



REPORT

**GRAND HAVEN BOARD OF LIGHT AND POWER - J.B.
SIMS GENERATING STATION**

Surface Impoundments Annual Visual Inspection

Submitted to:

Grand Haven Board of Light and Power

17000 Easton Drive
Grand Haven, Michigan 49417

Submitted by:

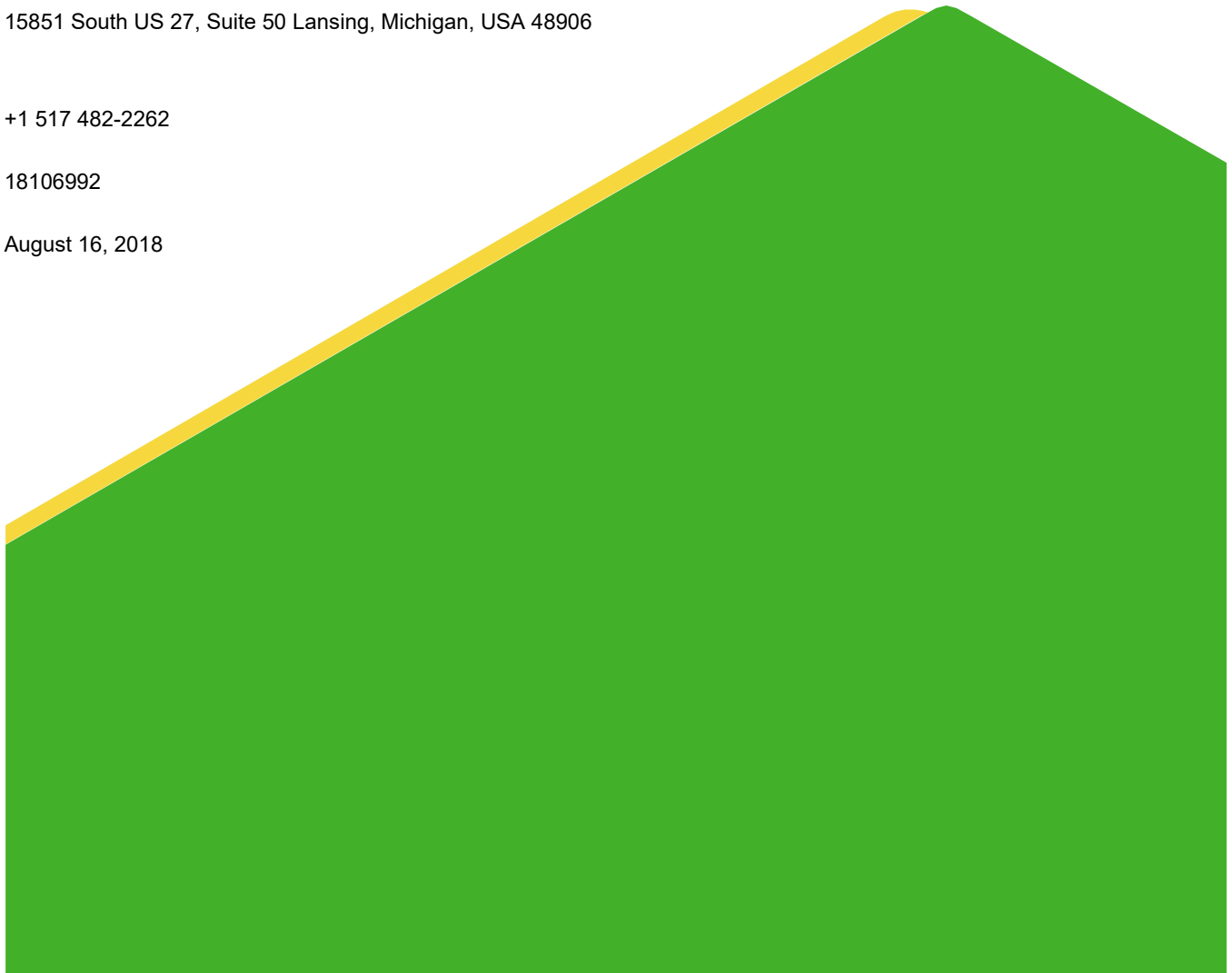
Golder Associates Inc.

15851 South US 27, Suite 50 Lansing, Michigan, USA 48906

+1 517 482-2262

18106992

August 16, 2018

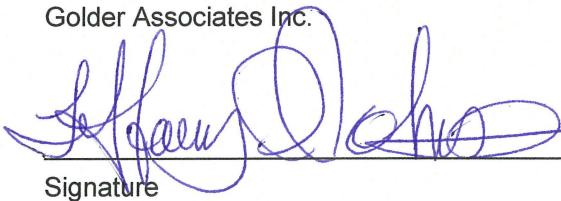


CERTIFICATION

Professional Engineer Certification Statement [40 CFR 257.83]

I hereby certify that, having reviewed the attached documentation and being familiar with the provisions of Title 40 of the Code of Federal Regulations Section 257.83 (40 CFR Part 257.83), I attest that this Annual Inspection Report is accurate and has been prepared in accordance with good engineering practices, including the consideration of applicable industry standards, and with the requirements of 40 CFR Part 257.83.

Golder Associates Inc.



Signature

August 16, 2018

Date of Report Certification

Date of Report Certification

Tiffany D. Johnson, P.E.

Name

Name

6201049160

Michigan P.E. #

Michigan P.E. #

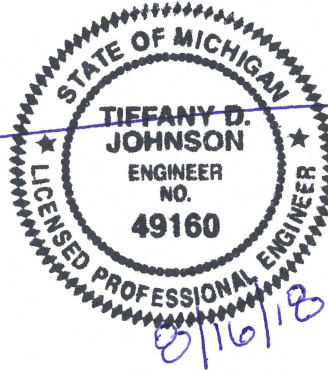


Table of Contents

1.0 INTRODUCTION	3
2.0 FACILITY DESCRIPTION.....	4
3.0 BACKGROUND AND DOCUMENT REVIEW SUMMARY	4
4.0 2018 VISUAL INSPECTION	5
5.0 CLOSING	6

APPENDICES

APPENDIX A

Visual Inspection Checklist

1.0 INTRODUCTION

The United States Environmental Protection Agency (EPA) promulgated the Resource Conservation and Recovery Act (RCRA) Coal Combustion Residuals (CCR) Rule (Rule) on April 17, 2015, with an effective date of October 19, 2015. The Rule requires owners or operators of existing CCR surface impoundments to have those units inspected on an annual basis by a qualified professional engineer in accordance with 40 CFR 257.83(b)(1). The annual qualified professional engineer inspections are required to be completed and the results documented in inspection reports (per 40 CFR 257.83(b)(2)) for CCR surface impoundments. Golder Associates Inc. (Golder) was retained by Grand Haven Board of Light and Power (GHBLP) J.B. Sims Generating Station (JBSGS) to perform the annual inspection of the Unit 3 East and West Bottom Ash Ponds, the CCR surface impoundments located at the JBSGS (Site).

The CCR Rule establishes national minimum criteria and new CCR management obligations for existing, new, and lateral expansions of CCR disposal units. One of the new obligations pertains to inspections, specifically; CCR unit owners/operators must initiate the following activities:

- weekly inspections and monthly instrument monitoring of CCR Units by October 19, 2015; and
- annual inspections of CCR units by January 18, 2016.

This report presents the results of the 2018 annual inspection of the Unit 3 Bottom Ash Ponds CCR surface impoundment unit at the JBSGS, located on Harbor Island, Grand Haven, Michigan. The inspection was conducted to comply with §257.83 of the CCR Rule.

Per 40 CFR 257.83(b)(1), Golder reviewed available information regarding the status and condition of the CCR units and performed an onsite visual inspection on August 8, 2018. The inspection objectives included the following:

- Review of Operational Records (as applicable, see Section 3):
 - Design and construction information.
 - Results of previous structural stability assessments.
 - Results of previous annual inspections.
- A visual inspection to identify signs of distress or malfunction in the CCR units and appurtenant structures.
- A visual inspection of the hydraulic structures underlying the CCR units, or passing through the dike of the CCR units, for structural integrity and continued safe and reliable operation.

In accordance with §257.83(b)(2), this inspection report has been prepared by a qualified professional engineer documenting the operational records review, visual inspection, and identifying the following since the previous annual inspection:

- Any changes in geometry of the CCR surface impoundment since the previous annual inspection.
- The location and type of existing instrumentation and the maximum recorded readings for each instrument since the previous annual inspection.

- The approximate minimum, maximum, and present depth and elevation of the impounded water and CCR since the previous annual inspection.
- The storage capacity of the impounding structure at the time of inspection.
- The approximate volume of the impounded water and CCR at the time of inspection.
- Any appearances of an actual or potential structural weakness of the CCR units, in addition to any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR units and appurtenant structures.
- Any other change(s) which may have affected the stability or operation of the impounding structure since the previous annual inspection.

2.0 FACILITY DESCRIPTION

The Unit 3 East and West Bottom Ash Ponds are located adjacent to each other and are formed by compacted clay earthen embankments with a common embankment between them. The impoundment areas range from 175 to 190 feet long by 71 to 80 feet wide with an approximate surface area of 0.2 and 0.3 acres for the east and west ponds, respectively. The ponds were designed by Black & Veatch in 1981 and are constructed with compacted clay embankments with 3 horizontal to 1 vertical (3H:1V) exterior slopes and 2H:1V interior slopes with an approximately 10 feet wide crest. The embankments are not regulated as dams by the Michigan Dam Safety office.

Both ponds were constructed with a minimum 3 feet of 3×10^{-7} centimeters per second (cm/sec) (Golder, January 2018) clay over the floor and are approximately 9 feet deep. The design bottom elevation of the ponds is Elevation (EI) 585 feet above mean sea level (ft-msl) and the current crest elevation ranges from 591.2 to 592.7 ft-msl. Based on discussions with GHBLP personnel, normal operating conditions maintain a pond elevation of approximately EI 588 to 590 ft-msl (1.2 to 4.7 feet of freeboard). The estimated storage capacity of each pond (with two feet of freeboard) is approximately 68,000 and 77,000 cubic feet for the East and West ponds, respectively.

A concrete overflow structure and sluice gate conduit between the east and west ponds allow for water level regulation between the two ponds and prevents overtopping of the embankment. These ponds do not have an outlet structure that discharges from the ponds. Water from the ponds is pumped back to the plant for reuse in plant operations after the bottom ash has settled out. A side stream from the recycled water is discharged to control solids in the recycled water and is regulated by the Michigan Department of Environmental Quality Permit number MI-0000278. Bottom ash is excavated from these ponds via crane or excavator and transported off-site. Periodically, GHBLP relines the ash ponds with clay to replace the clay liner that is removed during pond cleaning.

3.0 BACKGROUND AND DOCUMENT REVIEW SUMMARY

Golder performed a review of the following historic documentation relative to the Unit 3 East and West Bottom Ash Pond surface impoundments:

- City of Grand Haven, Michigan Board of Light and Power J.B. Sims Station, Unit 3 Ash Pond Construction Report (Black & Veatch, 1983)

- DRAFT - Coal Combustion Residue Impoundment, Round 12 - Dam Assessment Report, JB Sims Power Plant (Site 04), East and West Bottom Ash Ponds, Grand Haven Board of Power and Light, Grand Haven, Michigan, Prepared for: United States Environmental Protection Agency Office of Resource Conservation and Recovery, Prepared by: Dewberry & Davis, LLC Fairfax, Virginia, Dated October 2012 (EPA, 2012)
- Final Report of Evaluation for Grand Haven Power Plant Ash Impoundment Grand Haven, Michigan (Soils & Structures, 2014)
- Annual Ash Impoundment Inspection Report (Soils & Structures, July 2016)
- Select GHBLP J.B. Sims Ash Pond Daily Inspection Forms (Dated August 1, 2017 to August 1, 2018)
- 2017 Grand Haven Board of Light and Power J.B. Sims Generating Station, Unit 3 East and West Ash Pond Surface Impoundments Annual Visual Inspection Report (Golder, July 2017)
- Grand Haven Board of Light and Power J.B. Sims Generating Station, Units 1 and 3 Ash Ponds and Unit 3 East and West Bottom Ash Ponds – Documentation of Liner Construction, (Golder, January 2018)

4.0 2018 VISUAL INSPECTION

The 2018 onsite inspection of the Unit 3 East and West Bottom Ash Ponds was performed by Ms. Tiffany Johnson, P.E. and Mr. Brian Brown of Golder Associates Inc. (Golder) on August 8, 2018. Ms. Johnson is a Professional Engineer, licensed in the State of Michigan. Golder's inspectors were directed by Mr. Paul Cederquist, Environmental Compliance Specialist for the GHBLP JBSGS.

The inspection provides the following information as stipulated in 40 CFR 257.83(b)(2):

- Any changes in geometry of the CCR surface impoundment since the previous annual inspection.
 - An approximately 1-foot high berm was added to the west side of the toe road in the northwest corner of the West Pond to aid in minimization of erosion. This did not change the geometry of the Unit 3 East and West Bottom Ash Ponds observed since the previous annual inspection.
- The location and type of existing instrumentation and the maximum recorded readings for each instrument since the previous annual inspection.
 - There is currently no instrumentation in place designed to monitor for the structural stability of the Unit 3 East and West Bottom Ash Ponds.
- The approximate minimum, maximum, and present depth and elevation of the impounded water and CCR since the previous annual inspection.
 - Minimum: Approximately 585 ft-msl (empty) (assumed based on visual observation)
 - Maximum: Approximately 590 ft-msl (1 to 3 feet below the crest) (assumed based on visual observation)
 - Present Depth: The West pond has been dewatered, East pond's water depth is approximately 4 feet (based on visual observation).
- The storage capacity of the impounding structure at the time of inspection.

- With two feet of freeboard - approximately 68,000 and 77,000 cubic feet for the East and West ponds, respectively (based on review of available information).
- The approximate volume of the impounded water and CCR at the time of inspection.
 - Water = East pond impounded approximately 68,000 cubic feet of water, West pond had been dewatered.
 - CCR = East pond impounded approximately 40,000 to 50,000 cubic feet of CCR (based on review of available information), West pond was dewatered and CCR removal was taking place at the time of inspection.
- Any appearances of an actual or potential structural weakness of the CCR unit, in addition to any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR unit and appurtenant structures.
 - None were observed.
- Any other change(s) which may have affected the stability or operation of the impounding structure since the previous annual inspection.
 - None were observed.

Based on the August 8, 2018 visual inspection, the overall condition of the Unit 3 East and West Bottom Ash Ponds is acceptable. There were no structural weaknesses or safety issues observed within the upstream, downstream, crest or hydraulic structures that would likely impact operations. The following minor observations were documented (Note: Features observed and documented during the inspection were not considered a deficiency or release as classified under 40 CFR 257.83(b)(5) and required no immediate action beyond periodic inspection or maintenance):

- Minor erosion rilling was present along the eastern downslope berm of the East Pond;
- Minor cracking of the concrete erosion protection under the inlet pipes;
- Minor cracking was visible on the West Pond side of the interconnecting weir separating the East and West Ponds;
- One rodent burrow was observed on the south east corner of the East Pond; and
- Woody vegetation was present along the western toe areas of the West Pond.

5.0 CLOSING

This report has been prepared in general accordance with normally accepted civil engineering practices to fulfill the Resource Conservation and Recovery Act (RCRA) reporting requirements in accordance with 40 CFR 257.83(b). Based on review of information provided by GHBLP and Golder's on-site visual inspection, the overall condition of the Unit 3 East and West Bottom Ash Ponds is acceptable. Golder's assessment is limited to the information provided by GHBLP and to the features that could be visually inspected in a safe manner. Golder cannot attest to the condition of subsurface or submerged structures.

APPENDIX A

Visual Inspection Checklist

 CCR SURFACE IMPOUNDMENT VISUAL INSPECTION CHECKLIST

**Facility Name: J.B. Sims Generating Station (JBSGS) Unit 3
East and West Bottom Ash Ponds**

Owner: Grand Haven Board of Light and Power (GHBLP)

Purpose of Facility: These ponds are used to store bottom ash from the power plant. The ash is sluiced to the ponds where it is allowed to settle. The ash ponds are operated in a cyclic manner with the active pond receiving ash and other waste streams while the inactive pond is being cleaned of accumulated ash.

Location: Harbor Island, Grand Haven, Michigan

Inspected By: Tiffany Johnson, P.E. and Brian Brown

Inspection Date: 8/8/18

Weather: 76 degrees, partly cloudy/humid, no precipitation

ITEM					REMARKS
	Acceptable	Monitor/Maintain	Investigate	Repair	
1. General Conditions					
a. Year Minimum Water Elevation		-			Elevation: Approximately 585 ft-msl (or empty) (assumed based on visual)
b. Year Average Water Elevation		-			Elevation: Approximately 588 ft-msl (assumed based on visual)
c. Year Maximum Water Elevation		-			Elevation: Approximately 590 ft-msl (assumed based on visual) (approximately 1 foot below crest)
d. Current water level					Current water level: West pond is dry, East pond is approximately 4 feet below the crest.
e. Current storage capacity		-			Volume: With two feet of freeboard - approximately 68,000 and 77,000 cubic feet for the east and west ponds, respectively
f. Current volume of impounded water					Volume: Approximately 68,000 cubic feet in the east pond, the west pond is dry.
g. Alterations	X				Small clay berm on west side of toe road.
h. Development of downstream plain	X				n/a
i. Grass cover	X				

ITEM	Acceptable	Monitor/Maintain	Investigate	Repair	REMARKS
j. Settlement/misalignment/cracks	X				None observed.
k. Sudden drops in water level?	X				The west pond was intentionally drained for cleaning.
2. Inflow Structure					
a. Settlement	X				
b. Cracking		X			Cracking under inlet pipe.
c. Corrosion	X				
d. Obstacles in inlet	X				
e. Riprap/erosion control		X			Cracking in concrete under inlet pipes.
3. Outflow Structure					
a. Settlement	X				
b. Cracking		X			Minor cracking visible on the West Pond side of the concrete overflow structure separating the East and West ponds.
c. Corrosion	X				
d. Obstacles in outlet	X				
e. Riprap/erosion control	X				
f. Seepage	X				None observed.
4. Upstream slope					
a. Erosion	X				None observed.
b. Rodent burrows	X				
c. Vegetation	X				No vegetation, clay slopes.
d. Cracks/settlement	X				
e. Riprap/other erosion protection	X				
f. Slide, Slough, Scarp	X				
5. Crest					

ITEM	Acceptable	Monitor/Maintain	Investigate	Repair	REMARKS
a. Soil condition	X				Recently regraded.
b. Comparable to width from previous inspection	X				West pond crest width: 14-ft East pond crest width: 19-ft
c. Vegetation	X				n/a
d. Rodent burrows	X				None observed.
e. Exposed to heavy traffic		X			Inspection performed during the excavation of bottom ash from the West Pond. Crest is exposed to of heavy vehicle traffic, but no damage was observed.
f. Damage from vehicles/machinery	X				
6. Downstream slope					
a. Erosion		X			Minor rill erosion along the downstream east slope of the eastern pond.
b. Vegetation		X			Woody vegetation along the western slope of the West Pond.
c. Rodent burrows		X			One rodent burrow visible on the south east corner of the East Pond. GHBLP personnel have installed rodent traps to mitigate further incidences.
d. Slide, Slough, Scarp	X				
e. Drain conditions	X				
f. Seepage	X				
7. Toe					
a. Vegetation	X				
b. Rodent burrows	X				
c. Settlement	X				
d. Drainage conditions	X				
e. Seepage	X				
f. Other	X				

Notes:

- 1.) A concrete overflow structure and sluice gate conduit between the east and west ponds allow for water level regulation between the two ponds and prevents overtopping of the embankment. These ponds do not have an outlet structure that discharges from the ponds.

Water from the ponds is pumped back to the plant for reuse in plant operations after the bottom ash has settled out. A side stream from the recycled water is discharged to control solids in the recycled water and is regulated by the Michigan Department of Environmental Quality Permit number MI-0000278. Bottom ash is excavated from these ponds via crane or excavator and transported off-site. Periodically, GHBLP relines the ash ponds with clay to replace the clay liner that is removed during pond cleaning.

- 2.) Approximate impoundment volumes and interior elevations obtained from, Soils and Structures: Final Report of Evaluation For Grand Haven Power Plant Ash Impoundment Grand Haven, Michigan (Soils & Structures, 2014), and Annual Ash Impoundment Inspection Report (Soils & Structures, 2016). There have been no changes to the geometry of the Unit 3 East and West Bottom Ash ponds.
- 3.) Features observed and documented in this checklist were not considered a deficiency or release as classified under 40 CFR 257.83(b)(5) and required no immediate action beyond periodic inspection in accordance with the Operations and Maintenance Plan.
- 4.) ft-msl = feet above mean sea level.