Big Rivers ELECTRIC CORPORATION

Coleman Station Legacy Pond A CCR Surface Impoundment

Disposal of Coal Combustion Residuals (CCR) from Electric Utilities Final Rule
Structural Integrity Criteria for Existing CCR Surface Impoundments
Initial Safety Factor Assessment

May 8, 2026

Prepared By:

ASSOCIATED ENGINEERS, INC.
2740 North Main St. • Madisonville, KY 42431
Phone: (270) 821-7732 • Fax: (270) 821-7789

Project ID: 26-0144

Big Rivers Electric Corporation
Disposal of Coal Combustion Residuals (CCR) from Electric Utilities Final Rule
Structural Integrity Criteria for Existing CCR Surface Impoundments
Initial Safety Factor Assessment

CCR Surface Impoundment Information

Name:	Pond A Legacy CCR Impoundment
Operator:	BREC Coleman Station
Address:	4982 River Road Hawesville, Kentucky 42348

Qualified Professional Engineer

Name:	David A. Lamb
Company:	Associated Engineers, Inc.
Kentucky P.E. Number:	17822

Regulatory Applicability

As part of the § 257.73 Structural integrity criteria for existing CCR surface impoundments requirements, an owner or operator of an existing CCR surface impoundment must no later than May 8, 2026:

> Conduct an initial safety factor assessment for each CCR unit and document whether the calculated factors of safety for each CCR unit achieve the minimum safety factors specified below for the critical cross section of the embankment. The critical cross section is the cross section anticipated to be the most susceptible of all cross sections to structural failure based on appropriate engineering considerations, including loading conditions. The safety factor assessments must be supported by appropriate engineering calculations, documenting whether the CCR unit achieves the following minimum factors of safety:

1. The calculated static factor of safety under the long-term, maximum storage pool loading condition must equal or exceed 1.50.

2. The calculated static factor of safety under the maximum surcharge pool loading condition must equal or exceed 1.40.

3. The calculated seismic factor of safety must equal or exceed 1.00.

4. For dikes constructed of soils that have susceptibility to liquefaction, the calculated liquefaction factor of safety must equal or exceed 1.20.

From: VI. Development of the Final Rule - Technical Requirements

General Safety Factor Assessment Considerations

Generally accepted engineering methodologies specify that the determination of the structural stability factors of safety specified above is to be calculated by the qualified professional engineer using conventional analysis procedures or, if necessary, special analysis procedures. Conventional analysis procedures include, but are not limited to, limit equilibrium methods of slope stability analysis, whereas, special analysis procedures include, but are not limited to, finite element methods, finite difference methods, three-dimensional methods, or probabilistic methods. Whichever methodology is used to determine the factors of safety of the CCR surface impoundment, the qualified professional engineer must document the methodology used, as well as the basis for using that methodology, and the analysis must be supported by appropriate engineering calculations.

The Calculated Static Factor of Safety Under the Long-Term, Maximum Storage Pool Loading Condition

It is generally accepted practice to analyze the stability of the downstream slope of the dam embankment for steady-state seepage (or steady seepage) conditions with the reservoir at its normal operating pool elevation (usually the spillway crest elevation) since this is the loading condition the embankment will experience most. This condition is called steady seepage with maximum storage pool. The maximum storage pool loading is the maximum water level that can be maintained that will result in the full development of a steady-state seepage condition. Maximum storage pool loading conditions need to be calculated to ensure that the CCR surface impoundment can withstand a maximum expected pool elevation with full development of saturation in the embankment under long-term loading. The final rule requires that the calculated static factor of safety for the critical cross section of the CCR surface impoundment under the long-term maximum storage pool loading condition meet or exceed 1.5.

The Calculated Static Factor of Safety Under the Maximum Surcharge Pool Loading Condition

The maximum surcharge pool loading condition is calculated to evaluate the effect of a raised level (e.g., flood surcharge) on the stability of the downstream slope. This ensures that the CCR surface impoundment can withstand a temporary rise in pool elevation above the maximum storage pool elevation for which the CCR surface impoundment may normally be subject under inflow design flood stage, for a short-term until the inflow design flood is passed through the CCR surface impoundment. The final rule requires that the calculated static factor of safety for the critical cross section of the CCR surface impoundment under the long-term maximum surcharge pool loading condition meet or exceed 1.4.

The Calculated Seismic Factor of Safety

All CCR surface impoundments, including any lateral expansions that exceed the size threshold must meet a seismic factor of safety equal to or greater than 1.0. All CCR surface impoundments must also be capable of withstanding a design earthquake without damage to the foundation or embankment that would cause a discharge of its contents. To further support the location criteria established in this rule, CCR surface impoundments and any lateral expansion exceeding a specific height and/or volume threshold must be assessed under seismic loading conditions for a seismic loading event with a 2% probability of exceedance in 50 years, equivalent to a return period of approximately 2,500 years, based on the USGS seismic hazard maps for seismic events with this return period for the region where the CCR unit is located. EPA chose the 2% exceedance probability in 50 years event based on its common use in seismic design criteria throughout engineering.

The Calculated Liquefaction Factor of Safety

All CCR surface impoundments, including any lateral expansions that exceed the size threshold and have been determined to contain soils susceptible to liquefaction must meet a liquefaction factor of safety equal to or greater than 1.20. A prudent engineering analysis of structural stability also includes a liquefaction potential analysis and analysis of post-liquefaction static factors of safety. As discussed previously, liquefaction is a phenomenon which typically occurs in loose, saturated or partially-saturated soils in which the effective stress of the soils reduces to zero, corresponding to a total loss of shear strength of the soil. The most common occurrence of liquefaction is in loose soils, typically sands. The liquefaction FOS determination in the final rule is used to determine if a CCR unit would remain stable if the soils of the embankment of the CCR unit were to experience liquefaction. Liquefaction analysis is only necessary in instances where CCR surface impoundments show, through representative soil sampling, construction documentation, or anecdotal evidence from personnel with knowledge of the CCR unit's construction, that soils of the embankment are susceptible to liquefaction.

Failure To Demonstrate Minimum Safety Factors or Failure To Complete a Timely Safety Factor Assessment

As previously discussed, the rule requires an owner or operator to document that the calculated factors of safety for each CCR surface impoundment achieve the minimum safety factors specified in the rule. For any CCR surface impoundment that does not meet these requirements, the owner or operator must either take any engineering measure necessary to ensure that the unit meets the requirements by the rule's deadlines, or cease placement of CCR and non-CCR waste into the unit and initiate closure of such CCR unit as provided in section 257.102 within six months. Similarly, if an owner or operator fails to complete the initial safety factor assessment or any subsequent periodic factor safety assessment by the deadlines established in the rule, the owner or operator must cease placing CCR and non-CCR waste into the unit and initiate closure within six months.

Description of Impoundment

An aerial photo of the CCR unit is provided as Attachment A and an excerpt from U.S. Geological Survey (USGS) 7.5 minute Robards and Delaware topographic quadrangle maps showing the location of the CCR unit is provided as Attachment B.

The Legacy CCR unit which has been in place for 45 years, was used for the placement of coal combustion residual material; Primarily sluiced fly ash and bottom ash. No CCR was placed in the pond after the coal units were retired in May 2014. The immediate watershed that drains to the CCR unit and in which the CCR unit is located, is unnamed and 48 acres in size. This is an elevated structure, and the only inflow is precipitation that falls directly on the structure. Discharge is routed directly to the Ohio River

The CCR unit is a combined incised/earthen embankment structure. Embankments form the perimeter of the structure. The lower portion of the structure is incised. The interior of the pond was used as a borrow area. Original ground inside the structure ranged in elevation from elevation 390 to elevation 400. Based on the Burns & Roe, Inc. Design Manual dated February 1980 the borrow excavation went as low as elevation 388. The Ohio River is located approximately 200 feet east of the structure. Due to surface relief, the toe area of the structure is subject to flooding. The area was made up of cultivated fields containing a house place. The area generally drains east to the Ohio River. Underlying preconstruction soils consisted of Quaternary Alluvium. This material is variable in composition, locally consisting of unconsolidated sand, gravel, silt, or clay. Bedrock underlying the site is part of the Pennsylvanian Caseyville and Tradewater formations. Bedrock lies a 115’ to 165’ below the surface.

The dike is generally at elevation 415. The dike reaches a maximum height of 27 feet along the northwest corner. The dike reaches a maximum height of approximately 28 feet on the northwest corner. The Associated Engineers, Inc. survey dated March 20, 2019 was reviewed. It should be noted that the current condition was field verified. Based on grading activities that have occurred after the pond ceased receiving CCR there is no longer impounded water visible in the structure. The SM&E geotechnical report dated April 2019 indicated that no groundwater was encountered in holes drilled inside the pond limits.

Depths of impounded water and CCR are 0.0 feet and 27 feet (at respective locations of maximum impounded water and CCR depths). Corresponding elevations of impounded CCR is 411 feet, above mean sea level. This was verified by geotechnical drilling conducted inside the dry pond in April 2019.
The remaining storage capacity is approximately 217,800 cubic yards (if water can accumulate to the elevation of the emergency spillway). This volume was calculated based on the maximum allowable storage volume and the current volume of CCR stored in the facility based on the most recent survey.

The approximate volume of impounded water and CCR is 1,470,00 cubic yards (approximate water volume is 2,250 cubic yards (in an isolated shallow depression) and approximate CCR volume is 1,467,749.00 cubic yards). This volume was calculated based on the maximum storage capacity, the current amount of CCR stored in the facility based on the most recent survey, and the best available as-built data for the structure construction prior to placement of CCR.

The CCR impoundment emergency discharge consists of a rip rap trapezoidal channel with a bottom width of 20 feet at elevation 414 feet with 30:1 side slopes to elevation 415. This discharges into a rip rap energy dissipation pad. There is no evidence that this emergency spillway has discharged. The primary discharge of the impoundment is a concrete discharge structure with adjustable stop logs with a minimum elevation of 388 discharging to a 36" reinforced concrete pipe at elevation 386 which discharges to the Ohio River. Stop logs have been placed to elevation 408 and the pond shows no evidence of discharging or accumulating water.

Calculated Safety Factors

Results of the initial safety factor assessment for the critical cross section anticipated to be the most susceptible of all cross sections to structural failure based on appropriate engineering considerations, including loading conditions. The safety factor assessments are supported by appropriate engineering calculations.

The safety factor analysis was conducted using the Rocscience Inc. Slide geotechnical software by evaluating four cross sections along the embankment. Slide provides numerical tools to analyze the stability of embankments using limit equilibrium methods. At each cross section, drilling, surveying, laboratory testing, and a slope stability analysis were performed. Based on the four analysis scenarios, the lowest factor of safety for all scenarios was not found at a single cross section; therefore, the results listed below are the lowest factor of safety realized from all analyzed cross sections for each scenario. The safety factor assessments are supported by appropriate engineering calculations and the Slide modeling results for the Coleman Station Legacy Pond A CCR impoundment were utilized for the development of this reprot.

1. The calculated static factor of safety under the long-term, maximum storage pool loading condition equals: 1.62

2. The calculated static factor of safety under the maximum surcharge pool loading condition equals: 1.62

3. The calculated seismic factor of safety equals: 1.40

4. For dikes constructed of soils that have susceptibility to liquefaction, the calculated liquefaction factor of safety equals: 1.800

Against the conservative composite cross-section developed, Pond A meets the minimum factors of safety required under 40 CFR §257.73(e) for all three regulatory loading cases (long-term maximum storage pool, maximum surcharge pool, and pseudo-static seismic).

Sources of Information

Geotechnical and other information provided by Associated Engineers, Inc.

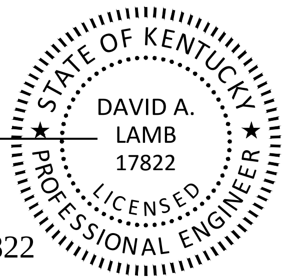
Geotechnical data obtained during geotechnical investigations performed by SM&E in April 2019. Reliance letter Dated April 14, 2026

Engineering design drawings and other information provided by Big Rivers Electric Corporation

United States Geological Survey U.S. Geological Survey (USGS) 7.5 minute Robards and Delaware topographic quadrangle maps

Professional Engineer Certification [Per 40 CFR § 257.73]
Coleman CCR Impoundment Initial Safety Factor Assessment

I hereby certify that myself or an agent under my review has prepared this Initial Safety Factor Assessment (Assessment), and being familiar with the provisions of the final rule to regulate the disposal of coal combustion residuals (CCR) as solid waste under subtitle D of the Resource Conservation and Recovery Act (RCRA), attest that this Assessment has been prepared in accordance with good engineering practices and meets the intent of 40 CFR Part 257.73. To the best of my knowledge and belief, the information contained in this Assessment is true, complete, and accurate.



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David A. Lamb P.E.

State of Kentucky License No. 17822

Date: May 8, 2026

Big Rivers Electric Corp.	Job Number: 25-0007
Coleman Facility, Hawesville, Kentucky	Date: 01/30/2026
Attachment A: Pond A Inspection Map	Scale: 1" = 400'
	Drawn By: D.T.H.

Revisions:

ASSOCIATED ENGINEERS, INC.
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Big Rivers Electric Corp.	Job Number: 25-0007	Revisions:
Coleman Facility, Hawesville, Kentucky Attachment B: Pond A Inspection Map - USGS TOPO OVERLAY	Date: 01/30/2026 Scale: 1" = 400' Drawn By: D.T.H.	

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Coleman Station Legacy Pond C CCR Surface Impoundment

Disposal of Coal Combustion Residuals (CCR) from Electric Utilities Final Rule
Structural Integrity Criteria for Existing CCR Surface Impoundments
Initial Safety Factor Assessment

May 8, 2026

Prepared By:

ASSOCIATED ENGINEERS, INC.
2740 North Main St. • Madisonville, KY 42431
Phone: (270) 821-7732 • Fax: (270) 821-7789

Project ID: 26-0144

Big Rivers Electric Corporation
Disposal of Coal Combustion Residuals (CCR) from Electric Utilities Final Rule
Structural Integrity Criteria for Existing CCR Surface Impoundments
Initial Safety Factor Assessment

CCR Surface Impoundment Information

Name:	Pond C Legacy CCR Impoundment
Operator:	BREC Coleman Station
Address:	4982 River Road Hawesville, Kentucky 42348

Qualified Professional Engineer

Name:	David A. Lamb
Company:	Associated Engineers, Inc.
Kentucky P.E. Number:	17822

Regulatory Applicability

As part of the § 257.73 Structural integrity criteria for existing CCR surface impoundments requirements, an owner or operator of an existing CCR surface impoundment must no later than May 8, 2026:

> Conduct an initial safety factor assessment for each CCR unit and document whether the calculated factors of safety for each CCR unit achieve the minimum safety factors specified below for the critical cross section of the embankment. The critical cross section is the cross section anticipated to be the most susceptible of all cross sections to structural failure based on appropriate engineering considerations, including loading conditions. The safety factor assessments must be supported by appropriate engineering calculations, documenting whether the CCR unit achieves the following minimum factors of safety:

1. The calculated static factor of safety under the long-term, maximum storage pool loading condition must equal or exceed 1.50.

2. The calculated static factor of safety under the maximum surcharge pool loading condition must equal or exceed 1.40.

3. The calculated seismic factor of safety must equal or exceed 1.00.

4. For dikes constructed of soils that have susceptibility to liquefaction, the calculated liquefaction factor of safety must equal or exceed 1.20.

From: VI. Development of the Final Rule - Technical Requirements

General Safety Factor Assessment Considerations

Generally accepted engineering methodologies specify that the determination of the structural stability factors of safety specified above is to be calculated by the qualified professional engineer using conventional analysis procedures or, if necessary, special analysis procedures. Conventional analysis procedures include, but are not limited to, limit equilibrium methods of slope stability analysis, whereas, special analysis procedures include, but are not limited to, finite element methods, finite difference methods, three-dimensional methods, or probabilistic methods. Whichever methodology is used to determine the factors of safety of the CCR surface impoundment, the qualified professional engineer must document the methodology used, as well as the basis for using that methodology, and the analysis must be supported by appropriate engineering calculations.

The Calculated Static Factor of Safety Under the Long-Term, Maximum Storage Pool Loading Condition

It is generally accepted practice to analyze the stability of the downstream slope of the dam embankment for steady-state seepage (or steady seepage) conditions with the reservoir at its normal operating pool elevation (usually the spillway crest elevation) since this is the loading condition the embankment will experience most. This condition is called steady seepage with maximum storage pool. The maximum storage pool loading is the maximum water level that can be maintained that will result in the full development of a steady-state seepage condition. Maximum storage pool loading conditions need to be calculated to ensure that the CCR surface impoundment can withstand a maximum expected pool elevation with full development of saturation in the embankment under long-term loading. The final rule requires that the calculated static factor of safety for the critical cross section of the CCR surface impoundment under the long-term maximum storage pool loading condition meet or exceed 1.5.

The Calculated Static Factor of Safety Under the Maximum Surcharge Pool Loading Condition

The maximum surcharge pool loading condition is calculated to evaluate the effect of a raised level (e.g., flood surcharge) on the stability of the downstream slope. This ensures that the CCR surface impoundment can withstand a temporary rise in pool elevation above the maximum storage pool elevation for which the CCR surface impoundment may normally be subject under inflow design flood stage, for a short-term until the inflow design flood is passed through the CCR surface impoundment. The final rule requires that the calculated static factor of safety for the critical cross section of the CCR surface impoundment under the long-term maximum surcharge pool loading condition meet or exceed 1.4.

The Calculated Seismic Factor of Safety

All CCR surface impoundments, including any lateral expansions that exceed the size threshold must meet a seismic factor of safety equal to or greater than 1.0. All CCR surface impoundments must also be capable of withstanding a design earthquake without damage to the foundation or embankment that would cause a discharge of its contents. To further support the location criteria established in this rule, CCR surface impoundments and any lateral expansion exceeding a specific height and/or volume threshold must be assessed under seismic loading conditions for a seismic loading event with a 2% probability of exceedance in 50 years, equivalent to a return period of approximately 2,500 years, based on the USGS seismic hazard maps for seismic events with this return period for the region where the CCR unit is located. EPA chose the 2% exceedance probability in 50 years event based on its common use in seismic design criteria throughout engineering.

The Calculated Liquefaction Factor of Safety

All CCR surface impoundments, including any lateral expansions that exceed the size threshold and have been determined to contain soils susceptible to liquefaction must meet a liquefaction factor of safety equal to or greater than 1.20. A prudent engineering analysis of structural stability also includes a liquefaction potential analysis and analysis of post-liquefaction static factors of safety. As discussed previously, liquefaction is a phenomenon which typically occurs in loose, saturated or partially-saturated soils in which the effective stress of the soils reduces to zero, corresponding to a total loss of shear strength of the soil. The most common occurrence of liquefaction is in loose soils, typically sands. The liquefaction FOS determination in the final rule is used to determine if a CCR unit would remain stable if the soils of the embankment of the CCR unit were to experience liquefaction. Liquefaction analysis is only necessary in instances where CCR surface impoundments show, through representative soil sampling, construction documentation, or anecdotal evidence from personnel with knowledge of the CCR unit's construction, that soils of the embankment are susceptible to liquefaction.

Failure To Demonstrate Minimum Safety Factors or Failure To Complete a Timely Safety Factor Assessment

As previously discussed, the rule requires an owner or operator to document that the calculated factors of safety for each CCR surface impoundment achieve the minimum safety factors specified in the rule. For any CCR surface impoundment that does not meet these requirements, the owner or operator must either take any engineering measure necessary to ensure that the unit meets the requirements by the rule's deadlines, or cease placement of CCR and non-CCR waste into the unit and initiate closure of such CCR unit as provided in section 257.102 within six months. Similarly, if an owner or operator fails to complete the initial safety factor assessment or any subsequent periodic factor safety assessment by the deadlines established in the rule, the owner or operator must cease placing CCR and non-CCR waste into the unit and initiate closure within six months.

Description of Impoundment

An aerial photo of the CCR unit is provided as Attachment A and an excerpt from U.S. Geological Survey (USGS) 7.5 minute Robards and Delaware topographic quadrangle maps showing the location of the CCR unit is provided as Attachment B.

The Legacy CCR unit was used for the placement of coal combustion residual material; Primarily slurried bottom ash and fly ash. No CCR was placed in the pond after the coal units were retired in May of 2014. The immediate watershed that drains to the CCR unit, and in which the CCR unit is considered to be located, is unnamed and 90 acres in size.

The CCR unit is a combined incised/earthen embankment structure. Embankments with a maximum height of 15 feet from the perimeter of the structure. The lower portion of the structure is incised. The interior of the pond was used as a borrow area. The Ohio River is located approximately 800 feet east of the structure. Due to surface relief, the toe area of the south dike is subject to flooding. The area was made up historically of cultivated fields, draining to the Ohio River. Underlying preconstruction soils consisted of Quaternary Alluvium. This material is variable in composition, locally consisting of unconsolidated sand, gravel, silt, or clay. Bedrock underlying the site is part of the Pennsylvanian Caseyville and Tradewater formations. Bedrock lies a 115' to 165' below the surface.

The Soil Survey of Daviess and Hancock Counties, Kentucky, published by the U.S. Department of Agriculture Soil Conservations Service, indicates the following soil units to be· present at the surface over the site: Otwell silt loam (OtA), Wheling loam (WnB), Weinbach silt loam 9Wh), Newark silt loam (Ne), Elk silt loam_ (EkB), Jacob silty clay loam (Ja), and the Ginat silt loam (Gn).
Although several units are represented, they exhibit a similar range of properties with regard to texture and engineering. Most are silt loams or silty clay loams, with engineering classification being silt (ML), silty clay (CL-ML), or lean clay (CL). Shrink-swell potential is generally low. This was verified by the geotechnical data obtained during geotechnical investigations performed by SM&E in April 2019. This data was reviewed as part of this report. The final as Built for this structure is dated February 12, 1971. Historic drawings provided by Big Rivers Electric Corporation and reviewed as a part of this report show the pond to be very close to full in August of 1990.

The dike is generally at elevation 405. The dike reaches a maximum height of 15 feet along the west and southern portion of the structure. There is also a rail bed constructed along the west and north portion of the dike. The east side of the structure appears to be incised. The north side of the structure is contained by fill placed for the plant entrance road and plant construction.

There are numerous transmission lines and associated power poles throughout the pond. The pond has had a soil cover placed and the area is currently vegetated and maintained.

The Inactive Ash Pond C Legacy CCR Impoundment is a combined incised/earthen embankment structure. The pond covers an area of approximately ninety (90) acres; the crest is approximately 8,000 feet long with the earthen embankment being approximately 6,300 feet long with a maximum height of 15 feet. The embankments were built with 2:1 upstream and downstream slopes. A decant is located in the southern area of the pond. The primary outlet structure is a 24-inch diameter, slotted PVC riser connected to a 24" diameter PVC pipe located along the south dike. The decant valve remains closed so no water is discharged.

There is no impounded water in the structure at this time. There are areas inside the structure where the covered and vegetated CCR reaches elevation 412. Based on review of geotechnical data, the CCR reaches an estimated maximum thickness of 19 feet.

This was verified by the geotechnical data obtained during geotechnical investigations performed by SM&E in April 2019. This data was reviewed as part of this report. The final as Built for this structure is dated February 12, 1971. Historic drawings provided by Big Rivers Electric Corporation and reviewed as a part of this report show the pond to be very close to full in August of 1990.

The impoundment has a gated outfall structure located approximately 935 feet east of the southwest corner of the structure. The valve remains closed at all times and the pond area is a vegetated field which absorbs the precipitation from rainfall events.

Calculated Safety Factors

Results of the initial safety factor assessment for the critical cross section anticipated to be the most susceptible of all cross sections to structural failure based on appropriate engineering considerations, including loading conditions. The safety factor assessments are supported by appropriate engineering calculations.

The safety factor analysis was conducted using the Rocscience Inc. Slide geotechnical software by evaluating four cross sections along the embankment. Slide provides numerical tools to analyze the stability of embankments using limit equilibrium methods. At each cross section, drilling, surveying, laboratory testing, and a slope stability analysis were performed. Based on the four analysis scenarios, the lowest factor of safety for all scenarios was not found at a single cross section; therefore, the results listed below are the lowest factor of safety realized from all analyzed cross sections for each scenario. The safety factor assessments are supported by appropriate engineering calculations and the Slide modeling results for the Coleman Station Legacy Pond C CCR impoundment were utilized for the development of this reprot.

1. The calculated static factor of safety under the long-term, maximum storage pool loading condition equals: 1.75

2. The calculated static factor of safety under the maximum surcharge pool loading condition equals: 1.75

3. The calculated seismic factor of safety equals: 1.51

4. For dikes constructed of soils that have susceptibility to liquefaction, the calculated liquefaction factor of safety equals: 1.800

Against the conservative composite cross-section developed, Pond C meets the minimum factors of safety required under 40 CFR §257.73(e) for all three regulatory loading cases (long-term maximum storage pool, maximum surcharge pool, and pseudo-static seismic).

Sources of Information

Geotechnical and other information provided by Associated Engineers, Inc.

Geotechnical data obtained during geotechnical investigations performed by SM&E in April 2019. Reliance letter Dated April 14, 2026

Engineering design drawings and other information provided by Big Rivers Electric Corporation

United States Geological Survey U.S. Geological Survey (USGS) 7.5 minute Robards and Delaware topographic quadrangle maps

Professional Engineer Certification [Per 40 CFR § 257.73]
Coleman Station Legacy Pond C CCR Impoundment Initial Safety Factor Assessment

I hereby certify that myself or an agent under my review has prepared this Initial Safety Factor Assessment (Assessment), and being familiar with the provisions of the final rule to regulate the disposal of coal combustion residuals (CCR) as solid waste under subtitle D of the Resource Conservation and Recovery Act (RCRA), attest that this Assessment has been prepared in accordance with good engineering practices and meets the intent of 40 CFR Part 257.73. To the best of my knowledge and belief, the information contained in this Assessment is true, complete, and accurate.

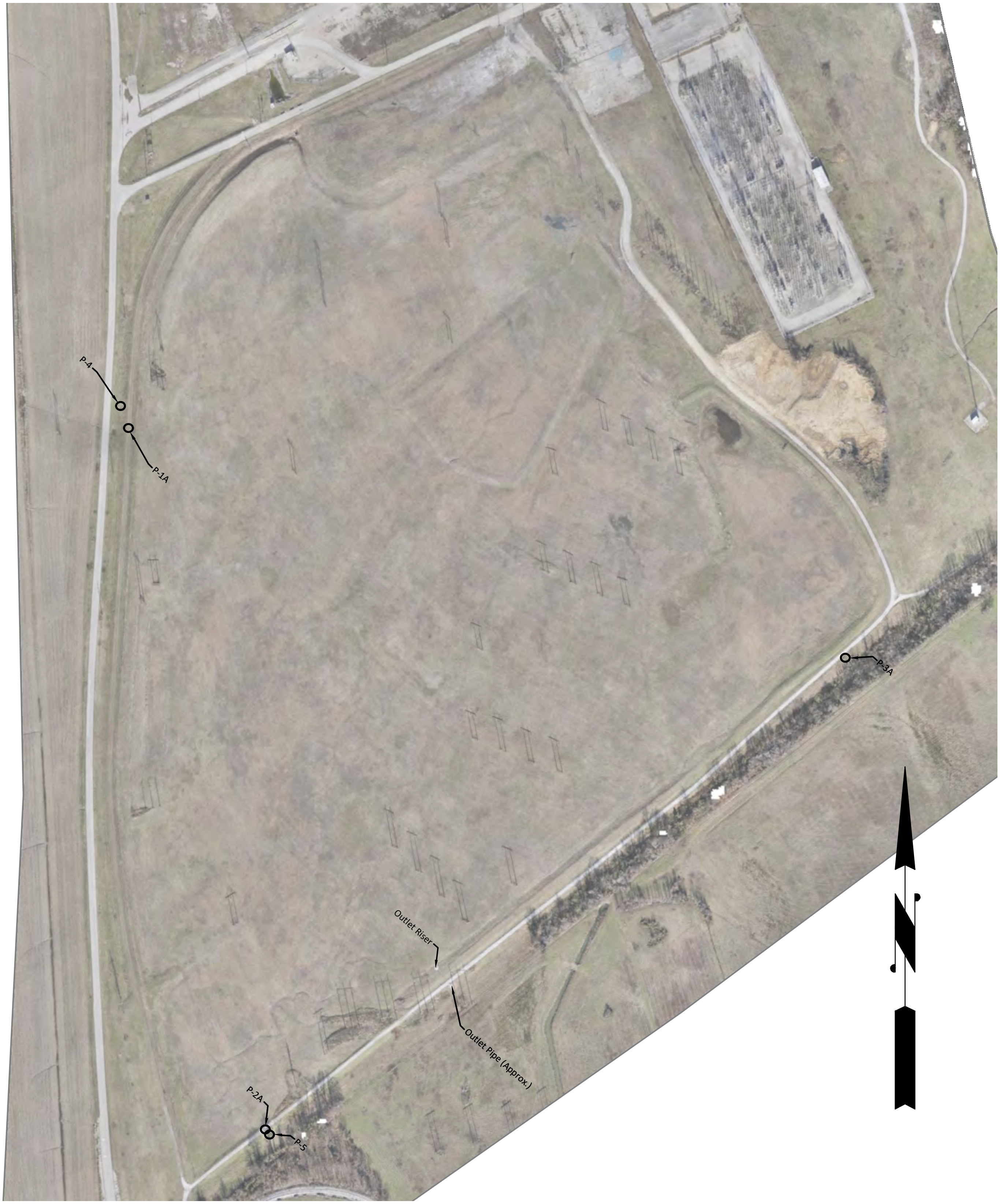
____

David A. Lamb P.E.

State of Kentucky License No. 17822

STATE OF KENTUCKY
DAVID A. LAMB 17822
LICENSED
PROFESSIONAL ENGINEER

Date: May 8, 2026



Big Rivers Electric Corp.	Job Number: 25-0007	Revisions:
Coleman Facility, Hawesville, Kentucky	Date: 01/30/2026	
Attachment A: Pond C Inspection Map	Scale: 1" = 400'	
	Drawn By: D.T.H.	

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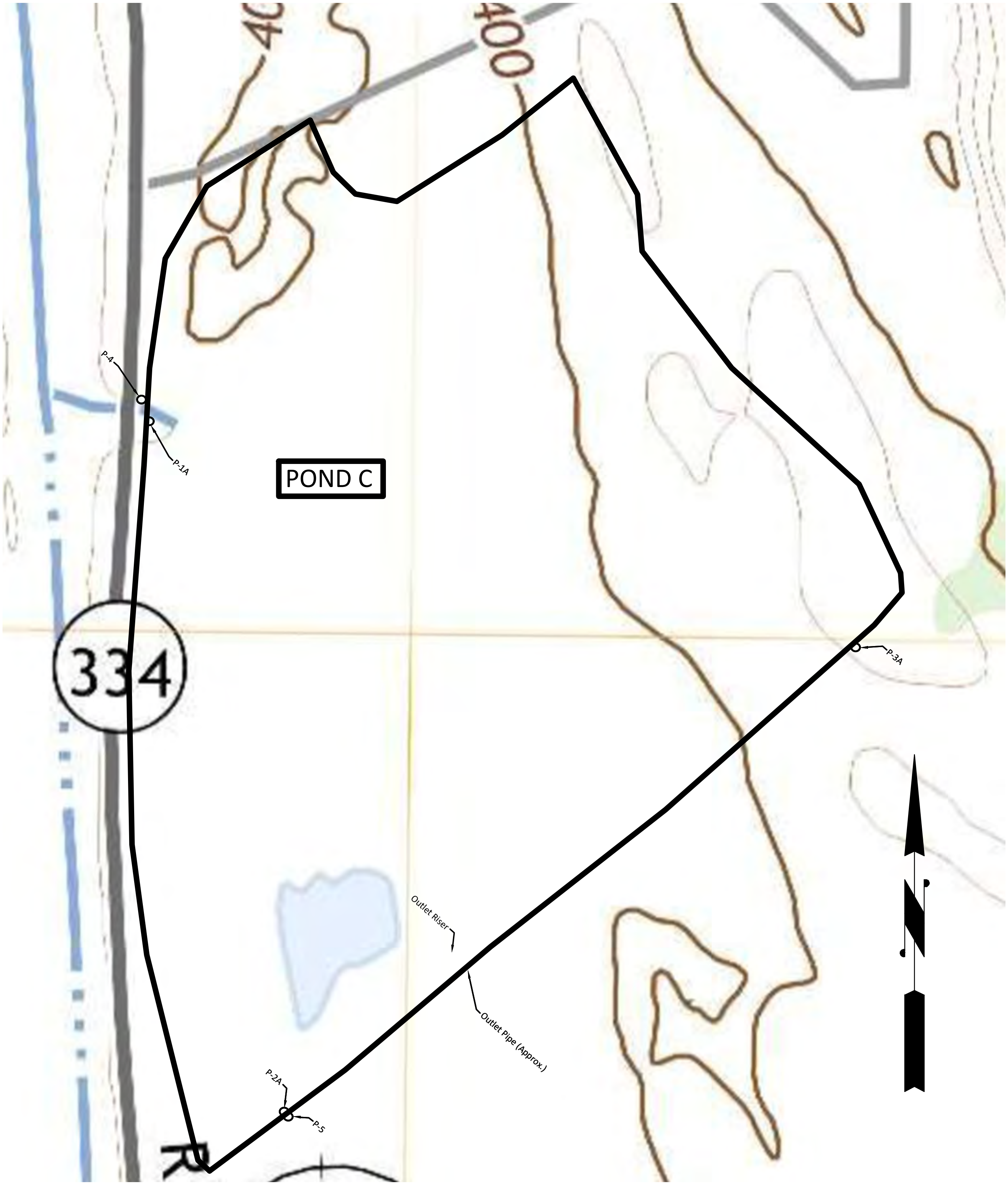

Big Rivers Electric Corp.	Job Number: 25-0007	Revisions:
Coleman Facility, Hawesville, Kentucky	Date: 01/30/2026	
Attachment B: Pond C Inspection Map - USGS TOPO OVERLAY	Scale: 1" = 400'	
	Drawn By: D.T.H.	

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Big Rivers ELECTRIC CORPORATION

Coleman Station Legacy Pond D CCR Surface Impoundment

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CCR Surface Impoundment Information

Name:	Pond D Legacy CCR Impoundment
Operator:	BREC Coleman Station
Address:	4982 River Road Hawesville, Kentucky 42348
CCR Unit Identification Number:	Kentucky State Dam Inventory System ID No. 01255

Qualified Professional Engineer

Name:	David A. Lamb
Company:	Associated Engineers, Inc.
Kentucky P.E. Number:	17822

Regulatory Applicability

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1. The calculated static factor of safety under the long-term, maximum storage pool loading condition must equal or exceed 1.50.

2. The calculated static factor of safety under the maximum surcharge pool loading condition must equal or exceed 1.40.

3. The calculated seismic factor of safety must equal or exceed 1.00.

4. For dikes constructed of soils that have susceptibility to liquefaction, the calculated liquefaction factor of safety must equal or exceed 1.20.

From: VI. Development of the Final Rule - Technical Requirements

General Safety Factor Assessment Considerations

Generally accepted engineering methodologies specify that the determination of the structural stability factors of safety specified above is to be calculated by the qualified professional engineer using conventional analysis procedures or, if necessary, special analysis procedures. Conventional analysis procedures include, but are not limited to, limit equilibrium methods of slope stability analysis, whereas, special analysis procedures include, but are not limited to, finite element methods, finite difference methods, three-dimensional methods, or probabilistic methods. Whichever methodology is used to determine the factors of safety of the CCR surface impoundment, the qualified professional engineer must document the methodology used, as well as the basis for using that methodology, and the analysis must be supported by appropriate engineering calculations.

The Calculated Static Factor of Safety Under the Long-Term, Maximum Storage Pool Loading Condition

It is generally accepted practice to analyze the stability of the downstream slope of the dam embankment for steady-state seepage (or steady seepage) conditions with the reservoir at its normal operating pool elevation (usually the spillway crest elevation) since this is the loading condition the embankment will experience most. This condition is called steady seepage with maximum storage pool. The maximum storage pool loading is the maximum water level that can be maintained that will result in the full development of a steady-state seepage condition. Maximum storage pool loading conditions need to be calculated to ensure that the CCR surface impoundment can withstand a maximum expected pool elevation with full development of saturation in the embankment under long-term loading. The final rule requires that the calculated static factor of safety for the critical cross section of the CCR surface impoundment under the long-term maximum storage pool loading condition meet or exceed 1.5.

The Calculated Static Factor of Safety Under the Maximum Surcharge Pool Loading Condition

The maximum surcharge pool loading condition is calculated to evaluate the effect of a raised level (e.g., flood surcharge) on the stability of the downstream slope. This ensures that the CCR surface impoundment can withstand a temporary rise in pool elevation above the maximum storage pool elevation for which the CCR surface impoundment may normally be subject under inflow design flood stage, for a short-term until the inflow design flood is passed through the CCR surface impoundment. The final rule requires that the calculated static factor of safety for the critical cross section of the CCR surface impoundment under the long-term maximum surcharge pool loading condition meet or exceed 1.4.

The Calculated Seismic Factor of Safety

All CCR surface impoundments, including any lateral expansions that exceed the size threshold must meet a seismic factor of safety equal to or greater than 1.0. All CCR surface impoundments must also be capable of withstanding a design earthquake without damage to the foundation or embankment that would cause a discharge of its contents. To further support the location criteria established in this rule, CCR surface impoundments and any lateral expansion exceeding a specific height and/or volume threshold must be assessed under seismic loading conditions for a seismic loading event with a 2% probability of exceedance in 50 years, equivalent to a return period of approximately 2,500 years, based on the USGS seismic hazard maps for seismic events with this return period for the region where the CCR unit is located. EPA chose the 2% exceedance probability in 50 years event based on its common use in seismic design criteria throughout engineering.

The Calculated Liquefaction Factor of Safety

All CCR surface impoundments, including any lateral expansions that exceed the size threshold and have been determined to contain soils susceptible to liquefaction must meet a liquefaction factor of safety equal to or greater than 1.20. A prudent engineering analysis of structural stability also includes a liquefaction potential analysis and analysis of post-liquefaction static factors of safety. As discussed previously, liquefaction is a phenomenon which typically occurs in loose, saturated or partially-saturated soils in which the effective stress of the soils reduces to zero, corresponding to a total loss of shear strength of the soil. The most common occurrence of liquefaction is in loose soils, typically sands. The liquefaction FOS determination in the final rule is used to determine if a CCR unit would remain stable if the soils of the embankment of the CCR unit were to experience liquefaction. Liquefaction analysis is only necessary in instances where CCR surface impoundments show, through representative soil sampling, construction documentation, or anecdotal evidence from personnel with knowledge of the CCR unit's construction, that soils of the embankment are susceptible to liquefaction.

Failure To Demonstrate Minimum Safety Factors or Failure To Complete a Timely Safety Factor Assessment

As previously discussed, the rule requires an owner or operator to document that the calculated factors of safety for each CCR surface impoundment achieve the minimum safety factors specified in the rule. For any CCR surface impoundment that does not meet these requirements, the owner or operator must either take any engineering measure necessary to ensure that the unit meets the requirements by the rule's deadlines, or cease placement of CCR and non-CCR waste into the unit and initiate closure of such CCR unit as provided in section 257.102 within six months. Similarly, if an owner or operator fails to complete the initial safety factor assessment or any subsequent periodic factor safety assessment by the deadlines established in the rule, the owner or operator must cease placing CCR and non-CCR waste into the unit and initiate closure within six months.

Description of Impoundment

An aerial photo of the CCR unit is provided as Attachment A and an excerpt from U.S. Geological Survey (USGS) 7.5 minute Robards and Delaware topographic quadrangle maps showing the location of the CCR unit is provided as Attachment B.

The Legacy CCR unit was used for the placement of coal combustion residual material; Primarily gypsum delivered to the pond by truck beginning October 2008. No CCR was placed in the pond after the coal units were retired in May 2014. The immediate watershed that drains to the CCR unit, and in which the CCR unit is located, is unnamed and 83.5 acres in size.

The CCR unit is a combined incised/earthen embankment structure. Embankments form the perimeter of the structure. The lower portion of the structure is incised. The interior of the pond was used as a borrow area. Original ground inside the structure ranged in elevation from elevation 387 to elevation 402. Based on September 22, 2008, As-Build drawing the borrow excavation went as low as elevation 376. The Ohio River is located approximately 300 feet east of the structure. Due to surface relief, the toe area of the structure is subject to flooding. The area was made up of cultivated fields with a low ridge transecting the area from southwest to northeast, draining northeast to the Ohio River. Underlying preconstruction soils consisted of Quaternary Alluvium. This material is variable in composition, locally consisting of unconsolidated sand, gravel, silt, or clay. Bedrock underlying the site is part of the Pennsylvanian Caseyville and Tradewater formations. Bedrock lies a 115’ to 165’ below the surface.

The Soil Survey of Daviess and Hancock Counties, Kentucky, published by the U.S. Department of Agriculture Soil Conservations Service, indicates the following soil units to be· present at the surface over the site: Otwell silt loam (OtA), Wheling loam (WnB), Weinbach silt loam 9Wh), Newark silt loam (Ne), Elk silt loam_ (EkB), Jacob silty clay loam (Ja), and the Ginat silt loam (Gn).

Although several units are represented, they exhibit a similar range of properties with regard to texture and engineering. Most are silt loams or silty clay loams, with engineering classification being silt (ML), silty clay (CL-ML), or lean clay (CL). Shrink-swell potential is generally low. This was verified by the geotechnical data obtained to gain approval from the Kentucky Natural Resources and Environmental Protection Cabinet. Permit No. 14678 was issued on January 25, 2005. This was further verified by the geotechnical data obtained during geotechnical investigations performed by SM&E in April 2019. This data was reviewed as part of this report. The final as Built for this structure is dated September 22, 2008. Historic drawings and aerial photography provided by Big Rivers Electric Corporation and Associated Engineers, Inc. reviewed as a part of this report show the pond never impounded significant water.

The dike is generally at elevation 415. The dike reaches a maximum height of 27 feet along the northwest corner. The east dike reaches a maximum height of approximately 25 feet on the north end and 17 feet at the south end. The south dike height trends from 16 feet at the east end to 21 feet at the west end. The west dike height ranges in height from 25 feet at the south end to 27 feet at the north end. The Associated Engineers, Inc. plans approved in the Dam Construction permit dated January 25, 2005 were reviewed. It should be noted that the approved plans allow for a dam crest elevation of 424. The construction was terminated at elevation 415. CCR primarily composed of dry Gypsum has been placed in the impoundment and a significant portion has been reclaimed for beneficial reuse. The main body of the pond does not impound water at this time. The stormwater portion of the structure on the northeast corner is the only area that impounds water.

Depth of impounded water in the storm water section of the pond is currently approximately 6 feet. The approximate volume of impounded water in the storm water section of the pond is 29,095 cubic yards. Maximum and minimum elevation of CCR is 414 feet and 379 feet, respectively, above mean sea level. These approximate depths and respective elevations are based on the most recent (December 2025) flight derived topographic contours.

Between 2020 and 2023 approximately 919,802 cubic yards of gypsum were removed from the impoundment for beneficial reuse purposes. The remaining storage capacity is approximately 1,599,800 cubic yards. This volume was calculated based on the maximum allowable storage volume and the current volume of CCR stored in the facility based on the most recent survey.

The CCR portion of impoundment discharge consists of a rip rap trapezoidal channel with a bottom width of 10 feet at elevation 410 feet with 3:1 side slopes to elevation 412. This discharges into the stormwater portion of the impoundment. The discharge from this portion of the impoundment is a valved 18" BCCMP at elevation 401 which enters the 5' diameter precast discharge riser with a 4'x4' inlet at elevation 409.1 feet. The discharge structure has a 36" RCP with Anti-seep collars that penetrates the embankment and discharges at elevation 390.

The Legacy CCR facility listed in the Kentucky State Dam Inventory System ID No. 01255 as a Low Hazard facility.

<u>Calculated Safety Factors</u>

Results of the initial safety factor assessment for the critical cross section anticipated to be the most susceptible of all cross sections to structural failure based on appropriate engineering considerations, including loading conditions. The safety factor assessments are supported by appropriate engineering calculations.

The safety factor analysis was conducted using the Rocscience Inc. Slide geotechnical software by evaluating four cross sections along the embankment. Slide provides numerical tools to analyze the stability of embankments using limit equilibrium methods. At each cross section, drilling, surveying, laboratory testing, and a slope stability analysis were performed. Based on the four analysis scenarios, the lowest factor of safety for all scenarios was not found at a single cross section; therefore, the results listed below are the lowest factor of safety realized from all analyzed cross sections for each scenario. The safety factor assessments are supported by appropriate engineering calculations and the Slide modeling results for the Coleman Station Legacy Pond D CCR impoundment were utilized for the development of this report.

1. The calculated static factor of safety under the long-term, maximum storage pool loading condition equals: 1.65

2. The calculated static factor of safety under the maximum surcharge pool loading condition equals: 1.65

3. The calculated seismic factor of safety equals: 1.42

4. For dikes constructed of soils that have susceptibility to liquefaction, the calculated liquefaction factor of safety equals: 1.800

Against the conservative composite cross-section developed, Pond D meets the minimum factors of safety required under 40 CFR §257.73(e) for all three regulatory loading cases (long-term maximum storage pool, maximum surcharge pool, and pseudo-static seismic).

<u>Sources of Information</u>

Geotechnical and other information provided by Associated Engineers, Inc.

Geotechnical data obtained during geotechnical investigations performed by SM&E in April 2019. Reliance letter Dated April 14, 2026

Engineering design drawings and other information provided by Big Rivers Electric Corporation

United States Geological Survey U.S. Geological Survey (USGS) 7.5 minute Robards and Delaware topographic quadrangle maps

Professional Engineer Certification [Per 40 CFR § 257.73]
Coleman Station Legacy Pond D CCR Impoundment Initial Safety Factor Assessment

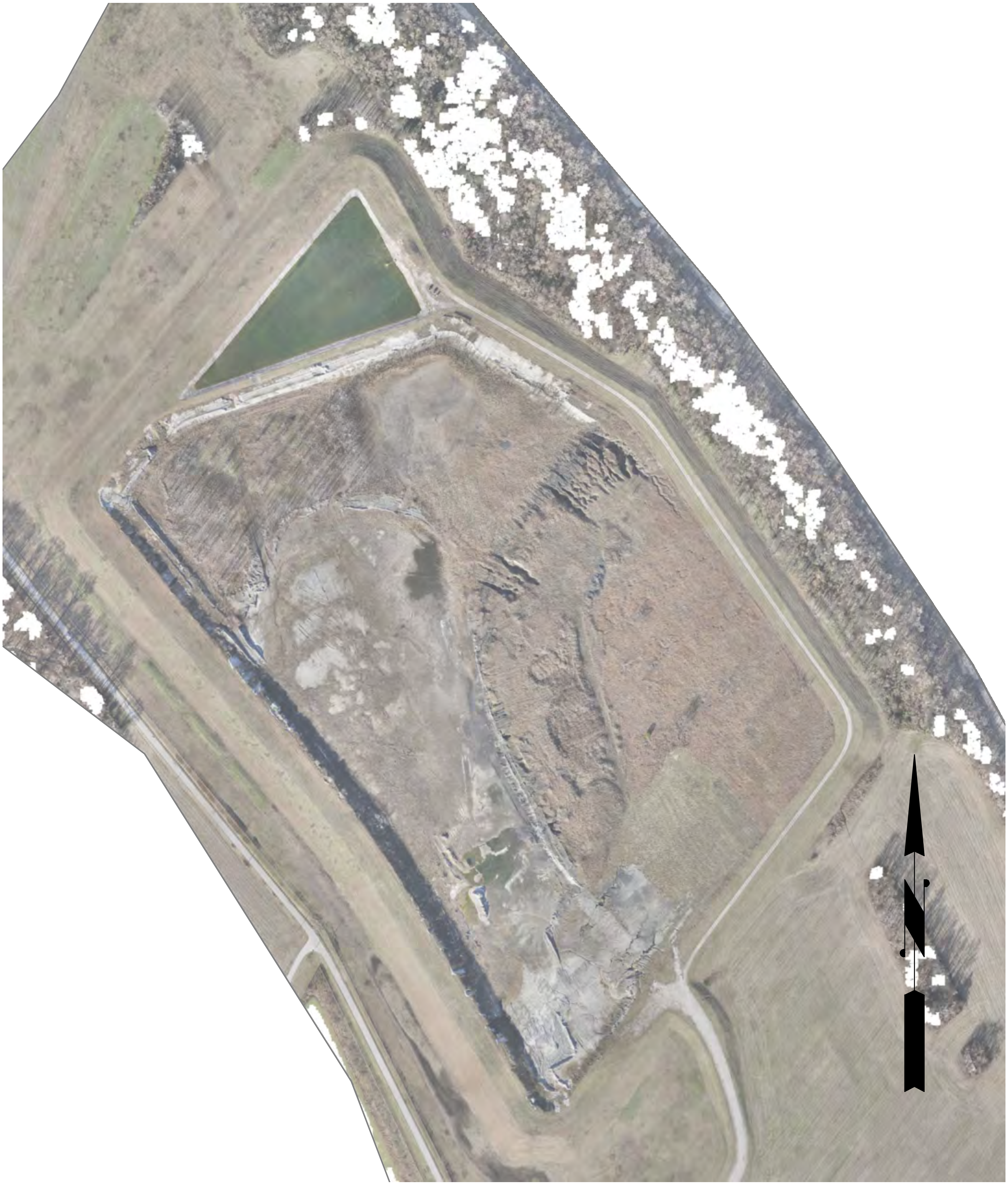
I hereby certify that myself or an agent under my review has prepared this Initial Safety Factor Assessment (Assessment), and being familiar with the provisions of the final rule to regulate the disposal of coal combustion residuals (CCR) as solid waste under subtitle D of the Resource Conservation and Recovery Act (RCRA), attest that this Assessment has been prepared in accordance with good engineering practices and meets the intent of 40 CFR Part 257.73. To the best of my knowledge and belief, the information contained in this Assessment is true, complete, and accurate.

STATE OF KENTUCKY
DAVID A.
LAMB
17822
LICENSED
PROFESSIONAL ENGINEER

David A. Lamb P.E.

State of Kentucky License No. 17822

Date: May 8, 2026



Big Rivers Electric Corp.	Job Number: 25-0007	Revisions:
Coleman Facility, Hawesville, Kentucky	Date: 01/30/2026	
Attachment A: Pond D Inspection Map	Scale: 1" = 400'	
	Drawn By: D.T.H.	

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Big Rivers Electric Corp.

Coleman Facility, Hawesville, Kentucky

Attachment B: Pond D Inspection Map - USGS TOPO OVERLAY

Job Number:	25-0007	Revisions:
Date:	01/30/2026	
Scale:	1" = 400'	
Drawn By:	D.T.H.	

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