

# Exhibit No. 133

*Exhibit No.:*  
*Issue(s):* Heat Rates  
*Witness:* Jordan T. Hull  
*Sponsoring Party:* MoPSC Staff  
*Type of Exhibit:* Rebuttal Testimony  
*Case No.:* ER-2022-0337  
*Date Testimony Prepared:* February 15, 2023

**MISSOURI PUBLIC SERVICE COMMISSION**

**INDUSTRY ANALYSIS DIVISION**

**ENERGY RESOURCES DEPARTMENT**

**REBUTTAL TESTIMONY**

**OF**

**JORDAN T. HULL**

**UNION ELECTRIC COMPANY,  
d/b/a AMEREN MISSOURI**

**CASE NO. ER-2022-0337**

*Jefferson City, Missouri  
February 2023*

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REBUTTAL TESTIMONY OF  
JORDAN T. HULL  
UNION ELECTRIC COMPANY,  
d/b/a AMEREN MISSOURI  
CASE NO. ER-2022-0337**

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1 **HEAT RATES**

2 Q. What is a heat rate?

3 A. A heat rate is a calculation of total volume of fuel burned for electric generation,  
4 multiplied by the average heat content of that volume of fuel for a given time period, divided  
5 by the total net generation of electricity in kilowatt hours (kWh) for that same time period.

6 Q. Why is it important to review the heat rate of a unit?

7 A. Heat rates of generating units are an indicator of each unit's performance. Heat  
8 rates are inversely related to the operating efficiency of the generating unit. Increasing heat  
9 rates of specific units over time may indicate that a specific unit's efficiency is declining. Heat  
10 rates can vary greatly depending on operating conditions, including but not limited to load,  
11 hours of operation, shutdowns and startups, unit outages, derates<sup>1</sup>, and weather conditions.  
12 Therefore, a good indication of unit performance for a utility's frequently used units is an  
13 analysis of the trend of heat rates over time.

14 Q. Did Ameren Missouri supply the heat rate testing results and monitoring  
15 procedures of the testing for its generating units as required by 20 CSR 4240-20.090(2) (A)15?

16 A. Yes. Whenever an electric utility requests that a rate adjustment mechanism  
17 ("RAM") such as a Fuel Adjustment Clause ("FAC") be continued or modified, Commission  
18 Rule 20 CSR 4240-20.090(2)(A)(15) specifies that the electric utility shall file supporting  
19 information, "in electronic format where available, with all links and formulas intact, as part of,  
20 or in addition to, its direct testimony" as part of its direct filing in a general rate proceeding:

21 A level of efficiency for each of the electric utility's generating units  
22 determined by the results of heat rate/efficiency tests or monitoring that  
23 were conducted or obtained on each of the electric utility's steam

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<sup>1</sup> Derate - To lower the rating of (a device), especially because of a deterioration in efficiency or quality.

1 generators, including nuclear steam generators, heat recovery steam  
2 generators, steam turbines and combustion turbines within twenty-four  
3 (24) months preceding the filing of the general rate increase case.

4 Pursuant to that rule, Ameren Missouri included heat rate test results conducted within  
5 the previous 24 months within Ameren Missouri's direct work papers (confidential).

6 Q. What is Staff's conclusion after reviewing these heat rates?

7 A. Staff reviewed the heat rate/efficiency test results and found them to be  
8 reasonable, based on comparisons with data filed in Ameren Missouri's previous general rate  
9 case proceedings and known changes in power plant operating parameters.

10 **GENERATING CAPACITY AND RELIABILITY**

11 Q. What is the general concern raised by OPC witness Jordan Seaver's direct  
12 testimony regarding generating capacity and reliability?

13 A. Mr. Seaver's general concern regarding generating capacity and reliability is the  
14 Company's accelerated expansion of renewable generation and dealing with load growth and  
15 retiring baseload generation with intermittent resources (i.e. wind and solar).

16 Q. Did OPC witness Mr. Seaver make any recommendations in regards to this in  
17 his testimony?

18 A. No, the purpose of Mr. Seaver's testimony is to raise concerns about the future  
19 reliability and capacity of Ameren Missouri's generating plants as planned for in its triennial  
20 Integrated Resource Plan.

21 Q. Does Staff share these same concerns regarding generating capacity and  
22 reliability?

1           A.     Yes. Staff shares the same concerns as Mr. Seaver. The lack of baseload  
2 generation in the future is an alarming concern from a grid reliability standpoint. While Staff  
3 does not oppose solar or wind, Staff believes that having dispatchable generation sources in  
4 which the output generation is not determined by the weather is important for grid reliability.  
5 This is important when planning for extreme weather as well as load growth in the service  
6 territory.

7           Q.     What is a dispatchable generation source?

8           A.     A dispatchable source of electricity refers to an electrical power system, such as  
9 a power plant, that can be turned on or off; in other words they can adjust their power output  
10 supplied to the electrical grid on demand. Dispatchable sources are able to ramp up or shut  
11 down relatively quickly in time intervals from a few seconds up to a couple of hours, depending  
12 on the need for electricity. Different types of power plants have different dispatch times.

13          Q.     Does Staff believe that all generation should be dispatchable?

14          A.     No. Staff does not oppose non-dispatchable generation or intermittent  
15 generation (i.e. wind and solar that rely on the weather). Staff believes there should be a diverse  
16 generation mix to always provide safe reliable electricity to all customers.

17          Q.     Has this concern been brought up before to the Commission?

18          A.     Yes, I raised the same concerns related to replacing baseload capacity with  
19 intermittent capacity (wind and solar) in the last Evergy Missouri rate Case No. ER-2022-0130.<sup>2</sup>  
20 This concern was also brought up during an agenda presentation on October 19, 2022, by  
21 David J. Tudor, CEO and General Manager, of Associated Electric Cooperative, Inc.

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<sup>2</sup> *Rebuttal Testimony of Jordan T. Hull, pgs. 6-7.*

Rebuttal Testimony of  
Jordan T. Hull

1 This concern was brought up during the local public hearing for this case, in Jefferson City  
2 Missouri, by a concerned ratepayer. This concern has also been raised in two current pending  
3 Certificates of Convenience and Necessity (CCN) cases, specifically, case numbers  
4 EA-2022-0328 and EA-2022-0245.

5 Q. Does this conclude your testimony?

6 A. Yes it does.



BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

In the Matter of Union Electric Company            )  
d/b/a Ameren Missouri's Tariffs to Adjust        )  
Its Revenues for Electric Service                )            Case No. ER-2022-0337

**AFFIDAVIT OF JORDAN T. HULL**

STATE OF MISSOURI     )  
                                  )  
COUNTY OF COLE       )            ss.

**COMES NOW JORDAN T. HULL** and on his oath declares that he is of sound mind and lawful age; that he contributed to the foregoing *Rebuttal Testimony of Jordan T. Hull*; and that the same is true and correct according to his best knowledge and belief.

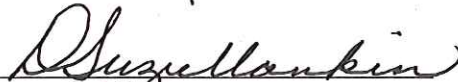
Further the Affiant sayeth not.

  
\_\_\_\_\_  
**JORDAN T. HULL**

**JURAT**

Subscribed and sworn before me, a duly constituted and authorized Notary Public, in and for the County of Cole, State of Missouri, at my office in Jefferson City, on this 9<sup>th</sup> day of February 2023.

D. SUZIE MANKIN  
Notary Public - Notary Seal  
State of Missouri  
Commissioned for Cole County  
My Commission Expires: April 04, 2025  
Commission Number: 12412070

  
\_\_\_\_\_  
Notary Public

**Jordan T. Hull**

**CURRENT POSITION:**

I am currently an Associate Engineer in the Energy Resources Department, Industry Analysis Division, of the Missouri Public Service Commission.

**EDUCATIONAL BACKGROUND & WORK EXPERIENCE:**

I received my Bachelor of Science Degree in Biological Engineering from the University of Missouri-Columbia in May of 2016. In June of 2016 I began employment with the Missouri Department of Natural Resources in the Air Pollution Control Program as an Environmental Engineer I. In June of 2017, I was promoted to an Environmental Engineer II within the Air Pollution Control Program. I began employment with the commission in November of 2018.

**Summary of Case Involvement:**

Case Number	Utility	Type	Issues
EO-2019-0067	KCP&L GMO	FAC Prudency Review	Heat Rates, Plant Outages, Generation Utilization
EO-2019-0068	KCP&L	FAC Prudency Review	Heat Rates, Plant Outages, Generation Utilization
EO-2019-0049	Liberty-Empire Electric Company	Integrated Resource Plan	Misc.
EO-2019-0132 & EO-2019-0133	KCP&L	MEEIA	Misc.
EO-2019-0257	Ameren- Missouri	FAC Prudency Review	Heat Rates, Plant Outages, Generation Utilization
ER-2019-0335	Ameren- Missouri	Rate Case	Heat Rates
ER-2019-0374	Liberty-Empire Electric Company	Rate Case	Heat Rates
EO-2020-0059	Liberty-Empire Electric Company	FAC Prudency Review	Heat Rates, Plant Outages, Generation Utilization

<b>Case Number</b>	<b>Utility</b>	<b>Type</b>	<b>Issues</b>
EO-2020-0262	EvergyWest	FAC Prudency Review	Heat Rates, Plant Outages, Generation Utilization, Self-Commitment
EO-2020-0263	Evergy Metro	FAC Prudency Review	Heat Rates, Plant Outages, Generation Utilization, Self-Commitment
EO-2021-0060	Ameren- Missouri	FAC Prudency Review	Heat Rates, Plant Outages, Generation Utilization, Self-Commitment
EO-2021-0021	Ameren- Missouri	Integrated Resource Plan	Misc.
EO-2021-0281	Liberty- Empire	FAC Prudency Review	Heat Rate, Plant Outages, Generation Utilization, Self-Commitment
EO-2021-0035	Evergy- Metro	Integrated Resource Plan	Misc.
EO-2021-0036	Evergy- West	Integrated Resource Plan	Misc.
EO-2021-0060	Ameren- Missouri	FAC Prudency Review	Heat Rate, Plant Outages, Generation Utilization, Self-Commitment
ER-2021-0240	Ameren- Missouri`	Rate Case	Heat Rate
ER-2021-0312	Liberty- Empire	Rate Case	Heat Rate
EO-2021-0331	Liberty Empire	Integrated Resource Plan	Misc.
EA-2022-0099	Ameren- Missouri	Transmission	Qualified to construct
EO-2022-0337	Ameren- Missouri	Rate case	Heat Rate
E0-2022-0245	Ameren- Missouri	Transmission	Qualified to construct
EO-2023-0087	Liberty- Empire	FAC Prudency Review	Heat Rate, Plant Outages, Generation Utilization, Self-Commitment