



**REPORT**

**D.E. Karn Generating Facility  
Bottom Ash Impoundment  
2018 Annual Surface Impoundment Inspection Report**  
*Essexville, Michigan Pursuant to 40 CFR 257.83*

Submitted to:

**Consumers Energy Company**

1945 W. Parnall Road  
Jackson, Michigan, USA 49201

Submitted by:

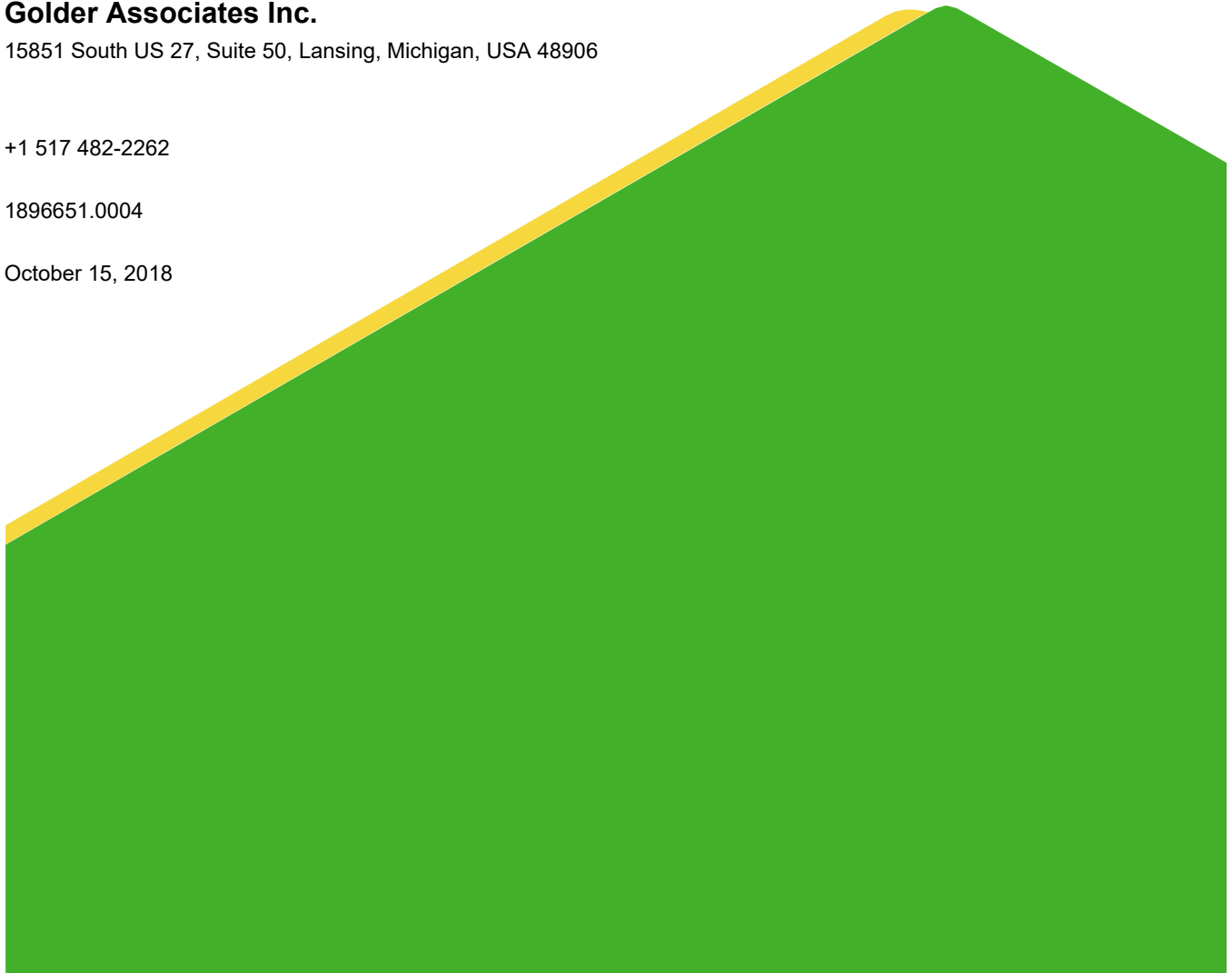
**Golder Associates Inc.**

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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

On April 17, 2015, the United States Environmental Protection Agency (EPA) issued the Coal Combustion Residual (CCR) Resource Conservation and Recovery Act (RCRA) Rule (40 CFR 257 Subpart D) (“CCR RCRA Rule”). The CCR RCRA Rule requires owners or operators of existing CCR surface impoundments to have those units inspected on an annual basis by a qualified professional engineer (QPE) 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). These inspections are focused primarily on the structural stability of the unit and must ensure that the operation and maintenance of the unit is in accordance with recognized and generally accepted good engineering standards. Each inspection must be conducted and certified by a QPE.

Golder Associates Inc. (Golder) was retained by Consumers Energy Company (CEC) to perform the annual inspection of the new Bottom Ash Impoundment at the D.E. Karn Generating Facility (D.E. Karn, Site) to document, to the extent reasonable based on the 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 new Bottom Ash Impoundment was under construction at the time of the inspection.

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

Bottom ash was still being sluiced from the D.E. Karn Unit 1 & 2 electrical generating units to the existing Bottom Ash Pond during the 2018 site inspection. The Bottom Ash Impoundment was under construction and was not receiving bottom ash at the time of inspection. An elevated trestle and pipe system will hydraulically convey bottom ash to the pond system through two 10-inch diameter Nuvaloy pipes each connected to 15-feet of flexible rubber hose at the pond inlet. Stored bottom ash will be removed via mechanical equipment from the pond as required to maintain storage capacity. Water will be discharged from the settling basin section of the impoundment through an 18-inch diameter SDR 11 HDPE pipe located on the east side into the polishing basin section of the impoundment. The water will be discharged from the polishing basing section through a 24-inch DR 17 HDPE pipe located near the southeast corner into an internal ditch that will convey the flow to the Site’s permitted National Pollutant Discharge Elimination System (NPDES) outfall.

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

**Table 1: Summary of Background Document Review**

Document	Date	Author
D.E. Karn Generating Plant Bottom Ash Surface Impoundment Approved For Construction Drawings Revision D	February 2018	Golder Associates, Inc.
D.E. Karn Generating Facility Karn Lined Impoundment Closure Plan	June 2018	Golder Associates, Inc.

### 3.0 2018 VISUAL INSPECTION

The 2018 onsite visual inspection of the Bottom Ash Impoundment was performed by Golder Associates Inc. (Golder) on May 8, 2018. Golder's inspectors, Tiffany Johnson, P.E. and Halle Doering, EIT, were accompanied by two Consumers Energy Company (CEC) representatives, as follows:

- Mr. George McKenzie, CEC System Engineering Department
- Mr. Caleb Batts, CEC Site Environmental 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.
  - No previous inspections have been performed on the Bottom Ash Impoundment. The impoundment was under construction during the time of inspection.
- Approximate minimum, maximum, and present depth and elevation of the impounded water and Coal Combustion Residuals (CCR) since the previous annual inspection.
  - No impounded water or CCR was present in the impoundment, it was not commissioned yet.
- Any instrumentation in place designed to monitor the structural stability of the Bottom Ash Pond.
  - There is currently no instrumentation in place designed to monitor for the structural stability of the Bottom Ash Impoundment at D.E. Karn.
- Storage capacity of the impounding structure at the time of inspection.
  - The Bottom Ash Impoundment was still in construction during inspection and did not have capacity to maintain bottom ash at the time.
  - The Bottom Ash Impoundment is designed for a maximum storage capacity of approximately 9,660 cubic yards, which assumes an approximately 5-foot thick bottom ash deposit across the entire area of the impoundment.
  - After construction is completed only the west half of the Settling Basin will be used for bottom ash collection. A bottom ash berm will be constructed to separate the Settling Basin

where it begins to widen. The western part of the Settling Basin will be cleaned out routinely on a weekly basis, so the maximum storage capacity of the impoundment is never reached.

- Approximate volume of the impounded water and CCR at the time of inspection.
  - No water or CCR was present at the time of inspection, the impoundment is still under construction and has not been commissioned yet.
- Appearances of 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 during construction.
- Any other change(s) which may have affected the stability or operation of the impounding structure since the previous annual inspection.
  - None were observed during construction.

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.
- 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.

The Bottom Ash Impoundment was under construction at the time of inspection and has not been previously inspected. There were no changes to note or compare to previous inspections.

## 4.0 LIMITATIONS OF ASSESSMENT

Golder has conducted the site inspection and prepared this report for the new Bottom Ash Impoundment at D.E. Karn. 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 Bottom Ash Impoundment at D.E. Karn 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
D.E. Karn Generating Plant Bottom Ash Surface Impoundment Approved For Construction Drawings Revision D	February 2018	Golder Associates, Inc.
D.E. Karn Generating Facility Karn Lined Impoundment Closure Plan	June 2018	Golder Associates, Inc.



## Signature Page

### Golder Associates Inc.

A handwritten signature in black ink that reads "Halle Doering". The signature is written in a cursive style with a large, stylized 'H' and 'D'.

Halle Doering  
*Staff Engineer*

A handwritten signature in blue ink that reads "Tiffany D. Johnson". The signature is written in a cursive style with a large, stylized 'T' and 'J'.

Tiffany D. Johnson, P.E.  
*Associate*

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**APPENDIX A - INSPECTION CHECKLIST FORM**

## CCR SURFACE IMPOUNDMENT VISUAL INSPECTION CHECKLIST

**Facility Name:** D.E. Karn Bottom Ash Impoundment

**Owner:** Consumers Energy Company (CEC)

**Purpose of Facility:** Detention and settlement of sluiced bottom ash.

**County, State:** Bay County, Michigan

**Inspected By:** Tiffany Johnson and Halle Doering

**Inspection Date:** May 8, 2018

**Weather:** 79 degrees, partly cloudy, slight breeze 5-10 mph

ITEM					REMARKS
	Acceptable	Monitor/Maintain	Investigate	Repair	
1. General Conditions					In active construction, currently placing liner.
a. Year Minimum Water Elevation					N/A
b. Year Average Water Elevation					N/A
c. Year Maximum Water Elevation					N/A
d. Current water level					N/A
e. Current storage capacity					N/A
f. Current volume of impounded water and CCR					N/A
g. Alterations					N/A
h. Development of downstream plain					N/A
i. Grass cover					N/A
j. Settlement/misalignment/cracks					N/A
k. Sudden drops in water level?					N/A
2. Inflow Structure					Bottom ash sluice not yet routed to impoundment.
a. Settlement	X				
b. Cracking	X				
c. Corrosion	X				

ITEM	Acceptable	Monitor/Maintain	Investigate	Repair	REMARKS
					In active construction, currently placing liner.
d. Obstacles in inlet	X				
e. Riprap/erosion control	X				
3. Outflow Structure					Bottom ash sluice not yet routed to impoundment.
a. Settlement	X				
b. Cracking	X				
c. Corrosion	X				
d. Obstacles in outlet	X				
e. Riprap/erosion control	X				
f. Seepage	X				
4. Upstream slope					Gravel slopes, still under construction.
a. Erosion	X				
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				
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					

ITEM					REMARKS
	Acceptable	Monitor/Maintain	Investigate	Repair	
					In active construction, currently placing liner.
a. Erosion	X				
b. Vegetation	X				
c. Rodent burrows	X				
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				

**General Remarks:**

- 1) Features observed and documented in this checklist were not considered a deficiency or release as classified under 40 CFR 257.84(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:**



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