GREDELL Engineering Resources, Inc.

ENVIRONMENTAL ENGINEERING LAND - AIR - WATER

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

September 1, 2017

Ms. Kim Dickerson
Associated Electric Cooperative, Inc.
Thomas Hill Energy Center – Power Division
5693 Highway F
Clifton Hill, Missouri 65244-9778

Re: Pond 001, Cell 3 Professional Engineering Annual Inspection of CCR Impoundment

Dear Ms. Dickerson:

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 good engineering standards. This letter is the inspection report required by 40 CFR 257.83 (b) (2). Bruce Dawson, P.E., Principal Geotechnical Engineer with Gredell Engineering, conducted an inspection of Pond 001, Cell 3 between August 23 and September 1, 2017. 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:

- a prior annual inspection report dated January 19, 2016 by Curtis Stundebeck, P.E.,
- a prior structural stability assessment dated 17 October 2016 by Haley & Aldrich of Cleveland, Ohio (Haley & Aldrich),
- Inflow Design Flood Control System Plan Pond 001 - Cell 003 dated 16 October 2016 by Haley & Aldrich,
- History of Construction – Cell 003 Associated Electric Cooperative, Inc. dated 16 October 2016 by Haley & Aldrich,
- Site Plan Drawing Y6, Revision 2 dated December 1, 1978 by Burns & McDonnell of Kansas City, Missouri,
- Proposed Pond 001 Slag Removal Project construction documents dated April 2011 by Gredell Engineering,
- Cell 3 2013 Ash Pond 001 CCP Removal Project, AECI THEC construction documents dated May 2013 by Gredell Engineering, and
- weekly inspection reports for 2016 and 2017 provided by AECI THEC.

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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 Pond 001 Cell 3 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 inlet structure of Cell 3 appeared to be intact, stable, and properly aligned. Direct observation of the principal spillway discharge pipe will require confined space entry protocols and was not attempted during this inspection. 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 correct vertical and horizontal alignment. The discharge end of the principal spillway pipe is submerged in Cell 4 and was not observed. The emergency spillway crosses the berm and top-of-berm roadway just west of the principal spillway 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;*

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. These observations are consistent with a prior annual inspection report dated January 19, 2016 by Curtis Stundebeck, P.E., and a prior structural stability assessment dated October 2016 by Haley & Aldrich of Cleveland, Ohio.

(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 713.4 feet, NAVD 88. CCR was submerged and no direct indication of CCR depth was available. AECI reports that CCR is near water level at the northwest corner of Cell 3, and accordingly is estimated to be nearing water level in the approximate north one-third of Cell 3, with gradually declining CCR depth from west to east and from north to south. Based on previous CCR removal records for Cell 3, the estimated CCR volume in Cell 3 is 20 acre-feet.

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

The estimated storage volume between observed water surface elevation and emergency spillway elevation is 18 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 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. CCR was submerged and no direct indication of CCR depth was available. AECI reports that CCR is near water level at the northwest corner of Cell 3, and accordingly is estimated to be nearing water level in the approximate north one-third of Cell 3, with gradually declining CCR depth from west to east and from north to south. Based on previous CCR removal records for Cell 3, the estimated CCR volume in Cell 3 is 20 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, nor any 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.*

None observed.

(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.*

None identified.

GENERAL COMMENTS and RECOMMENDATIONS

This concludes the 2017 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

Bruce Dawson, P.E.
Principal Geotechnical Engineer

9/1/17

C: Thomas R. Gredell, P.E., President w/o enclosure