

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

Electronic Application Of Kentucky Power Company	)	
For A Certificate Of Public Convenience And	)	
Necessity To Expand and Upgrade Portions of the	)	Case No. 2025-00335
Baker Substation In Lawrence County, Kentucky	)	
(Baker Reactor Breaker Project)	)	

APPLICATION

Kentucky Power Company (“Kentucky Power” or the “Company”) applies to the Public Service Commission of Kentucky (“Commission”) pursuant to KRS 278.020(1), 807 KAR 5:001, Section 15, and all other applicable statutes and regulations, for an order granting a certificate of public convenience and necessity (“CPCN”) authorizing the Company to expand and upgrade portions of the Baker Substation located in Lawrence County, Kentucky, as described in more detail in this Application (the “Project”). The Project proposed in this Application is functionally and electrically the same project proposed in the Company’s Application for a Declaratory Order in Case No. 2024-00283, wherein the Commission declared that a CPCN was not required.¹ The Company now files this Application for a CPCN because the expected estimated costs of the project that was the subject of Case No. 2024-00283 have since increased such that a CPCN likely is required, based on existing Commission precedent. Although the Project’s cost is only about 1.4% of the Company’s plant in service, the Company now seeks a CPCN due to the higher estimated costs.

1 In The Matter Of: Electronic Application Of Kentucky Power Company For A Declaratory Order That The Proposed Installation Of A New Three-Phase Reactor Circuit Breaker And Associated Construction At The Baker Substation In Lawrence County, Kentucky Is An Ordinary Extension In The Usual Course Of Business And Does Not Require A Certificate Of Public Convenience And Necessity, Case No. 2024-00283.

Kentucky Power's compliance with the requirements of 807 KAR 5:001, Section 14, and 807 KAR 5:001, Section 15 is detailed in **EXHIBIT 1** to the Application.

The Company states as follows in support of its Application:

APPLICANT

1. **Name and Address:** The Applicant's full name and post office address is: Kentucky Power Company, 1645 Winchester Avenue, Ashland, Kentucky 41101. The Company's electronic mail address is kentucky_regulatory_services@aep.com.

2. **Incorporation:** Kentucky Power is a corporation organized on July 21, 1919 under the laws of the Commonwealth of Kentucky. The Company currently is in good standing in Kentucky.²

3. **Business:** Kentucky Power is a public utility principally engaged in the provision of electricity to Kentucky consumers. The Company generates and purchases electricity that it distributes and sells at retail to approximately 162,000 customers located in all, or portions of, the Counties of Boyd, Breathitt, Carter, Clay, Elliott, Floyd, Greenup, Johnson, Knott, Lawrence, Leslie, Letcher, Lewis, Magoffin, Martin, Morgan, Owsley, Perry, Pike, and Rowan.

THE PROPOSED BAKER REACTOR BREAKER PROJECT

Background

4. Kentucky Power's Baker 765/345kV Substation ("Baker Substation" or the "Substation") is approximately one-half mile north of the Big Sandy Plant in Lawrence County, Kentucky and was built around 1969. There are several transmission lines and transformers at the Baker Substation. More than one of the transmission lines are points of interconnection for

² A certified copy of the Company's Articles of Incorporation and all amendments thereto was attached to the Joint Application in *In the Matter Of: The Joint Application Of Kentucky Power Company, American Electric Power Company, Inc. And Central And South West Corporation Regarding A Proposed Merger*, P.S.C. Case No. 99-149. The Company's October 21, 2025 Certificate of Existence is filed as **EXHIBIT 2** to the Application.

independent power producers (“IPP”). The Substation is currently comprised of a two-string breaker and a half configuration 765kV station with three transmission line exits. These transmission lines connect to Hanging Rock Substation, Broadford Substation, and Culloden Substation. Additionally, there is a 345kV transmission line also arranged in a breaker and a half configuration with three strings with two exits at the Substation. The entire Substation yard is approximately 22 acres but is split between a 765kV section and a 345kV section. This part of the Project will be performed on the northern 765kV portion of the Substation, which makes up approximately 15 acres of the property.

5. The reactors connected to the Baker-Broadford 765kV circuit are used to help control the voltage levels and fluctuations during varying system conditions. There are four reactor units associated with this line in Baker Substation (one for each of the three phases of the system, plus a spare unit). These reactors are large in size, approximately 45 feet tall and weighing roughly 150 tons each. Adding a reactor circuit breaker to the reactors will allow for real-time switching control of the reactors to help maintain voltage levels on the system, especially during high transfer scenarios.

The Proposed Project

6. Kentucky Power, in conjunction with PJM Interconnection LLC (“PJM”), has identified a solution to fully address the operational needs identified at the Baker Substation. Kentucky Power would include:

- a) Expanding the yard (an approximate 640-foot by 185-foot expansion) at the Baker Substation;
- b) Relocating the existing reactors within the expanded yard at the Baker Substation;

- c) Installing a new three-phase 765kV 50kA circuit breaker on the reactors on the Baker-Broadford 765kV line within the Baker Substation;
- d) Reconnecting the existing Baker-Broadford 765kV circuit to the relocated reactors; and
- e) Associated distribution work and relocating an existing gas line located within the property.

7. The Company would also perform other nominal construction as part of this project, including relocating an existing gas pipeline, partially modifying an existing access drive, and moving the existing security perimeter fence, all within the property currently owned by Kentucky Power.

8. The Company has included a copy of the general arrangement drawing as **EXHIBIT 5** that demonstrates the existing Baker Substation and the construction that would be performed as part of the Baker Reactor Breaker Project.

9. The Baker Reactor Breaker Project is a baseline project. There are no PJM supplemental projects associated with the Baker Reactor Breaker Project.

10. Neither AEP, Kentucky Transmission Company, Inc., nor any successor entity would own or invest in the Project. Kentucky Power would own the portion of the project located in the Commonwealth in its entirety.

Need For The Project

11. PJM and Kentucky Power have identified an immediate need at the Baker Substation. During day-to-day operations, the reactors may need to be switched off or on based on real time system conditions. Currently, during high load conditions, as well as high transfer conditions, the line reactors cannot be switched off while the 765kV line is energized, which poses operational risks and adds unnecessary operation cycles to the main line breakers. The addition of

a reactor circuit breaker allows for switching the reactors in and out of service without also having to take the 765kV transmission circuit they are attached to out of service. This operational flexibility is necessary to ensure regional system reliability and optimal performance.

12. Further, the existing reactors are located in a space-constrained area in the 765kV yard, lack necessary space clearances to add the proposed reactor circuit breaker, and must be relocated to install the reactor circuit breaker. The existing Baker-Broadford 765kV line reactors are currently located directly under the 765kV line and are between the station structure and the eastern line of the fence of the station. The eastern fence line directly abuts U.S. Route 23, which precludes acquiring any additional space in the easterly direction. This necessitates expanding the 765kV yard northward on Kentucky Power land and relocating the existing reactors into an expanded portion as shown on **EXHIBIT 5**.

Estimated Project Cost

13. The total cost estimate for the Project is approximately \$29.4 million. That sum comprises: (a) approximately \$24.5 million for the Substation expansion and equipment; \$1.2 million for removal costs; \$140,000 for telecommunications work; \$50,000 for associated distribution work; and \$3.5 million to relocate the TC Energy gas line. While the Project cost estimate represents the best engineering assessment of the costs as of the date of this Application, the exact cost will not be known until the Project is complete. The current estimate represents a difference of approximately \$6 million from the estimate provided in Case No. 2024-00283. This difference is the result of updated engineering and design, the increased costs to move a third party gas line, as well as the corresponding updated contingency amount.

14. Kentucky Power's assets, net of regulatory assets and deferred charges (or plant in service) as of June 2025, totaled \$2.1 billion. The cost of the Project thus represents approximately 1.4% of plant in service.

15. Because the Company's costs associated with the project are recovered through its FERC-regulated formula rates, Kentucky Power is responsible for its allocated share of the project under the AEP East Transmission Agreement. Kentucky Power's allocation of total AEP East Zonal costs is roughly 5.62%, so the Company will be responsible for approximately \$1.35 million of the total costs of the Baker Reactor Breaker Project. This amount is expected to be less than the potential costs of not addressing the need for the project or addressing it by other means.

16. Kentucky Power anticipates funding the cost of the Project through its operating cash flow and other internally generated funds.

17. Kentucky Power expects annual operating costs of approximately \$4,400 for general maintenance and inspection. The projected additional annual ad valorem taxes resulting from the Project are expected to total approximately \$70,000. This amount is an estimate and may be impacted by any changes to the Project plan.

Alternatives To Resolving The Existing Facility's Operational Concerns

18. The Project, as described in this Application, is a PJM-mandated baseline project that will increase regional system operational flexibility. PJM and Kentucky Power have identified real-time operational issues that must be addressed, and the proposed Project is the least cost, reasonable alternative that fully addresses the identified issues. For example, as part of the Project, the Company will add reactor circuit breakers to existing equipment completely within property already owned by Kentucky Power. The only other plausible—though not reasonable—option would be to construct a new greenfield substation and a new connection 765kV transmission line, which would be neither efficient nor cost-effective. It would be significantly more expensive. The estimated cost of the alternative, at this time, is approximately \$266 million, compared to the estimated cost of the proposed Project of approximately \$29.4 million.

19. For the reasons stated herein, the construction of the Baker Reactor Breaker Project would not result in wasteful duplication. The Project is the least cost option, most reasonable solution to identify and resolve the baseline operation issues identified at the Baker Substation.

PJM Review

20. The Project addresses immediate operation needs identified through the PJM Regional Transmission Expansion Plan (“RTEP”) process at the Baker Substation.

21. The need for and the benefits of the Project are further detailed in the testimony of Company Witness Moore, **EXHIBIT 10** (the Baseline Project PJM Slides). The need for the work and the functions of the major Project components are explained in further detail in **EXHIBIT 6** (List of the major components of the proposed Project and their purpose).

22. The Project is located entirely within Kentucky Power’s certified territory and will not compete with any public utilities, corporations, or persons.

Real Property And Right-Of-Way

23. As currently designed, no additional right-of-way will need to be acquired in connection with the Project. The majority of the Project will be performed entirely within Kentucky Power’s existing right-of-way. The majority of the Project will be performed within Company-owned property. Although not anticipated, constructability issues, access requirements, and conditions that are not evident until final engineering, or that arise as a result of landowner negotiations in the event of a change, may result in Kentucky Power being required to expand the Baker Substation Project outside Company-owned property, as indicated on **EXHIBIT 4** (the “Proposed Project Maps”).

Notices

24. Kentucky Power is not required to provide any notices in connection with this filing.

25. The Company did not hold public meetings regarding this Project because the Project will be performed entirely within Company property, does not require any additional land purchase or ROW expansion, and does not affect any outside landowners.

Franchises And Permits

26. Environmental and permitting requirements are expected to be minimal. Kentucky Power anticipates that a wetland delineation and stream identification survey will be conducted for the project. It is anticipated that any impact to these resources will be covered under the United States Army Corps of Engineers' Nationwide Permit, non-reporting, for the installation of culverts and access roads. Construction activities that take place in, along, or over a wetland, stream (if the watershed is one square mile or more in size), or within a floodplain will require a Kentucky Division of Water Stream Construction Permit.

27. Because the total earth disturbance will be greater than one acre, a construction stormwater permit will be required from the Kentucky Department of Environmental Protection, Division of Water.

28. A Kentucky Pollutant Discharge Elimination System Stormwater Pollution Prevention Plan will be developed for the Project.

29. The Company does not anticipate that the Project will affect any federally or state protected species.

The Proposed Construction Is Required By The Public Convenience And Necessity

30. The Project is required by the public convenience and necessity.

31. The Project will not produce wasteful duplication. It will not result in an excess of capacity over need, and does not represent an excess of investment in relation to the productivity and efficiencies to be gained.

32. Kentucky Power and PJM have identified an immediate operational need at Baker Substation. Currently, the 765kV reactor at Baker Substation on the Baker–Broadford circuit is a fixed reactor that requires the line to be taken out of service to energize or de-energize for switching, which is often impractical during real-time operations and poses operational risks—especially under high transfer conditions—while also increasing wear on the main line breakers. Installing the reactor a circuit breaker on the reactors on the Baker-Broadford 765kV line allows the reactors to switch in and out of service without the need to take the Baker-Broadford 765 kV line out of service. The switchable reactors allow for increased interface limits, which prevents potential voltage collapse conditions that may occur at higher transfers with the reactors connected. Additionally, the switchable reactors enable control of high voltages during valley/light loading periods.

33. Given the location of the existing reactors and the nature of this request, the Company identified one potential alternative that would necessitate the construction of a new greenfield 765kV substation. That alternative is neither cost-effective nor reasonable. The current estimated cost of the alternative is approximately \$266 million, compared to the current estimated cost of the proposed Project of approximately \$29.4 million.

34. As such, the Project as described in this Application avoids wasteful duplication of new equipment and lines and is the least-cost, most reasonable alternative to fully address the baseline operational issues identified by Kentucky Power and PJM.

Commencement And Completion Of Work

35. The Company anticipates beginning construction on the Project during the second quarter of 2026, depending on the outcome and timing of this proceeding. Work is anticipated to be completed by the end of the third quarter of 2027.

Exhibits And Testimony

36. The exhibits and testimony are listed in the Appendix to this Application, and are attached to and made a part of this Application.

Communications

37. Kentucky Power respectfully requests that communications in this matter be addressed to the e-mail addresses identified on Kentucky Power's October 13, 2025 Notice of Election of Use of Electronic Filing Procedures.

Request for Deviation

38. Exhibit 5 is comprised of engineering specification drawings of the major individual components of the Baker Project. The specifications are demonstrative of the components that make up the general arrangement drawing of the proposed station layout (Exhibit 4). Exhibit 5 was provided to satisfy the requirements of 807 KAR 5:001, Section 15(2)(d)(2), which requires plans specifications and drawings of the proposed plant, equipment, and facilities. All equipment specified in Exhibit 5 is standard transmission equipment used across the AEP system and is not unique to the Project.

39. The individual pieces of equipment are designed and engineered by their respective manufacturers and would not be appropriate to be stamped by Kentucky Power or AEP's internal or consultant engineers. KRS 322.340(4), in fact, recognizes that a professional engineer's "seal or stamp and signature shall be used by licensees only if the work being stamped was under the licensee's complete direction and control." Thus, because the specifications for the standard transmission equipment contained in Exhibit 5 were designed by the manufacturer of each piece of equipment, Kentucky Power is unable to provide an Exhibit 5 that is signed or stamped by an engineer registered in Kentucky.

40. To the extent a deviation from this requirement is necessary with respect to Exhibit 5, Kentucky Power respectfully requests a deviation pursuant to 807 KAR 5:001, Section 22, and requests that the Commission accept Exhibit 5 to satisfy the requirements of 807 KAR 5:001, Section 15(2)(d)(2).

WHEREFORE, Kentucky Power Company respectfully requests that the Commission issue an Order:

(1) Granting Kentucky Power a Certificate of Public Convenience and Necessity for the Project authorizing Kentucky Power to:

- a) Expand the yard (an approximate 640-foot by 185-foot expansion) at the Baker Substation;
- b) Relocate the existing reactors within the expanded yard at the Baker Substation;
- c) Install a new three-phase 765kV 50kA circuit breaker on the reactors on the Baker-Broadford 765kV line within the Baker Substation;
- d) Reconnect the existing Baker-Broadford 765kV circuit to the relocated reactors; and
- e) Conduct associated distribution work and relocate an existing gas line located within the property;

(2) Granting Kentucky Power, to the extent necessary, a deviation pursuant to 807 KAR 5:001, Section 22, as to Exhibit 5 and accepting Exhibit 5 to satisfy the requirements of 807 KAR 5:001, Section 15(2)(d)(2); and

(3) Granting Kentucky Power such other relief as may be appropriate.

Respectfully submitted,



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COUNSEL FOR KENTUCKY POWER
COMPANY

EXHIBITS

<u>EXHIBIT 1</u>	Filing Requirements Checklist
<u>EXHIBIT 2</u>	Kentucky Power Company's October 21, 2025 Certificate of Existence
<u>EXHIBIT 3</u>	[Reserved]
<u>EXHIBIT 4</u>	Map of Suitable Scale Illustrating the Proposed Project
<u>EXHIBIT 5</u>	Plans and Specifications and Drawings of the Proposed Project Signed by an Engineer Licensed in Kentucky
<u>EXHIBIT 6</u>	List of the major components of the proposed Project and their purpose
<u>EXHIBIT 7</u>	[Reserved]
<u>EXHIBIT 8</u>	[Reserved]
<u>EXHIBIT 9</u>	[Reserved]
<u>EXHIBIT 10</u>	Baseline Project PJM Slides

EXHIBIT 1

Application Filing Requirements Checklist

Requirement	Description of Requirement	Location(s) in Filing
<i>General Application Requirements</i>		
807 KAR 5:001		
Section 7(1)	The application and 10 copies.	Company is e-filing.
Section 4(3)	Paper signed by submitting party or attorney.	Application at p. 11.
Section 4(3)	Name, address, telephone number, fax number, and e-mail address of submitting party or attorney.	Application at p. 11.
Section 4(10)	Personal information must be redacted.	Complied.
Section 8(2)(a)	At least seven (7) days prior to the submission of its application, an applicant shall file written notice of its election to use electronic filing procedures using the Notice of Election of Use of Electronic Filing Procedures form.	Complied. Filed October 13, 2025.
Section 8(4)(b)	E-filed documents must be .pdf files that: • are searchable and optimized for internet viewing; • have bookmarks distinguishing sections; • if scanned material, be at resolution of 300 DPI	Complied.
Section 8(5)(a)	Each electronic submission shall include an introductory file in portable document format that is named “Read1st” and that contains a general description of the filing.	Complied.
Section 8(5)(a)	Each electronic submission shall include an introductory file in portable document format that is named “Read1st” and that contains a list of all material to be filed in paper or physical medium but not included in the electronic submission, and a statement that the material in the electronic submission are a true representation of the materials in paper medium.	Complied.

Section 8(5)(b)	The “Read1st” file and any other material that normally contains a signature shall contain a signature in the electronically submitted document.	Complied.
Section 14(1)	Full name, mailing address, and e-mail address of applicant.	Application at ¶ 1.
Section 14(1)	Facts on which application is based, with request for the order, authorization, permission, or certificate desired.	Application, introductory paragraph, <i>passim</i> ; Direct Testimony of Tanner S. Wolfram; Direct Testimony of Jasmine L. Moore; Direct Testimony of Tyler M. Benedum; Motion for Leave to Appear <i>Pro Hac Vice</i> .
Section 14(1)	A reference to the particular law requiring Commission approval.	Application at introductory paragraph.
Section 14(2)	If a corporation, the applicant shall identify in the application the state in which it is incorporated and the date of its incorporation, attest that it is currently in good standing in the state in which it is incorporated, and if it is not a Kentucky corporation, state if it is authorized to transact business in Kentucky.	Application at ¶ 2; Application Exhibit 2.
Section 14(3)	If a limited liability company, the applicant shall identify in the application the state in which it is organized and the date on which it was organized, attest that it is in good standing in the state in which it is organized, and, if it is not a Kentucky limited liability company, state if it is authorized to transact business in Kentucky.	N/A
Section 14(4)	If the applicant is a limited partnership, a certified copy of its limited partnership agreement and all amendments, if any, shall be annexed to the application, or a written statement attesting that its partnership agreement and all amendments have been filed with the commission in a prior proceeding and referencing the case number of the prior proceeding.	N/A

<i>Applications for Certificates of Public Necessity</i>		
Section 15(2)(a)	The facts relied upon to show that the proposed construction or extension is or will be required by public convenience or necessity.	Application at introductory paragraph, <i>passim</i> ; Application Exhibits 4-6, 10; Direct Testimony of Tanner S. Wolfram; Direct Testimony of Jasmine L. Moore; Direct Testimony of Tyler M. Benedum.
Section 15(2)(b)	Copies of franchise or permits, if any, from the proper public authority for the proposed construction or extension, if not previously filed with the Commission.	N/A
Section 15(2)(c)	A full description of the proposed location, route, or routes of the proposed construction or extension, including a description of the manner of the construction and the names of all public utilities, corporations, or persons with whom the proposed construction or extension is likely to compete.	Application at ¶¶ 6, 7, 8, 10, 12, 22; Application Exhibits 4 & 5; Wolfram Direct Testimony; Moore Direct Testimony; Benedum Direct Testimony.
Section 15(2)(d)(1)	One (1) copy in portable document format on electronic storage medium and two (2) copies in paper medium of: maps to suitable scale showing the location or route of the proposed construction or extension as well as the location to scale of like facilities owned by others located anywhere within the map area with adequate identification as to the ownership of the other facilities; and plans and specifications and drawings of the proposed plant, equipment, and facilities.	Application Exhibit 4, 5.
Section 15(2)(d)(2)	One (1) copy in portable document format on electronic storage medium and two (2) copies in paper medium of: plans and specifications and drawings of the proposed plant, equipment, and facilities.	Application Exhibit 5.

Section 15(2)(e)	The manner in detail in which the applicant proposes to finance the proposed construction or extension.	Application at ¶¶ 13, 14 15, 16; Wolfram Direct Testimony at pp. 7-8.
Section 15(2)(f)	An estimated annual cost of operation after the proposed facilities are placed into service.	Application at ¶ 17; Wolfram Direct Testimony at p. 8.

EXHIBIT 2

Commonwealth of Kentucky
Michael G. Adams, Secretary of State

Michael G. Adams
Secretary of State
P. O. Box 718
Frankfort, KY 40602-0718
(502) 564-3490
<http://www.sos.ky.gov>

Certificate of Existence

Authentication number: 347618
Visit <https://web.sos.ky.gov/ftshow/certvalidate.aspx> to authenticate this certificate.

I, Michael G. Adams, Secretary of State of the Commonwealth of Kentucky, do hereby certify that according to the records in the Office of the Secretary of State,

KENTUCKY POWER COMPANY

KENTUCKY POWER COMPANY is a corporation duly incorporated and existing under KRS Chapter 14A and KRS Chapter 271B, whose date of incorporation is July 21, 1919 and whose period of duration is perpetual.

I further certify that all fees and penalties owed to the Secretary of State have been paid; that Articles of Dissolution have not been filed; and that the most recent annual report required by KRS 14A.6-010 has been delivered to the Secretary of State.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my Official Seal at Frankfort, Kentucky, this 21st day of October, 2025, in the 234th year of the Commonwealth.



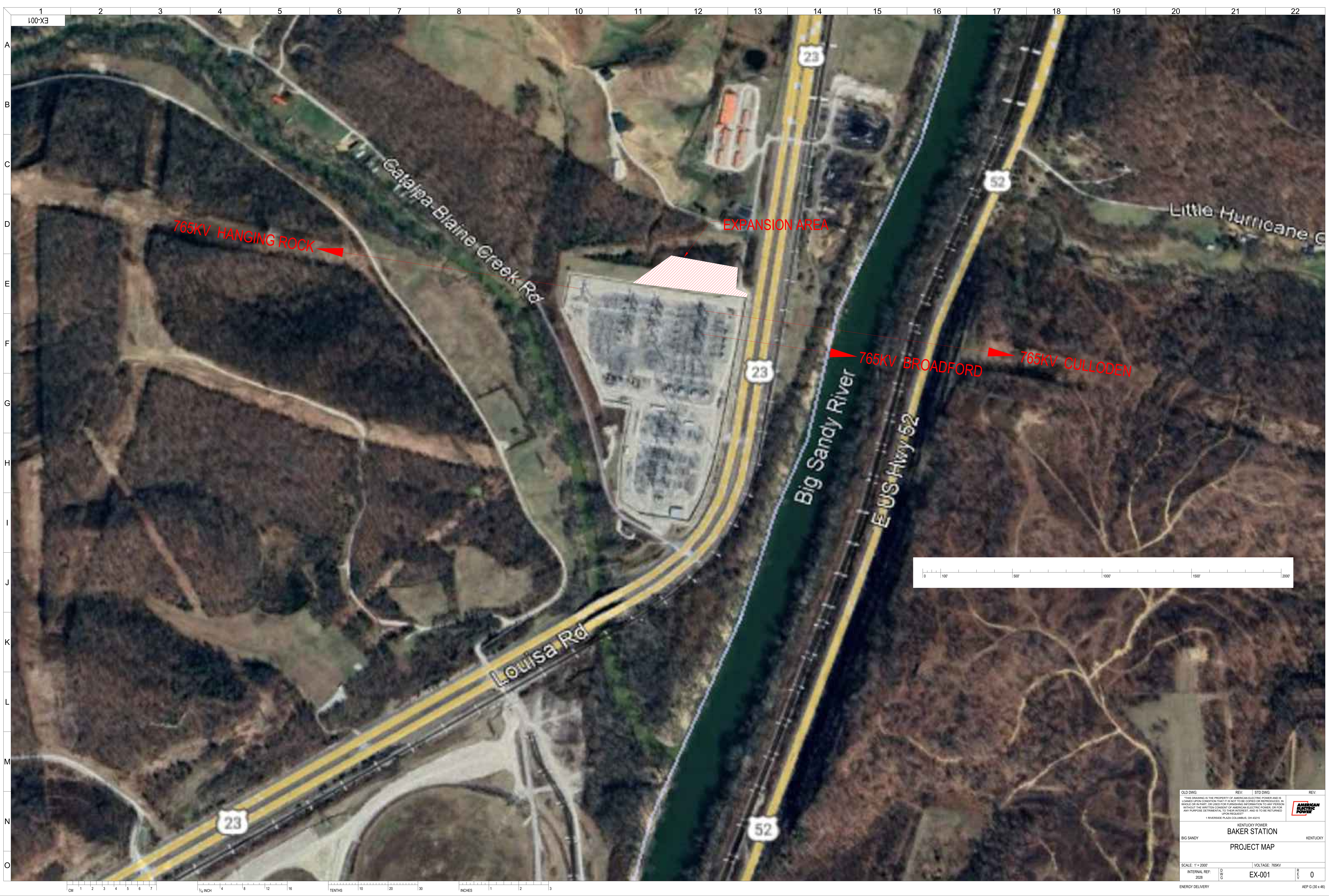
Michael G. Adams

Michael G. Adams
Secretary of State
Commonwealth of Kentucky
347618/0028317

EXHIBIT 3

This Exhibit is a placeholder and is not required for this Application.

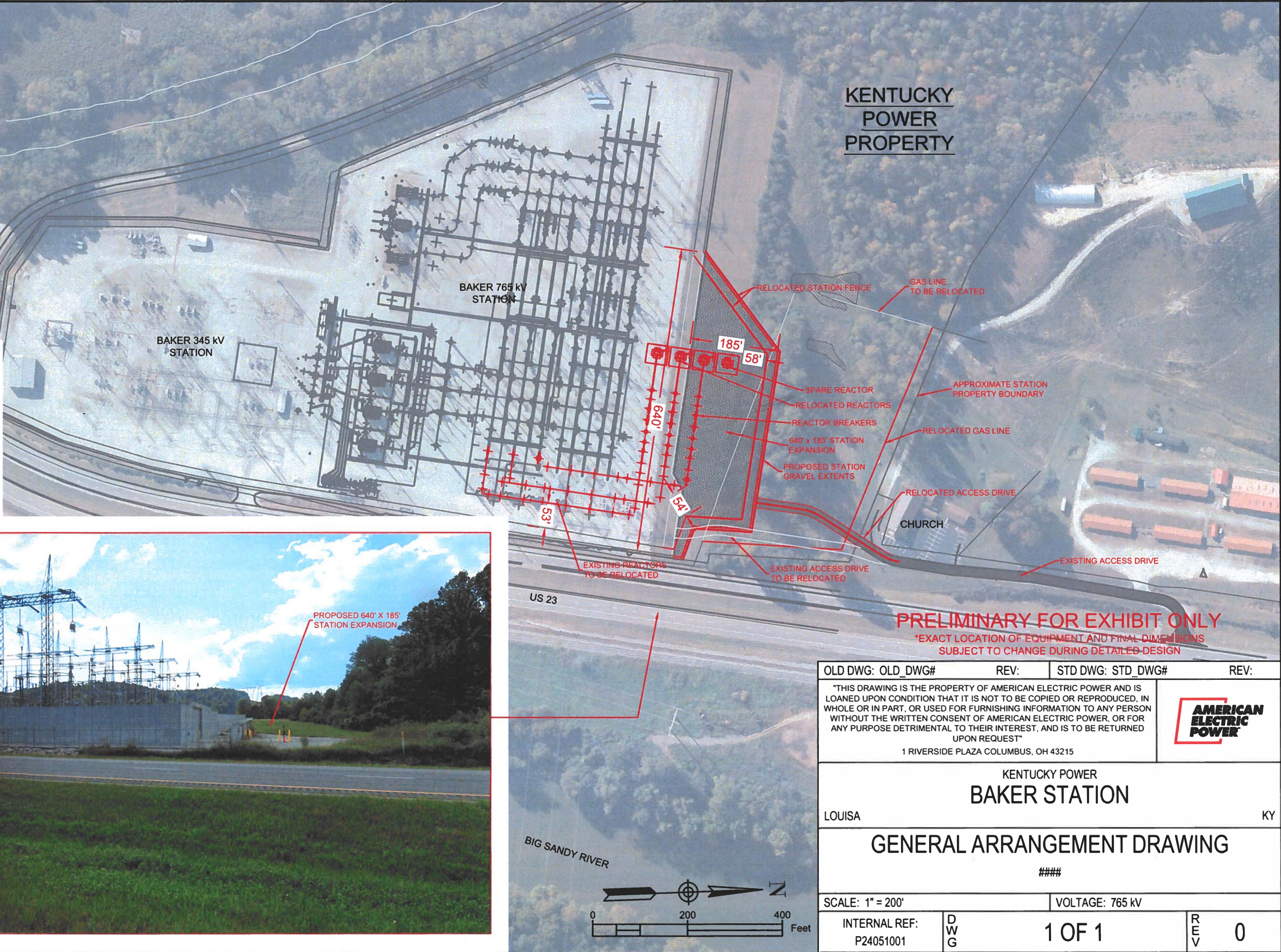
EXHIBIT 4





OLD DWG.	REV.	STD DWG.	REV.
THIS DRAWING IS THE PROPERTY OF AMERICAN ELECTRIC POWER AND IS LOANED TO YOU ON THE CONDITION THAT IT IS NOT TO BE COPIED OR REPRODUCED IN WHOLE OR IN PART, OR USED FOR ANY PURPOSE OTHER THAN THAT FOR WHICH IT WAS ORIGINALLY INTENDED. WITHOUT THE WRITTEN CONSENT OF AMERICAN ELECTRIC POWER, OR FOR ANY PURPOSE DETRIMENTAL TO THEIR INTEREST, AND IS TO BE RETURNED UPON REQUEST.			
1 RIVERSIDE PLAZA COLUMBUS, OH 43205			
KENTUCKY POWER			
BAKER STATION			
PROJECT MAP			
SCALE: 1" = 1000'		VOLTAGE: 765KV	
INTERNAL REF:	DWG	REV	0
2028	EX-001		

Public EXHIBIT 5



Confidential Exhibit 5 pages 2 through 6 are redacted in their entirety.

EXHIBIT 6

Baker Station Elements

<u>Description</u>	<u>Purpose</u>	<u>Driver for Asset Replacement/Installation</u>
Installing (1) 3-phase set of 765kV circuit breakers	To provide switchability for the 765KV reactors on the Baker - Broadford 765 kV line	PJM and Kentucky Power identified an immediate operational need for the installation of 765 kV reactor breakers at Baker Station. The reactors cannot be switched in or out unless the Baker - Broadford 765 kV line is switched out of service.
Relocation of (4) 765KV Reactors	Space at the existing location of the reactors is inadequate to add the needed breakers.	There is not enough room for the reactor breakers to be installed given current location of the reactors.
Install 3-phase 765KV breaker disconnect switch	To facilitate maintenance, help to sectionalize, and provide a visual break.	Installation of the switch is standard and necessary for circuit breaker installs.
Install 3-phase 765KV line traps	To aid in the communication between stations and equipment for protection related purposes.	Installation of the line trap is standard and necessary for protection.
Expanding the yard by approximately 640 x 185 feet	To create room for the installation of new equipment and relocated reactors.	There is not enough room for the reactor breakers to be installed given current location of the reactors.

EXHIBIT 7

This Exhibit is a placeholder and is not required for this Application.

EXHIBIT 8

This Exhibit is a placeholder and is not required for this Application.

EXHIBIT 9

This Exhibit is a placeholder and is not required for this Application.

EXHIBIT 10

Operational Performance Issues on AEP 765kV Reactors

The following AEP 765kV have fixed reactors (using isolating switches with no breakers), which require the associated 765kV lines to be switched out of service to energize or de-energize their line reactors.

- 765kV reactor at Broadford on the Broadford – Jacksons Ferry 765kV line.
- 765kV reactor at Broadford on the Broadford – Baker 765kV line.
- 765kV reactor at Jefferson on the Jefferson – Greentown 765kV line.
- 765kV reactor at Baker on the Broadford – Baker 765kV line.

As system conditions change during day-to-day operations, the reactors may need to be switched Off (under higher transfers or heavy load conditions) or On (to manage potential high voltages under low transfer conditions). Currently, the four-765kV lines listed above will need to be taken out of service to allow for safe switching of their associated line reactors. These reactors need to be removed from service prior to issues developing and most of the time it is not feasible to perform such switching maneuver during real-time operations. Additionally, switching the 765kV line(s) out of service during high transfer conditions poses operational risk and add unnecessary operation cycles to the main line breakers.

The associated 765kV lines directly impact the AEP/DOM interface and are key to reliable operation under high power transfer conditions. During high load conditions as well as high transfer conditions, the line reactors may need to be switched off to manage low 765kV voltages conditions. Under high power transfer conditions, including extreme weather, switching the lines out of service in order to disconnect the line reactors poses an operational risk as breakers ~~and~~ or other equipment may fail during the maneuver preventing the switched off line from being returned to service. Under light load and low transfer conditions; the reactors are required to be switched in to manage high voltages in the area. These reactors need to be removed from service prior to issues developing and most of the time it is not feasible to perform during real-time operations. System operations face these reliability operational challenges during a large number of days annually (conditions binding several hundred hours). Normally, system operations need the line to be in service without the reactors for the peak(s) and needs the reactors in overnight for the valley. That's four switching operations in ~24hr period daily. Every switching operation carries some risk. Continued and repeated switching operations exponentially increases that risk.

During Winter Storm Elliot, the Broadford 765kV bus was one of the limiting facilities due to low voltage, which caused multiple IROL exceedances. The worst post contingency voltage is 0.90 p.u.. In real-time, it requires the line to come out of service to remove the reactors. During this event, the lines could not be removed from service, as it would create additional low voltage and voltage drop violations, severely reduced the transfer capability of the AEP/DOM interface, and including approaching or exceeding the IROL limit.

Most recently, in January 2024, Operations had to proactively remove the reactors from service to help with voltages in the area during heavy transfers. At the same time, all of the reactors could not be removed ahead of time as high voltages were a concern during off-peak hours. If these line reactors were switchable, the operational limitation on the AEP/DOM IROL Interface during Winter Storm Gerri would have removed the need to issue a TLR1.

The AEP-DOM interface has bound 596 times since June 1, 2022 until February 25, 2024. In January 2024, the interface was binding for 303 times, among that 201 times are limited by steady state voltage collapse even with reactors out at Broadford.

Power system studies were conducted including peak and valley studies on multiple days including extreme days such as Winter Storm Elliot, Winter Storm Gerri, and middle of the day with mild forecasts. Broadford 765kV bus typically has the lowest voltage in the area and is the limiting element for the AEP/DOM IROL Interface. The switchable reactors will allow for increasing the interface limits when most required, preventing potential voltage collapse conditions that may occur at higher transfers with the reactors connected. The switchable reactors will also enable control of higher voltages during valley/light loading periods. A Real-Time state estimator case from January 10 shows that removing the 765kV reactors at Broadford would have provided an additional 200 MVA of transfer capability on the AEP/DOM interface. During high transfers, such as during a winter storm, the reactors out of service would have provided an addition 500 MVA of transfer capability.

The issue become more prevalent and is identified as a critical operational performance issue more recently as more than 5000MW generation in the BGE/PEPCO/DOM areas retired in the past several years, which pushes the AEP/DOM interface closer to the limits. Another reason is that the recent extreme weather conditions such as winter storm events occur more frequently and make such operational need for flexibility more important.

PJM has determined that the operational performance issues described above create an immediate reliability need for which a competitive window is not feasible. The identified operational performance issues are based on a review of historical concerns associated with the operation of the system, therefore projects needed to address such issues must be initiated as soon as practically possible. PJM determined that no other transmission or non-transmission options would sufficiently address the immediate reliability need. Due to these reasons and consideration that a shortened competitive window will lead to delays of about six months, without material benefit, PJM has determined to designate AEP construction responsibility to mitigate these immediate need violations.



Immediate Reliability Need to Address Operational Performance Issues: AEP 765kV Switchable Line Reactors

Wenzheng Qiu
Transmission Planning
Transmission Expansion Advisory Committee
April 2, 2024

- The following AEP 765kV lines have fixed reactors (using isolating switches with no breakers) which are not switchable while the associated 765kV line(s) are energized;
 - 765kV reactor at Broadford on the Broadford – Jacksons Ferry 765kV line.
 - 765kV reactor at Broadford on the Broadford – Baker 765kV line.
 - 765kV reactor at Jefferson on the Jefferson – Greentown 765kV line.
 - 765kV reactor at Baker on the Broadford – Baker 765kV line.
- As system conditions change during day-to-day operations, the reactors need to be switched Off (under higher transfers or heavy load conditions) or On (to manage High Voltage/low transfer conditions).
- Currently, the four 765kV lines listed above will need to be taken out of service to allow for safe switching of their associated line reactors.
- Switching the 765kV line(s) OOS during high transfer conditions poses operational risk and add unnecessary operation cycles to the main line breakers.



Reliability Need to Address Operational Performance Issues

- The associated 765kV lines directly impact the AEP/DOM interface and are the key to reliable operation under high power transfer conditions.
- During high load conditions as well as high transfer conditions, the line reactors may need to be switched off to manage low 765kV voltages conditions.
 - Under high power transfer conditions, including extreme weather, switching the lines off to disconnect the line reactors poses an operational risk (breakers and/or other equipment may fail during the maneuver preventing the switched off line from being returned to service)
- Under light load and low transfer conditions; the reactors are also required (to be switched in) to manage high voltages in the area.
- These reactors need to be removed from service prior to issues developing and most of the time it is not feasible to perform during real-time operations. This presents high risk if equipment breaks and the line (s) cannot be placed back in service .



Historical Operational Performance

- During Winter Storm Elliot, the Broadford 765kV bus was one of the limiting facilities due to low voltage, which caused multiple IROL exceedances.
- In January, 2024, Operations had to proactively remove the reactors from service to help with voltages in the area during heavy transfers. At the same time, all of the reactors could not be removed ahead of time as high voltages were a concern during off-peak hours.
- The AEP-DOM interface has bound 596 times since June 1, 2022 until February 25, 2024. In January 2024, the interface was binding for 303 times, among that 201 times are limited by steady state voltage collapse even with reactors out at Broadford.
- Power System studies were conducted including peak and valley load conditions on multiple days including extreme conditions such as Winter Storm Elliot, Winter Storm Gerri, and middle of the day with mild forecasts. Broadford 765kV bus typically has the lowest voltage in the area and is the limiting element for the AEP/DOM IROL Interface.
- The switchable reactors will allow for increasing the interface limits, preventing potential voltage collapse conditions that may occur at higher transfers with the reactors connected. The switchable reactors will also enable control of higher voltages during valley/light loading periods.

Historical Operational Performance – Influencing Factors

- More than 5000MW generation in the BGE/PEPCO/DOM areas retired in the past several years.
- During high load periods, higher transfers from the northwest (AEP) towards the southeast (Dominion).
- The AEP/DOM interfacing is being utilized closer to the limits. The Broadford area is a constant weak point where the voltage collapse point has the potential of developing.

Unit	Capacity (MW) Total: 10,797.5	Fuel Type (All)	State (All)	Age	Transmission Owner Zone (3)	Future Deactivations		Deactivated Gene
						Owner Notification Date	Actual Deactivation Date	Reliability Analysis (All)
Chesterfield 5	336.8		VA	56	Dominion	2.20.2020	6.1.2023	
Chesterfield 6	678.1		VA	51	Dominion	2.20.2020	6.1.2023	
Lanier 1 CT	7		VA	21	Dominion	9.29.2021	6.1.2023	
DINWIDDIE 1 CT	3		VA	28	Dominion	9.29.2021	6.1.2023	
Weakley CT	7		VA	21	Dominion	9.29.2021	6.1.2023	
Rockville CT	4		VA	26	Dominion	9.29.2021	6.1.2023	
Yorktown 3	767.1		VA	48	Dominion	12.20.2022	6.1.2023	
Dickerson CT1	18		MD	55	PEPCO	7.25.2022	10.23.2022	
Morgantown CT1	16		MD	52	PEPCO	4.12.2022	10.1.2022	
Morgantown CT2	16		MD	51	PEPCO	4.12.2022	10.1.2022	
Morgantown Unit 1	613.3		MD	51	PEPCO	6.09.2021	5.31.2022	
Morgantown Unit 2	619.4		MD	50	PEPCO	6.09.2021	5.31.2022	
Oaks Landfill	2.2		MD	11	PEPCO	5.27.2021	7.1.2021	
Chalk Point Unit 1	333.1		MD	56	PEPCO	8.10.2020	6.1.2021	
Chalk Point Unit 2	337.2		MD	55	PEPCO	8.10.2020	6.1.2021	
Birchwood Plant	238		VA	24	Dominion	10.06.2020	3.1.2021	
Spruance NUG 1	116		VA	25	Dominion	11.25.2019	1.12.2021	
Possum Point 5	770.2		VA	29	Dominion	3.26.2019	12.30.2020	
Dickerson Unit 1	182		MD	61	PEPCO	5.15.2020	8.13.2020	
Dickerson Unit 2	180		MD	60	PEPCO	5.15.2020	8.13.2020	

Deactivated Generation in BGE/PECO/DOM since 2020-present

- PJM has determined that the operational performance issues described above create an immediate reliability need for which a competitive window is not feasible:
 - The identified operational performance issues are based on a review of historical concerns associated with the operation of the system;
 - Projects needed to address such issues must be addressed as soon as practical;
 - PJM determined that no other transmission or non-transmission options would sufficiently address the immediate reliability need;
 - The issue become more prevalent recently, as indicated in Slide #4 and #5. One reason is that more than 5000MW generation in the BGE/PEPCO/DOM areas retired in the past several years, which pushes the AEP/DOM interface closer to the limits. Another reason is the extreme weather conditions such as winter storm events make the situation even worse.
- PJM will proceed with an Immediate need project(s) –without a Window to address the reliability needs driven by Operational Performance issues



Immediate Need Statement Posted

- Need Statement Posted at <https://pjm.com/committees-and-groups/committees/teac> under 4.2.2024 TEAC as one of the Informational only items.
- PJM welcomes all stakeholders input and comments on its “Immediate Need Assessment.”
- PJM welcomes all stakeholder feedback.
- Once a proposed transmission solution is identified, PJM will bring it forward to the April 30, 2024 TEAC meeting for first read.

Questions?

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Revision History

Version No.	Date	Description
1	3/22/2024	• Original slides posted

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Solution for the Immediate Need Operational Performance Issues: AEP 765kV Switchable Line Reactors

First Read

Wenzheng Qiu
Transmission Planning
Transmission Expansion Advisory Committee
April 30, 2024



AEP Transmission Zone: Baseline Operational Performance: 765kV Fixed Line Reactors

Process Stage: Proposed Solution – First Read

Criteria: Operational Performance

Assumption Reference: Real time operation

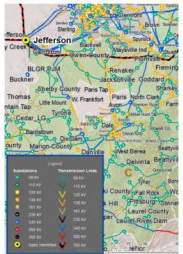
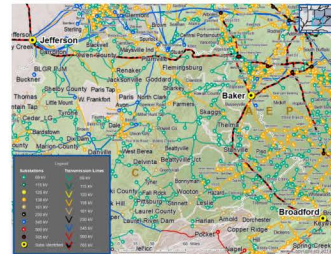
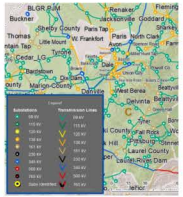
Model Used for Analysis: Operation cases

Proposal Window Exclusion: Immediate Need

Problem Statement:

PJM Operations has requested flexibility in the ability to switch in 765 kV reactors at Baker, Broadford, and Jefferson stations. Currently, these reactors are tied directly to the line which requires a line outage to switch the reactors on and off. During recent winter storm events, PJM determined that having the ability to remove these reactors from service could have helped support certain systems.

* The detailed need was presented in 4.2.2024 TEAC and the need document was posted at <https://pjm.com/committees-and-groups/committees/teac> under the same TEAC as one of the Informational only items.





Background - Problem Statement (Presented April 2nd)

- The following AEP 765kV lines have fixed reactors (using isolating switches with no breakers) which are not switchable while the associated 765kV line(s) are energized;
 - 765kV reactor at Broadford on the Broadford – Jacksons Ferry 765kV line.
 - 765kV reactor at Broadford on the Broadford – Baker 765kV line.
 - 765kV reactor at Jefferson on the Jefferson – Greentown 765kV line.
 - 765kV reactor at Baker on the Broadford – Baker 765kV line.
- As system conditions change during day-to-day operations, the reactors need to be switched Off (under higher transfers or heavy load conditions) or On (to manage High Voltage/low transfer conditions).
- Currently, the four 765kV lines listed above will need to be taken out of service to allow for safe switching of their associated line reactors.
- Switching the 765kV line(s) OOS during high transfer conditions poses operational risk and add unnecessary operation cycles to the main line breakers.



Background - Problem Statement (Presented April 2nd)

- The associated 765kV lines directly impact the AEP/DOM interface and are the key to reliable operation under high power transfer conditions.
- During high load conditions as well as high transfer conditions, the line reactors may need to be switched off to manage low 765kV voltages conditions.
 - Under high power transfer conditions, including extreme weather, switching the lines off to disconnect the line reactors poses an operational risk (breakers and/or other equipment may fail during the maneuver preventing the switched off line from being returned to service)
- Under light load and low transfer conditions; the reactors are also required (to be switched in) to manage high voltages in the area.
- These reactors need to be removed from service prior to issues developing and most of the time it is not feasible to perform during real-time operations. This presents high risk if equipment breaks and the line (s) cannot be placed back in service .



AEP Transmission Zone: Baseline Operational Performance: 765kV Fixed Line Reactors

Proposed Solution:

- Add a 765 kV breaker at Baker station for the reactor on the Broadford 765 kV line. **Estimated Cost: 23.36M**
- Add two 765 kV breakers to the reactors at Broadford station on the Baker and Jacksons Ferry 765 kV lines. **Estimated Cost: 29.05M**
- Add a 765 kV breaker to the reactor at Jefferson station on the Greentown 765 kV line. **Estimated Cost: 8.53M**

Total Estimated Cost: \$60.935 M

Alternatives: N/A. Considering the location of the existing reactors and the immediate need nature of the request, no viable alternates were identified.

Required IS Date: 6/1/2027

Projected IS Date: 6/1/2027

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1	4/19/2024	• Original slides posted
2	4/22/2024	• Add slides #3-5 for details for the problem statement

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Solution for the Immediate Need Operational Performance Issues: AEP 765kV Switchable Line Reactors

Second Read

Wenzheng Qiu
Transmission Planning
Transmission Expansion Advisory Committee
June 4, 2024



AEP Transmission Zone: Baseline Operational Performance: 765kV Fixed Line Reactors

Process Stage: Recommended Solution – Second Read

Criteria: Operational Performance

Assumption Reference: Real time operation

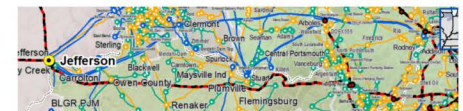
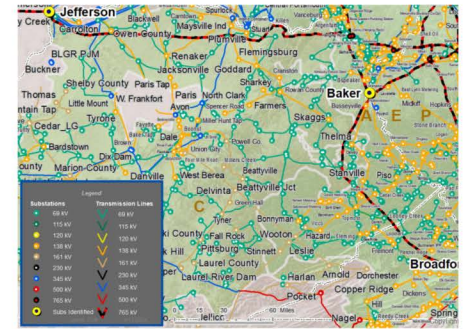
Model Used for Analysis: Operation cases

Proposal Window Exclusion: Immediate Need

Problem Statement:

PJM Operations has requested flexibility in the ability to switch in 765 kV reactors at Baker, Broadford, and Jefferson stations. Currently, these reactors are tied directly to the line which requires a line outage to switch the reactors on and off. During recent winter storm events, PJM determined that having the ability to remove these reactors from service could have helped support certain systems.

* The detailed need was presented in 4.2.2024 TEAC and the need document was posted at <https://pjm.com/committees-and-groups/committees/teac> under the same TEAC as one of the Informational only items.





AEP Transmission Zone: Baseline Operational Performance: 765kV Fixed Line Reactors

Recommended Solution:

- Add a 765 kV breaker at Baker station for the reactor on the Broadford 765 kV line (B3847.1). **Estimated Cost: 23.36M**
- Add two 765 kV breakers to the reactors at Broadford station on the Baker and Jacksons Ferry 765 kV lines (B3847.2). **Estimated Cost: 29.05M**
- Add a 765 kV breaker to the reactor at Jefferson station on the Greentown 765 kV line (B3847.3). **Estimated Cost: 8.53M**

Total Estimated Cost: \$60.935 M

Required IS Date: 6/1/2027

Projected IS Date: 6/1/2027

Previously Presented: 4/30/2024

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