GREDELL Engineering Resources, Inc.

ENVIRONMENTAL ENGINEERING LAND - AIR - WATER

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

August 3, 2022

Ms. Sarah White
Associated Electric Cooperative, Inc.
PO Box 754
Springfield MO 65801

RE: Pond 001, Cell 3 Professional Engineering Annual Inspection of CCR Impoundment
AECI PO No. TH-103736

Dear Ms. White:

GREDELL Engineering Resources, Inc. (Gredell Engineering) conducted the annual inspection by a qualified professional engineer of Pond 001, Cell 3 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. Bruce Dawson, P.E., Gredell Engineering, accompanied by Ben Gutz, AECI, conducted an on-site inspection of Pond 001, Cell 3 (Cell 3) July 18, 2022. The following is the inspection report required by 40 CFR 257.83 (b) (2).

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:

- Weekly inspection reports for 2021 and 2022 provided by AECI THEC,
- Report on Periodic Structural Stability Assessment, Pond 001 – Cell 003, Thomas Hill Energy Center, Clifton Hill, Missouri by Haley & Aldrich, Inc., Cleveland, Ohio, dated 15 October 2021, reference File No. 128064-022,
- Pond 001, Cell 3 Professional Engineering Annual Inspection of CCR Impoundment, dated August 28, 2020 by Gredell Engineering, and
- Cell 3 - 2013 Ash Pond 001 CCP Removal Project construction documents dated May 2013 by Gredell Engineering.

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;*

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There were no visible signs of distress or malfunction of Pond 001 Cell 3 or its appurtenant structures at the time of this inspection. The embankment and surrounding areas were closely mowed, which provided good conditions for visual 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 inlet structure of Cell 3 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 discharge end of the principal spillway pipe is submerged in Cell 4 and was not observed. Direct observation of the principal spillway discharge pipe will require remote controlled inline camera inspection or confined space entry protocols and was not attempted during this inspection. The emergency spillway crosses the berm and top-of-berm roadway just west of the principal spillway, is armored with 8 to 12-inch rip rap on the upstream and downstream slopes and approximately 1-inch clean crushed limestone across the embankment crest, and was observed to be in good 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;*

Approximately 1 acre of the northeast corner of Cell 3 was filled and graded in 2020 to form an open channel that receives Cell 2 discharge and routes the flow along the easterly side of Cell 3 and Cell 4 to discharge directly to the Middle Fork of the Little Chariton River below Cell 4.

The Cell 3 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. The access road and emergency spillway were well maintained.

Small rapid drawdown induced scarps were noted sporadically at the waters' edge along the upstream embankment and side slopes of Cell 3. Their size and frequency were not sufficient to create a concern for embankment stability or operation of the structure. These should be monitored regularly to determine when maintenance is appropriate.

An area of bare ground approximately 50-feet long and 8-feet wide was noted along the northeast perimeter of Cell 3. We recommend that areas of bare ground or sparse vegetation be overseeded with an appropriate seed mix during the fall seeding season.

(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 3.

(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 3. The water level in Cell 3 was approximately elevation 714.7 feet, relative to an elevation of 719.40 feet at the top of Cell 3's principal spillway riser structure, as surveyed by Mark Robertson, PLS in February 2013. Any CCR was inundated and not visible at the time of these observations. No direct indication of CCR depth across Cell 3 was available.

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

The estimated storage volume between the observed water surface elevation (714.7 feet) and emergency spillway elevation (716.2 feet) is approximately 19 acre-feet.

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

Gredell Engineering is not aware of any record information that would provide a basis for accurately estimating the volume of Cell 3. The Initial Annual CCR Surface Impoundment PE Inspection by Curtis Stundebeck, P.E. reports an approximate total volume for Cell 3 of 160 acre-feet. Figure 4, "Storage Capacity and Impounded CCR and Water Volumes" of Haley & Aldrich's October 2021 Report on Periodic Structural Stability Assessment, Pond 001 – Cell 3 indicates the storage volume of Cell 3 to be approximately 159 acre-feet (after reduction of Cell 3 area and volume due to construction of the Cell 002 diversion channel in 2020). CCR was submerged across the impoundment and no direct indication of CCR depth was available. Based on an approximate total volume of 159 acre-feet and the estimated storage capacity at the time of this inspection, the approximate volume of impounded water and CCR at the time of this inspection is approximately 140 acre-feet.

(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 3 structures. There were no observed existing conditions disrupting or having the potential to disrupt the operation and safety of Cell 3 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.*

At the time of this inspection, there were no discernible changes which have affected the stability or operation of the Cell 3 embankments.

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 this inspection.

GENERAL COMMENTS and RECOMMENDATIONS

We recommend that areas of bare ground or sparse vegetation be overseeded with an appropriate seed mix during the fall seeding season. Small rapid drawdown induced scarps should be monitored regularly to determine when maintenance is appropriate.

This concludes the 2020 annual inspection by a qualified professional engineer of Pond 001, Cell 3 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,

STATE OF MISSOURI
BRUCE DAWSON
NUMBER E-22331
REGISTERED PROFESSIONAL ENGINEER

8/3/22

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Principal Geotechnical Engineer, Vice President

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