GREDELL Engineering Resources, Inc.

ENVIRONMENTAL ENGINEERING LAND - AIR - WATER

Offices in Jefferson City, Kansas City Metro and Springfield, Missouri

August 28, 2020

Mr. Ryan Bennett
Associated Electric Cooperative, Inc.
Thomas Hill Energy Center – Power Division
5693 Highway F
Clifton Hill, Missouri 65244-9778

Re: Pond 001, Cell 1 Professional Engineering Annual Inspection of CCR Impoundment

Dear Mr. Bennett:

GREDELL Engineering Resources, Inc. (Gredell Engineering) conducted the annual inspection by a qualified professional engineer of Pond 001, Cell 1 at Associated Electric Cooperative's (AECI) Thomas Hill Energy Center (THEC), as required by 40 CFR 257.83 (b) to ensure that the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted engineering standards. This letter is the inspection report required by 40 CFR 257.83 (b) (2). Zachary Troesser, P.E., Geotechnical Engineer, with Gredell Engineering, conducted an inspection of Pond 001, Cell 1 (Cell 1) between August 21 and 28, 2020. The inspection consists of a review of available information, on-site observation of the facility, and preparation of this report.

REVIEW OF AVAILABLE INFORMATION

Per 40 CFR 257.83 (b) (1), this inspection included:

> ***(i)*** *A review of available information regarding the status and condition of the CCR unit, including, but not limited to, files available in the operating record (e.g., CCR unit design and construction information required by §§ 257.73(c)(1) and 257.74(c)(1), previous periodic structural stability assessments required under §§ 257.73(d) and 257.74(d), the results of inspections by a qualified person, and results of previous annual inspections).*

Gredell Engineering reviewed the following documents as part of this inspection:

- Pond 001, Cell 1 Professional Engineering Annual Inspection of CCR Impoundment dated August 30, 2019 by Gredell Engineering,
- Initial Periodic Structural Stability Assessment Pond 001 - Cell 001 dated 17 October 2016 by Haley & Aldrich of Cleveland, Ohio (Haley & Aldrich),
- Cell 1 – 2015 Ash Pond 001 Project #3 – CCR Containerization construction documents dated October 2015 by Gredell Engineering,
- Construction Modification Report for Ash Pond 001 Cell 2 West Basin dated October 2015 by Gredell Engineering,
- weekly inspection reports for 2019 and 2020 provided by AECI THEC, and
- "CELL 002 EAST AND WEST IMPROVEMENTS" dated June 2020 by Haley & Aldrich, Cleveland, Ohio.

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ON-SITE OBSERVATIONS

Per 40 CFR 257.83 (b) (1), this inspection included:

(ii) *A visual inspection of the CCR unit to identify signs of distress or malfunction of the CCR unit and appurtenant structures;*

There were no visually discernible signs of distress or malfunction of Cell 1 or its appurtenant structures at the time of this inspection.

(iii) *A visual inspection of any 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.*

The reinforced concrete principal spillway of Cell 1 appeared to be intact, stable, and properly aligned. The structure displayed no signs of concrete spalling or cracking that would impair structural integrity, there was no visible exposed reinforcing steel, and the structure appeared to be in functional vertical and horizontal alignment. The principal spillway discharges via a 30-inch diameter reinforced concrete pipe. The visible end of the pipe was intact and appeared to be in good working condition.

Per 40 CFR 257.83 (b) (2), the following observations are noted:

(i) *Any changes in geometry of the impounding structure since the previous annual inspection;*

The embankment crest and slopes were of uniform line and grade. There was no discernible sag, slumping, bulging or other geometric indications of adverse embankment or embankment foundation performance. Construction was in progress within Cell 2, with the work described by construction documents titled "Cell 002 East and West Improvements", dated June 2020, by Haley & Aldrich, Cleveland, Ohio. Vegetation had been stripped up to the toe of the Cell 1 Embankment as part of the modifications to Cell 2.

(ii) *The location and type of existing instrumentation and the maximum recorded readings of each instrument since the previous annual inspection;*

There is no instrumentation of Cell 1.

(iii) *The approximate minimum, maximum, and present depth and elevation of the impounded water and CCR since the previous annual inspection;*

Gredell Engineering is not aware of any minimum and maximum water level and CCR records for Cell 1. The water level in Cell 1 was approximately elevation 741.6 feet, NAVD 29. CCR was submerged across much of Cell 1 and no indication of CCR depth could be determined.

(iv) *The storage capacity of the impounding structure at the time of the inspection;*

Design drawings titled Ash Pond Modifications prepared by Burns and McDonnell, dated June 4, 1984, indicate Cell 1 has an approximate capacity of 20 Acre-feet. The water elevation within the pond at the time

of inspection was about elevation 741.6 feet and a minor amount of CCR was noted above the water surface within Cell 1 during the site inspection. No topographic / bathymetric surveys were conducted as part of this inspection; therefore no estimate of CCR volume could be determined. The available storage capacity above the observed water elevation up to the low point of the Cell 1 embankment (elevation 744 feet) is about 5 acre-feet.

(v) *The approximate volume of the impounded water and CCR at the time of the inspection;*

The total volume of CCR and water within Cell 1 is about 15 acre-feet. CCR was predominantly submerged and no indication of CCR volume could be determined. Additionally, CCR is removed on a regular basis from Cell 1 and stockpiled on the adjacent dewatering pad. The dewatering pad is constructed with an aggregate working surface, clay liner, perimeter berm, and cutoff trench, and drains into Cell 1.

(vi) *Any 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;*

There were no appearances of actual or potential structural weakness of the Cell 1 structures, nor any observed existing conditions disrupting or having the potential to disrupt the operation and safety of Cell 1 and its appurtenant structures.

(vii) *Any other change(s) which may have affected the stability or operation of the impounding structure since the previous annual inspection.*

None observed. It is beyond the scope of this report to evaluate potential impacts of the in-progress construction adjacent to Cell 1.

Per 40 CFR 257.83 (b) (5):

> *If a deficiency or release is identified during an inspection, the owner or operator must remedy the deficiency or release as soon as feasible and prepare documentation detailing the corrective measures taken.*

No visual evidence of a deficiency or release was identified during the course of this inspection.

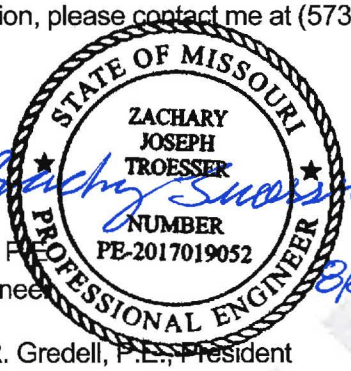
GENERAL COMMENTS and RECOMMENDATIONS

A small gouge was observed in the dense graded aggregate base along the perimeter berm of the de-watering pad. We recommend caution cones or posts similar to common highway delineators be placed at regular intervals along the interior edge of the perimeter berm to assist ash removal operators in recognizing the edge of berm. Posts should not be driven deeper than about 16-inches to ensure the integrity of the clay liner of the dewatering pad. For reference, the de-watering pad was designed to include a 16-inch thick dense graded aggregate base operating surface over an 8-inch layer of drainage aggregate, all over a 2-feet thick clay liner.

Cell 1 currently has no instrumentation for determining water elevation. We understand that AECI has recently purchased a staff gauge for monitoring the water elevation within Cell 1 and anticipate the instrumentation will be installed soon.

This concludes the 2020 annual inspection by a qualified professional engineer of Pond 001, Cell 1 at Associated Electric Cooperative's Thomas Hill Energy Center, as required by 40 CFR 257.83 (b). Gredell Engineering appreciates this opportunity to serve AECI THEC. If you have any questions or require additional information, please contact me at (573) 659-9078.

Sincerely,



Zachary Troesser, P.E.
Geotechnical Engineer

8/28/20

C: Thomas R. Gredell, P.E., President