REPORT

J.H. Campbell Generating Facility
Bottom Ash Ponds 1-2 North and South
2018 Annual Surface Impoundment Inspection Report

West Olive, Michigan Pursuant to 40 CFR 257.83

Submitted to:

Consumers Energy Company
1945 W. Parnall Road Jackson, Michigan, USA 49201

Submitted by:

Golder Associates Inc.
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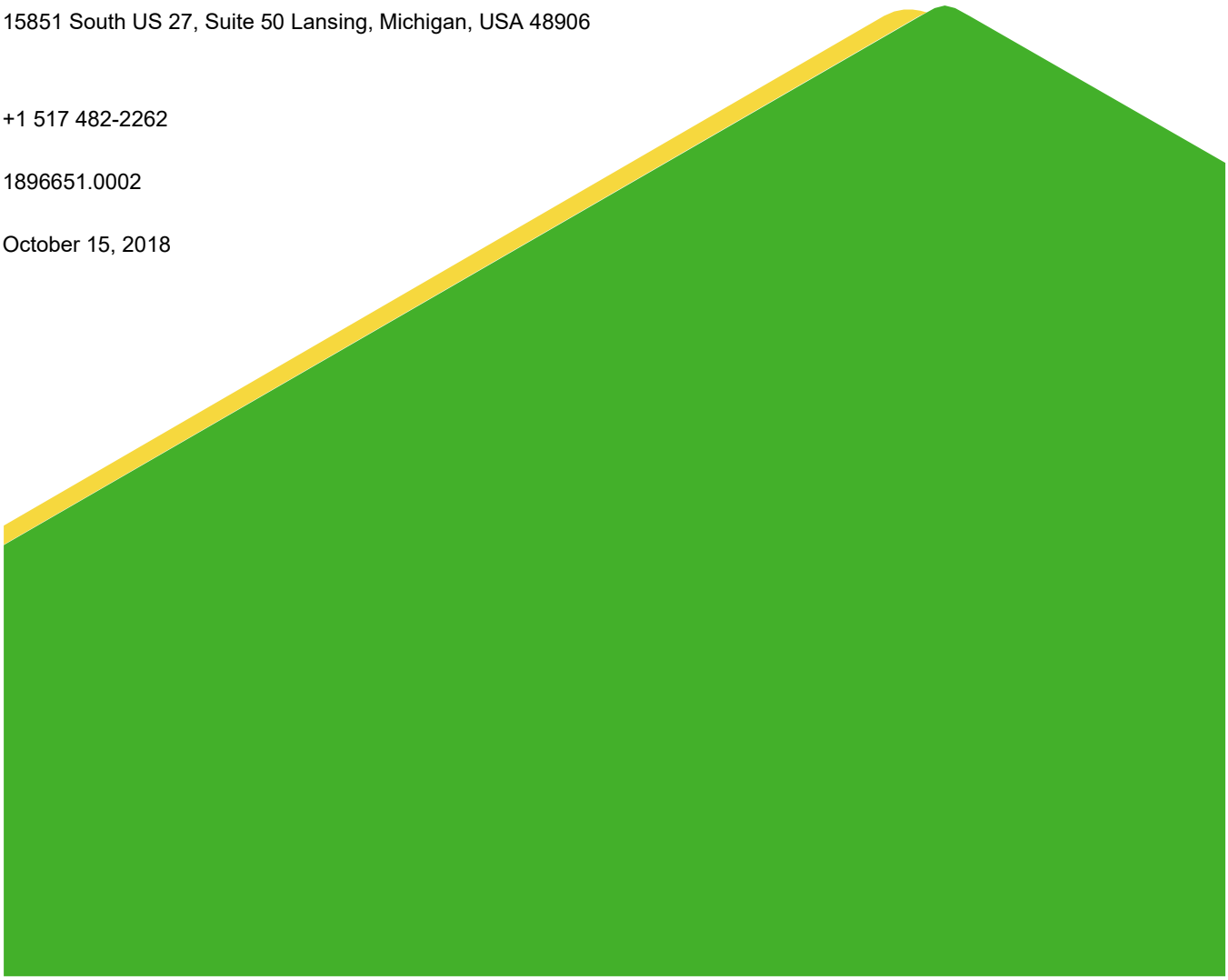
October 15, 2018



Certifications

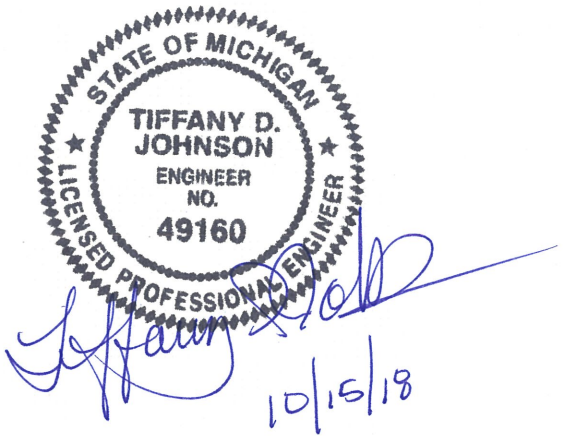
Professional Engineer Certification Statement [40 CFR 257.83]

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.

October 15, 2018

Date of Report Certification



Tiffany D. Johnson, P.E.

Name

6201049160

Professional Engineer Certification Number

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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. 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). 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 Existing CCR Surface Impoundments.

Golder Associates Inc. (Golder) was retained by Consumers Energy Company (CEC) to perform the annual inspection of Bottom Ash Ponds 1-2 North and South at the J.H. Campbell Generating Facility (Site) to document, to the extent reasonable based on information provided by CEC and the limits of the visual inspection, that the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering standards. The inspection included the following:

- Review of applicable information regarding the status and condition of the CCR unit
- A visual inspection of the CCR unit to identify signs of distress or malfunction of the CCR unit and appurtenant structures
- A visual inspection of hydraulic structures underlying the base of the CCR unit or passing through the dike of the CCR unit for structural integrity and continued safe and reliable operation

2.0 BACKGROUND AND DOCUMENT REVIEW SUMMARY

J.H. Campbell is an active coal generating facility. The Facility is located in West Olive, Michigan and is bounded by Lake Michigan to the west, Pigeon Lake and Pigeon River to the south, and Lakeshore Drive to the east. Bottom ash is sluiced from the J.H. Campbell Unit 1 and 2 electrical generating units to a pair of ponds, classified as Bottom Ash Ponds 1-2 North and South. An elevated trestle and pipe system hydraulically conveys bottom ash to the pond system. Bottom ash is removed via mechanical equipment from the ponds as required to maintain storage capacity on a yearly basis. Water is discharged from the ponds via corrugated high-density polyethylene (HDPE) outflow pipes into an internal ditch that conveys the flow to an internal pond system and ultimately to the Site's permitted National Pollutant Discharge Elimination System (NPDES) discharge. At the time of the inspection, a perimeter ditch is located toward the western and southern toe of Bottom Ash Pond 1-2. This flow in this ditch is covered under the Site's NPDES Permit and flows into the internal pond system and is ultimately discharged through the Site's NPDES outfall. The Bottom Ash Ponds 1-2 North and South are scheduled to be closed in 2018.

The applicable available information reviewed for this assessment is summarized in Table 1 below.

Table 1: Summary of Background Document Review

Document	Date	Author
Weekly Inspection Reports	January 2017 – January 2018	Bottom Ash Ponds 1-2 North and South Qualified Personnel
J.H. Campbell Bottom Ash Pond 2017 Annual RCRA CCR Inspection Report	October 2017	Golder Associates Inc.
J.H. Campbell Bottom Ash Ponds 1-2 Structural Stability and Safety Factor Assessment Report (includes 2016 inspection information)	October 2016	Golder Associates Inc.
J.H. Campbell Bottom Ash Ponds 1-2 Closure Plan	October 2016	Golder Associates Inc.
J.H. Campbell Bottom Ash Ponds 1-2 Inflow Design Flood Control System Plan	October 2016	Golder Associates Inc.
J.H. Campbell Bottom Ash Pond 1-2 2015 Initial Annual RCRA CCR Surface Impoundment Inspection	January 2016	Golder Associates Inc.
Surveillance Monitoring Programs (SMPs)	December 2010, Revised 2015	CEC

3.0 2018 VISUAL INSPECTION

Golder performed an onsite inspection of Bottom Ash Ponds 1-2 on May 10, 2018. Golder inspectors, Tiffany Johnson, P.E. and Halle Doering, EIT, were accompanied by two CEC representatives, as follows:

- Mr. George McKenzie, CEC Systems Engineering Department
- Mr. Kevin Starken, CEC J.H. Campbell Environmental and Technical Support Department

The inspection checklist form (see Appendix A) provides both observations and recommendations as a result of the visual inspection and the following information as stipulated in 40 CFR 257.83(b):

- Any changes in geometry of the impounding structure since the previous annual inspection.
  - None observed.
- Approximate minimum, maximum, and present depth and elevation of the impounded water and Coal Combustion Residuals (CCR) since the previous annual inspection.

  - Approximate minimum, maximum, and current water surface elevations (normal operating levels for the pond): 619.1 ft-amsl for Bottom Ash Pond 1-2 North and 618.8 ft-amsl for Bottom Ash Pond 1-2 South, based on the invert of the outlet pipe for each pond.

- Any instrumentation in place designed to monitor the structural stability of Bottom Ash Ponds 1-2 North and South.
  - At the time of the inspection and report, there were no plans for installation of stability monitoring instrumentation for Bottom Ash Ponds 1-2 North or South and the Ponds are planned to be closed in 2018.
- Storage capacity of the impounding structure at the time of inspection.
  - Current storage capacity is approximately 49,300 cubic yards (cys) for Bottom Ash Pond 1-2 South and approximately 60,300 cys for Bottom Ash Pond 1-2 North, based on an approximate bottom of CCR elevation that ranges from an approximate elevation of 594 feet (Pond 1-2 South) to 602 feet (Pond 1-2 North) NGVD29 and two feet of freeboard measured from a topographic survey collected in May of 2016 (622.7 NGVD29), with no changes from the previous inspection.
- Approximate volume of the impounded water and CCR at the time of inspection.
  - Current volume of CCR and water is approximately 40,800 cys for Bottom Ash Pond 1-2 South and approximately 50,700 cys for Bottom Ash Pond 1-2 North, based on an approximate bottom of CCR elevation that ranges from an approximate elevation of 594 feet to 602 feet NGVD29 and pond operating level (618.8 feet and 619.1 feet NGVD29 respectively for Bottom Ash Pond 1-2 South and Bottom Ash Pond 1-2 North) based on a topographic survey collected in May of 2016, with no changes from previous inspection.
- 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.

The checklist categorizes observed conditions of the impoundment or appurtenant structures as either acceptable, monitor/maintain, investigate, or repair, which are defined as follows:

- Acceptable: The condition was visually documented to be acceptable, requiring no action beyond periodic inspection in accordance with the SMP and typical maintenance.
- Monitor/Maintain: The condition was visually identified to exhibit the potential for or show existing degeneration that should either be monitored or maintained as detailed in the checklist.
  - Items identified in this category are not considered a deficiency or release as classified under 40 CFR 257.83(b)(5) requiring immediate action by CEC.
- Investigate: The limitations of the visual inspection did not allow for an opinion to be made on the condition of the item observed, and Golder recommends additional investigation to categorize the item.
- Repair: Golder recommends that items identified with a repair designation exhibited conditions that should initiate measures be taken to rectify the area of concern.

- It should be noted that no items identified for repair were considered a deficiency or release as classified under 40 CFR 257.83(b)(5) requiring immediate action by CEC.

Based on a review of previous inspection reports listed in Table 1 compared to conditions noted during the inspection, the following changes were observed:

- Seepage areas observed in 2017 along the exterior northwest toe for Bottom Ash Pond 1-2 North were not active at the time of the inspection;
- Minor erosion, and surficial sloughing observed along the interior slopes;
- Woody vegetation was observed on Bottom Ash Ponds1-2 interior slopes and North exterior slope; and
- Rodent burrows were observed along the exterior slopes of Bottom Ash Ponds 1-2.

4.0 LIMITATIONS OF ASSESSMENT

Golder has conducted the site inspection and prepared this report for the J.H. Campbell Bottom Ash Ponds 1-2 North and South. The factual data, assessment, interpretations, and recommendations provided herein are based on the results of field observations from site inspections performed by Golder and review of previous site inspection reports provided to Golder by CEC and pertain to the specific project as described in this report and are not applicable to any other project or site location.

Golder has prepared this report in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering and science professions currently practicing under similar conditions and has characterized the site conditions within the limitations of the scope of services as defined by CEC and subject to the time limits and physical constraints applicable to this report. No other warranty, expressed or implied, is made. Any change of site conditions, purpose, development plans, or operation may alter the validity of this report. Golder cannot be responsible for use of this report, or portions thereof, unless Golder is requested to review and, if necessary, revise the report.

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)(2). Golder has reviewed the available information on the J.H. Campbell Bottom Ash Ponds 1-2 North and South and performed an onsite visual inspection. Golder's assessment is limited to the information provided by CEC and to the features that could be inspected visually in a safe manner. Golder cannot attest to the condition of subsurface or submerged structures.

6.0 REFERENCES

Document	Date	Author
Weekly Inspection Reports	January 2017 – January 2018	Bottom Ash Ponds 1-2 North and South Qualified Personnel
J.H. Campbell Bottom Ash Pond 2017 Annual RCRA CCR Inspection Report	October 2017	Golder Associates Inc.
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Signature Page

Golder Associates Inc.

Halle Doering
Staff Engineer

Tiffany D. Johnson, P.E.
Associate

APPENDIX A - INSPECTION CHECKLIST FORM

CCR SURFACE IMPOUNDMENT VISUAL INSPECTION CHECKLIST

Facility Name: J.H. Campbell Bottom Ash Pond 1-2

Owner: Consumers Energy Company (CEC)

Purpose of Facility: Detention and settlement of sluiced bottom ash from Unit 1-2

County, State: Ottawa County, Michigan

Inspected By: Tiffany Johnson and Halle Doering **Inspection Date: May 10, 2018**

Weather: 48°F Overcast

ITEM	Acceptable	Monitor/Maintain	Investigate	Repair	REMARKS
1. General Conditions					
a. Year Minimum Water Elevation					Approximate minimum, maximum, and current water surface elevations (normal operating levels for the pond): 619.1 ft-amsl for Bottom Ash Pond 1-2 North and 618.8 ft-amsl for Bottom Ash Pond 1-2 South, based on the invert of the outlet pipe for each pond.
b. Year Average Water Elevation					
c. Year Maximum Water Elevation					
d. Current water level					
e. Current storage capacity					Volume: ~49,300 CY Pond 1-2S / ~60,300 CY Pond 1-2N (See Note 1)
f. Current volume of impounded water and CCR					Volume: ~40,800 CY Pond 1-2S / ~ 50,700 CY Pond 1-2N (See Note 1)
g. Alterations	X				Ponds are being closed in 2018.
h. Development of downstream plain		X			Intermittent historical plains observed from active and historical seeps along western toe, not active during inspection, maintain water level controls and erosion controls. See Note 4.
i. Grass cover		X			Woody vegetation on interior slopes, and exterior toe.
j. Settlement/misalignment/cracks		X			Historical settlement observations were removed with slope regrading. Continue weekly monitoring of the south and west slopes in accordance with SMP. See Note 2.
k. Sudden drops in water level?	X				
2. Inflow Structure					Coal pile runoff and bottom ash trestle. Pond to be closed in 2018 and piping removed.
a. Settlement	X				
b. Cracking	X				
c. Corrosion	X				
d. Obstacles in inlet	X				
e. Riprap/erosion control	X				Rip rap observed at culvert for ditch at toe.
3. Outflow Structure					Pond to be removed and closed in 2018.
a. Settlement	X				
b. Cracking	X				
c. Corrosion	X				
d. Obstacles in outlet	X				
e. Riprap/erosion control		X			Minor erosion observed around outlet pipe along interior slope of 1-2S, maintain erosion controls in this area. See Note 4.
f. Seepage	X				
4. Upstream slope					

ITEM	Acceptable	Monitor/Maintain	Investigate	Repair	REMARKS
a. Erosion	X				Intermittent interior erosion rills noted along interior slopes, maintain erosion controls in this area as needed to protect the outflow pipes. See Note 4.
b. Rodent burrows	X				
c. Vegetation		X			Upstream slopes have sparse to bare vegetation, and west downstream slope has woody vegetation, maintain erosion and vegetation controls. See Note 4.
d. Cracks/settlement	X				
e. Riprap/other erosion protection	X				Not observed.
f. Slide, Slough, Scarp		X			Minor sloughing in localized areas where slopes are steep. Maintain erosion controls, see note 4.
5. Crest					
a. Soil condition	X				Bottom Ash
b. Comparable to width from previous inspection	X				
c. Vegetation	X				
d. Rodent burrows	X				
e. Exposed to heavy traffic	X				
f. Damage from vehicles/machinery	X				
6. Downstream slope					
a. Erosion	X				
b. Vegetation		X			Sparse vegetation observed intermittently along west and northwest slopes north of newly regraded areas, maintain vegetation controls. See Note 4.
c. Rodent burrows		X			Rodent burrows were observed on the west and south downslopes, maintain animal control procedures, see note 4.
d. Slide, Slough, Scarp	X				See Note 2.
e. Drain conditions	X				
f. Seepage		X			There are several historical seeps at the toe of the western slope of Pond 1/2N, which were not active at the time of inspection, see note 3.
7. Toe					
a. Vegetation		X			Observed intermittent woody vegetation, maintain vegetation controls. See Note 4.
b. Rodent burrows	X				
c. Settlement	X				
d. Drainage conditions	X				
e. Seepage		X			There are several historical seeps at the toe of the western slope of Pond 1/2N, these were not active during inspection, see note 3.

Notes:

1) Current storage capacity is based on an approximate bottom of CCR elevation that ranges from an approximate elevation of 594 feet to 602 feet NGVD29 and two feet of freeboard measured from a topographic survey collected in May of 2016 (622.71 NGVD29). Volume of impounded water and CCR are based on an approximate bottom of CCR elevation that ranges from an approximate elevation of 594 feet to 602 feet NGVD29 and pond operating level (618.8 feet and 619.1 feet NGVD29 respectively for Pond 1-2S and Pond 1-2N) based on a topographic survey collected in May of 2016 with no changes since the last inspection.

2) Historic sloughing and settlement along areas of the western slope of the Bottom Ash Pond are now newly regraded and reseeded. Golder recommends continued weekly observations for visual changes in appearance of the newly regraded western slopes. This item is not considered a deficiency or release requiring immediate action per 40 CFR 257.83(b)(5).

3.) Evidence of historic seepage was observed along the toe of the Bottom Ash Pond 1-2. Active sediment transport was not observed at the time of inspection. It appears the seepage has not increased or produced

additional sediment loss compared to the previous inspection in 2017. Golder recommends that CEC visually monitor the seeps weekly, per the site's SMP, to identify changes in seep flow, sediment transport, or visible piping. This item is not considered a deficiency or release requiring immediate action per 40 CFR 257.83(b)(5).

4.) 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 SMP and typical maintenance.

Name of Engineer: Tiffany D. Johnson, P.E.

Date: October 15, 2018

Engineering Firm: Golder Associates Inc.

Signature: 

golder.com