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 Rebuild the Wooton-Stinnett Portion of the Hazard-Pineville 161 kV Line In Leslie County, Kentucky ("Wooton-Stinett 161 kV Transmission Rebuild Project"	)	Case No. 2022-00118

DIRECT TESTIMONY OF

NICOLAS C. KOEHLER

ON BEHALF OF KENTUCKY POWER COMPANY

DIRECT TESTIMONY OF
NICOLAS C. KOEHLER ON BEHALF OF
KENTUCKY POWER COMPANY
BEFORE THE PUBLIC SERVICE COMMISSION OF KENTUCKY

CASE NO. 2022-00118

TESTIMONY INDEX

DIRECT TESTIMONY OF

NICOLAS C. KOEHLER

ON BEHALF OF KENTUCKY POWER COMPANY
BEFORE THE PUBLIC SERVICE COMMISSION OF KENTUCKY

CASE NO. 2022-00118

I. INTRODUCTION

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

A. My name is Nicolas C. Koehler. My position is Director of East Transmission Planning for American Electric Power Service Corporation ("AEPSC"). AEPSC supplies engineering, financing, accounting, planning, advisory, and other services to the subsidiaries of the American Electric Power ("AEP") system, one of which is Kentucky Power Company ("the Company"). My business address is 8500 Smiths Mill Road, New Albany, Ohio 43054.

II. BACKGROUND

Q. PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND BUSINESS EXPERIENCE.

A. I received a Bachelor of Science – Electrical Engineering degree from Ohio Northern University in Ada, Ohio. In 2008, I joined AEP as a Planning Engineer where I advanced through increasing levels of responsibility. I received my Professional Engineer license in the state of Ohio in 2012 (license number 76967). In May 2019, I assumed my current position.

Q. WHAT ARE YOUR RESPONSIBILITIES AS DIRECTOR OF EAST TRANSMISSION PLANNING?

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

Q. HAVE YOU PREVIOUSLY SUBMITTED TESTIMONY BEFORE THE KENTUCKY PUBLIC SERVICE COMMISSION?

A. Yes. I previously submitted testimony in Case No. 2020-00062 and Case No. 2021-00346.

III. PURPOSE OF TESTIMONY

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. I am testifying in support of Kentucky Power's application for a Certificate of Public Convenience and Necessity authorizing Kentucky Power to construct the Wooton-Stinnett 161 kV Rebuild Project (the "Project"). I will provide information related to the need for the Project.

IV. TRANSMISSION PLANNING AND EXPANSION

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

A. Kentucky Power's transmission system is part of the AEP eastern transmission system, which consists of the transmission facilities of ten AEP operating or transmission companies including Kentucky Power, Appalachian Power Company, Ohio Power Company, Indiana Michigan Power Company, Wheeling Power Company, Kingsport Power Company, AEP Indiana Michigan Transmission Company, AEP Kentucky

Transmission Company, AEP Ohio Transmission Company, and AEP West Virginia Transmission Company. This expansive system allows the economical and reliable delivery of electric power for all AEP customers, including customers of Kentucky Power. Planning and operation of the system is integrated through the coordinated efforts of the AEP Transmission Department ("AEP Transmission"), a business unit of AEPSC, and PJM. AEP Transmission works closely with neighboring utilities, other interconnected entities, and PJM to plan and operate the transmission grid. RTOs align the transmission planning and operating requirements set out in each RTO's protocols and operating criteria, as further defined through North American Electric Reliability Corporation (NERC) requirements. Kentucky Power has input into the RTO planning process through AEP Transmission.

Q. PLEASE DESCRIBE THE PJM RTEP PROCESS.

A. The PJM RTEP process is a 24-month planning process that identifies reliability issues over a 15-year horizon. The 24-month planning process consists of overlapping 18-month planning cycles to identify and develop shorter lead-time transmission upgrades and one 24-month planning cycle to provide sufficient time for the identification and development of longer lead-time transmission upgrades that may be required to satisfy planning criteria.

Q. WHAT TYPES OF PROJECTS RESULT FROM THE RTEP PROCESS?

A. Kentucky Power, through AEP Transmission, participates in the PJM planning process, which is guided by PJM, NERC, RFC, and AEP planning criteria. The process generally results in two categories of projects: Baseline and Supplemental. Each category is described in detail below. The first project category is Baseline Upgrades. Using the aforementioned criteria, PJM and Kentucky Power, in conjunction with AEP, develop projects to address criteria violations. Baseline projects include transmission expansions or enhancements that are required to achieve compliance with respect to PJM's system reliability, operational performance, or market efficiency criteria as determined by PJM's Office of the Interconnection, as well as projects that are needed to meet Transmission Owners' local transmission planning criteria.

Q. WHAT IS THE SECOND PROJECT CATEGORY?

A. The second project category is Supplemental Projects. Supplemental Projects include all projects that are not addressing minimum bright-line Transmission Planning criteria. These projects are needed to maintain the existing grid as designed, connect new customers to the grid, satisfy contractual and regulatory requirements, and to meet RTO and industry standards, as set forth in the PJM Operating Agreement. Examples of Supplemental upgrades include interconnection of new retail demand, modification to existing delivery points, replacing failed equipment, proactive replacement of deteriorating assets in poor condition prior to failure, modernization and hardening of the grid, improved operational efficiency and performance, and installation and expansion of supervisory control and data acquisition.

Q. WHAT IS THE PROCESS FOR REVIEWING PJM SUPPLEMENTAL PROJECTS?

A. The process outlines the following steps and requirements:

- provide for separate stakeholder meetings to discuss:
    - models, criteria, and assumptions used to plan Supplemental Projects; (Assumptions Meeting);
    - needs underlying Supplemental Projects (Needs Meeting); and

  - proposed solutions to meet those needs (Solutions Meeting).
- post criteria, assumptions, and models at least 20 calendar days prior to the Assumptions Meeting;
- post criteria violations and drivers at least 10 days in advance of the Needs Meeting;
- post potential solutions and alternatives identified by the PJM Transmission Owners or stakeholders at least 10 days in advance of the Solutions Meeting; and
- submit comments at least 10 days before the Local Plan is integrated into the RTEP for PJM Transmission Owner review and consideration.

FERC has been very specific that the changes it required in Docket EL16-71 are prospective only. Thus, Supplemental Projects reviewed prior to the effective date of the new process were and will continue to be subject to the rules applicable when they were reviewed. It is also important to understand that Supplemental Projects that the Company presents through the PJM stakeholder process are no different from the types of projects for which the Company previously sought, and the Commission previously granted, certificates of public convenience and necessity before Kentucky Power joined PJM. This Project followed the updated requirements for Supplemental projects as outlined above.

Q. DOES KENTUCKY POWER FOLLOW SPECIFIC GUIDELINES TO DETERMINE THE NECESSITY OF SUPPLEMENTAL PROJECTS?

A. Yes. Kentucky Power follows an established and detailed protocol to evaluate and select Supplemental Projects that assures only projects that are needed are pursued. See **EXHIBIT 19**, AEP's Guidelines For Transmission Owner Identified Needs. The guidelines discuss the drivers or inputs that should be considered when evaluating transmission system needs. The guidelines ensure that all AEP-affiliated Transmission Owners are applying consistent criteria in their evaluations; Kentucky Power ultimately determines the mix of Supplemental Projects needed to maintain the reliability of its transmission grid within the AEP Zone. Consistent with the AEP Guidelines for Transmission Owner Identified Needs, Kentucky Power considers safety risks or concerns, asset condition, abnormal operating conditions, reliability performance, RTO or ISO notices, stakeholder and customer input, state and federal standards or policies, including NERC transmission planning standards, and environmental impacts in identifying Supplemental Projects.

Q. WHAT DRIVERS OR INPUTS DOES KENTUCKY POWER CONSIDER IN IDENTIFYING SUPPLEMENTAL PROJECTS?

A. Consistent with the AEP Guidelines for Transmission Owner Identified Needs, the considerations include:

Equipment Condition, Performance and Risk: These are investments made to ensure the safe and reliable operation of the transmission system. The decision to pursue such projects can be based on equipment performance, obsolescence and expected life concerns, equipment condition, reliability impact, maintenance costs, environmental impact and engineering recommendations.

Operational Flexibility and Efficiency: These projects can optimize system configuration, lower equipment duty cycles, reduce the impact on and limit the exposure to customers for planned or forced outages and can facilitate improved restoration times. They also provide opportunities to bring the system up to current standards and design principles.

Infrastructure Resilience: These projects can improve system ability to anticipate, absorb, adapt to and/or rapidly recover from disruptive natural or man-made events including severe weather, geo-magnetic disturbances and physical and cyber security challenges.

Customer Service: These projects accommodate new, increasing or future load so that the system can reliably address customer needs.

Other Drivers: Examples include industry recommendations, changes to standards and regulations, and state policy objectives.

Q. WHAT IS PJM'S ROLE IN REVIEWING SUPPLEMENTAL PROJECTS?

A. All projects affecting the topology of the grid (i.e., projects that impact the modeled structure of the grid), whether baseline or supplemental, are subject to the stakeholder process within PJM. While PJM does not "approve" Supplemental Projects, these projects are submitted to PJM and reviewed with the TEAC or Sub-regional RTEP Committee – Western on a regular basis (typically monthly). All TEAC and Sub-regional RTEP Committee – Western meetings are open and any transmission stakeholder can attend and participate. Any stakeholder input regarding specific projects is vetted through this PJM committee meeting process. Supplemental Projects are subject to two rounds of review and detailed system needs and project information, including alternative solutions, are provided to stakeholders.

Q. IS THE DESIGNATION OF A PROJECT AS A BASELINE OR SUPPLEMENTAL PROJECT INDICATIVE OF WHETHER THE PROJECT IS NECESSARY, OR HOW NECESSARY IT IS?

A. No, it is not. The designation of a project as a Baseline or Supplemental Project is not indicative of the level of, or absence of, need for the project. Instead, the designations simply reflect that the project satisfies different planning requirements and parameters. The criteria for designation as a Supplemental or Baseline project are not mutually exclusive, and a single project sometimes can be justified under either. Supplemental Projects are required for the reasons discussed in Section VIII of this testimony. Supplemental Projects improve or preserve a PJM Transmission Owner's ability to provide reliable service to its customers, consistent with its obligation to serve, and are grounded in good utility practice.

Q. DOES PJM FACTOR THE AGE OR CONDITION OF EQUIPMENT INTO ITS FORWARD LOOKING MODELS FOR SYSTEM RELIABILITY?

A. No, it does not. The forward-looking models that PJM and transmission owners employ to identify Baseline Projects assume the modeled system will perform as designed without regard to the age or actual condition of all the elements of the transmission system, including those elements constructed, upgraded, or maintained as non-baseline elements. This means that for modeling purposes, a substation with 75-year old components that are deteriorating is assumed to function with the same reliability as a five year old substation with newer components. Although PJM transmission planning treats load dropping as an acceptable means of mitigating potential system reliability criteria violations under certain scenarios, such a planning approach is contrary to Kentucky Power's obligation under KRS 278.030(3) to provide "adequate, efficient and reasonable service," including the safe and reliable delivery of electricity to its customers. In that regard, Baseline projects alone would be insufficient to satisfy Kentucky Power's obligation to provide safe and reliable service to its customers.

Q. IS ALL OF THE WORK ASSOCIATED WITH A TRANSMISSION PROJECT SUBMITTED TO PJM?

A. No. There are project elements that either do not change the transmission grid's topology, or that are implicit in the description of larger projects, that are not required to be submitted to PJM for explicit review. These project elements do not affect the transmission grid analysis within the framework of PJM's FERC-approved planning process. These project elements nevertheless are essential to the larger projects submitted to PJM. For example, when a new breaker installation project is submitted to PJM, the breaker would likely be the only major piece of equipment listed in the submission. The PJM submission would not include a listing of elements such as Coupling Capacitor Voltage Transformers (CCVTs) and relaying required for the breaker to function properly. CCVTs are utilized for real time voltage sensing on the grid. Relays receive information from CCVTs and other instrument transformers and determine the proper course of action for the equipment to which they are tied. Without the relays and CCVTs, the breaker would not know when or how to operate.

Q. IS THERE ALSO A PROCESS FOR REVIEWING TRANSMISSION PROJECTS AT FERC?

A. Yes. In addition to the PJM stakeholder review, there is another opportunity to evaluate the prudence of transmission projects at FERC. Specifically, AEP's annual transmission formula rate filings include protocols for the review of both the annual projection and true up of the AEP formula rates.

V. PROJECT NEED

Q. PLEASE DESCRIBE THE NEED DRIVING THE PROJECT.

A. The Project is driven by the Equipment Material/Condition/Performance/Risk on the Wooton-Stinnett section of the Wooton-Pineville 161 kV line. The Wooton-Pineville line was originally built in 1942 and has experienced signifigant degredation based on its age. The specific Project in this application will address these concerns on the 11-mile section between Wooton and Stinnett substations on this line. The Project will also address necessary improvements at the Wooton, Leslie, and Stinnett substations. This section is comprised of structures, the majority of which are wood structures dating back to 1942. Inspections of the circuit indicate open conditions have been observed (Open conditions being the existing and unaddressed physical conditions associated with a Transmission Line component) along the line. There are a total of 105 open conditions on this line section, mainly including damages poles and crossarms. There are 103 structural open conditions: rotted poles (47), rotted crossarms (22), damaged poles (10), insect damaged crossarms (8), woodpecker damaged poles (8), bowed poles (2), bowed crossarms (2), twisted crossarms (2), a split pole (1), and a rotted filler block (1). The hardware related open condition is for loose guys (1), and the grounding related open condition is for a broken ground wire lead (1). This segment of line is associated with two circuits, the entire approximately 6.5 miles Leslie – Wooton 161 kV Circuit and approximately 4.5 miles of the Leslie – Pineville 161 kV Circuit. In the last five years, there have been one momentary and two permanent outages on the Leslie – Wooton 161 kV Circuit. The momentary outage was due to ice/snow. The permanent outages were due to vegetation fall-ins outside of the right of way. In the last five years, there have been twelve momentary and fourteen permanent outages on the Leslie – Pineville 161 kV Circuit. The momentary outages were due to lightning (9) and wind (3). The permanet outages were due to vegetation fall-ins outside of the right of way (8), lightning (2), ice/snow (2), crossarm failure (1), and fire (1). Three of the permant outages caused a total of 631k minutes of interruption, affecting 4,142 customers served from Stinnett Substation. A summary of circuit outages can be found in **<u>EXHIBIT 3.</u>**

Q. HAS THE PROJECT GONE THROUGH THE PJM M-3 PROCESS?

Yes. The project was posted to the local plan on October 27, 2021 and subsequently assigned Supplemental ID s2428.1 through s2428.8. This project was reviewed with stakeholders at the March 19, 2020 meeting and the solution was presented on November 20, 2020 at the Sub-Regional RTEP-Western meetings hosted by PJM. The project costs in the local plan slides reflect transmission cost estimates and do not reflect distribution substation cost estimates. Any further updates to the local plan slides, including cost estimates, anticipated to occur during this proceeding will be submitted accordingly.

Q. ARE THERE FUTURE PROJECTS ANTICIPATED FOR THIS LINE?

Yes. While this filing encompasses the rebuild of the approximately 11-mile section of the Wooton-Stinnett line, there will be an additional project in the future that will address rebuilding the rest of the line from Stinnett to Pineville, the application for which will be filed at a later time. This is part of a larger rehabilitation project for this area. The Commission has approved and reviewed the project for the Hazard-Wooton Line (Case Number 2019-00154).

The Company is making one additional filing in connection with these remaining improvements. Three filings are necessary due to the length of the existing Hazard – Pineville 161 kV Transmission Line (45.2 miles), in order to help schedule the work and control the timing of expenditures. The last portion to be rebuild is approximately 29 miles long between Stinnett and Pineville and crosses the Daniel Boone National Forest, which will require additional approvals, coordination, and time.

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

A. The Project proposes to rebuild approximately 11 miles of 161kV line between the Wooton, Leslie, and Stinnett substations. Rebuilding the line would addresses the identified concerns as described in the application on this circuit. The structures have exceeded their expected life in providing service to customers and have reached the point in which it is most appropriate to replace them to avoid any substantial structure failure that could turn into a cascading failure with outage times being delayed due to lack of adequate access roads and the remote location of the almost eighty year old line.

Q. HOW MANY CUSTOMERS ARE SERVED BY THIS TRANSMISSION LINE IN THE AREA?

A. The existing transmission grid in the Project area serves the Wooton, Leslie, and Stinnett substations.

- Wooton Substation only has transmission facilities at 161,000 volts and serves no direct metered customers.
- Leslie Substation serves 25 MVA of peak load which has about 3,300 customers and serves a large portion of northern Leslie County, Kentucky.
- Stinnett Substation provides service to about 1,700 customers which serves about 20 MVA of peak load.

Q. WILL DISTRIBUTION LINE WORK BE UNDERTAKEN AT THE TIME OF THE TRANSMISSION PROJECT?

A. Yes. As part of the Project, distribution lines between Leslie and Stinnett will be reinforced in order to be able to recover the load out of Stinnett from Leslie.

VI. PROJECT DESCRIPTION

Q. PLEASE PROVIDE AN OVERVIEW OF THE PROPOSED PROJECT.

A. The Project consists of six components to address the needs discussed above. **EXHIBIT 13** (Rebuild Study) to the Application identifies the major Project components for the transmission line rebuild, their purpose, and the principal drivers for their inclusion in the Project. The description below has been updated to reflect the most current descriptions of the proposed Project from the October 27, 2021 local plan update. In the event additional updates are made to the proposed Project during this proceeding, the Company will update this filing accordingly:

(1) The construction of approximately 11 miles of single and double circuit 161 kV transmission line (of which less than 0.5 mile is double circuit) from the Wooton Substation, Leslie Substation, and Stinnett Substation to address the degraded condition of that existing line. This portion of the Project will also include expansion of the right-of-way ("ROW") for this line;

(2) At Wooton Substation, upgrade relaying to accommodate new OPGW (optical ground wire) fiber protection;

(3) At Leslie Substation, reconductor the 161 kV Bus, relaying upgrades toward Wooton and Pineville, replace 161 kV MOAB W, replace 161 kV MOAB W, and replace the 161 kV XF#1 high-side switch;

(4) Relocate approximately 0.3 miles of 69 kV Leslie – Clover Fork which includes one structure and reconfiguration of the existing line to cross underneath the proposed Wooton-Stinnett 161 kV line;

(5) At Stinnett substation, upgrade relaying to accommodate new OPGW fiber protection. Provide transition, entry, and termination for OPGW connectivity to the Hazard-Pineville fiber route;

(6) Provide transition, entry, and termination for OPGW connectivity at Leslie Substation. Company Witness Larson describes the Wooton-Stinnett 161 kV Project ROW expansion.

VII. ALTERNATIVES TO THE PROJECT

Q. WHAT ELECTRICAL ALTERNATIVES WERE EVALUATED BY THE COMPANY?

A. Given the remote nature of the line and the load served from the line, no cost effective alternative exists that addresses the needs on the entire asset. Recent inspection of the facilities indicate structure replacements are needed on a total of 19 structures (79% of the line section) between the Wooton and the Leslie Substations and on a total of 22 structures (69% of the line section) between the Leslie and the Stinnett Substations. The majority of the structures currently without conditions are of the same vintage and can reasonably be expected to incur similar conditions over time. Any rehab only work would address structure related open conditions, as well as a condition related to grounding for a broken ground wire lead and a hardware related open conditions for a loose guy wire. However, this does not take into consideration neighboring poles that may be impacted by the rehab and could potentially leave some vintage 1942 structures in-service. There could also be sections of the vintage 1942, 500 KCMIL (kilo circular mils) copper conductor left behind with this approach.

Q. CAN THE FACILITIES BE REPAIRED?

A. The existing conductor cannot be replaced due to the existing structures not being able to withstand an upgraded conductor size. There are no appropriate alternatives.

Q. WOULD THAT ALTERNATIVE BE PREFERABLE COMPARED TO THE COMPANY'S PROPOSAL?

A. No, the best alternative is to replace the entire line, between Wooton, Leslie, and Stinnett substations, with the proposed rebuilt line as a single project. While replacement of discrete components could be done on a piece by piece basis, that alternative would not effectively address the risk that remaining structures could fail in the near future, and increases the risk of having to replace newly refurbished structures as a result of the failure of previously unrefurbished structures in the line. Additionally, refurbishing the line on a piecemeal basis would require multiple outages over a period of time, resulting in increased overall outage time for customers. Piecemeal replacement would also increase the overall cost of the project due to increased mobilization and construction costs.

VIII. PJM REVIEW

Q. PLEASE PROVIDE A SUMMARY OF THE PROJECT'S ADVANCEMENT THROUGH THE PJM PROCESS?

A. The Project need was first submitted at the Subregional Reliability Transmission Expansion Plan Committee meeting held on March 19, 2020. The solution slides were presented again at the RTEP meeting on November 20, 2020 and is provided as **EXHIBIT 21** (PJM Solution). The project was originally posted to the local plan on December 18,

2020. The anticipated in-service date for the Wooton – Stinnett portion of the project is November 2024.

Q. CAN TEMPORARY MEASURES BE TAKEN TO REPAIR OR IMPROVE THE EXISTING STRUCTURES?

A. No, this Project is driven by asset renewal concerns, making logical upgrades to the 161kV corridor connecting to the previously approved and constructed project (Hazard-Wooton). The Wooton-Stinnett 161kV Transmission Rebuild Project is part of several sections of line rebuild projects and will include a future project along the Stinnett-Pineville line.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

VERIFICATION Draft Koehler.docx

DocVerify ID:	7A06BA90-6BBE-4FA0-BC77-DE5D51D7CB31
Created:	May 23, 2022 04:53:19 -8:00
Pages:	1
Remote Notary:	Yes / State: KY

E-Signature Summary

E-Signature 1: Nicolas C Koehler (NCK)
May 23, 2022 07:02:08 -8:00 [57ED0984B147] [167.239.221.107]
nckoehler@aep.com (Principal) (Personally Known)

E-Signature Notary: Jennifer Young (JAY)
May 23, 2022 07:02:08 -8:00 [4EFE1FA9165E] [167.239.221.101]
jayoung1@aep.com
I, Jennifer Young, did witness the participants named above electronically sign this document.

VERIFICATION

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

Nicolas C Koehler
Signed on 2022/05/23 07:02:08 -8:00

____
Nicolas C. Koehler

Commonwealth of Kentucky	)	
	)	Case No. 2022-00118
Boyd County	)	

Subscribed and sworn before me, a Notary Public, by Nicolas C. Koehler this ___23rd_____ day of May XX, 2022.

Signed on 2022/05/23 07:02:08 -8:00
____
Notary Public

JENNIFER A. YOUNG
ONLINE NOTARY PUBLIC
STATE AT LARGE KENTUCKY
Commission # KYNP31964
My Commission Expires Jun 21, 2025
Notary Stamp 2022/05/23 07:02:08 PST 4EFE1FA9165E

My Commission Expires ____06/21/2025_____________

Notarial act performed by audio-visual communication