solutions and action

Interstate Power and Light Company
Lansing 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 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 existing 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) 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 existing CCR surface impoundments with a height of 5 feet or more and a storage volume of 20 acre-feet or more or the existing CCR surface impoundment has a height of 20 feet or more (40 CFR §§ 257.73(b), 257.73(d) and 257.83(b)).

1.2 Annual Inspection Applicability

The Interstate Power and Light Company (IPL), Lansing Generating Station (LAN) in Lansing, Iowa has one existing CCR surface impoundment that meets the requirements of Section 1.1, identified as the LAN Upper Ash Pond.

The annual inspection of the existing CCR surface impoundment at LAN was completed by a qualified PE on October 24th and 25th, 2016. The annual inspection was completed to ensure that the design, construction, operation, and maintenance of the existing CCR surface impoundment at LAN is consistent with recognized and generally accepted good engineering standards.

The annual inspection of the existing CCR surface impoundment at LAN included a review of available information regarding the status and condition of the existing CCR surface impoundment. The information reviewed included all relevant files available in the operating record at the time of the annual

inspection, as well as all relevant publicly accessible internet site entries. These files for the existing CCR surface impoundments at BGS 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 30-day instrumentation monitoring by a qualified person, and results of the previous annual inspection.

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

2. FACILITY DESCRIPTION

The following sub-section provides a summary description of the facility and existing CCR surface impoundment located at LAN. LAN is located three miles southeast of Lansing, Iowa on the western shore of the Mississippi River in Allamakee County, at 2320 Power Plant Drive, Lansing, Iowa.

LAN is a fossil-fueled electric generating station that has used four steam turbine electric generating units throughout its history. Unit 1, Unit 2, and Unit 3 were retired by 2014 and Unit 4 is the only operating unit. Sub-bituminous coal is the primary fuel for producing steam at LAN. The CCR at LAN is categorized into three types: bottom ash, fly ash, and scrubber byproduct. Fly ash is collected by electrostatic precipitators and pneumatically conveyed to an onsite fly ash silo, which is equipped with a baghouse for dust control. The fly ash is then either transported off-site for beneficial reuse, landfilled (in the case of high loss on ignition), or sluiced to a CCR surface impoundment identified as the LAN Upper Ash Pond (typically during startup and shutdown). Bottom ash is sluiced to the LAN Upper Ash Pond, where it is dredged, dewatered, and transported to the onsite landfill. The LAN Upper Ash Pond is located south of the generating plant and is the only existing CCR surface impoundment. Scrubber byproduct consists of fly ash, unreacted lime, and activated carbon. Scrubber byproduct is collected in the byproduct silo prior to being landfilled.

A previous CCR surface impoundment at LAN, identified as the Lower Ash Pond, was located west of the generating plant and north of Power Plant Drive. The Lower Ash Pond was closed in September 2015 by removing the CCR from the surface impoundment via hydraulic dredge and sluicing the CCR to the south end of the LAN Upper Ash Pond. CCR was removed from the Lower Ash Pond prior to backfilling the surface impoundment.

General Facility Information:

Date of Initial Facility Operations:	1946
IDNR State ID No.	03-UDP-01-15
NPDES Permit Number:	IA0300100
Latitude / Longitude:	41°56'38.43"N 91°38'22.39"W
Site Coordinates:	Section 03, Township 28 North, Range 07 West
Nameplate Ratings:	Unit 1 (1948): 16.6 MW (Retired)
	Unit 2 (1949): 11.4 MW (Retired)
	Unit 3 (1957): 35.8 MW (Retired)
	Unit 4 (1977): 270 MW

2.1 LAN Upper Ash Pond

The LAN Upper Ash Pond is located southwest of the generating plant and south of Power Plant Drive. The LAN Upper Ash Pond receives influent flows from the Unit 4 boiler floor sumps, water treatment sumps, fly ash hydroveyor system, storm water runoff from the active dry ash landfill and hillside east of the impoundment, as well as sluiced fly ash and bottom ash. The LAN Upper Ash Pond is the only receiver of sluiced CCR at LAN. The CCR is sluiced from the generating plant to the south east corner of the LAN Upper Ash Pond. The sluiced CCR discharges into the southeast corner of the LAN Upper Ash Pond where the majority of the CCR settles. Ongoing maintenance dredging is conducted in the southern portion of the LAN Upper Ash Pond. The dredged CCR is temporarily stockpiled and dewatered prior to being transported to the on-site active dry ash landfill located south of the LAN Upper Ash Pond.

The sluiced water that is discharged into the LAN Upper Ash Pond flows to the west prior to flowing north through a series of five interconnected settling areas separated by intermediate dikes. Settling Area #1 is the furthest south, while Settling Area #5 is the furthest north. The intermediate dikes have 30-inch

diameter corrugated metal pipes on the west and east sides, which hydraulically connect the five settling areas. The water from each settling area flows north until it enters the large open area of the LAN Upper Ash Pond.

The north end of the LAN Upper Ash Pond has a concrete wet well and overflow weir structure that controls the LAN Upper Ash Ponds water level, and is identified as Weir Box #1. The water in the LAN Upper Ash Pond overflows a stop log weir into Weir Box #1, and then through a 24-inch diameter corrugated metal pipe under Power Plant Drive, and into Weir Box #2. The water leaves Weir box #2 through a 24-inch diameter high density polyethylene pipe, which connects Weir Box #2 to Weir Box #3 in the backfilled former Lower Ash Pond. The water flows through Weir Box #3 and discharges to the west through a 24-inch diameter corrugated metal pipe into Unnamed Creek #1. Unnamed Creek #1 flows to the north into Unnamed Creek #2 which then discharges into the Mississippi River. The National Pollution Discharge Elimination System (NPDES) Outfall 002 monitoring location, which consists of flow monitoring instrumentation, is located at Weir Box #1 and compliance samples are collected from Weir Box #3.

3. ANNUAL INSPECTION REPORTING CRITERIA

The following sub-sections address the annual inspection reporting criteria per §257.83(b)(2) of the CCR Rule for the existing CCR surface impoundment located at LAN.

3.1 LAN Upper Ash Pond

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

After conducting the annual inspection, as well as review of available information provided by LAN pertaining to the status and condition of the existing CCR surface impoundment, and discussions with LAN facility personnel who oversee and maintain the operation, maintenance, and inspection activities of the existing CCR surface impoundment, the following changes to the geometry of the CCR surface impoundment were identified since the previous annual inspection:

- At the time of the initial CCR Rule annual inspection in October 2015 the west embankment of the LAN Upper Ash Pond was undergoing the installation of a cut-off wall in the center of the embankment. The cut-off wall was installed, from north to south along the entire length of the embankment, in order to reduce horizontal migration of groundwater through the west embankment. Since the previous annual inspection, the cut-off wall installation along the west embankment of the LAN Upper Ash Pond was completed. After the cut-off wall was installed a non-woven geotextile was placed over the length of the cut-off wall, followed by placement of one foot of borrow soil material across the ten feet wide embankment crest. The upstream/downstream slopes were regraded; and
- Re-grading of the upstream slopes of the west embankment of the CCR surface impoundment, along the four southern settling areas, by the

placement of fill material in order to lessen the slope and allow for better management of vegetation as well as routine inspections along the upstream slopes.

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

Instrumentation that supports the operation of the LAN Upper Ash Pond includes flow monitoring equipment to measure the flow of the discharged water. The instrumentation is located at the north end of the LAN Upper Ash Pond at Weir Box #1 and is associated with the NPDES Outfall 002 at LAN.

The flow data associated with the NPDES Outfall 002 discharge (e.g. maximum flow rate) was provided by IPL for 2016 (July 29, 2016 through October 03, 2016). Reviewing the provided flow data, the maximum flow reading recorded through NPDES Outfall 002 was 7.21 million gallons per day (August 2016).

IPL also provided the measured depths of water above the overflow weir for 2016 (July 29, 2016 through October 03, 2016). Reviewing the provided water depth data, the maximum water depth recorded was 10.70 inches (August 2016). Adding the maximum water depth to the overflow weir elevation of 648.13 feet, which was surveyed at elevation at the time of the annual inspection, the maximum water surface elevation was 658.83 feet.

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

The minimum, maximum, and present depths and elevations of the impounded CCR and water in the LAN Upper 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. Additionally, 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 flow metering equipment data since the previous annual inspection, original design drawing contours of the LAN Upper Ash Pond prepared by Sargent & Lundy (1974), the most recent topographic survey of the LAN Upper Ash Pond (2015), and the most recent hydrographic survey of the LAN Upper Ash Pond (2015). 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:

- LAN Upper Ash Pond - Settling Area #1
    - At the time of the annual inspection, the water surface elevation was 653.75 feet, 3.25 feet below the crest of the west embankment of the CCR surface impoundment, which had an elevation of approximately 657 feet at the lowest point of the embankment adjacent to settling area #1.
    - At the time of the annual inspection, the water depth that was measured within settling area #1 of the CCR surface impoundment varied between 13.6 feet and 16.9 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 640.15 feet and 636.85 feet.
    - From the 1974 original design drawing contours of the LAN Upper Ash Pond, the original design bottom contour elevation of the

existing CCR surface impoundment was approximately 624 feet. The depth of settling area #1 of the CCR surface impoundment varied between an elevation of 640.15 feet and 636.85 feet. Comparing the results from the water depth measurements at the time of the annual inspection to the 1974 original design drawing contours, the deposition thickness varied between 16.15 feet and 12.85 feet.

- LAN Upper Ash Pond - Settling Area #2
    - At the time of the annual inspection, the water surface elevation was 652.42 feet, 3.58 feet below the crest of the west embankment of the CCR surface impoundment, which had an elevation of approximately 656 feet at the lowest point of the embankment adjacent to settling area #2.
    - At the time of the annual inspection, the water depth that was measured within settling area #2 of the CCR surface impoundment varied between 10.1 feet and 12.0 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 642.32 feet and 640.42 feet.
    - From the 1974 original design drawing contours of the LAN Upper Ash Pond, the original design bottom contour elevation of the existing CCR surface impoundment was approximately 624 feet. The depth of settling area #2 of the CCR surface impoundment varied between an elevation of 642.32 feet and 640.42 feet. Comparing the results from the water depth measurements at the time of the annual inspection to the 1974 original design drawing

contours, the deposition thickness varied between 18.32 feet and 16.42 feet.

- LAN Upper Ash Pond - Settling Area #3
    - At the time of the annual inspection, the water surface elevation was 651.71 feet, 3.29 feet below the crest of the west embankment of the CCR surface impoundment, which had an elevation of approximately 655 feet at the lowest point of the embankment adjacent to settling area #3.
    - At the time of the annual inspection, the water depth that was measured within settling area #3 of the CCR surface impoundment varied between 7.4 feet and 11.2 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 644.31 feet and 640.51 feet.
    - From the 1974 original design drawing contours of the LAN Upper Ash Pond, the original design bottom contour elevation of the existing CCR surface impoundment was approximately 624 feet. The depth of settling area #3 of the CCR surface impoundment varied between an elevation of 644.31 feet and 640.51 feet. Comparing the results from the water depth measurements at the time of the annual inspection to the 1974 original design drawing contours, the deposition thickness varied between 20.31 feet and 16.51 feet.
- LAN Upper Ash Pond - Settling Area #4
    - At the time of the annual inspection, the water surface elevation was 649.92 feet, 4.08 feet below the crest of the west

embankment of the CCR surface impoundment, which had an elevation of approximately 654 feet at the lowest point of the embankment adjacent to settling area #4.

- At the time of the annual inspection, the water depth that was measured within settling area #4 of the CCR surface impoundment varied between 6.4 feet and 8.7 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 643.52 feet and 641.22 feet.
- From the 1974 original design drawing contours of the LAN Upper Ash Pond, the original design bottom contour elevation of the existing CCR surface impoundment was approximately 624 feet. The depth of settling area #4 of the CCR surface impoundment varied between an elevation of 643.52 feet and 641.22 feet. Comparing the results from the water depth measurements at the time of the annual inspection to the 1974 original design drawing contours, the deposition thickness varied between 19.52 feet and 17.22 feet.

- LAN Upper Ash Pond - Settling Area #5
  - At the time of the annual inspection, the water surface elevation was 648.44 feet, 4.56 feet below the crest of the west embankment of the CCR surface impoundment, which had an elevation of approximately 653 feet at the lowest point of the embankment adjacent to settling area #5.
  - At the time of the annual inspection, the water depth that was measured within settling area #5 of the CCR surface impoundment

varied between 4.6 feet in the southern portion to 12.1 feet in the northern portion near Weir Box #1.

- 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 643.84 feet and 636.34 feet.
- From the 1974 original design drawing contours of the LAN Upper Ash Pond, the original design bottom contour elevation of the existing CCR surface impoundment was approximately 624 feet. The depth of settling area #5 of the CCR surface impoundment varied between an elevation of 643.84 feet and 636.34 feet. Comparing the results from the water depth measurements at the time of the annual inspection to the 1974 original design drawing contours, the deposition thickness varied between 19.84 feet and 12.34 feet.

3.1.4 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 CCR surface impoundment in the areas where water was present, and the approximate depth of water within those areas of the CCR surface impoundment. The water depth measurements of the CCR surface impoundment were collected at the time of the annual inspection.

From the most recent topographic and hydrographic surveys of the LAN Upper Ash Pond (2015), as well as the water depth data that was collected within each of the settling areas at the time of the annual inspection, the following water surface areas and average water depths of each settling area of the CCR surface impoundment are as follows:

LAN Upper Ash Pond – Settling Area ID	Water Surface Area (Acres)	Average Water Depth (Feet)
Settling Area #1	1.32	15.63
Settling Area #2	0.84	10.93
Settling Area #3	0.78	9.30
Settling Area #4	0.78	7.55
Settling Area #5	7.27	7.94

Thus, from the water surface areas and average water depth data provided above, the total storage capacity within the LAN Upper Ash Pond at the time of the annual inspection was approximately 162,000 cubic yards.

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

The volume of impounded CCR and water (i.e. total volume) within the LAN Upper 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 original design drawing contours of the LAN Upper Ash Pond prepared by Sargent & Lundy (1974), the most recent topographic survey of the LAN Upper Ash Pond (2015), and the most recent hydrographic survey of the LAN Upper Ash Pond (2015).

The surveyed elevation of the water surface within the LAN Upper Ash Pond at the time of the annual inspection varied between the five settling areas. Therefore, the volume of impounded CCR and water, where water was present, was determined individually for each of the five settling areas. In addition to the volume of CCR and water in the areas where water was present, the volume of impounded CCR located outside the footprint of the water surface of the settling areas was determined. These additional areas included the

intermediate dikes located between the five settling areas, as well as the areas where CCR maintenance dredging activities had not been completed within the CCR surface impoundment.

From the available information, the total volume of impounded CCR and water within the LAN Upper Ash Pond at the time of the annual inspection was approximately 568,000 cubic yards.

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

After review of available information provided by LAN pertaining to the status and condition of the existing CCR surface impoundment, discussions with LAN 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 structure (NPDES Outfall 002) associated with the LAN Upper Ash Pond.

Regarding the existing conditions of the LAN Upper 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.

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

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

impoundment, there has been one identified change since the previous annual inspection that has the potential to affect the operation of the LAN Upper Ash Pond.

Per the September 2016 Structural Stability Assessment prepared in accordance with §257.73 of the CCR Rule, the hydraulic structures associated with the LAN Upper Ash Pond were inspected for structural integrity, as well as for significant deterioration, deformation, distortion, bedding deficiencies, sedimentation, and debris which may negatively affect the operation of the hydraulic structure. The hydraulic structure, located between Weir Box #1 and Weir Box #2, was not able to be fully inspected due to the 24 inch diameter corrugated metal pipe was lower in elevation than the subsequent downstream pipes and therefore was submerged. However, a pump was used to dewater Weir Box #1 and the video camera system was able to collect visuals on the initial section of the hydraulic structure. From the inspection, solid buildup was found on the initial section of the hydraulic structure which could negatively affect the operation of the hydraulic structure. As of this annual inspection, LAN was pursuing options to safely clean and inspect the section of pipe from Weir Box #1 to Weir Box #2.

4. CERTIFICATION

To meet the requirements of 40 CFR 257.83(b), 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).

By: _____

Name: Mark Loerop

Date: Dec 21, 2016