COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

Electronic Investigation of the Service, Rates and Facilities of Kentucky Power Company	)))	Case No. 2021-00370

REBUTTAL TESTIMONY OF

TIMOTHY C. KERNS

ON BEHALF OF KENTUCKY POWER COMPANY

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I. INTRODUCTION

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

A. My name is Timothy C. Kerns. My business address is 1 Riverside Plaza, Columbus, OH 43215. In January 2024, I accepted the position of Senior Vice President of Fossil Hydro Generating Assets where I lead the Fossil and Hydro Generating Assets group under the American Electric Power Company, Inc. Energy Services organization. Immediately prior to my current role, I was Vice President of Generating Assets for Appalachian Power Company and Wheeling Power Company starting March 2023. I have also served as Vice President of Generating Assets for Kentucky Power Company ("Kentucky Power" or "the Company") and Indiana Michigan Power Company from 2020 to 2023.

Q. ARE YOU THE SAME TIMOTHY C. KERNS WHO FILED DIRECT TESTIMONY IN THIS PROCEEDING?

A. Yes.

II. PURPOSE OF REBUTTAL TESTIMONY

Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY IN THIS PROCEEDING?

A. I am responding to the incorrect assertions made in the testimony of the Office of the Attorney General of the Commonwealth of Kentucky ("AG") and the Kentucky Industrial Utility Customers, Inc. ("KIUC") Witness Lane Kollen that the performance of Kentucky Power's Mitchell units is "poor". I address the Mitchell Plant's performance from a unit availability perspective. Company Rebuttal Witness Vaughan addresses the operations (economic dispatch) of the units, in particular as it affects Net Capacity Factor ("NCF"), the sole metric used (inappropriately, in my view) by Mr. Kollen to measure performance.

I will specifically address the following aspects of Witness Kollen's testimony regarding the Mitchell Plant units' generating performance:

1. Witness Kollen's use of NCF as the sole metric for characterizing generating unit performance; and
2. Witness Kollen's comparison of the operating performance of the Mitchell generating units to that of Eastern Kentucky Power Company's ("EKPC") coal-fired H.L. Spurlock ("Spurlock") units.

Q. DO YOU ADDRESS THE PERFORMANCE OF ROCKPORT UNITS 1 AND 2?

A. No. Witness Kollen asserts that the performance of the Rockport units was also "poor." These assertions are also not relevant to the adequacy of the service that Kentucky Power provides to its customers. The Rockport Unit Power Agreement

("UPA") is a financial and contractual agreement, and Kentucky Power does not control Rockport's maintenance or dispatch. Additionally, Kentucky Power's interest in the Rockport UPA terminated prior to the events of Winter Storm Elliott. Therefore, I do not address in my Rebuttal Testimony the operational aspects of the Rockport Plant, which are outside the control of Kentucky Power.

III. GENERATING UNIT PERFORMANCE MEASURES

Q. AG-KIUC WITNESS KOLLEN ASSERTS THAT THE MITCHELL UNITS "OPERATED POORLY" DURING CALENDAR YEARS 2020 THROUGH 2022. DO YOU AGREE?

A. No. For the reasons that I and other Company witnesses have explained in recent Commission proceedings, including most recently in Kentucky Power's 2021-2023 Fuel Adjustment Clause Proceeding, Docket No. 23-000008, Kentucky Power prudently maintains the Mitchell Plant and has achieved good results for the plant. More to the point here, Mr. Kollen offers no valid evidence to support his contention that the Mitchell Plant "operated poorly." Mr. Kollen reaches his conclusion by relying solely on NCF data, a metric that is not appropriate to assess unit reliability and is not ordinarily used by plant operators to do so. He also draws an inapt comparison to EKPC's Spurlock units.

Q. WHY DO PLANT OPERATORS NOT RELY ON NET CAPACITY FACTOR DATA TO ASSESS GENERATOR PERFORMANCE?

A. The primary reason that plant operators do not rely on NCF to assess generator performance is that it is primarily an energy market-driven metric, the ratio of a unit's actual generation output to its maximum potential generation output ("Net

Maximum Capacity") for a given period, as explained by Company Rebuttal Witness Vaughan. That ratio is naturally affected by factors having nothing to do with a plant's availability. Anything that causes the unit's output to be less than its Net Maximum Capacity will reduce its NCF, including routine maintenance and ordinary economic dispatch decisions by PJM. As a result, even a well-maintained and well-performing plant may have a low NCF during several or many months.

Here, Mr. Kollen fails to recognize that generating unit performance is a result of economics and availability. Specifically, Mr. Kollen does not analyze the extent to which Mitchell's NCF is driven by prudent maintenance practices and economics. Notably, as Mr. Vaughan discusses, Mitchell may operate for few hours during certain months simply because it is less expensive to serve customers with power purchased from the PJM power pool. Accordingly, a unit's NCF provides little insight into its performance.

The better measure of a unit's performance is its Equivalent Availability Factor ("EAF"), as supplemented by its Equivalent Planned, Maintenance, and Forced Outage Factors. With these metrics, it is possible to understand when the unit was available to run, and for those times it was not operational and why not. The Equivalent Demand Forced Outage Factor ("EFORd") is also an important metric for describing unit reliability. Mr. Kollen addressed none of these. Company Witness Rosenberger and I fully addressed Mitchell's performance, including outage planning, in our testimony in Docket No. 2023-000008.

Q. CAN YOU ELABORATE ON WHY A WELL-PERFORMING PLANT'S NET CAPACITY FACTOR MAY APPEAR LOW EVEN WHEN THE PLANT IS PHYSICALLY AVAILABLE TO OPERATE?

A. Yes, consider the following five scenarios for a hypothetical 100 MW plant's operation over a given month, which I summarize below in Figure TCK-R1:

- Scenario 1 – The 100 MW unit is available for operation at its rated output and dispatched for 100% of the hours in the month.
- Scenario 2 – The 100 MW unit is available for operation and dispatched for 100% of the month but has a forced de-rate of 50MW for the entire month.
- Scenario 3 – The 100 MW unit is available for operation at its rated output for only 50% of the hours in the month due to a Planned Outage. It is dispatched at its rated output for the remaining 50% of the month.
- Scenario 4 – The 100 MW unit is available for operation at its rated output for 100% of the month but is not selected for operation due to market conditions (Reserve Shutdown) during the month.
- Scenario 5 – The 100 MW Unit is available for operation at its rated output for 100% of the month but its actual output is 40% for that entire month due to market conditions.

Figure TCK-R1 – NCF and EAF Relationships for a Theoretical 100 MW Rated Unit

Scenario #	Percent of Month Available (%)	Derate Factor (%)	Outage Factor (%)	Dispatched (% of Month)	Available Unit Output (MW)	NCF (%)	EAF (%)
1	100	0	0	100	100	100	100
2	100	50	0	100	50	50	50
3	50	0	50	50	100	50	50
4	100	0	0	0	100	0	100
5	100	0	0	40	100	40	100

As you can see, the NCF is affected both by unit availability issues (scenarios 2 and 3) and market conditions (scenarios 4 and 5). The EAF, however, is affected only by unit derates (curtailments) and outages. In my view, it does not make sense to consider factors unrelated to a plant's ability to run when evaluating its performance. Again, Mr. Vaughan also discussed how PJM makes economic dispatch decisions.

Q. MR. KOLLEN OBSERVES THAT BOTH MITCHELL UNITS DID NOT OPERATE FOR ENTIRE MONTHS AT A TIME. DOES THAT PROVIDE INSIGHT INTO THE UNITS' PERFORMANCE?

A. No, for the same reason that NCF alone is not an appropriate metric to evaluate plant performance; a plant can have a 0% NCF for reasons entirely unrelated to its availability. Mr. Kollen's own Exhibit LK-2 proves the point: in most cases, EAF percentages far exceed NCF percentages for the same period, showing that the NCF is driven by factors other than availability. For example, when a plant is not economically selected by PJM and not self-scheduled by the Company, it enters Reserve Shutdown status, where it is disconnected from the grid by the Plant and placed on standby. While the plant is in Reserve Shutdown status, however, it remains available to PJM to start up within its stated operating parameters and operate. During Reserve Shutdowns, a unit's NCF can be 0% while its EAF will be 100%.

Moreover, a plant's NCF will be 0% during routine Planned and Maintenance Outages. As I explained in my Direct Testimony (at 7:15-9:8, 11:1-21), Company generating assets, including Mitchell, are maintained in accordance

with industry and manufacturer standards to provide safe, economical, and reliable generation output. The Company typically schedules outages during times when the market has historically been less volatile, that is, during shoulder months March to May and October to December. Mr. Kollen has not questioned the prudence of Kentucky Power's scheduling of Planned or Maintenance Outages at Mitchell.

Finally, I also note that in 2021, Mitchell Unit 1 experienced a catastrophic failure of the Phase 1 Generation Step-up ("GSU") Transformer, which steps up the voltage from the generator output to the 765 kV line voltage for one of the three phases. The incident was caused by an electrical fault inside the transformer, leading to a gas buildup, breach, and significant fire. The fire damaged portions of the surrounding building, electrical cables, bushings, and buss-work. Relying on their training and experience, the plant team was able to minimize the damage without any injuries or adverse environmental effects. But because of the difficulty of removing, shipping, and replacing the large GSU transformer, it took roughly two months (April 9, 2021 through June 5, 2021) to return Mitchell Unit 1 to service. This catastrophic event was a rare occurrence and is not expected to be a contributor to Forced Outages going forward.

IV. COMPARISON OF THE MITCHELL PLANT TO SPURLOCK

Q. MR. KOLLEN ALSO SUPPORTS HIS CONCLUSIONS BY COMPARING THE NET CAPACITY FACTORS FOR MITCHELL UNITS 1 AND 2 TO SPURLOCK'S GENERATING UNITS. DO YOU BELIEVE MR. KOLLEN'S ANALYSIS IS REASONABLE?

A. Absolutely not. Initially, as discussed above, comparing plants' NCFs says as much—or more—about the economics of their operations as their availability or actual performance. Furthermore, these plants are not comparable in any case because they are examples of two very different coal technologies—Mitchell is a supercritical coal facility whereas Spurlock is a subcritical coal facility.

Q. YOU REFERENCED THE ECONOMICS OF OPERATIONS. DO YOU HAVE REASON TO BELIEVE THAT EKPC OPERATES SPURLOCK USING DIFFERENT ECONOMIC PRINCIPLES THAN KENTUCKY POWER OPERATES MITCHELL?

A. Yes, Company Rebuttal Witness Vaughan discusses that further in his rebuttal Testimony.

Q. YOU REFERENCED DIFFERENT TECHNOLOGIES. WHY DOES IT MATTER FOR MR. KOLLEN'S ANALYSIS THAT MITCHELL IS A SUPERCRITICAL PLANT WHEREAS SPURLOCK IS A SUBCRITICAL PLANT?

A. Simply put, because Mitchell is a supercritical plant and Spurlock is a subcritical plant, Mr. Kollen's analysis is between apples and oranges.

By way of background, supercritical coal-fired units operate at high pressure and temperature, above a thermodynamic "critical point," reducing the energy needed to change the water into steam. Consequently, supercritical units require less coal to heat the same amount of water, considerably increasing the plant's design thermal efficiency. Subcritical coal-fired units, by contrast, operate below the "critical point" and do not achieve the same benefits as a supercritical unit. These inherent differences affect NCFs in two main ways.

First, the higher pressure and temperature of a supercritical unit results in higher stresses on the components, requiring more frequent maintenance. This can result in the need for more Planned and Maintenance Outages to keep the units operating safely, efficiently, and reliably, and could potentially lead to Forced Outages.

Second, the operating parameters of the technologies affect their economic dispatch patterns. When they were originally built in the 1970s and 1980s, supercritical units were considered baseload units that operated continuously, whereas subcritical plants had greater flexibility. Now, energy prices are often below the cost of operating supercritical units continuously. Moreover, because of their limited operational flexibility, supercritical units are often not selected even to satisfy intraday peaks. Accordingly, when following economic dispatch, I would expect the NCFs of supercritical units in PJM to be generally lower than those of subcritical units.

V. CONCLUSION

Q. WHAT CONCLUSIONS SHOULD THE COMMISSION DRAW FROM YOUR REBUTTAL TESTIMONY?

A. First, the Commission should conclude that Mr. Kollen's assertion that the performance of Kentucky Power's Mitchell units is "poor" is inaccurate. Mr. Kollen relied solely on NCF, a generation performance metric that is substantially affected by energy market conditions, and failed to acknowledge that a generating unit's performance is a result of both economics and availability.

Secondly, Mr. Kollen's comparison of the operating performance of the Mitchell generating units to that of EKPC's coal-fired Spurlock units is of no relevance since these plants are not comparable in any case because they are examples of two very different coal technologies, and the operating parameters of the technologies affect their economic dispatch patterns.

Lastly, Kentucky Power's generating assets provide adequate performance and safe, economic, environmentally compliant, and reliable generation output to serve load and accommodate fluctuating customer needs. Notably, the Mitchell Plant was available and operated during Winter Storm Elliott, in contrast to many other PJM coal unit resources that experienced forced outages.

Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

A. Yes, it does.

VERIFICATION

The undersigned, Timothy C. Kerns, being duly sworn, deposes and says he is the Senior Vice President of Fossil Hydro Generating Assets, 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.

Timothy C. Kerns

Commonwealth of Kentucky)
) Case No. 2021-00370
County of Boyd)

Subscribed and sworn to before me, a Notary Public in and before said County and State, by Timothy C. Kerns, on 2/16/2024.

MARILYN MICHELLE CALDWELL
Notary Public
Commonwealth of Kentucky
Commission Number KYNP71841
My Commission Expires May 5, 2027

Notary Public

My Commission Expires May 5, 2027

Notary ID Number KYNP71841