



J.H. Campbell Generating Facility

Dry Ash Landfill Cell 6 Expansion - Location Restriction Certification Report

Pursuant to:

40 CFR 257.60

40 CFR 257.61

40 CFR 257.62

40 CFR 257.63

40 CFR 257.64

Submitted to:

Consumers Energy Company

1945 Parnall Road
Jackson, Michigan, USA 49201

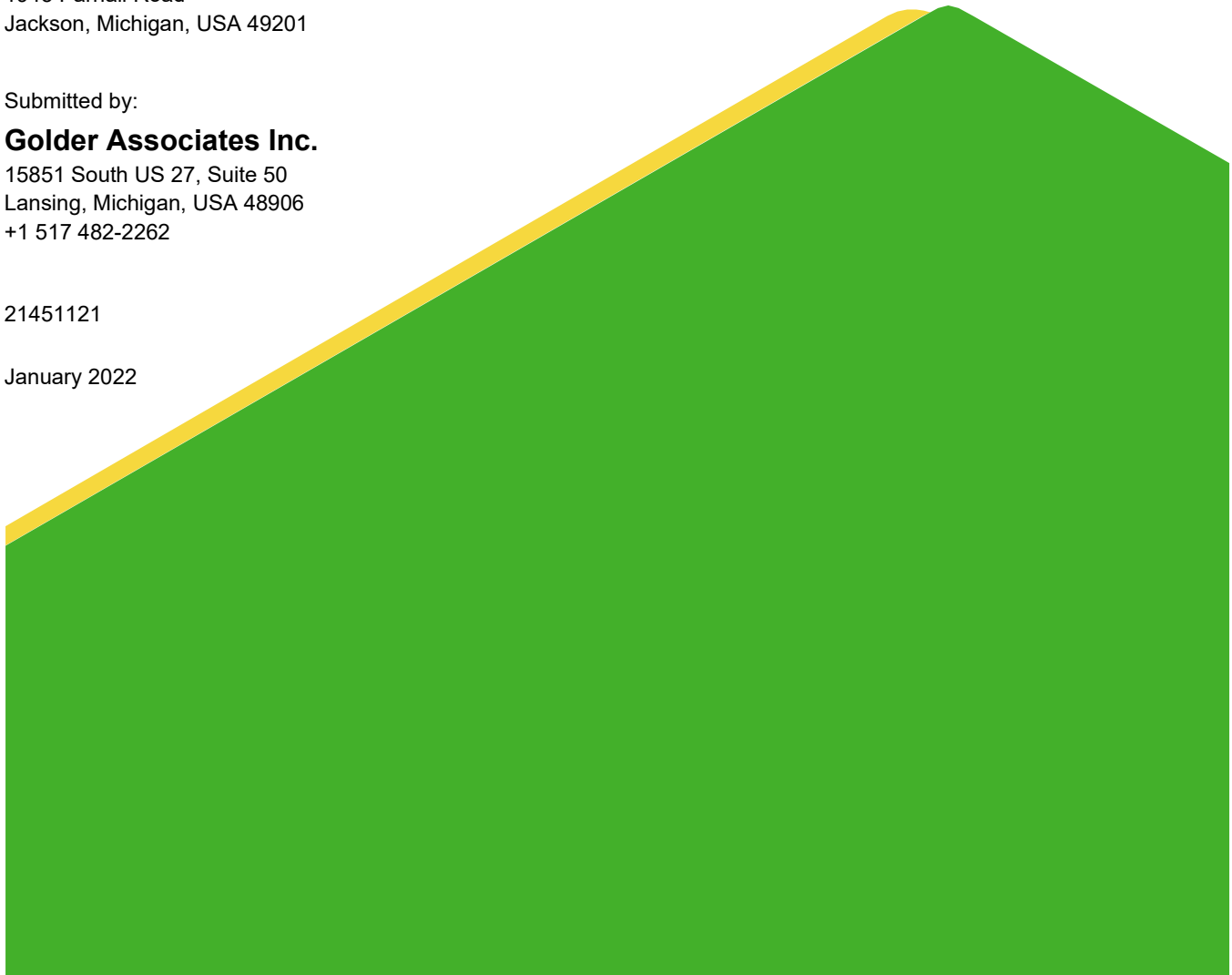
Submitted by:

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January 2022



CERTIFICATION

Professional Engineer Certification Statement [40 CFR 257.60-64]

I hereby certify that, having reviewed the attached documentation and being familiar with the provisions of Title 40 of the Code of Federal Regulations Sections 257.60-64 (40 CFR Part 257.60-64), this Location Restriction Certification 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 257.60-64.

Golder Associates USA Inc.

Tiffany D. Johnson
Signature

January 28, 2022
Date of Report Certification

Tiffany D. Johnson, P.E.
Name

6201049160
Professional Engineer Certification Number

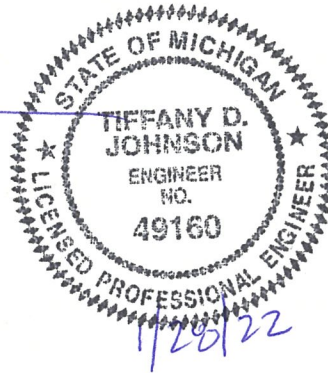


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1.0 INTRODUCTION

On April 17, 2015, the United States Environmental Protection Agency (USEPA) issued the Coal Combustion Residual (CCR) Resource Conservation and Recovery Act (RCRA) Rule (40 CFR 257 Subpart D) (“CCR RCRA Rule”) to regulate the solid waste management of CCR generated at electric utilities. Sections 257.60-64 of the CCR RCRA Rule require the owner or operator of a lateral expansion of a CCR unit to document that the lateral expansion was designed to meet the location restriction criteria outlined therein. The CCR RCRA Rule defines a lateral expansion of a CCR unit as a horizontal expansion of the waste boundaries of an existing CCR landfill or existing CCR surface impoundment made after October 19, 2015. According to Sections 257.60(b), 257.61(b), 257.62(b), 257.63(b), and 257.64(c); the documentation must be certified by a qualified professional engineer. Prior to first receipt of waste to the CCR unit, the documentation must be placed in the facility’s operating record and posted to the publicly available website per Sections 257.60(c), 257.61(c), 257.62(c), 257.63(c), and 257.64(d).

Golder Associates USA Inc. (Golder) is submitting this report to certify that the Consumers Energy Company (CEC) J.H. Campbell Generating Facility (JH Campbell) Dry Ash Landfill Cell 6 Expansion is located in an area that meets criteria outlined in 40 CFR 257.60-64.

2.0 PLACEMENT ABOVE THE UPPERMOST AQUIFER [40 CFR 257.60]

Section 257.60 of the CCR RCRA Rule requires that a lateral expansion of a CCR unit be constructed with a base that is located no less than five feet above the upper limit of the uppermost aquifer or must demonstrate that there will not be an intermittent, recurring, or sustained hydraulic connection between any portion of the base of the CCR unit and the uppermost aquifer due to normal fluctuations in groundwater elevations.

CEC submitted the J.H. Campbell Dry Ash Landfill Expansion Construction Permit Application, Cells 5 through 9 (CPA) to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) Office of Waste Management and Radiological Protection. The CPA included vertical expansion of JH Campbell Dry Ash Landfill Cells 5 through 9 and was submitted to EGLE on July 13, 2021 (Golder 2021). The landfill expansion construction permit application was approved by the EGLE on November 30, 2021 (EGLE 2021). The landfill design included in the CPA (Golder 2021) utilized sump elevations that are a minimum of five feet above the historical high groundwater elevation. Specifically, the base of the Cell 6 sump is designed at 605.4 feet (NGVD 29), and the historical high groundwater elevation at this location is 600.3 feet (NGVD 29) (Golder 2021).

3.0 WETLANDS [40 CFR 257.61]

Section 257.61 of the CCR RCRA Rule requires that a lateral expansion of a CCR unit not be located in wetlands, as defined in 40 CFR Section 232.2. The following sources were utilized, in part, to determine if the JH Campbell Dry Ash Landfill Cell 6 Expansion is located within a wetland:

- US Geological Survey (USGS) topographic map
- National Wetland Inventory (NWI) map
- EGLE wetland map
- US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) soil survey map
- Aerial imagery
- Federal Emergency Management Agency (FEMA) floodplain map

According to the NWI and EGLE maps, there are no mapped wetlands within the limits of the Dry Ash Landfill Cell 6 Expansion. In addition, the NRCS soil survey map indicates there are no hydric (wetland) soils within the limits of the Dry Ash Landfill Cell 6 Expansion. The results of the wetland evaluation of the Dry Ash Landfill Cell 6 Expansion footprint satisfy the requirements of Section 257.61.

4.0 FAULT AREAS [40 CFR 257.62]

Section 257.62 requires that a lateral expansion of a CCR unit not be located within 200 feet of the outermost damage zone of a fault that has had displacement in Holocene time (approximately 12,000 years ago to present day). According to the USGS U.S. Quaternary Faults and Folds Database (USGS 2014b), the fault zone nearest to the JH Campbell Dry Ash Landfill Cell 6 Expansion with documented displacement in Holocene time is the New Madrid Seismic Zone. While active fault zones are not expressed at the surface, movement along these faults have caused seismic activity in the region for the past 4,500 years.

According to the Missouri Department of Natural Resources, the New Madrid Seismic Zone is primarily located in southeastern Missouri, northeastern Arkansas, western Tennessee, western Kentucky, and southern Illinois. The JH Campbell Dry Ash Landfill Cell 6 Expansion is approximately 400 miles northeast of the New Madrid Seismic Zone, satisfying the requirements of Section 257.62.

5.0 SEISMIC IMPACT ZONES [40 CFR 257.63]

Section 257.63 requires that a lateral expansion of a CCR unit not be located in seismic impact zones, defined in Section 257.53 as an area having two percent or greater probability that the maximum expected horizontal ground acceleration will exceed 10 percent of gravity (0.10g) in 50 years (return period of approximately 2,500 years). Data published in 2014 from the USGS indicates that the JH Campbell Landfill Cell 6 Expansion footprint has an annual frequency of exceedance of 8.5×10^{-5} for an earthquake with a maximum expected horizontal ground acceleration of 0.10g, which corresponds to a probability of exceedance of 0.42 percent in 50 years and a return period of 12,000 years.

Since the probability of exceedance is less than two percent in 50 years for a maximum expected horizontal ground acceleration of 0.10g, the JH Campbell Dry Ash Landfill Cell 6 Expansion is not located in a seismic impact zone, satisfying the requirements of Section 257.63.

6.0 UNSTABLE AREAS [40 CFR 257.64]

Section 257.64 requires that a lateral expansion of a CCR unit not be located in an unstable area. As outlined in Section 257.64(b), the following must be considered when determining whether an area is unstable:

- Onsite or local soil conditions that may result in significant differential settling
- Onsite or local geologic or geomorphologic features
- Onsite or local human-made features or events (both surface and subsurface)

Previous geotechnical investigations in and around the JH Campbell Dry Ash Landfill Cell 6 Expansion indicate the onsite soils are comprised of a native sand layer that overlies glacial till (EES 2012). The sand deposit extends to an approximate depth of 45 to 60 feet below ground surface (bgs) and is underlain by fine-grained silty clay and clay silt soils which extend to bedrock at approximately 140 feet bgs (EES 1992).

Settlement of the soils forming the foundation of the JH Campbell Dry Ash Landfill Cell 6 Expansion were analyzed as part of the CPA (Golder 2021). The analysis assessed differential settlement along leachate collection piping resulting from maximum CCR fill heights. Results of the settlement analysis confirm that the onsite soil conditions do not result in significant differential settlement that would affect the minimum design criteria established for the leachate collection system.

A desktop study was conducted using GeoWebFace (SOM 2021), an online GIS database managed by the State of Michigan which confirmed that no oil wells, no gas wells, and no underground mines are located in a proximity that would affect the stability of the JH Campbell Dry Ash Landfill Cell 6 Expansion.

Additionally, maps provided by the USGS (USGS 2014a) and the Michigan Natural Features Inventory (Albert, et al. 2008) indicate that the JH Campbell Dry Ash Landfill Cell 6 Expansion is not located in an area prone to karst development.

A slope stability analysis was performed as part of the design for the CPA (Golder 2021). Soil conditions observed during the geotechnical investigations were incorporated into the analysis to account for onsite geologic features. The analyses were conducted at:

- Locations with substantial CCR fill heights
- Locations with limited buttressing of CCR fill slopes
- Locations where forward sloping liner gradients might contribute to embankment instability

Results of the stability analysis indicated that the JH Campbell Dry Ash Landfill Cell 6 Expansion foundation and design slopes are stable.

The historical geotechnical investigations along with the results of the settlement analysis, slope stability analysis, and desktop study indicate the JH Campbell Dry Ash Landfill Cell 6 Expansion is not located in an unstable area, satisfying the requirements of Section 257.64.

7.0 CONCLUSION AND SUMMARY

Golder has determined that the JH Campbell Dry Ash Landfill Cell 6 Expansion meets the location restrictions outlined in 40 CFR 257.60-64. Prior to the first receipt of waste to the CCR unit, this report must be placed in the facility's operating record in accordance with Section 257.105(e) and must be made available on the facility's publicly accessible internet site in accordance with Section 257.107(e).

Sincerely,

Golder Associates Inc.



Tiffany Johnson, P.E.
Director



Jeffrey R. Piaskowski, P.E.
Lead Consultant

8.0 REFERENCES

- Albert, D.A., Cohen, J.G., Kost, M.A., Slaughter, B.S., and Enander, H.D. 2008. Distribution of Maps of Michigan's Natural Communities. Michigan Natural Features Inventory, Report No. 2008-01, Lansing, MI.
- Engineering and Environmental Solutions (EES), LLC. November 18, 1992. Final Report – Subsurface Exploration and Geotechnical Summary Report for the Proposed J.H. Campbell Ash Storage Facility Cell Expansion Project, West Olive, Michigan.
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- Golder Associates Inc. June 2021. J.H. Campbell Dry Ash Landfill Expansion Construction Permit Application, Cells 5 through 9. Facility ID Number 395496.
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- State of Michigan (SOM). 2021. GeoWebFace GIS Database.
- U.S. Geological Survey (USGS). 2014a. Karst in the United States: A Digital Map Compilation and Database.
- U.S. Geological Survey (USGS). 2014b. U.S. Quaternary Faults and Folds Database.



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