

CCR Surface Impoundment 2016 Annual Inspection Report

Louisa Generating Station



MidAmerican Energy Company Louisa Generating Station

Muscatine, Iowa January 13, 2017

MidAmerican Energy Company Louisa Generating Station CCR Surface Impoundment 2016 Annual Inspection Report

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Professional Engineer Certification

"I hereby certify that the CCR Surface Impoundment at the Louisa Generating Station, owned and operated by the MidAmerican Energy Company, has been inspected and this report prepared in accordance with the Coal Combustion Residual Rule 40 CFR 257.83(b). I am a duly licensed Professional Engineer under the laws of the State of Iowa."

Print Name:

Signature: Hory

21143

Date:

January 13, 2017

Douglas T. DeCesar

License #:

My license renewal date is December 31, 2017.



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January 2017

1 Introduction

On April 17, 2015, the U.S. Environmental Protection Agency (EPA) published the final rule for the regulation and management of coal combustion residuals (CCR) under Subtitle D of the Resource Conservation and Recovery Act [RCRA, 42 United States Code (U.S.C.) §6901 et seq.]. The CCR Rule defines a set of requirements for the disposal and handling of CCR within CCR units (defined as either landfills or surface impoundments). MidAmerican Energy Company (MEC) is subject to the CCR Rule and therefore must have a qualified Professional Engineer conduct an annual inspection on all CCR surface impoundments in accordance with 40 CFR Section 257.83. HDR conducted the 2016 annual inspection of the Louisa Generating Station (LGS) surface impoundment (LGS Surface Impoundment) on October 19, 2016, on behalf of MEC. This report contains the results and observations of the inspection.

1.1 Purpose

The CCR Rule requires subsequent inspections of CCR units and reports to be completed and filed on an annual basis. The completion date of the initial inspection report (i.e. placed in the facility operating record) established the deadline to complete the first subsequent inspection and report. The requirements of the annual inspection for CCR surface impoundments include:

- A review of available information regarding the status and condition of the CCR unit, weekly inspections, structural stability assessments, and previous annual inspections 257.83 (b)(1)(i)
- A visual inspection of the CCR unit and appurtenant structures to identify signs of distress or malfunction 257.83 (b)(1)(ii)
- A visual inspection of any hydraulic structures underlying the base or passing through the dike of the CCR unit for structural integrity and continued safe and reliable operation 257.83 (b)(1)(iii)
- An inspection report that includes the following:
 - Changes in geometry since the last inspection 257.83 (b)(2)(i)
 - Location and type of existing instrumentation and maximum recorded readings -257.83 (b)(2)(ii)
 - Approximate minimum, maximum and present depth and elevation of impounded water and CCR - 257.83 (b)(2)(iii)
 - Storage capacity of the impounding structure at time of inspection 257.83 (b)(2)(iv)
 - Approximate volume of impounded water and CCR in unit at time of inspection -257.83 (b)(2)(v)
 - Appearance of actual or potential structural weakness of the CCR unit 257.83 (b)(2)(vi)
 - Any other changes which may have affected the stability or operation of the CCR unit since the last inspection 257.83 (b)(2)(vii)

MEC, as owner and operator of the Louisa Generating Station CCR Surface Impoundment, must notify the Iowa Department of Natural Resources (IDNR) Director within 30 days of placing the CCR Surface Impoundment Annual Inspection Report in the operating record and date of posting to the CCR web site (40 CFR §257.106 and §257.107).

1.2 Facility Background

The Louisa Generating Station is a coal-fired generating plant located south of Muscatine, Iowa, along the west shore of the Mississippi River. The LGS has an existing CCR landfill and an existing CCR surface impoundment. This annual inspection report covers the LGS Surface Impoundment.

The LGS Surface Impoundment is located east of the operating plant and adjacent to the Mississippi River. The impoundment is split into two portions, a large primary storage pond and a secondary pond, referred to as the reclaim water pond which accepts flow from the primary storage pond. Water from the reclaim water pond is either discharged to the Mississippi River through a permitted outfall or recirculated to the plant for reuse as bottom ash transport water. An outfall structure from the primary storage pond conveys water to the reclaim water pond. A lift station located at the northwest corner of the reclaim water pond pumps liquids back to the plant for reuse. The primary storage pond's main function is to settle CCR materials permitting sediment free liquids to drain to the reclaim water pond. Both portions of the surface impoundment are lined with rip rap for slope protection on the interior of the embankments. The exterior slopes of the embankments are vegetated. The total surface area of the primary storage pond (western portion) is approximately 26.4 acres; while the reclaim water pond (eastern portion) has a surface area of approximately 2.8 acres. A facility site map is included in Appendix A. Two thirds of the impoundment is contained with a constructed embankment, while the remaining one third of the impoundment is excavated from in situ material.

2 Review of Available Information

Section 257.83(b)(1)(i) of the CCR Rule requires that available information regarding the status and condition of the CCR surface impoundment such as the previous weekly and annual inspections and structural stability assessment are to be reviewed. Several documents pertaining to the operation and structural integrity of the LGS Surface Impoundment were reviewed before, during and after the site inspection, including:

- Previous annual inspection report prepared by Burns & McDonnell dated January 15, 2016.
- The LGS Surface Impoundment weekly inspection records (per Section 257.83(a)) from October 27, 2015 through October 18, 2016.
- Previous structural stability assessment prepared by Burns and McDonnell dated October 10, 2016.
- Records of depths/elevations of impounded water, provided by MEC included with the 7 day inspections.

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- Disposal quantities provided by MEC.
- November 2014 Topographic survey provided by MEC.

Review of the above documents did not uncover any unresolved issues that indicated operational, safety or structural concerns of the LGS Surface Impoundment.

3 Visual Site Inspection

Section 257.83(b)(1)(ii) and (iii) of the CCR Rule requires a visual inspection of the CCR surface impoundment be performed. A site inspection of the LGS Surface Impoundment was performed on October 19, 2016 by Doug DeCesare and Garrett Williams of HDR. Office reviews of available information were also conducted by Doug DeCesare and Garrett Williams.

The weather during the site visit was partly cloudy with temperatures ranging from 48 to 65 degrees Fahrenheit.

3.1 Extent of Inspection

The visual inspection involved walking the entire perimeter of the impoundment to visually inspect the toe, mid-slope and crest of the exterior embankment. The interior embankment was also visually inspected along all sides of the surface impoundment. The intent of the visual inspection was to identify signs of any distress or malfunction of the CCR surface impoundment and appurtenant structures including a check of the hydraulic structures for structural integrity and continued safe and reliable operation. As the CCR Rule only requires the inspection of the existing CCR surface impoundments and appurtenant structures, this report does not address the condition of the groundwater monitoring system, access roads beyond the surface impoundment perimeter, and structures, grades or drainage channels that are not an operational component of the LGS Surface Impoundment.

The field visit focused on the following:

- Perimeter embankments/berms condition (surface cracking, erosion, slides/sloughs, inadequate slope protection, poor vegetation, animal burrows, settlement, seepage)
- Interior berms condition
- Hydraulic structures
 - o Inlet condition
 - o Equalization structure condition
 - o Outfall structure condition/Pump Station Inlets
- Perimeter drainage

The surface impoundment was actively receiving flow from the plant during the inspection.

3.2 Inspection Findings

Based on the observations made at the time of the visual inspection, the following are the findings of the LGS Surface Impoundment inspection:

North Side (Primary Storage Pond)

- From the "Y" in the access road toward the east, the exterior slope of the embankment shows signs of limited groundcover and minor erosion rills. MEC staff has recently reseeded the area.
- Near the "Y", located near the middle of the north side, ash elevation was observed to be approaching the top of the embankment. MEC has rerouted discharge piping to remedy the area.

East Side (Primary Storage Pond)

- There was minor weathering of the riprap on the interior slope protection on the east side.
- The hydraulic equalization structure appeared to be in good working order, indicated by the reclaim pond and primary storage basin being equal elevations.

West Side (Primary Storage Pond)

• Dense stable vegetation was observed along the interior slope.

South Side (Primary Storage Pond)

- Along the interior embankment, there was degradation of the rip rap.
- Some bare patches in vegetation and subsequent erosion were noted sporadically along the exterior embankment slope.
- Minor erosion rills were observed to have been filled in with erosion stone.
- A circular slough was noted mid-berm (exterior) to the bottom of the slope 150 feet west of the east monitoring well (MW 105). MEC has repaired and reseeded this area.

Reclaim Water Pond

- Erosion observed along the north slope.
- The gauge at the pump station read approximately elevation 562 feet the lower portion of the gauge is corroded and difficult to read. The gauge should have the corrosion repaired to improve the readability of the gauge.
- The east slope of the reclaim water pond was visually inspected. No issues associated with the exterior slope were observed.

The soils in the embankment appear to be highly sandy and are easily disturbed with minimal activity. Prior to the inspection, MEC had mowed grass along the exterior slopes of the embankment. The mowing activities disturbed some of the topsoil and vegetation. MEC has reseeded the areas of disturbance. This area should be continuously monitored for any degradation of the slope and appropriate repairs made in a timely manner, as necessary.

Hydraulic structures were visually inspected for signs of distress or malfunction as appropriate and where accessible, the equalization structure, metal and concrete condition, and exterior features were reviewed. Overall, the LGS Surface Impoundment appeared to be well maintained and in good working order. No significant deficiencies were identified.

4 Changes in Geometry

Section 257.83(b)(2)(i) of the CCR rule requires that any changes in geometry be noted since the previous annual inspection.

Currently the geometry of the LGS Surface Impoundment remains similar to that of the previous inspection. The 12" HDPE sluice line that had been discharging near the high point of the pond was extended to the east. The flow from this previous location had deposited ash along the northern area of the pond near where the road "Y" is located. The relocation of this line also involved construction of a berm within the impoundment along the new outlet in an attempt to force water to flow more towards the east rather than the north.

5 Instrumentation

Section 257.83(b)(2)(ii) of the CCR rule requires location and type of existing instrumentation and maximum recorded readings of each instrument since the previous annual inspection.

A gauge is located on both the hydraulic equalization structure and lift station at the northwest corner of the reclaim water pond. The maximum recorded reading since the previous inspection was 564.0' Mean Sea Level (MSL) on July 7, 2016, as recorded by MEC during weekly inspections. The minimum recorded reading since the previous inspection was 559.67' MSL on March 15, 2016, as recorded by MEC during weekly inspections. Gauge reading at the time of inspection indicate a water surface elevation of 561.5' MSL.

6 Approximate Depth - Impounded Water and CCR

Section 257.83(b)(2)(iii) requires the approximate minimum, maximum and present depth and elevation of the impounded water and CCR to be identified since the previous annual inspection.

At the time of inspection, the water surface elevation was approximately 561'-6" MSL. Routine inspections of the impoundment indicate water levels within the pond vary from a low of 559.67' MSL to a high of 564.0' MSL. Depth of water was estimated to be 13.5 feet at the time of the inspection.

CCR material in the impoundment ranged in elevation from 550.5 to 572.5 feet MSL with a depth ranging from 8.5 to 30.5 feet from bottom of impoundment to top of ash.

7 Storage Capacity

Section 257.83(b)(2)(iv) requires the storage capacity of the impounding structure at the time of inspection to be identified.

The total volume of the impoundment with two feet of freeboard was previously estimated as 562 acre feet. After disposal of 12,500 CY of CCR since the previous annual inspection, the total storage capacity was reduced to approximately 554.25 acre-feet, a reduction of 7.75 acre feet from that noted in the previous annual inspection report.

8 Approximate Volume - Impounded Water and CCR

Section 257.83(b)(2)(v) requires the approximate volume of CCR and water in the CCR surface impoundment to be estimated as part of the annual inspection report. The previous annual inspection estimated a total CCR volume disposed within the impoundment as 842,000 cubic yards. MEC estimates a total of 12,500 cubic yards of CCR was disposed since the previous annual inspection within the LGS Surface Impoundment; therefore 854,500 cubic yards of CCR material is estimated to be within the impoundment. Impounded water volume is estimated to be 88.3 acre-feet based on water surface elevation of 561.5 feet MSL.

9 Appearance of Structural Weakness

Section 257.83(b)(2)(vi) of the CCR Rule requires any appearances of actual or potential structural weakness or conditions that could disrupt or potentially disrupt operation and safety of the CCR surface impoundment and appurtenant structures be noted in the inspection report.

Based on the visual inspection findings reported above in Section 3, no apparent or potential structural weaknesses were observed.

10 Changes Affecting Stability or Operation

Section 257.83(b)(2)(vii) of the CCR Rule requires that changes that affect stability or operation of the impounding structure be identified since the last annual inspection. Based on review of weekly inspections and the Initial Structural Stability Assessment, completed by Burns and McDonnell, there were no reported, observed, or suspected changes that have weakened the site stability or negatively impacted the operation.





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2016 ANNUAL INSPECTION REPORT LOUISA GENERATING STATION - CCR SURFACE IMPOUNDMENT FACILITY SITE MAP

DECEMBER 2016

FIGURE

APPENDIX A

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