COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

Electronic Application Of Kentucky Power Company For Approval Of (1) A Certificate Of Public Convenience And Necessity To Make The Capital Investments Necessary To Continue Taking Capacity And Energy From The Mitchell Generating Station After December 31, 2028, (2) An Amended Environmental Compliance Plan, (3) Revised Environmental Surcharge Tariff Sheets, And (4) All Other Required Approvals And Relief	)	Case No. 2025-00175

DIRECT TESTIMONY OF

ALEX E. VAUGHAN

ON BEHALF OF KENTUCKY POWER COMPANY

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TABLE OF CONTENTS

SECTION **PAGE**

I. INTRODUCTION 1
II. BACKGROUND 1
III. PURPOSE OF TESTIMONY 3
IV. DESCRIPTION OF ALTERNATIVES 4
V. EVALUATION OF POST-2031 ALTERNATIVES 8
VI. CONCLUSION 13

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I. INTRODUCTION

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

A. My name is Alex E. Vaughan. I am employed by American Electric Power Service Corporation ("AEPSC") as Managing Director- Pricing Generation & Fuel Strategy. My business address is 1 Riverside Plaza, Columbus, Ohio 43215. AEPSC is a wholly-owned subsidiary of American Electric Power Company, Inc. ("AEP"), the parent Company of Kentucky Power Company (the "Company" or "Kentucky Power").

II. BACKGROUND

Q. PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND BUSINESS EXPERIENCES.

A. I graduated from Bowling Green State University with a Bachelor of Science degree in Finance in 2005. Prior to joining AEPSC, I worked for a retail bank and a holding company where I held various underwriting, finance, and accounting positions. In 2007, I joined AEPSC as a Settlement Analyst in the RTO Settlements Group. I later became the PJM Settlements Lead Analyst, and in that role, I was responsible for reconciling AEP's settlement of its activities in the PJM Interconnection, LLC ("PJM") market with the monthly PJM invoices and for resolving issues with PJM. In 2010, I transferred to Regulatory Services as a Regulatory Analyst and was later promoted to the position of Regulatory Consultant. My responsibilities included supporting regulatory filings across

AEP's eleven state jurisdictions and at the Federal Energy Regulatory Commission. I also performed financial analyses related to AEP's generation resources and loads, power pools, and PJM. In September 2012, I was promoted to Manager, Regulatory Pricing and Analysis, where I was responsible for cost of service, rate design, and special contract analysis for the AEP east operating companies. In September 2018, I was promoted to Director of Regulated Renewables and Pricing, at which time oversight of regulated renewable, new generation and fuel filings across the AEP operating Companies was added to my responsibilities. In June of 2022 I was promoted to Managing Director of Regulated Pricing. I assumed my current position in August of 2024.

Q. PLEASE DESCRIBE YOUR CURRENT RESPONSIBILITIES.

A. I am responsible for assisting Kentucky Power and the other AEP electric utility operating companies in the preparation of their regulatory filings before this and other commissions under whose jurisdiction these companies provide electric service. My responsibilities include the oversight of cost-of-service analyses, rate design, special contracts, energy supply costs and new generation resource approvals for the AEP operating companies.

Q. HAVE YOU PREVIOUSLY TESTIFIED IN ANY REGULATORY PROCEEDINGS?

A. Yes. I have presented testimony on behalf of the AEP operating companies numerous times before the regulatory bodies in Virginia, West Virginia, Kentucky, Tennessee, Indiana, Michigan, and Oklahoma. In Kentucky, I have testified before the Kentucky Public Service Commission (the "Commission") in several cases, most notably in Kentucky Power's past five base rate case proceedings (Case Nos. 2013-00197, 2014-00396, 2017-00179, 2020-00174, and 2023-00159), the proposed transfer of ownership of

Kentucky Power in Case No. 2021-00481, and Case No 2023-00008 (the Company's last 2-year fuel review).

III. PURPOSE OF TESTIMONY

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my direct testimony is to describe the economic (customer cost) analysis used by Kentucky Power to evaluate the alternatives available to the Company to address its upcoming capacity needs. This evaluation determined the annual revenue requirements for the alternatives to meet the Company's upcoming capacity needs from the end of 2028 through 2031. The evaluation also considered the potential cost impacts of environmental compliance options that would be required, under current environmental law, for continued operation of the Mitchell Generating Station ("Mitchell Plant" or "Mitchell" or "the Plant") after 2031.[1]

Q. WHAT DID THAT ANALYSIS SHOW?

A. The analysis demonstrated that the Company's proposal, to make the investments necessary to continue with a 50% undivided interest in the energy and capacity from the Mitchell Plant beyond the currently-required termination of that interest at the end of 2028, is from an economic perspective the least-cost, reasonable alternative for Kentucky Power to continue to address a large portion of its capacity and energy needs. The Company's proposal remains the best alternative regardless of the post-2031 environmental compliance options implemented by the Company.

[1] On June 11, 2025, the Environmental Protection Agency ("EPA") announced proposed rules that would repeal the 2024 GHG Rule (greenhouse gas) and MATS Rule (mercury & air toxics standards). The EPA has indicated a goal to finalize these rulemakings by the end of this year.

IV. DESCRIPTION OF ALTERNATIVES

Q. WHAT UPCOMING CAPACITY SHORTFALL IS KENTUCKY POWER ADDRESSING IN THIS PROCEEDING?

A. As more fully described by Company Witness Wolffram, the Commission's ruling in Case No. 2021-00004 requires the Company to terminate (stop receiving its share of the energy and capacity) its 50% undivided interest in the Mitchell Plant on January 1, 2029. This required termination will result in a capacity deficit of at least 606 megawatts ("MWs") of unforced capacity ("UCAP").[2] The alternatives evaluated by the Company focus on the deficit that would be realized should the Company not continue to participate fully in the capacity and energy from its 50% share of the Mitchell Plant after 2028.

Q. WHAT ALTERNATIVES DID THE COMPANY EVALUATE TO ADDRESS THE UPCOMING CAPACITY SHORTFALL?

A. Kentucky Power evaluated the following alternatives:

- Alternative 1 – Make necessary investments to continue with a 50% undivided interest in the Mitchell Plant's output beyond December 31, 2028.
- Alternative 2 – Enter into power purchase agreements ("PPAs") with thermal resources (informed by 2023 All-Source Request for Proposals ("RFP")).
- Alternative 3 – Enter into market purchases for capacity and energy.

Q. PLEASE DESCRIBE EACH ALTERNATIVE IN MORE DETAIL.

A. All three alternatives consider the years 2029-2031, which is the period in question.

[2] According to the Company's most recent integrated resource plan, the Mitchell Plant represented 713 MW of summer capacity for the Company. Post IRP filing PJM made changes to its capacity accreditation process. Based on PJM's new ELCC process the Company's 50% share of Mitchell is estimated to be worth approximately 606 MW of accredited capacity or UCAP.

Alternative 1 – Mitchell Plant Cost of Service

Under Alternative 1, Kentucky Power makes the necessary investments to continue receiving capacity and energy from its undivided 50% interest in the Mitchell Plant after December 31, 2028. This alternative includes the full estimated cost of service for the Company's 50% interest in the Mitchell Plant and includes non-fuel and fuel revenue requirements, with a credit for any estimated energy margins the Plant can produce during its operations. Alternative 1 does not include any capacity revenues as the Mitchell UCAP is required to serve the Company's load obligation.

Alternative 1 includes the amount of Mitchell capital starting with the year-end 2024 balance and rolls it forward to a year-end 2028 figure utilizing the currently budgeted capital for the Plant and the currently approved level of depreciation expense for the Plant. The analysis then uses 50% of this new year-end 2028 plant balance as the starting point for the return on and of net book value ("NBV"). The analysis utilizes NBV rather than "rate base" because the accumulated deferred federal income taxes associated with the existing Mitchell Plant balance is not included in the return on calculations. The analysis assumes that this reduction in rate base would continue on in general rates through the planned 2040 end of useful life of the Plant regardless of the decision on the Plant post-2028. The remaining NBV recovery for Alternatives 2 and 3 includes the same assumption and use the same recovery period for the Mitchell NBV as does Alternative 1 (through 2040).

Alternative 1 also includes an annual expense level of the amortization the Company is requesting for the 50% of the Effluent Limitations Guideline ("ELG") amounts collected from West Virginia customers as discussed by Company Witness Wolffram.

Alternative 2 - PPAs

Under Alternative 2, Kentucky Power would address its capacity shortfall by entering into PPAs for thermal resources. The analysis of this alternative utilized the pricing from the Company's 2023 (updated in 2024) All Source RFP ("2023 RFP") as a proxy for what the cost of a PPA would be during the period of 2029-2031. This proxy pricing is conservative because the prices used were from the 2023 RFP process; in general, prices for capacity resources have continued to increase since that time. There were three thermal assets with bids that scored higher in the 2023 RFP process than the Bright Mountain solar Renewable Energy Purchase Agreement ("REPA"), which the Commission declined to approve earlier this year. One of those assets has subsequently been sold to another entity so it was not utilized in the analysis. The bid costs and energy benefits of the two remaining thermal assets were considered and averaged together in the annual price estimate for the evaluation of Alternative 2. The Company did not include the other PPA bids that scored lower than the Bright Mountain REPA that the Commission has already denied. The analysis added market capacity purchase costs to the PPA bids in an amount to make the UCAP MWs equal to that estimated to be provided by the Company's 50% share of Mitchell so that all three alternatives were evaluated on a comparable basis. In addition to the PPA costs and market purchases themselves, Alternative 2 includes recovery of the annual amount of Mitchell NBV. This amount is the estimated year-end 2028 plant balance amortized through 2040, with a weighted average cost of capital ("WACC") return on the balance utilizing the Company's last approved WACC used in its base rates.

Alternative 3 – Market Replacement Costs

Under Alternative 3, the Company would address its capacity shortfall by entering into market purchases for the needed capacity and energy. This alternative includes the estimated cost of energy and capacity in the amount that the Mitchell Plant is currently estimated to provide the Company in 2029-2031. The amount and price of energy utilized in Alternative 3 is derived from the Company's latest net energy cost forecast.[3] The amount of capacity required is equal to the amount the Company estimates the Mitchell Plant will provide in 2029-2031. The price of replacement market capacity used is from the Company's latest base fundamental forecast. The capacity price averages roughly $207/MW-day, which is lower than the last PJM Reliability Pricing Model ("RPM") base residual auction results. Like Alternative 2, the total cost of this alternative also includes recovery of the annual amounts of the remaining Mitchell Plant NBV.

Q. DID THE COMPANY ANALYZE A NEW GENERATION BUILD AS PART OF ITS ALTERNATIVES?

A. No. The Company did not include any new build resources as an alternative in this analysis because the time frame within which the Company must meet its current capacity needs makes that option impractical. It is estimated that a new build generation resource could not be placed in-service until at least 2031. Thus, the schedule for such a new resource does not line up with the need in this instance and as such is not a viable option to consider for a capacity and energy need beginning in 2029.

Q. WHAT ARE THE RESULTS OF YOUR ANALYSIS?

A. The annual revenue requirements of each Alternative are presented in Table AEV-1 below.

[3] KPCO 2025 3+9 NEC forecast dispatch results.

Table AEV-1 – Annual Revenue Requirements of Alternatives

	2029	2030	2031	Total
Alternative 1 - Mitchell				
Mitchell COS	$ 86,378,348	$ 113,272,572	$ 135,755,059	$ 335,405,979
Alternative 2 - PPAs				
Thermal PPAs from RFP	$ 82,746,107	$ 84,763,986	$ 87,792,986	
Remaining NBV Recovery	$ 75,154,986	$ 72,045,688	$ 68,936,390	
Total Cost	$ 157,901,093	$ 156,809,674	$ 156,729,376	$ 471,440,143
Alternative 3 -Market				
Remaining NBV Recovery	$ 75,154,986	$ 72,045,688	$ 68,936,390	
Replacement Market Energy	$ 224,514,595	$ 176,454,655	$ 140,564,210	
Replacement Market Capacity	$ 44,696,074	$ 45,911,294	$ 47,027,351	
Total Cost	$ 344,365,656	$ 294,411,638	$ 256,527,951	$ 895,305,244

Q. WHICH ALTERNATIVE PRODUCES THE LOWEST ESTIMATED COST FOR CUSTOMERS FOR THE 2029-2031 TIME PERIOD?

A. Alternative 1, where Kentucky Power makes the investments necessary to continue receiving its 50% undivided interest in the capacity and energy from the Mitchell Plant beyond 2028, is the best option for the Company and its customers. This alternative produces a revenue requirement that is approximately $136 million less than the next best alternative for this time period. Alternative 1 also provides the added benefit of allowing Kentucky Power and the Commission time to pursue additional options post-2031. These alternatives are evaluated below.

V. EVALUATION OF POST-2031 ALTERNATIVES

Q. DID THE COMPANY EVALUATE MULTIPLE ENVIRONMENTAL COMPLIANCE OPTIONS FOR OPERATING THE MITCHELL PLANT AFTER 2031? IF SO, WHY?

A. Yes. Under current law, the Mitchell Plant cannot continue to operate as a coal plant beyond December 31, 2031, without further investments in environmental upgrades. Thus,

while Kentucky Power is not currently seeking approval to make further investments beyond the ELG investments that have already been made, the post-2031 analysis demonstrates that Kentucky Power's continued interest in Mitchell beyond 2028 allows for numerous future options for the Company and its customers going forward.

Q. PLEASE DESCRIBE THE OTHER ENVIRONMENTAL REGULATIONS CONSIDERED IN YOUR ANALYSIS.

A. Based on discussions with subject matter experts in Environmental Services and Generation Engineering, and the environmental regulations in question, the possible compliance options and timelines for the Mitchell Plant are:

1. Revised Mercury and Air Toxics (MATS): comply by May, 2027;
2. Revised Effluent Limitation Guidelines ("Revised ELG Rule") – the Revised ELG Rule requires installation of a zero liquid discharge system ("ZLD System") by (a) December 31, 2029, or (b) December 31, 2034, if the facility installed bioreactors to meet 2020 ELG rule; and
3. Section 111 Greenhouse Gas Standards ("GHG Rule") – the GHG Rule requires the Plant to either (a) retire by 2032, (b) convert to a 40% gas co-fire and retire by 2039, or (c) convert to 100% gas with no set retirement date.

Q. PLEASE DESCRIBE THE POST-2031 ALTERNATIVES THE COMPANY ANALYZED.

A. To comply with these environmental regulations, the Company analyzed and evaluated the following Alternatives:

- Alternative E1 – convert to 40% gas co-fire to comply with the GHG Rule, do not install a ZLD System to comply with the Revised ELG Rule, and retire by December 31, 2034;
- Alternative E2 – convert to a 40% gas co-fire to comply with the GHG Rule, install a ZLD System to comply with the Revised ELG Rule, and retire by January 1, 2039;
- Alternative E3 – convert to 100% gas to comply with the GHG Rule conversion, install a ZLD System[4] to comply with the Revised ELG Rule, and no retirement deadline (assumed 20-year life); and
- Alternative E4 – construct a new build combined cycle gas plant to replace Mitchell.

This analysis assumed that all of the alternatives are MATS compliant.

Q. DID YOU CONSIDER ANY OTHER OPTIONS FOR 2031 AND BEYOND?

A. Yes. An additional alternative was also evaluated where it was assumed that the environmental regulations in question were delayed until after 2040 and the Mitchell Plant could continue to operate as a coal plant to its currently assumed retirement date of 2040. This "delayed environmental" scenario is Alternative E5. For clarity, Alterative E5 is not currently a viable option as it would require a change in federal law.

Q. PLEASE DESCRIBE HOW KENTUCKY POWER EVALUATED THE ALTERNATIVES.

A. The Company performed a cost of service economic analysis for each of the alternatives so that they could be compared against one another and to the relative level of the Mitchell

[4] The ZLD system under this option is for existing sources such as ash ponds.

Plant's current cost of service. The following is a stepwise description of how the analyses were performed:

Step 1. The 2024 actual Mitchell Plant NBV was rolled forward to an estimated December 31, 2029 amount using the currently approved depreciation rates and forecasted capital additions.

Step 2. The estimated December 31, 2029 Mitchell Plant NBV was assumed to be recovered over the remaining life of the compliance option with a return on the outstanding balance at the Company's currently approved WACC.

a. The Mitchell Plant NBV was amortized through 2038 for Alternatives E1 and E2 as recovery through the shorter period of 2034 made Alternative E1 more of an outlier and 2038 is more consistent with the period through which the Mitchell Plant is currently being depreciated (2040).

b. Alternative E3 assumes a 20-year life so the Mitchell Plant NBV amortization is the same.

Step 3. Account for the initial incremental capital investment amount associated with each compliance alternative.

Step 4. Include new operations and maintenance (O&M) expense levels, as well as on-going capital requirements, in the cost of service for each compliance alternative.

Step 5. Include other operating expenses such as taxes.

Step 6. Apply an estimated unit dispatch analysis for each alternative based on the operating characteristics of the compliance alternative. The resulting total fuel costs and market revenues were incorporated into the total cost of service for each alternative under this step.

Step 7. The Mitchell Plant compliance options with the shorter assumed lifespans (E1 & E2) were made to purchase market energy and capacity in the amount produced by the compliance option with longest assumed life (E3) so that they could be evaluated on an apples-to-apples basis.

Step 8. Compare the resulting annual cost of service for each alternative on a number of metrics as described later in this testimony.

I received information, inputs, and assumptions from Kentucky Power and from various AEPSC groups with subject matter expertise in the areas addressed such as the Generation Engineering, Environmental Services, Commercial Operations, and the Integrated Resource Planning teams.

Q. WHAT WERE THE RESULTS OF THE ALTERNATIVES ANALYSIS.

A. The results from the alternatives analysis are summarized in Confidential Table AEV-2 below:

Confidential Table AEV-2

	Alternative E1	Alternative E2	Alternative E3	Alternative E4	Alternative E5
	40% Co-Fire Only Retire by 12/31/2034	40% Co-Fire, + ELG, Retire by 1/1/2039	100% Gas Conversion,+ ELG, No Set Retirement Date	New Build 1200 MW CC	Delayed Environmental, Retire 12/31/2040
Levelized Cost of Energy ($/MWh)	[redacted]				
Present Value Revenue Requirement (Millions of Dollars)					
Avg Annual Revenue Requirement (Millions of Dollars)					
Average Capacity Factor					
Up-Front Capital Cost (Millions of Dollars)					[5]

The average capacity factors are for the operational life of the asset in each option. All other figures in Confidential Table AEV-2 are for the 20-year study period analyzed.

Q. WHAT ARE YOUR CONCLUSIONS FROM THE ALTERNATIVES ANALYSIS?

A. The alternatives analysis shows that regardless of which post-2031 environmental compliance option is ultimately pursued, making the investments necessary now for Kentucky Power to continue with a 50% undivided interest in the Mitchell Plant provides the Company and its customers with multiple, viable, reasonable cost options to meet its capacity and energy obligations for its customers into the future beyond 2031.

VI. CONCLUSION

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes, it does.

[5] For the delayed environmental case, Alternative E5, this figure is the estimated amount of incremental capital needed to continue coal operations at the plant through 2040 rather than the up-front capital cost of the other alternatives.

VERIFICATION

The undersigned, Alex E. Vaughan, being duly sworn, deposes and says he is the Managing Director of Regulated Pricing 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.

Alex E. Vaughan

State of Ohio)
) Case No. 2025-00175
County of Franklin)

Subscribed and sworn before me, a Notary Public, by Alex E. Vaughan this 23rd day of June 2025.

Notary Public

My Commission Expires Does Not Expire

NOTARIAL SEAL STATE OF OHIO

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