR §§ 257.83(b) and 257.100(a), I Mark W. Loerop hereby certify that I am a licensed professional engineer in the State of Wisconsin; and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in 40 CFR §§ 257.83(b) and 257.100(a).

By:  _____
Name: MARK LOEROP _____
Date: DECEMBER 16, 2019 _____

