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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d/b/a AMEREN MISSOURI

CASE NO. ER-2022-0337

Q. Please state your name and business address.

A. Jordan T. Hull, 200 Madison Street, Jefferson City, MO 65101.

Q. By whom are you employed and in what capacity?

A. I am employed by the Missouri Public Service Commission ("Commission" or "PSC") as an Associate Engineer.

Q. Please describe your educational background and work experience.

A. Please refer to the attached Schedule JTH-r1.

Q. Have you previously filed testimony before this Commission?

A. Yes, I have. Please refer to the attached Schedule JTH-r1 for a list of cases in which I have previously filed testimony.

EXECUTIVE SUMMARY

Q. What is the purpose of your rebuttal testimony?

A. The purpose of this testimony is to discuss why Staff reviews heat rates. It also provides Staff's conclusion after reviewing Union Electric Company, d/b/a Ameren Missouri's ("Ameren Missouri") current heat rates for its generating units. It will also discuss Staff's general agreement with the Office of the Public Counsel's ("OPC") witness Jordan Seaver's direct testimony regarding generating capacity and reliability.

HEAT RATES

Q. What is a heat rate?

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

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

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

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

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

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

[1] Derate - To lower the rating of (a device), especially because of a deterioration in efficiency or quality.

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

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

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

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

GENERATING CAPACITY AND RELIABILITY

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

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

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

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

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

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

Q. What is a dispatchable generation source?

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

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

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

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

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

[2] *Rebuttal Testimony of Jordan T. Hull, pgs. 6-7.*

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

Q. Does this conclude your testimony?

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)
) ss.
COUNTY OF COLE)

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 Hull
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 9th 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

D Suzie Mankin
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

Case Number	Utility	Type	Issues
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