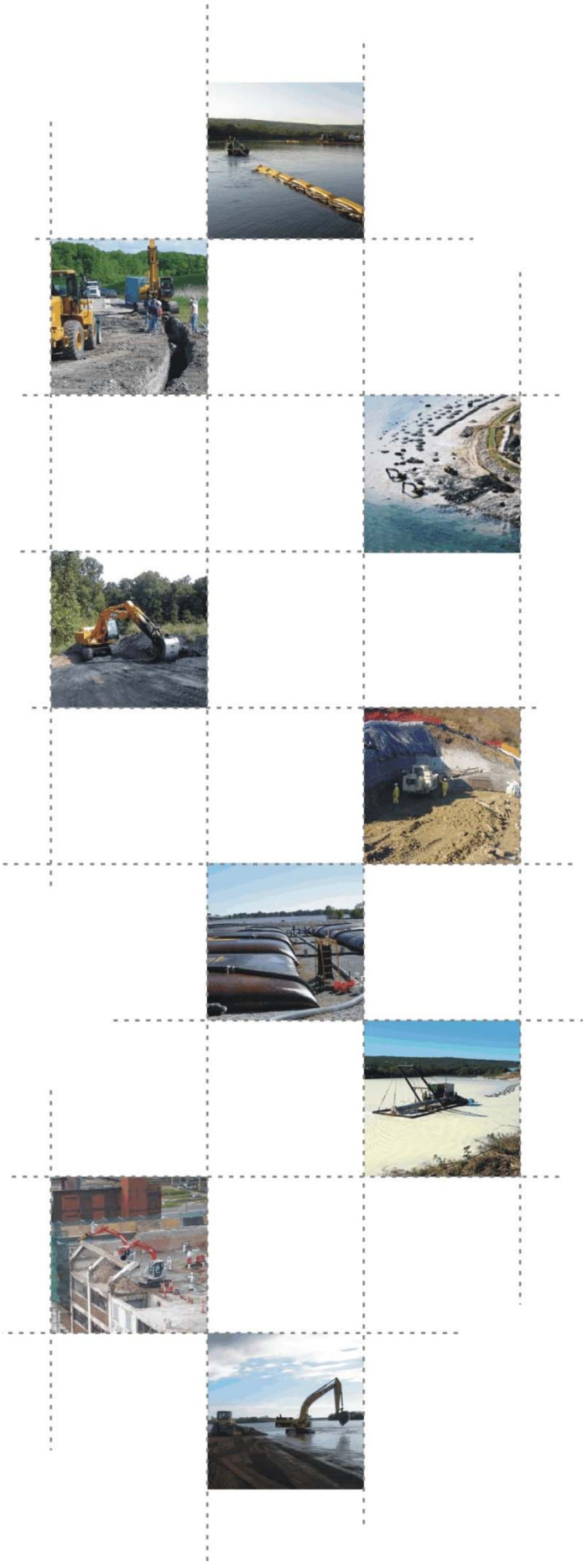
ALLIANT ENERGY
INTERSTATE POWER AND LIGHT
LANSING GENERATING STATION

CCR SURFACE IMPOUNDMENT

ANNUAL INSPECTION REPORT

January 15, 2016



HARD HAT SERVICES™
Engineering, Construction and Management Solutions

EXECUTIVE SUMMARY

This annual inspection report has been prepared in accordance with the requirements of the United States Environmental Protection Agency (USEPA) 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 the CCR Rule) published on April 17, 2015 and effective October 19, 2015.

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 existing 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.

TABLE OF CONTENTS

1.0 INTRODUCTION 1

1.1 CCR Rule Applicability 1

1.2 Annual Inspection Applicability to the Lansing Generating Station 1

2.0 DESCRIPTION OF EXISTING CCR SURFACE IMPOUNDMENT AT LAN 3

2.1 LAN Upper Ash Pond 3

3.0 ANNUAL INSPECTION REPORTING CRITERIA 4

3.1 LAN Upper Ash Pond 4

3.1.1 Changes in Geometry (§257.83(b)(2)(i)) 4

3.1.2 Existing Instrumentation (§257.83(b)(2)(ii)) 4

3.1.3 Depth and Elevation of Impounded CCR and Water (§257.83(b)(2)(iii)) 5

3.1.4 Storage Capacity of Impounding Structure (§257.83(b)(2)(iv)) 6

3.1.5 Volume of Impounded CCR and Water (§257.83(b)(2)(v)) 6

3.1.6 Structural Weaknesses and Disruptive Conditions (§257.83(b)(2)(vi)) 7

3.1.7 Other Changes Affecting Stability or Operation of Impounding Structure (§257.83(b)(2)(vii)) 8

4.0 CERTIFICATION 9

1.0 INTRODUCTION

This annual inspection report has been prepared in accordance with the requirements of §257.83(b) of 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 five feet or more and a storage volume of twenty acre-feet or more or the existing CCR surface impoundment has a height of twenty feet or more (40 CFR §§ 257.73(b), 257.73(d) and 257.83(b)).

1.2 Annual Inspection Applicability to the Lansing Generating Station

The Interstate Power and Light Company (IPL), Lansing Generating Station (LAN) in Lansing, Iowa has one existing CCR surface impoundment, identified as the LAN Upper Ash Pond. The LAN Upper Ash Pond meets the requirements of §257.73(b)(1) and §257.73(b)(2) of the CCR Rule, as the existing CCR surface impoundment has a storage height greater than twenty feet and a storage volume greater than 20 acre-feet, and thus is subject to the periodic structural stability assessment requirements of §257.73(d) of the CCR Rule. Therefore, the existing CCR surface impoundment at LAN is required to be inspected by a qualified PE on a periodic basis per §257.83(b) of the CCR Rule.

The initial annual inspection of the LAN Upper Ash Pond was completed by a qualified PE on October 19, 2015. The annual inspection was completed by a qualified PE 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 initial annual inspection of the LAN Upper Ash Pond 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 initial annual inspection. These files for the LAN Upper Ash Pond included the 7-day inspection forms and 30-day instrumentation monitoring forms.

The initial 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 impoundment and appurtenant structures. Additionally, the visual inspection included any 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.

2.0 DESCRIPTION OF EXISTING CCR SURFACE IMPOUNDMENT AT LAN

The following sub-section provides a summary description of the existing CCR surface impoundment located at LAN.

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, as well as sluiced CCR. The LAN Upper Ash Pond is the primary receiver of 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 out. Ongoing maintenance dredging is conducted in the southern portion of the LAN Upper Ash Pond. The dredged CCR is 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 ponds separated by intermediate dikes. The intermediate dikes consist of 30-inch diameter corrugated metal pipes on the west and east sides, which hydraulically connects the five settling ponds. The water from each settling pond flows north until it enters the large open settling pond area of the LAN Upper Ash Pond. The north end of the LAN Upper Ash Pond consists of a concrete water level control 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 flows through the Weir Box #1, under Power Plant Drive, and through a second water level control structure identified as Weir Box #2. The water then flows through a 24-inch diameter high density polyethylene pipe, which connects Weir Box #2 to Weir Box #3. The water flows through Weir Box #3 and discharges to the west through a 24-inch diameter corrugated metal pipe into an Unnamed Creek #1. Unnamed Creek #1 flows to the north and 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.

3.0 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 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 have been no identified changes in the geometry of the impounding structure that would warrant additional investigation or remedial activities.

At the time of the initial CCR Rule annual inspection the west embankment of the LAN Upper Ash Pond was undergoing the installation of a cut-off wall in the center of the west embankment. The cut-off wall was installed along the entire length of the west embankment of the LAN Upper Ash Pond, from north to south, in order to reduce horizontal migration of groundwater through the west embankment.

Additionally, review of historical annual inspections completed in 2011 through 2014, prior to this initial CCR Rule annual inspection, has shown there have been no other previously identified changes in the geometry of the LAN Upper Ash Pond.

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

Instrumentation that supports the operation of the LAN Upper Ash Pond includes flow monitoring instrumentation. 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.

As this is the initial CCR Rule annual inspection, there was no historical record of available information regarding the maximum recorded readings of each instrument from a previous annual inspection that was available for review. However, flow data associated with the NPDES Outfall 002 discharge (e.g. maximum daily flow) was provided by IPL staff for 2015 (January 01, 2015 through August 18, 2015). Reviewing the provided flow data, the maximum daily flow recorded through NPDES Outfall 002 was approximately 4.44 million gallons (January 2015).

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

As this is the initial CCR Rule annual inspection, there was no historical record of available information regarding the approximate minimum, maximum, and present depths and elevations of the impounded CCR and water in the LAN Upper Ash Pond from a previous annual inspection that was available for review.

However, historical information was previously provided from IPL staff, including 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, the following depths and elevations were approximated for the impounded CCR and water:

- 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.
- From the 2015 topographic survey, the water elevation in the southern portion of the LAN Upper Ash Pond was approximately 652. The water elevation in the northern portion of the LAN Upper Ash Pond was approximately 648. The difference in water elevation, approximately 4 feet, was due to the difference in invert elevations of the hydraulic structures that are located between the interconnected ponds.

  The lowest surveyed elevation of the top of the impounding structure, located along the northern portion of the west embankment of the LAN Upper Ash Pond, was approximately 652.
- From the 2015 hydrographic survey, the average bottom contour elevation in the southern portion of the LAN Upper Ash Pond varied due to the continued deposition of sluiced CCR, as well as ongoing maintenance dredging activities. The lowest surveyed bathymetric contour elevation was approximately 636. The average surveyed bathymetric contour elevation was estimated to be approximately 645.

  From the 2015 hydrographic survey, the bathymetric contour elevations in the northern portion of the LAN Upper Ash Pond varied from south to north. The southern half of the northern portion of the LAN Upper Ash Pond had an average bathymetric contour elevation estimated to be approximately 644. The northern half of the northern portion of the LAN Upper Ash Pond had an average bathymetric contour elevation of 640. The lowest surveyed bathymetric elevation was approximately 636, located south of Weir Box #1.
- Comparing the 2015 hydrographic survey to the 1974 original design drawing contours, the total deposition thickness of the LAN Upper Ash Pond varies from

south to north. The average deposition thickness in the southern portion of the LAN Upper Ash Pond was estimated to be approximately 21 feet. The average deposition thickness in the northern portion of the LAN Upper Ash Pond was estimated to be approximately 18 feet.

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

The storage capacity of the LAN Upper Ash Pond at the time of the initial annual inspection was not readily available.

However, historical information was previously provided from IPL staff, including 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, the approximate storage capacity of the LAN Upper Ash Pond was calculated.

From the 2015 topographic survey, the maximum water elevation in the LAN Upper Ash Pond was approximately 652. From the 2015 hydrographic survey, the bottom contour elevation of the LAN Upper Ash Pond varied with an average elevation estimated to be approximately 643.5. Comparing the maximum surveyed water elevation with the estimated average bathymetric elevation of the LAN Upper Ash Pond, the average interior storage height was approximately 8.5 feet.

The total surface area of the LAN Upper Ash Pond was approximately 13 acres. Therefore, the total volume of water within the LAN Upper Ash Pond available for storage is approximately 178,000 cubic yards.

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

The volume of impounded CCR and water (total volume) within the LAN Upper Ash Pond at the time of the initial annual inspection was not readily available.

However, historical information was previously provided from IPL staff, including 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, the total volume of impounded CCR and water was calculated.

From the 1974 original design drawing contours, the bottom elevation of the LAN Upper Ash Pond was approximately 624. From the 2015 topographic survey, the maximum surveyed water elevation was approximately 652. The total interior storage height of the LAN Upper Ash Pond was calculated by subtracting the bottom elevation of the 1974 original design drawing contours (624) from the surveyed water elevation (652). Thus, the height of the impounded CCR and water within the LAN Upper Ash Pond was approximately 28 feet.

The total surface area of the LAN Upper Ash Pond was approximately 13 acres. Therefore, the estimated total volume of impounded CCR and water was approximately 587,000 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 that would warrant additional investigation or remedial activities. 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 that are disrupting or have the potential to disrupt the operation and safety of the existing CCR surface impoundment and appurtenant structures, the following conditions were identified:

- Vegetation Overgrowth
    - The upstream slope of the north embankment of the LAN Upper Ash Pond could not be properly inspected due to the presence of dense grassy vegetation from the water surface to the top of slope. The vegetation restricted the ability to properly inspect the embankment for stability. Items such as erosion, seeps, and animal activity (if present) were unable to be observed due to the vegetation overgrowth.
    - The downstream slope of the west embankment of the LAN Upper Ash Pond could not be properly inspected due to the presence of dense/tall brush and woody vegetation (e.g. tall grass, shrubs, small diameter trees) located from the toe of slope to two thirds (2/3) up the slope. The

vegetation restricted the ability to properly inspect the embankment for stability. Items such as erosion and animal activity (if present) were unable to be observed due to the vegetation overgrowth.

{Note: Embankments of existing CCR surface impoundments located in or adjacent to floodplains, sovereign lands, property boundaries, wetlands, and potential other restrictive areas may require various types of permits prior to conducting vegetation management activities.}

Note, at the time the initial CCR Rule annual inspection was conducted the west embankment of the LAN Upper Ash Pond was undergoing remedial activities as a cut-off wall was in the process of being installed along the entire length of the west embankment. The cut-off wall installation restricted access to the downstream slope of the west embankment for safely conducting vegetation management activities.

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

As this is the initial CCR Rule annual inspection, there is no historical record of available information regarding other identified changes that have affected the stability or operation of the LAN Upper Ash Pond from a previous annual inspection that was available for review.

However, after review of historical 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 have been other changes that have affected the stability and operation of the LAN Upper Ash Pond. These changes, in addition to the installation of the cut-off wall along the west embankment of the LAN Upper Ash Pond, include the following:

- Closure of a surface impoundment (Lower Pond) located north of the north LAN Upper Ash Pond embankment was completed in 2015. The closure of the Lower Pond included removal of the CCR, backfilling the surface impoundment and hydraulically connecting the Weir Box #2 to Weir Box #3, which allowed the water from the LAN Upper Ash Pond to bypass the closed surface impoundment and discharge into Unnamed Creek #1. The closure of the Lower Pond was completed in order to increase the stability of the north embankment of the LAN Upper Ash Pond in order to meet the structural integrity criteria requirements of the CCR Rule.

4.0 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: JAN 15, 2016