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October 17, 2018

Big Rivers Electric Corporation
Sebree Generating Station
9000 Highway 2096
Robards, Kentucky 42452

Engineer's Certification of Fault Area Demonstration
Existing Green CCR Surface Impoundment
EPA Final CCR Rule
Sebree Station
Robards, Kentucky

1.0 PURPOSE

The purpose of this document is to certify that the Fault Area Demonstration for the BREC Sebree Station "Green" Existing CCR Surface Impoundment is in compliance with the Fault Area Demonstration specified in the Final CCR Rule at 40 CFR §257.62 presented below is the project background, summary of findings, limitations and certification.

2.0 BACKGROUND

During active fault movement, earth displacement where the ground may be bent or warped typically occurs within a zone spanning 200 feet from the fault line. In accordance with 40 CFR §257.62(a), all new and existing CCR impoundments, landfills, and vertical expansions must not be located within 60 meters (200 feet) of the outermost danger zone created by faults active during the Holocene Period. The Holocene Period is defined by any geologic event occurring within the past 11,700 years; the time span indicating that a fault is active.

3.0 SUMMARY OF FINDINGS

The Sebree Station is located in the vicinity of two subparallel, east-northeast trending fault systems: the Pennyrile Fault System located about 20 miles south of the plant site, and the Rough Creek Fault System, situated approximately 2 miles south of the site. Neither of these systems has been active during Holocene times. Based on a review of the USGS website which contains information on faults and associated folds in the United States that are believed to be sources of M>6 earthquakes during the Quaternary Period (the past 1,600,000 years, including Holocene Epoch), there are no known faults of this age located within the vicinity of Sebree Station.

Based upon a review of the documented sources and comparison with CCR Rule 40 CFR §257.62(a) as presented above, the CCR unit is much further than 60 meters (200 feet) from the outermost damage zone of a fault that has seen displacement during the Holocene Period. Through the references listed below and the attached figures, AECOM has determined that the existing CCR surface impoundment at the Big Rivers' Sebree station meets the fault area requirements of the EPA Final CCR Rule 40 CFR

§257.62. AECOM has determined that there are no reasonable expectations that fault movement will disrupt the integrity of the existing CCR surface impoundment.

4.0 CERTIFICATION

I, Michael Brian Cole, being a Registered Professional Engineer in good standing in the State of Kentucky, do hereby certify, to the best of my knowledge, information, and belief, that the information contained in this certification has been prepared in accordance with the accepted practice of engineering. I certify, for the above-referenced CCR Unit, that the demonstration regarding the location of the CCR Unit within 60 meters (200 feet) of the outermost damage zone of a fault that has had a displacement in Holocene time as included in the Fault Area Demonstration for Coal Combustion Residuals dated October 17, 2018 meets the requirements of 40 CFR § 257.62(a).

M. Brian Cole
Printed Name

October 17, 2018
Date

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ATTACHMENTS: Fault Area Demonstration for Coal Combustion Residuals

Big Rivers ELECTRIC CORPORATION

Your Touchstone Energy® Cooperative

Existing Green CCR Surface Impoundment

Disposal of Coal Combustion Residuals (CCR) from Electric Utilites Final Rule

Fault Area Demonstration for Coal Combustion Residuals (CCR)

October 17, 2018

Prepared by

AECOM

Project Number: 60570534

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1.0 INTRODUCTION

1.1 OBJECTIVE

The purpose of this demonstration is to document compliance with 40 CFR §257.62 of the Environmental Protection Agency Final Coal Combustion Residual Rule (EPA Final CCR Rule). This Fault Area Demonstration is based on existing published documentation from various sources.

1.2 RULE REQUIREMENTS

According to 40 CFR §257.62(a) of the EPA Final CCR Rule, any new CCR landfills, existing, and new CCR surface impoundments, and all lateral expansions of CCR units must not be located within 60 meters (200 feet) of the outermost damage zone of a fault that has had displacement in Holocene times unless the owner or operator demonstrate by October 17, 2018 that an alternative setback distance of less than 60 meters (200 feet) will prevent damage to the structural integrity of the CCR unit.

1.3 RULE BACKGROUND

During active fault movement, earth displacement where the ground may be bent or warped typically occurs within a zone spanning 200 feet from the fault line. In accordance with 40 CFR §257.62(a), all new and existing CCR impoundments, landfills, and vertical expansions must not be located within 60 meters (200 feet) of the outermost danger zone created by faults active during the Holocene Period. The Holocene Period is defined by any geologic event occurring within the past 11,700 years; the time span indicating that a fault is active.

Providing an adequate setback distance as required by 40 CFR §257.62(a), is an attempt to reduce the risk of CCR unit failures. Potential failures include surface breakage, cracks, and fissures between fill and confining slopes, slope failure via landslides, liquefaction induced lateral spacing and settlement of the pile, disruption of surface water and drainage control systems, and rupture of leachate collection systems. In the case that an existing CCR facility is within 200 feet of an active fault, the operator or owner of the facility must provide a demonstration recognizing that acceptable engineering practices have been incorporated into the design of the CCR unit so that the structural integrity of the CCR unit will not be disrupted.

1.4 SITE BACKGROUND

Big Rivers Electric Corporation (BREC) owns and operates the Sebree Station in Sebree, Kentucky. The Sebree Station is located in Webster County approximately 3.2 miles northeast of the town of Sebree, Kentucky situated immediately east of the Pennyrile Parkway approximately 1.5 miles north of the intersection of the Pennyrile Parkway and Kentucky Route 56 (see **Figure 1**). Sebree Station is composed of 2 Green generating units, one Reid generating unit, and two HMPL generating units. The Green Station CCR Surface Impoundment (Green Pond) is located directly south of the Sebree Station, situated north of the Green Station

Coal Combustion Residuals (CCR) Landfill. The current Green Surface Impoundment footprint is approximately 16 acres (**Figure 2**).

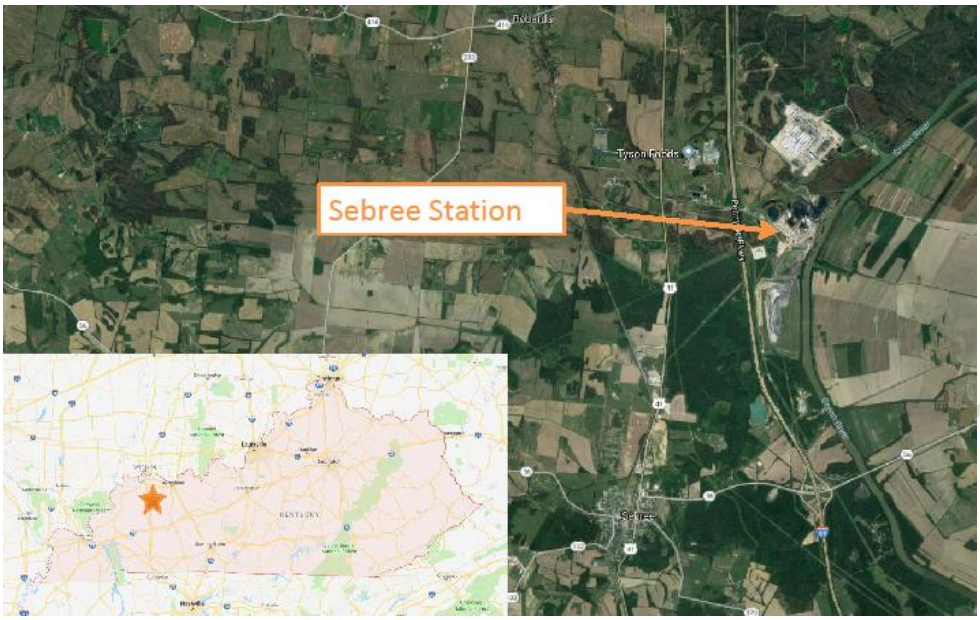

Figure 1: Big Rivers Sebree Station Site Location

Figure 2: Site Overview

2.0 REGIONAL GEOLOGY

The site lies in the Western Kentucky Coalfields, a gently rolling upland. In the vicinity of the site, maximum topographic relief is on the order of 80 feet. Surface drainage is to the south to Groves Creek, a primary tributary to the Green River, and to the east to the Green River.

Published geologic mapping (Murphy, 2007) shows the site to be immediately underlain by unconsolidated loess representing the Pleistocene and Holocene geologic epoch and unconsolidated alluvium representing the Pleistocene and Holocene epochs. The loess reportedly consists of sandy and clayey silt. The alluvium reportedly consists of silt and clay with lesser amounts of sand and gravel. **Attachment A** shows the regional geologic formations surrounding the area.

The unconsolidated materials are shown to be underlain by the base of the Shelburn Formation (formerly identified as the Lisman Formation (Fairer, 1973)) and the Carbondale Formation, both of which represent the Pennsylvanian Geologic Period. The West Franklin Limestone Member which consists of one to three layers of limestone interbedded by calcareous clay shale, and comprises the top of the Shelburn Formation. The Providence Limestone Member, consisting of limestone and interbedded shale, comprises the base of the Shelburn Formation. The Providence Member is reportedly absent in much of the area due to erosional channeling. Due to its discontinuous character and the presence of interbedded shale, hydrologically significant karst features are not present in the Providence Limestone Member. The Carbondale Formation consists of cyclic sequences of sandstones, shales, siltstones and coals. The Carbondale sediments were deposited in a fluvial-deltaic system. As a result of this depositional environment, lithologic units of the Carbondale tend to be lenticular bodies rather than continuous sheet-like strata. Gradational and abrupt horizontal changes in lithology are often encountered.

The structure contours illustrated on the geologic map (Murphy, 2007) are based on the attitude of the No. 9 coal seam, and show the site to lie on the flank of a gentle anticline. Stratigraphic dip is shown to be on the order of 35 feet per mile to the southeast. No faults or other significant structural features are depicted on the geologic map.

3.0 SITE FAULTING

The Sebree Station is located in the vicinity of two subparallel, east-northeast trending fault systems: the Pennyrile Fault System located about 20 miles south of the plant site, and the Rough Creek Fault System, situated approximately 2 miles south of the site. Based on a review of the USGS website which contains information on faults and associated folds in the United States that are believed to be sources of M>6 earthquakes during the Quaternary Period (the past 1,600,000 years, including Holocene Epoch), there are no known faults of this age located within the vicinity of the Sebree Station.

The U.S. Geological Survey (USGS) information indicates that the site and surrounding area may be subject to events affecting the central portion of western Kentucky, and thus the plant site, primarily emanate from two Holocene fault zones– the New Madrid Seismic Zone of the central Mississippi Valley and the Wabash Valley Seismic Zone located along the border between Illinois and southwestern Indiana (**Attachment B**). Both fault zones exceed the 200 foot offset, the New Madrid Fault Zone is located approximately 110 miles (177,028 meters) from Sebree Station and Wabash Valley Seismic Zone is approximately 30 miles (48280 meters) from the site.

CONCLUSIONS

Based upon a review of the documented sources and comparison with CCR Rule 40 CFR §257.62(a) as presented above, the CCR unit is much further than 60 meters (200 feet) from the outermost damage zone of a fault that has seen displacement during the Holocene Period. Through the references listed below and the attached figures, AECOM has determined that the existing CCR surface impoundment at the Big Rivers' Sebree station meets the fault area requirements of the EPA Final CCR Rule 40 CFR §257.62. AECOM has determined that there are no reasonable expectations that fault movement will disrupt the integrity of the existing CCR surface impoundment.

4.0 REFERENCES

Survey, The University of Kentucky, July 6, 2016. Online Kentucky Geologic Map Information Service Map, http://kgs.uky.edu/kgsmap/kgsgeoserver/viewer.asp

Online Fault Map, Quaternary Faults and Folds, United States Geological Survey, July 6, 2016. http://earthquake.usgs.gov/hazards/qfaults/map/#qfaults

Solis, M.P., and Venard, E.A., 2000, Spatial database of the Robards quadrangle, Henderson and Webster Counties, Kentucky: Kentucky Geological
Survey, ser. 12, Digitally Vectorized Geologic Quadrangle Data DVGQ-1084. Adapted from Fairer, G.M., 1973, Geologic map of the Robards
quadrangle, Henderson and Webster Counties, Kentucky: U.S. Geological Survey Geologic Quadrangle Map GQ-1084, scale 1:24,000.

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October 17, 2018

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Engineer's Certification of Fault Area Demonstration
Existing Reid/HMPL CCR Surface Impoundment
EPA Final CCR Rule
Sebree Station
Robards, Kentucky

1.0 PURPOSE

The purpose of this document is to certify that the Fault Area Demonstration for the BREC Sebree "Reid/HMPL" Existing CCR Surface Impoundment is in compliance with the Fault Area Demonstration specified in the Final CCR Rule at 40 CFR §257.62 presented below is the project background, summary of findings, limitations and certification.

2.0 BACKGROUND

During active fault movement, earth displacement where the ground may be bent or warped typically occurs within a zone spanning 200 feet from the fault line. In accordance with 40 CFR §257.62(a), all new and existing CCR impoundments, landfills, and vertical expansions must not be located within 60 meters (200 feet) of the outermost danger zone created by faults active during the Holocene Period. The Holocene Period is defined by any geologic event occurring within the past 11,700 years; the time span indicating that a fault is active.

3.0 SUMMARY OF FINDINGS

The Sebree Station is located in the vicinity of two subparallel, east-northeast trending fault systems: the Pennyrile Fault System located about 20 miles south of the plant site, and the Rough Creek Fault System, situated approximately 2 miles south of the site. Neither of these systems has been active during Holocene times. Based on a review of the USGS website which contains information on faults and associated folds in the United States that are believed to be sources of M>6 earthquakes during the Quaternary Period (the past 1,600,000 years, including Holocene Epoch), there are no known faults of this age located within the vicinity of Sebree Station.

Based upon a review of the documented sources and comparison with CCR Rule 40 CFR §257.62(a) as presented above, the CCR unit is much further than 60 meters (200 feet) from the outermost damage zone of a fault that has seen displacement during the Holocene Period. Through the references listed below and the attached figures, AECOM has determined that the existing CCR surface impoundment at the Big Rivers' Sebree Station meets the fault area requirements of the EPA Final CCR Rule 40 CFR §257.62. AECOM has determined that there are no reasonable expectations that fault movement will disrupt the integrity of the existing CCR surface impoundment.

AECOM

4.0 CERTIFICATION

I, Michael Brian Cole, being a Registered Professional Engineer in good standing in the State of Kentucky, do hereby certify, to the best of my knowledge, information, and belief, that the information contained in this certification has been prepared in accordance with the accepted practice of engineering. I certify, for the above-referenced CCR Unit, that the demonstration regarding the location of the CCR Unit within 60 meters (200 feet) of the outermost damage zone of a fault that has had a displacement in Holocene time as included in the Fault Area Demonstration for Coal Combustion Residuals dated October 17, 2018 meets the requirements of 40 CFR § 257.62(a).

M. Brian Cole
Printed Name

October 17, 2018
Date

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ATTACHMENTS: Fault Area Demonstration for Coal Combustion Residuals

Big Rivers Electric Corporation

Your Touchstone Energy® Cooperative

Existing Reid/HMPL CCR Surface Impoundment

Fault Area Demonstration for Coal Combustion Residuals (CCR)
Disposal of Coal Combustion Residuals (CCR) from Electric Utilites Final Rule

October 17, 2018

Prepared by

AECOM

Project Number: 60571713

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1.0 INTRODUCTION

1.1 OBJECTIVE

The purpose of this demonstration is to document compliance with 40 CFR §257.62 of the Environmental Protection Agency Final Coal Combustion Residual Rule (EPA Final CCR Rule). This Fault Area Demonstration is based on existing published documentation.

1.2 RULE REQUIREMENTS

According to 40 CFR §257.62(a) of the EPA Final CCR Rule, any new CCR landfills, existing, and new CCR surface impoundments, and all lateral expansions of CCR units must not be located within 60 meters (200 feet) of the outermost damage zone of a fault that has had displacement in Holocene times unless the owner or operator demonstrate by October 17, 2018 that an alternative setback distance of less than 60 meters (200 feet) will prevent damage to the structural integrity of the CCR unit.

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During active fault movement, earth displacement where the ground may be bent or warped typically occurs within a zone spanning 200 feet from the fault line. In accordance with 40 CFR §257.62(a), all new and existing CCR impoundments, landfills, and vertical expansions must not be located within 60 meters (200 feet) of the outermost danger zone created by faults active during the Holocene Period. The Holocene Period is defined by any geologic event occurring within the past 11,700 years; the time span indicating that a fault is active.

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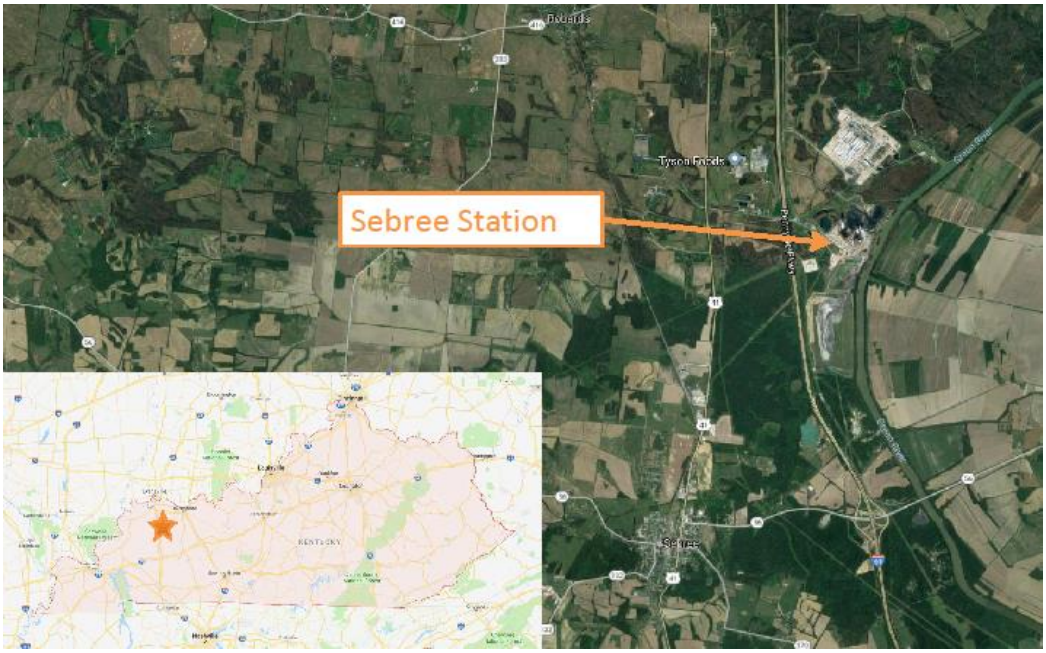
1.4 SITE BACKGROUND

Big Rivers Electric Corporation (BREC) owns and operates the Sebree Station in Sebree, Kentucky. The Sebree Station is located in Webster County approximately 3.2 miles northeast of the town of Sebree, Kentucky situated immediately east of the Pennyrile Parkway approximately 1.5 miles north of the intersection of the Pennyrile Parkway and Kentucky Route 56 (see **Figure 1**). Sebree Station is composed of 2 Green generating units, one Reid generating unit, and 2 HMPL generating units. The Reid/HMPL CCR Surface Impoundment (Reid Pond) is located directly northwest of the Sebree Station. The current Reid/HMPL Surface Impoundment footprint is approximately 21 acres (**Figure 2**).



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2.0 REGIONAL GEOLOGY

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4.0 REFERENCES

Survey, The University of Kentucky, July 6, 2016. Online Kentucky Geologic Map Information Service Map, http://kgs.uky.edu/kgsmap/kgsgeoserver/viewer.asp

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