

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 Construct 69kV Transmission Lines	)	Case No. 2026-00184
And Associated Transmission Grid Upgrades In Pike	)	
County, Kentucky (Breaks-Dorton Project)	)	

DIRECT TESTIMONY OF
NICOLAS C. KOEHLER
ON BEHALF OF KENTUCKY POWER COMPANY

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I. INTRODUCTION

1 **Q. PLEASE STATE YOUR NAME, POSITION AND BUSINESS ADDRESS.**

2 A. My name is Nicolas C. Koehler. My business address is 8500 Smiths Mill Road, New
3 Albany, Ohio 43054. I am employed by American Electric Power Service Corporation
4 (“AEPSC”) as Managing Director – East Transmission Planning. AEPSC is a subsidiary
5 of American Electric Power Company, Inc. (“AEP”) that provides support services to the
6 operating subsidiaries of AEP, including Kentucky Power Company (“Kentucky Power”
7 or the “Company”).

II. BACKGROUND

8 **Q. PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND**
9 **BUSINESS EXPERIENCE.**

10 A. I received a Bachelor of Science – Electrical Engineering degree from Ohio Northern
11 University in Ada, Ohio. In 2008, I joined AEP as a Planning Engineer where I advanced
12 through increasing levels of responsibility. I received my Professional Engineer license in
13 the state of Ohio in 2012 (license number 76967). In May 2019, I became the Director of
14 East Transmission Planning. In April 2025, I assumed the role of Managing Director of
15 East Transmission Planning.

1 **Q. WHAT ARE YOUR RESPONSIBILITIES AS MANAGING DIRECTOR OF EAST**
2 **TRANSMISSION PLANNING?**

3 A. My role includes organizing and managing all activities related to assessing the adequacy
4 of AEP’s transmission network to meet the needs of its customers in a reliable, cost
5 effective, and environmentally compatible manner. I participate in transmission planning
6 activities with Kentucky Power to address overall system performance.

III. PURPOSE OF TESTIMONY

7 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

8 A. I am testifying in support of Kentucky Power’s application for a certificate of public
9 convenience and necessity authorizing Kentucky Power to construct the Breaks-Dorton
10 Project (the “Proposed Project”) described below.

11 **Q. ARE YOU SPONSORING ANY EXHIBITS OR ATTACHMENTS IN THIS**
12 **APPLICATION?**

13 A. Yes, I am sponsoring **EXHIBIT 13**, which provides a comparison of the Proposed Project
14 with alternatives that I discuss later in this testimony. Additionally, I am supporting
15 **EXHIBIT 10**, which is the information presented at the PJM Sub-Regional Regional
16 Transmission Expansion Plan (SRRTEP) meetings held on October 14, 2022 and
17 November 18, 2022. This information demonstrates the baseline violations being
18 addressed by the project as well as supplemental needs that are addressed as part of the
19 baseline solution.

IV. PROJECT DESCRIPTION

Q. PLEASE PROVIDE AN OVERVIEW OF THE PROPOSED PROJECT.

A. The Proposed Project consists of the following scopes of work to address the baseline and asset renewal needs. Specifically, the Proposed Project will:

- Rebuild the Breaks – Dorton 46kV line section to 69kV standards.
- Rebuild the Henry Clay Substation to 69kV standards.
- Retire the Draffin Substation and replace it with the greenfield Ratliff Substation.
- Retire approximately six miles of 46kV lines between the Henry Clay Substation and the Elwood Substation. A new right of way will be used to shorten the line mileage between the stations.
- Convert the line between the Dorton Substation and the Burdine Substation to 69kV.
- Convert the Burdine Substation to 69kV by replacing the distribution bank at Burdine Substation.

V. PROJECT NEED

Q. PLEASE DESCRIBE THE NEED DRIVING THE PROJECT.

A. The Proposed Project will address two needs. First, the Proposed Project will address identified baseline violations of FERC 715 Reliability Standards.¹ In the 2027 Winter RTEP case, PJM models were used to examine the system, and it was determined that voltage magnitude and drop violations occur under various N-1-1 contingency scenarios² which consist of losing two of the three 138kV or 69kV sources to the area from Dorton Substation, Cedar Creek Substation, and Breaks Substation. As one specific example,

¹ <https://docs.aep.com/docs/requiredpostings/TransmissionStudies/docs/2024/TransmissionPlanningReliabilityCriteria-AEP-PJM-2024-Filing.pdf>

² An N-1-1 energy loss refers to the loss of load, generation, or transfer capability resulting from a contingency scenario in which one system component is already out of service and a second component also fails, causing a reduction in the amount of energy that can be reliably delivered by the power system.

1 under an N-1-1 loss of 138kV and 69kV sources out of the 138kV source at Dorton
2 Substation and the 138kV source at Cedar Creek Substation, the stations located along the
3 Cedar Creek – Elwood and the Breaks – Dorton – Elwood circuits would experience
4 voltage magnitude and drop violations. This could cause customer outages and reliability
5 issues. Second, the Proposed Project will allow the Company to replace outdated and
6 deteriorating 46kV infrastructure with modern 69kV equipment.

7 **Q. PLEASE PROVIDE DOCUMENTATION REGARDING THE BASELINE**
8 **VIOLATIONS.**

9 A. Please see **EXHIBIT 10** for the information. This Exhibit includes details presented to PJM
10 supporting the need for the baseline work included in this application. The supplemental
11 needs that the baseline project addresses are also included in this exhibit.

12 **Q. WHAT OUTDATED INFRASTRUCTURE WILL THE PROPOSED PROJECT**
13 **ADDRESS?**

14 A. The Proposed Project would address asset renewal needs on Breaks – Dorton – Elwood
15 46kV lines. This allows for the replacement of approximately 20 miles of outdated 46kV
16 transmission lines with modern 69kV transmission lines and shortens the line by
17 approximately six miles.

18 **Q. HOW MANY CUSTOMERS ARE SERVED BY THE BREAKS-DORTON LINES?**

19 A. This Project will improve transmission lines that serve approximately 4,600 customers-

20 **Q. PLEASE DESCRIBE HOW THE PROJECT ADDRESSES THE NEEDS YOU**
21 **IDENTIFY ABOVE.**

22 A. The Proposed Project addresses the needs above by reconfiguring the area and replacing
23 deteriorating 46kV infrastructure. The voltage violations are addressed by rebuilding and

1 converting the infrastructure in the area to modern 69kV equipment, allowing stronger
2 more reliable power to be delivered to the area. The Proposed Project would mitigate the
3 voltage violations found during the 2027 Winter RTEP case, update the area to modern
4 69kV standards, and address asset renewal needs.

VI. TRANSMISSION PLANNING AND EXPANSION

Q. HOW DO PJM, AEP, AND KENTUCKY POWER COORDINATE PLANNING AND OPERATION OF KENTUCKY POWER'S TRANSMISSION SYSTEM?

7 A. Kentucky Power adheres to the transmission reliability criteria defined in AEP's FERC
8 Form 715 filing (the "AEP Criteria"), which includes the contingency categories defined
9 in NERC Reliability Standard TPL-001-4. AEP is a member of the PJM Regional
10 Transmission Organization ("RTO"). To ensure that the regional transmission system
11 owned by its members can reliably meet the projected demand of the customers served by
12 that system, PJM conducts an ongoing Regional Transmission Expansion Plan ("RTEP")
13 study process. RTEP studies are conducted on a five-year-out, "top-down" basis and
14 involve an exhaustive review of all PJM bulk electric system facilities (including AEP's
15 transmission facilities of 138kV and greater) for compliance with applicable reliability
16 criteria. AEP also conducts an exhaustive parallel, "bottom-up" assessment of its entire
17 transmission system (including sub-138kV facilities) using PJM's RTEP models to ensure
18 that its system continues to comply with the AEP Criteria under projected future
19 conditions.

Q. EXPLAIN THE PJM PROCESS FOR THE SELECTION OF THIS PROJECT?

21 A. The supplemental Project need was reviewed with stakeholders at the Sub-Regional RTEP-
22 Western meetings as described below. The Baseline needs were identified through the

PJM RTEP process as part of the 2021 RTEP analysis that identified the previously mentioned voltage violations on the 46kV system. The Baseline Project was reviewed at the October 14, 2022 and the November 18, 2022 Sub-Regional RTEP-Western meetings hosted by PJM. The Baseline ID assigned by PJM is B3736.

Q. HAS THE PROJECT DESCRIPTION BEEN MODIFIED SINCE BEING PRESENTED AT PJM?

A. Yes. Instead of replacing Henry Clay Substation with Poor Bottom Substation, the Henry Clay Substation will be expanded and rebuilt. The retirement of the 17.2 mile Cedar Creek – Elwood 46kV circuit, Cedar Creek work, and the retirement of Pike 29 Switching Station and Rob Fork Switching Station were included in the original PJM presentation for the project but are instead being completed in a future project. The Poor Bottom Substation option would have been a more costly option that placed the Substation closer to residences. Due to the difficulties acquiring land and the higher cost, the Company determined to instead expand the Henry Clay Substation to utilize existing infrastructure and minimize conflicts with landowners. The Proposed Project will also replace the 46/12kV transformer at the Burdine Substation with a 69/12kV transformer converting the Burdine Substation into a 69kV Substation.

The designs are electrically similar; however, the Proposed Project re-uses the existing property for the Henry Clay Substation, with some expansion, rather than build an entirely greenfield station, and adds the Burdine Substation upgrades. Additional information regarding the station design and expansion is included in Direct Testimony of Company Witness El-Safty.

Q. WHY WAS THE PROPOSED PROJECT SELECTED?

A. The Proposed Project addresses the baseline violations in the most cost-effective manner

1 while also addressing identified supplemental needs on the Breaks – Dorton – Elwood
2 46kV circuit under AEP-2020-AP012 (presented on February 21, 2020 S-WRRTEP). The
3 Proposed Project converts the area from outdated 46kV transmission lines that will
4 eventually become obsolete to modern 69kV transmission lines and helps maintain the
5 condition of the Company's transmission infrastructure.

VII. ALTERNATIVES TO THE PROJECT

6 **Q. WHAT OPTIONS WERE CONSIDERED AS BASELINE ALTERNATIVES**
7 **DURING THE PJM PROCESS, AND WHY WERE THEY DISMISSED?**

8 A. During the PJM process, there was an alternative submitted and ultimately dismissed to
9 install a 9.6 MVAR 46kV Capacitor Bank at the Dorton Substation and a 12.9 MVAR
10 Capacitor Bank at Cedar Creek 46kV Substation. However, this option did not address
11 any supplemental needs and only addressed the baseline violations. This would require
12 future projects to address the supplemental needs at a later time and could result in
13 increased cost and additional outages. In order to efficiently use work crews, minimize
14 outages, and address all identified baseline and supplemental needs, the Proposed Project
15 was developed, submitted to, reviewed, and approved by PJM.

16 **Q. WHAT OTHER HOLISTIC ELECTRICAL ALTERNATIVES WERE**
17 **EVALUATED BY THE COMPANY?**

18 A. The Company developed a holistic alternative to the Proposed Project that provides similar
19 benefits, which is further described as Alternative in **EXHIBIT 13**. The alternative project
20 would:

- 21 • Rebuild approximately 26 miles Dorton – Elwood – Breaks 46kV line in the
22 clear.

- Replace switch structures at Henry Clay Switching Station, Henry Clay Substation, Draffin Substation, and Pike 29 Substation.
- Install a 7.7 MVAR capacitor bank, and circuit switcher on the 46kV bus at Dorton Substation.
- Rebuild approximately a 3 mile portion of the Cedar Creek – Elwood 46kV transmission line and keep Pike 29 customer on the 46kV service.
- Serve the Pike 29 customer radially via Henry Clay Switching Station.

Q. HOW DOES THE ESTIMATED COST OF THE PROJECT ALTERNATIVE COMPARE TO THE ESTIMATED COST OF THE PROPOSED PROJECT.

A. The estimated project alternative cost is \$159.4 million, and the estimated Proposed Project cost is \$135.3 million. Ultimately, the Proposed Project is the most cost-effective, reasonable solution to prevent system failures.

Q. WHAT ARE THE SHORTCOMINGS OF THE ALTERNATIVE COMPARED TO THE COMPANY’S PROPOSED PROJECT?

A. In addition to the cost, the alternative continues to operate the line at 46kV, which is a voltage the Company is working to eliminate as an operating voltage. Converting to 69kV as proposed in the Project results in fewer line miles as compared to a complete rebuild of the assets as they are currently constructed. The additional line length if the alternative proposal were to move forward also comes with higher risk due to additional “line exposure.” Longer lines equate to more risk due to there being more areas for disruption to occur.

Q. PLEASE EXPLAIN WHY THE PROPOSED PROJECT IS PREFERABLE TO THESE ALTERNATIVES.

A. The Proposed Project is the most cost-effective, reasonable solution that addresses all of the documented needs. In addition to solving the baseline needs, the Proposed Project

1 addresses the inevitable upgrade of the system to modern 69kV standards. The Company
2 is making efforts to upgrade the entire system to 69kV to make sure there is no
3 bottlenecking at points of lower voltage equipment. The 69kV system has higher capability
4 than the 46kV system, allowing for more power flow.

5 **Q. IS THE PROPOSED PROJECT THE LEAST COST REASONABLE OPTION?**

6 A. Yes.

7 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

8 A. Yes, it does.

VERIFICATION

The undersigned, Nicolas C. Koehler, being duly sworn, deposes and says he is the Managing Director Transmission Planning for American Electric Power Service Corporation, that he has personal knowledge of the matters set forth in the foregoing testimony and the information contained therein is true and correct to the best of his information, knowledge, and belief after reasonable inquiry.

Signed by:

Nicolas C. Koehler

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Nicolas C. Koehler

Commonwealth of Kentucky)

)

County of Boyd)

Case No. 2026-00184

Subscribed and sworn to before me, a Notary Public in and before said County and State, by Nicolas C. Koehler, on 8/26/2026 | 12:33 PM EDT.

Signed by:

Michelle Caldwell

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Notary Public

My Commission Expires 05/05/2027

Notary ID Number KYNP71841

MARILYN MICHELLE CALDWELL
ONLINE NOTARY PUBLIC
COMMONWEALTH OF KENTUCKY
Commission #KYNP71841
My Commission Expires 5/5/2027