



solutions and action

Interstate Power and Light Company

Ottumwa Generation Station
CCR Surface Impoundment Annual Inspection Report
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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) 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.

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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 Interstate Power and Light Company (IPL), Ottumwa Generating Station (OGS) in Ottumwa, Iowa 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 OGS Ash Pond and the inactive CCR surface impoundment is identified as the OGS Zero Liquid Discharge (ZLD) Pond. The CCR surface impoundments have been assigned a state identification number by the Iowa Department of Natural Resources (IDNR), which is 90-UDP-01-15.

According to IPL personnel, the OGS ZLD Pond is scheduled to close in 2020, and the OGS Ash Pond is scheduled to close in 2022 following installation of a dry bottom ash handling system. Alliant Energy issued a Notice of Intent to

Close and a Notification of Intent to Comply with Alternative Closure Requirements on April 17, 2019 for the OGS Ash Pond.

The annual inspection of the CCR surface impoundments at OGS was completed by a qualified PE on June 10 and 11, 2019. The annual inspection was completed to ensure that the design, construction, operation, and maintenance of the CCR surface impoundments at OGS are consistent with recognized and generally accepted good engineering standards.

The annual inspection of the CCR surface impoundments at OGS 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 OGS (ccr.alliantenergy.com). These files for the CCR surface impoundments at OGS included, 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 CCR surface impoundments located at OGS.

2.1 OGS 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 OGS pertaining to the status and condition of the existing CCR surface impoundment, and discussions with OGS 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 OGS Ash Pond includes the following:

- *Parshall flume discharge structure and equipment to measure the flow of the discharged water through the NPDES Outfall 001.* The instrumentation is in the northeast corner of the OGS Ash Pond within the Polishing Pond area of the CCR surface impoundment.

The flow data associated with the NPDES Outfall 001 discharge (i.e. maximum daily flow), since the previous annual inspection, was provided by IPL from May 1, 2018 through April 30, 2019. Reviewing the provided flow data, the maximum daily flow recorded through NPDES Outfall 001 was 5.0 million gallons (October 9, 2018).

- *Staff gauge to monitor the water elevation of the CCR surface impoundment.* The staff gauge, prior to May 07, 2018, was in the northeast corner of the OGS Ash Pond. As areas within the CCR surface impoundment froze during the winter months the existing staff gauge became bent/twisted from the ice. On May 07, 2018 the staff gauge was relocated to the northwest corner of the OGS Ash Pond where it was secured to a concrete structure. The staff gauge was resurveyed on May 22, 2018.

The staff gauge water elevation data, since the previous annual inspection, was provided by IPL. The staff gauge measurements were collected at the same time as the 7-day inspections. The water elevation data included measurements collected between May 23, 2018 through April 24, 2019. After review of the provided staff gauge water elevation data, the maximum water elevation recorded within the large open area of the OGS Ash Pond was 676.98 feet (August 29, 2018) (Note: Elevations in feet above mean sea level).

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 OGS 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 IPL.

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

The historical information provided from IPL included staff gauge water elevation data since the previous annual inspection, a drawing of the original site grading plan contours prepared by Black & Veatch (1976) which show the original contours prior to the construction of the OGS Ash Pond, as well as the most recent topographic/bathymetric survey of the OGS Ash Pond completed by French-Reneker-Associates (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:

- OGS Ash Pond – Large Open Area of Impounded Water
 - At the time of the annual inspection, the water surface elevation of the large open area of impounded water within the CCR surface impoundment was observed to have a staff gauge elevation of 675.06 feet, approximately 0.82 feet lower in elevation than that observed during the 2018 annual inspection. The water surface at the time of the annual inspection was approximately 6.94 feet below the crest of the east embankment of the CCR surface impoundment, which had an elevation of approximately 682 feet at the lowest point of the embankment.
 - At the time of the annual inspection, the water depth that was measured within the large open area of impounded water within the CCR surface impoundment varied between 0.00 feet (water surface) in the southwest portion of the CCR surface impoundment and 10.4 feet in the eastern portion of the CCR surface impoundment adjacent to the Polishing Pond area.

Note, at the time of the annual inspection four of the water depth measurement locations in the southwest portion of the CCR surface impoundment were located outside the footprint of the impounded water due solids deposition and lower water elevation.

- From the water depth measurements at the time of the annual inspection, the elevation of the top of CCR/sediment that was measured within the large open area of impounded water within the CCR surface impoundment varied between an elevation of 675.06 feet (water surface) in the southwest portion of the CCR surface impoundment to an elevation of 664.7 feet in the eastern portion of the CCR surface impoundment.
- From staff gauge water elevation data provided by IPL since the previous annual inspection, the minimum water elevation within the large open area of the OGS Ash Pond was recorded to be 675.38 feet. The maximum water elevation within the large open area of the OGS Ash Pond was recorded to be 676.98 feet.
- From the 1976 drawing of the original site grading plan contours, the original bottom contour elevations varied from west to east within the existing area of impounded water within the CCR surface impoundment. The depth of the OGS Ash Pond varied between an elevation of 674 feet near the western portion of the CCR surface impoundment to an elevation of 656 feet in the eastern portion of the CCR surface impoundment adjacent to the Polishing Pond area. Comparing the results from the water depth measurements at the time of the annual

inspection to the 1976 original site grading plan bottom contour elevations, the deposition thickness ranged from 1.6 feet in the western portion of the CCR surface impoundment to 8.6 feet in the eastern portion of the CCR surface impoundment.

- OGS Ash Pond – Polishing Pond Area
 - At the time of the annual inspection, the water surface elevation of the Polishing Pond area of the CCR surface impoundment was surveyed to be 673.28 feet, approximately 7.72 feet below the crest of the east embankment of the CCR surface impoundment (681 feet).
 - At the time of the annual inspection, the water depth that was measured within the Polishing Pond area of the CCR surface impoundment varied between 5.5 feet and 6.4 feet.
 - From the water depth measurements at the time of the annual inspection, the elevation of the top of CCR/sediment that was measured within the Polishing Pond area of the CCR surface impoundment varied between an elevation of 667.78 feet to an elevation of 666.88 feet.
 - From the 1976 drawing of the original site grading plan contours, the bottom contour elevation within the Polishing Pond area was approximately 658 feet. Comparing the results from the water depth measurements at the time of the annual inspection to the 1976 original site grading plan bottom contour elevations, the deposition thickness in the Polishing Pond area was approximately 9.3 feet.

- OGS Ash Pond – Out of Water Area
 - Of the approximately 39 acres that makes up the surface area of the OGS Ash Pond, approximately 27.3 acres consists of CCR/sediment above the normal impounded water elevation. The out of water area is generally located in the southwestern, western, and northwestern portions of the CCR surface impoundment. At the time of the annual inspection an additional 2.85 acres of CCR/sediment was located outside the normal footprint of impounded water due to the lower water elevation, which increased the out of water area to approximately 30.15 acres. From the 1976 drawing of the original site grading plan contours, the average bottom contour elevation within the western portion of the CCR surface impoundment was approximately 675 feet.
 - From both the 2016 topographic/bathymetric survey of the OGS Ash Pond and the survey of the water surface elevation at the time of the annual inspection, the elevation of the top of CCR/sediment varied between 677 feet near the large open area of impounded water and 705 feet in the northwest portion of the OGS Ash Pond in the CCR operational area. Comparing the 2016 topographic/bathymetric survey top of CCR/sediment elevations, as well as the survey of the water surface elevation at the time of the annual inspection, to the 1976 drawing of the original site grading plan contour elevations, the deposition thickness of the OGS Ash Pond in the areas that did not consist of impounded water at the time of the annual inspection varied between 2 feet and 30 feet.

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 estimated acreage 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 CCR surface impoundment. The water depth measurements of the CCR surface impoundment were collected at the time of the annual inspection.

From both the 2016 topographic/bathymetric survey of the OGS Ash Pond and the survey of the water surface elevation at the time of the annual inspection, the area of the water surface of the CCR surface impoundment was approximately 8.85 acres. From the water depth data that was collected during the annual inspection, the average water depth within the CCR surface impoundment was approximately 5.77 feet. Thus, the storage capacity within the OGS Ash Pond at the time of the annual inspection was approximately 82,400 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) within the OGS 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 IPL. Historical information provided from IPL included a drawing of the original site grading plan contours prepared by Black & Veatch (1976), as well as the most recent topographic/bathymetric survey of the OGS Ash Pond completed by French-Reneker-Associates (2016).

The water surface elevation of the large open area of impounded water within the CCR surface impoundment that was surveyed at the time of the annual inspection was 675.06 feet. From the 2016 topographic/bathymetric survey of the OGS Ash Pond, the average elevation of the top of CCR/sediment outside the footprint of the water surface, which includes the bottom ash pile, was estimated to be approximately 681 feet. From the 1976 drawing of the original site grading plan contours, the bottom contour elevation that was present prior to the construction of the OGS Ash Pond was approximately 662 feet in the large open area of impounded water and 675 feet in the area outside the footprint of the water surface.

The surface area of the OGS Ash Pond, in the area where water was present, was approximately 8.85 acres. Thus, the volume of impounded CCR and water within the OGS Ash Pond, within the area where water was present, was approximately 200,800 cubic yards. The surface area of the OGS Ash Pond, in the area located outside of the footprint of the water portion, which includes the bottom ash pile, was approximately 30.15 acres. Thus, the volume of impounded CCR within the OGS Ash Pond, in the area located outside of the footprint of the water portion, was approximately 316,000 cubic yards. The total volume of impounded CCR and water within the OGS Ash Pond at the time of the annual inspection was approximately 516,800 cubic yards.

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

After review of available information provided by OGS pertaining to the status and condition of the existing CCR surface impoundment, discussions with OGS 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 identified issues with the structural integrity of the hydraulic structures (NPDES Outfall 001) associated with the OGS Ash Pond.

Regarding the existing conditions of the OGS 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. At the time of the annual inspection, the upstream and downstream slopes of the embankments of the CCR surface impoundment were well maintained.

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

After review of available information provided by OGS pertaining to the status and condition of the existing CCR surface impoundment, as well as discussions with OGS 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 OGS Ash Pond since the previous annual inspection.

2.2 OGS Zero Liquid Discharge 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 OGS pertaining to the status and condition of the inactive CCR surface impoundment, and discussions with OGS 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))

Instrumentation that supports the operation of the OGS ZLD Pond includes a staff gauge to monitor the water elevation of the CCR surface impoundment. The staff gauge is in the western portion of the OGS ZLD Pond. As areas within the CCR surface impoundment froze during the winter months the existing staff gauge became bent/twisted from the ice. On May 18, 2018 the staff gauge was reinstalled and on May 22, 2018 the staff gauge was resurveyed.

The staff gauge water elevation data, since the previous annual inspection, was provided by IPL. The staff gauge measurements were collected at the same time as the 7-day inspections. The water elevation data included measurements collected between May 23, 2018 through April 24, 2019. After review of the provided staff gauge water elevation data, the maximum water elevation recorded within the OGS ZLD Pond was 672.51 feet (March 20, 2019) (Note: Elevations in feet above mean sea level).

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 OGS ZLD 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 IPL.

The annual inspection included the collection of field data such as surveying of the water surface elevation, as well as on-water GPS depth measurements from

the water surface to the top of CCR/sediment to determine depths/elevations. Therefore, field data collected was used in conjunction with information obtained during the annual inspection in order to approximate minimum, maximum, and present depths and elevations of the impounded CCR and water in the OGS ZLD Pond.

The historical information provided from IPL included staff gauge water elevation data, a drawing of the original site grading plan contours prepared by Black & Veatch (1976) which show the original contours prior to the construction of the OGS ZLD Pond, the most recent topographic/bathymetric survey of the OGS ZLD Pond completed by French-Reneker-Associates (2015), as well as historical information on the depth in which the CCR is present within the inactive CCR surface impoundment. Reviewing the information provided within the above-mentioned documents, as well as the collected field data 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 OGS ZLD Pond was surveyed to be 673.56 feet, approximately 7.44 feet below the crest of the east embankment of the CCR surface impoundment, which had an elevation of approximately 681 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 0.7 feet in the western portion of the CCR surface impoundment adjacent to the hydrated fly ash pile and 19.25 feet in the southeastern portion of the CCR surface impoundment.

- From the water depth measurements at the time of the annual inspection, the elevation of the top of CCR/sediment that was measured within the CCR surface impoundment varied between an elevation of 672.86 feet in the western portion of the CCR surface impoundment adjacent to the hydrated fly ash pile to an elevation of 654.31 feet in the southeastern portion of the CCR surface impoundment, with an average elevation of approximately 660.15 feet.
- From the 1976 drawing of the original site grading plan contours, the original bottom contour elevations varied from east to west within the CCR surface impoundment. The depth of the OGS ZLD Pond varied between an elevation of 655 feet in the eastern portion of the CCR surface impoundment to an elevation of 664 feet in the western portion of the CCR surface impoundment, averaging an elevation of approximately 659.5 feet. Based upon historical documentation provided by IPL, the average bottom of CCR elevation identified in soil borings taken throughout the CCR surface impoundment was approximately 656.8 feet. Comparing the results of the average water depth measurement at the time of the annual inspection to the average bottom of CCR elevation identified within historical documentation, the average deposition thickness was observed to be approximately 3.35 feet within the CCR surface impoundment.

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. The water depth measurements of the CCR surface impoundment were collected at the time of the annual inspection.

From both the 2015 topographic/bathymetric survey of the OGS ZLD Pond and the survey of the water surface elevation at the time of the annual inspection, the area of the water surface of the CCR surface impoundment was approximately 18.7 acres. From the water depth data that was collected during the annual inspection, the average water depth within the CCR surface impoundment was approximately 13.41 feet. Thus, the storage capacity within the OGS ZLD Pond at the time of the annual inspection was approximately 404,300 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) within the OGS ZLD 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 IPL. Historical information provided from IPL included a drawing of the original site grading plan contours prepared by Black & Veatch (1976), as well as the most recent topographic/bathymetric survey of the OGS ZLD Pond completed by French-Reneker-Associates (2015). Additionally, IPL provided historical information on the depth in which the CCR is present within the inactive CCR surface impoundment.

The water surface elevation of the CCR surface impoundment that was surveyed at the time of the annual inspection was 673.56 feet. Based upon

historical documentation provided by IPL, the average bottom of CCR elevation identified in soil borings taken throughout the CCR surface impoundment was approximately 656.8 feet.

The surface area of the OGS ZLD Pond, in the area where both water and CCR were present, was approximately 18.7 acres. The total volume of impounded CCR and water within the OGS ZLD Pond at the time of the annual inspection was approximately 505,300 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 OGS pertaining to the status and condition of the inactive CCR surface impoundment, discussions with OGS 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.

Regarding the existing conditions of the OGS ZLD 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. At the time of the annual inspection, the upstream and downstream slopes of the embankments of the CCR surface impoundment were well maintained.

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 OGS pertaining to the status and condition of the inactive CCR surface impoundment, as well as discussions with OGS 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 OGS ZLD 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 Iowa; 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: JUNE 25, 2019

