



# Annual Inspection Report

## D.E. KARN GENERATING FACILITY

### BOTTOM ASH POND

# 2017 ANNUAL SURFACE IMPOUNDMENT INSPECTION REPORT

Essexville, Michigan

Pursuant to 40 CFR 257.83

**Submitted To:** Consumers Energy Company  
1945 W. Parnall Road  
Jackson, MI 49201

**Submitted By:** Golder Associates Inc.  
15851 South US 27, Suite 50  
Lansing, MI 48906 USA

October 2017

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## 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.

October 12, 2017

Date of Report Certification

Tiffany Johnson, PE

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 Bottom Ash Pond at the D.E. Karn Generating Facility (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 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 is sluiced from the D.E. Karn Unit 1 & 2 electrical generating units to the Bottom Ash Pond. An elevated trestle and pipe system hydraulically conveys bottom ash to the pond system. Stored bottom ash is removed via mechanical equipment from the pond as required to maintain storage capacity on at least a yearly basis. Water is discharged from the pond via one 24-inch diameter steel pipe into an internal ditch that conveys 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
Weekly inspections performed by Consumers Energy Company (CEC)	June 2016 – May 2017	Varying CEC D.E. Karn Generating Facility Qualified Persons
D.E. Karn Generating Facility Bottom Ash Pond Structural Stability and Safety Factor Assessment Report (includes 2016 Annual Inspection Information)	October 2016	Golder Associates Inc.
D.E. Karn Bottom Ash Pond 2015 Initial Annual Inspection Report	January 2016	Golder Associates Inc.
D.E. Karn Ash Disposal Area, Triennial Ash Dike Risk Assessment Report – Spring 2014	December 2014	Barr Engineering Company
D.E. Karn Ash Disposal Area, 2012 Ash Dike Risk Assessment Final Inspection Report	August 2012	AECOM Technical Services, Inc.
Final Report Round 7 DAM Assessment, Consumers Energy Company-D.E. Karn Plant 1 & 2 Solid Waste Disposal Area	June 2011	GZA GeoEnvironmental, Inc.
Surveillance Monitoring Programs (SMPs)	December 2010, Revised 2015	CEC



Inspection Report D.E. Karn Generating Facility Ash Dike Risk Assessment, Essexville, Michigan	October 2009	AECOM Technical Services, Inc.
D.E. Karn Generating Facility Ash Dike Risk Assessment, Potential Failure Mode Analysis (PFMA) Report	October 2009	AECOM Technical Services, Inc.



### 3.0 2017 VISUAL INSPECTION

The 2017 onsite visual inspection of the Bottom Ash Pond was performed by Golder Associates Inc. (Golder) on May 15, 2017. Golder's inspectors, Tiffany Johnson, P.E. and Samantha Fentress, were accompanied by four Consumers Energy Company (CEC) representatives, as follows:

- Mr. George McKenzie, CEC System Engineering Department
- Mr. Bradley T. Runkel, CEC Environmental Services Department
- Mr. Harold D. Register, Jr., CEC Environmental Services 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 changes were observed since the previous inspection.
- Approximate minimum, maximum, and present depth and elevation of the impounded water and Coal Combustion Residuals (CCR) since the previous annual inspection.
  - Approximate minimum: 583 feet above mean sea level (ft-amsl) NAVD88
  - Approximate average: 591.6 ft-amsl) NAVD88
  - Approximate maximum: 596.2 ft-amsl) NAVD88
  - Current water level: 591.6 ft-amsl) NAVD88
- 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 Pond at D.E. Karn. At the time of the inspection and report, there are no plans for installation of stability monitoring instrumentation due to the future planned decommissioning of the Bottom Ash Pond.
- Storage capacity of the impounding structure at the time of inspection.
  - The storage capacity is approximately 60,200 cubic yards
- Approximate volume of the impounded water and CCR at the time of inspection.
  - Approximate volume of water and CCR is 25,500 cubic yards
- 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
- 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.
- 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:

- Minor erosion was noted in areas along the upstream and downstream slopes.
- Tall vegetation was observed in areas along the interior and exterior slopes.
- Rodent burrows were noted in areas on interior and exterior slopes.





#### **4.0 LIMITATIONS OF ASSESSMENT**

Golder has conducted the site inspection and prepared this report for the Bottom Ash Pond 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 Pond 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.

### GOLDER ASSOCIATES INC.

Samantha Fentress  
Engineer

Tiffany D. Johnson, P.E.  
Associate



## 6.0 REFERENCES

Document	Date	Author
Weekly inspections performed by Consumers Energy Company (CEC)	June 2016 – May 2017	Varying CEC D.E. Karn Generating Facility Qualified Persons
D.E. Karn Generating Facility Bottom Ash Pond Structural Stability and Safety Factor Assessment Report (includes 2016 Annual Inspection Information)	October 2016	Golder Associates Inc.
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**APPENDIX A  
INSPECTION CHECKLIST FORM**



## CCR SURFACE IMPOUNDMENT VISUAL INSPECTION CHECKLIST

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

**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 Samantha Fentress      **Inspection Date:** May 15, 2017

**Weather:** Clear, Sunny 65° Fahrenheit

ITEM					REMARKS
	Acceptable	Monitor/Maintain	Investigate	Repair	
1. General Conditions					
a. Year Minimum Water Elevation					Elevation: 583.0 NAVD88
b. Year Average Water Elevation					Elevation: 591.6 NAVD88
c. Year Maximum Water Elevation					Elevation: 596.2 NAVD88
d. Current water level					Elevation: 591.6 NAVD88
e. Current storage capacity					Volume: 60,200 cubic yards (See Note 1)
f. Current volume of impounded water and CCR					Volume: 25,500 cubic yards (See Note 1)
g. Alterations					None observed or documented
h. Development of downstream plain	X				None observed
i. Grass cover		X			Tall vegetation on western slopes, maintain vegetation controls, see note 2.
j. Settlement/misalignment/cracks	X				None observed
k. Sudden drops in water level?	X				None observed or documented
2. Inflow Structure					
a. Settlement	X				
b. Cracking	X				Inflow structure was assessed in 2016.
c. Corrosion	X				Inflow structure was assessed in 2016.
d. Obstacles in inlet	X				None observed
e. Riprap/erosion control	X				
3. Outflow Structure					Overflow weir is clear
a. Settlement	X				None observed
b. Cracking	X				None observed
c. Corrosion	X				None observed
d. Obstacles in outlet		X			Monitor for vegetation blocking the outlet, see note 2.
e. Riprap/erosion control		X			Maintain erosion controls, see note 2.
f. Seepage	X				None observed
4. Upstream slope					
a. Erosion		X			Erosion observed on upstream slopes, maintain grading and erosion controls, see note 2.
b. Rodent burrows		X			Rodent holes observed on north side of the pond, maintain animal control procedures, see Note 2.
c. Vegetation		X			Tall vegetation on upstream slopes, maintain vegetation controls, see note 2.
d. Cracks/settlement	X				None observed
e. Riprap/other erosion protection	X				None observed
f. Slide, Slough, Scarp	X				None observed
5. Crest					
a. Soil condition	X				
b. Comparable to width from previous inspection	X				



ITEM					REMARKS
	Acceptable	Monitor/Maintain	Investigate	Repair	
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			Minor erosion observed, maintain grading and erosion controls, see note 2.
b. Vegetation		X			Tall vegetation on western slopes, maintain vegetation controls, see note 2.
c. Rodent burrows		X			Rodent holes observed, maintain animal control procedures, see Note 2.
d. Slide, Slough, Scarp	X				None observed
e. Drain conditions	X				None observed
f. Seepage	X				None observed
7. Toe					
a. Vegetation	X				
b. Rodent burrows	X				None observed
c. Settlement	X				None observed
d. Drainage conditions	X				None observed
e. Seepage	X				None observed

**Notes:**

- 1) Current volume of impounded water and CCR is based on an approximate bottom elevation of 583.0 feet (NAVD88) and normal operating level of 591.6 feet (NAVD88). The unit's storage capacity is based on an approximate pond bottom elevation of 583.0 feet NAVD88 and elevation 596.2 feet (NAVD88), which corresponds to the 2 feet below the lowest elevation of the exterior berm. Elevations used in this calculation are based off a May 2016 topographic and bathymetric survey completed by Engineering and Environmental Solutions, LLC (EES).
- 2) 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.
- 3) 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.

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

**Date: 10-12-17**

**Engineering Firm: Golder Associates Inc.**

**Signature:**



Established in 1960, Golder Associates is a global, employee-owned organization that helps clients find sustainable solutions to the challenges of finite resources, energy and water supply and management, waste management, urbanization, and climate change. We provide a wide range of independent consulting, design, and construction services in our specialist areas of earth, environment, and energy. By building strong relationships and meeting the needs of clients, our people have created one of the most trusted professional services organizations in the world.

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