REPORT

J.H. Campbell Generating Facility
Pond 3
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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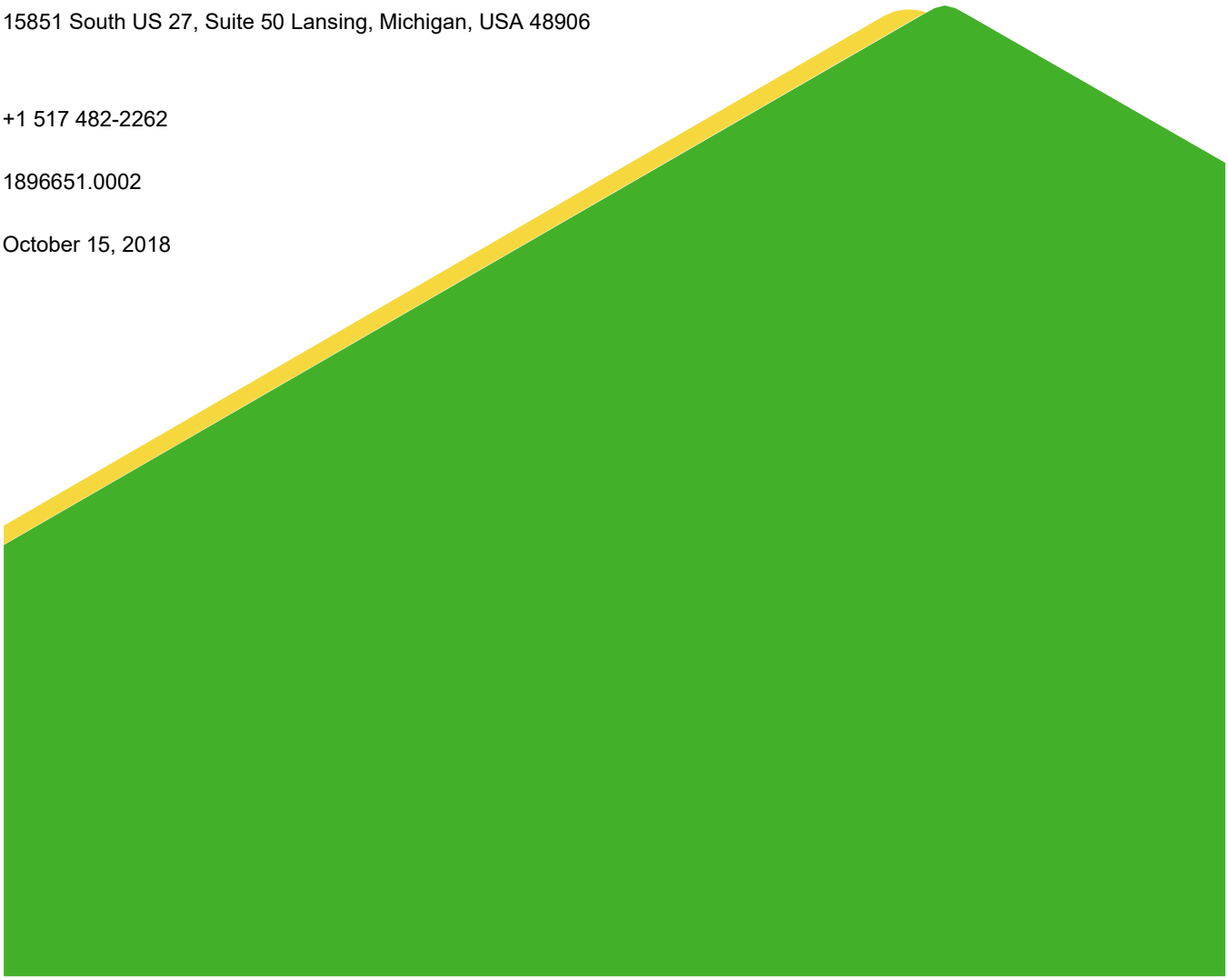
October 15, 2018



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

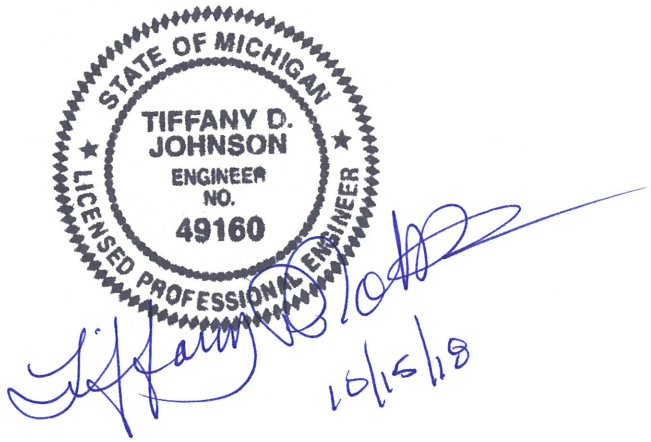
Date of Report Certification

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 the Bottom Ash Pond 3 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 available 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. Currently, bottom ash is sluiced from the J.H. Campbell Unit 3 electrical generating unit to Pond 3 South. Bottom Ash Pond 3 North has been closed (CCR was removed) and replaced with a bottom ash tank system in 2018. An elevated trestle and pipe system hydraulically conveys bottom ash to Bottom Ash Pond 3 South. Stored 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 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) outfall. Currently, a perimeter ditch is located toward the western toe of Bottom Ash Pond 3 South. 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. Bottom Ash Pond 3 South is 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 inspections performed by Consumers Energy Company (CEC)	January 2017 – January 2018	Bottom Ash Pond 3 South Qualified Personnel
J.H. Campbell Bottom Ash Pond 3 2017 Annual RCRA CCR Inspection Report	October 2017	Golder Associates Inc.
J.H. Campbell Bottom Ash Pond 3 Structural Stability and Safety Factor Assessment Report (includes 2016 inspection information)	October 2016	Golder Associates Inc.
J.H. Campbell Bottom Ash Pond 3 Closure Plan	October 2016	Golder Associates Inc.
J.H. Campbell Bottom Ash Pond 3 Inflow Design Flood Control System Plan	October 2016	Golder Associates Inc.
J.H. Campbell Bottom Ash Pond 3 2015 Initial Annual RCRA CCR Surface Impoundment Inspection Report	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 Pond 3 South 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
- Ms. 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.
  - At the time of the inspection, Bottom Ash Pond 3 North had been clean closed (CCR was removed in 2017) and a bottom ash tank system had replaced Bottom Ash Pond 3 North.
  - The North downslope of Bottom Ash Pond 3 South had been regraded and seeded as part of the Bottom Ash Tank construction.

  - Bottom Ash Pond 3 South recently had bottom ash removed and interior slopes graded.
- Approximate minimum, maximum, and present depth and elevation of the impounded water and Coal Combustion Residuals (CCR) since the previous annual inspection.
  - Approximate minimum water surface elevation: 604 feet above mean sea level (ft-amsl), Bottom Ash Pond 3 South only, no changes from previous inspection.
  - Approximate average and current water surface elevation: 613 ft-amsl, this is the average operating level of Bottom Ash Pond 3 South, no changes from previous inspection.
  - Approximate maximum water surface elevation: 624.5 ft-amsl, this is the maximum operating level of Bottom Ash Pond 3 South based on the invert elevation of the outlet pipe.
- Any instrumentation in place designed to monitor the structural stability of Bottom Ash Ponds 3 South.
  - At the time of the inspection and report, there were no plans for installation of stability monitoring instrumentation for Bottom Ash Pond 3 South. Bottom Ash Pond 3 South is scheduled to be closed in 2018.
- Storage capacity of the impounding structure at the time of inspection.
  - Current storage capacity is approximately 129,200 cubic yards (cys) for Bottom Ash Pond 3 South based on an approximate bottom of CCR elevation 600 ft-amsl NGVD29 and two feet of freeboard measured from a topographic survey collected in May of 2016 (629.8 NGVD29), with no changes from the previous inspection. Bottom Ash Pond 3 North has been removed.
- Approximate volume of the impounded water and CCR at the time of inspection.
  - Current volume of CCR and water is approximately 90,000 cys for Bottom Ash Pond 3 South based on an approximate bottom of CCR elevation of 600 ft-amsl NGVD29 measured from a topographic survey collected in May of 2016 and current pond operating level of 613 ft-amsl based on visual measurements, with no significant changes from previous inspection. Bottom Ash Pond 3 North has been removed.
- 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:

- Bottom Ash Pond 3 North has been removed and replaced with Bottom Ash Tanks. Slopes have been regraded and reseeded;
- Woody vegetation was observed on Pond 3 South exterior West slope;
- Minor erosion, and surficial sloughing was observed along the interior slopes of Bottom Ash Pond 3 South;
- Observed localized erosion on the interior slope underneath the trestle; and
- Rodent burrows were observed along the exterior slopes of Bottom Ash Pond 3 South.

4.0 LIMITATIONS OF ASSESSMENT

Golder has conducted the site inspection and prepared this report for the J.H. Campbell Bottom Ash Pond 3 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 3 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 inspections performed by Consumers Energy Company (CEC)	January 2017 – January 2018	Bottom Ash Pond 3 South Qualified Personnel
J.H. Campbell Bottom Ash Pond 3 2017 Annual RCRA CCR Surface Impoundment 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 3S

Owner: Consumers Energy Company (CEC)

Purpose of Facility: Detention and settlement of sluiced bottom ash from Unit 3

County, State: Ottawa County, Michigan

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

Weather: 64° Overcast

ITEM	Acceptable	Monitor/Maintain	Investigate	Repair	REMARKS
1. General Conditions					NOTE: At the time of the inspection, Bottom Ash Pond 3 North had been clean closed and replaced with a tank system.
a. Year Minimum Water Elevation					Elevation: 604.0 ft-amsl NGVD29 Pond 3 South Only
b. Year Average Water Elevation					Elevation: 613 ft-amsl NGVD29 Pond 3 South Only
c. Year Maximum Water Elevation					Elevation: 624.5 ft-amsl NGVD29 Pond 3 South Only
d. Current water level					Elevation: 613 ft-amsl NGVD29 Pond 3 South Only
e. Current storage capacity					Volume: ~129,200 cys Pond 3S only (See Note 1)
f. Current volume of impounded water and CCR					Volume: ~90,000 cys for Pond 3S only (See Note 1)
g. Alterations	X				Bottom Ash Pond 3N has been removed and replaced with a tank system. The north downslope of Pond 3S has been regraded and reseeded.
h. Development of downstream plain	X				Intermittent historical plains observed from historical seeps, maintain water level controls and erosion controls. There were no active seeps observed. See Note 3.
i. Grass cover	X				
j. Settlement/misalignment/cracks	X				Continue weekly monitoring in accordance with SMP, no change was observed. See Note 2.
k. Sudden drops in water level?	X				Bottom Ash Pond 3N has been removed. None observed.
2. Inflow Structure					
a. Settlement	X				
b. Cracking	X				
c. Corrosion	X				Perform routine maintenance of inflow piping and supports. See Note 4.
d. Obstacles in inlet	X				
e. Riprap/erosion control	X				N/A
3. Outflow Structure					
a. Settlement	X				Minor bend noted in outlet pipe of Pond 3, continue maintenance controls and monitor in accordance with the SMP. See Note 4.
b. Cracking	X				
c. Corrosion	X				
d. Obstacles in outlet	X				
e. Riprap/erosion control		X			Sparse riprap at outlets, maintain erosion control procedures, see Note 4.
f. Seepage	X				
4. Upstream slope					

ITEM	Acceptable	Monitor/Maintain	Investigate	Repair	REMARKS
a. Erosion	X				Interior slopes were recently regraded to clean out the Bottom Ash. Erosion was observed underneath the trestle.
b. Rodent burrows	X				
c. Vegetation	X				
d. Cracks/settlement	X				
e. Riprap/other erosion protection	X				
f. Slide, Slough, Scarp	X				
5. Crest					
a. Soil condition	X				Gravel and bottom ash.
b. Comparable to width from previous inspection	X				
c. Vegetation	X				None, gravel.
d. Rodent burrows	X				None observed.
e. Exposed to heavy traffic	X				No.
f. Damage from vehicles/machinery	X				Recently regraded.
6. Downstream slope					
a. Erosion		X			Observed areas of minor erosion, maintain erosion controls. See Note 4.
b. Vegetation		X			Observed areas of sparse vegetation, maintain vegetation controls. See Note 4.
c. Rodent burrows	X				None.
d. Slide, Slough, Scarp	X				See Note 2.
e. Drain conditions					n/a
f. Seepage	X				None observed, see note 3.
7. Toe					
a. Vegetation	X				Recently seeded north downslope.
b. Rodent burrows	X				None.
c. Settlement	X				
d. Drainage conditions	X				
e. Seepage	X				See note 3.

Notes:

1) For Bottom Ash Pond 3 South Only - Current storage capacity is based on an approximate bottom elevation of 600.0 feet NGVD29 and two feet of freeboard measured from a topographic survey collected in May of 2016 (629.8 NGVD29). Current volume of impounded water and CCR are based on an approximate bottom elevation of 600.0 feet NGVD29 and approximated visual current pond water level (613 feet NGVD29), with no significant change from the previous inspection.

2) Evidence of historic surficial sloughing was observed along areas of the western slope of the Bottom Ash Pond 3 South. The interior slopes were recently graded, and Bottom Ash Pond 3 South is scheduled to be closed in 2018. Golder recommends weekly observations for visual changes in appearance. This item is not considered a deficiency or release requiring immediate action per 40 CFR 257.83(b)(5).

3) Evidence of historic seepage and piping was observed during this inspection in locations along the western toe of Bottom Ash Pond 3 South, and along the opposite bank of the perimeter ditch. Seepage and piping was not active during this inspection. Golder recommends CEC visually monitor for seepage on a weekly basis, per the site's SMP, to identify potential for 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