Exhibit No.:	
Issue(s):	*Weather Normalization*
Witness:	*Hari K. Poudel, PhD*
Sponsoring Party:	*MoPSC Staff*
Type of Exhibit:	*Rebuttal Testimony*
Case No.:	*GR-2024-0106*
Date Testimony Prepared:	*August 22, 2024*

MISSOURI PUBLIC SERVICE COMMISSION

INDUSTRY ANALYSIS DIVISION

TARIFF/RATE DESIGN DEPARTMENT

REBUTTAL TESTIMONY

OF

HARI K. POUDEL, PhD

LIBERTY UTILITIES (Midstates Natural Gas) CORP.,

d/b/a Liberty

CASE NO. GR-2024-0106

Jefferson City, Missouri
August 2024

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Q. Please state your name and business address.

A. My name is Hari K. Poudel, and my business address is P.O. Box 360, Jefferson City, MO 65102.

Q. Are you the same Hari Poudel who prepared the direct testimony in this case?

A. Yes.

EXECUTIVE SUMMARY

Q. What is the purpose of your rebuttal testimony?

A. The purpose of my rebuttal testimony is to specifically address several concerns that Staff has regarding the weather normalization ("WN") adjustments that Liberty Midstates witness Mr. Eric Fox calculated in his direct testimony. In addition, Staff calculates WN adjustments based on the revised Data Request ("DR") 0209 by rate classes[1] for three different service areas[2].

Q. Which aspects of the WN adjustments calculated by Mr. Fox will you be discussing?

[1] Northeast Division ("NEMO"), Southeast ("SEMO"), and Western ("WEMO") service areas. NEMO primarily serves northeast, SEMO the southeast, and WEMO the west near Kansas City.
[2] Residential, Small General Service ("SGS"), Medium General Service ("MGS"), and Large General Service ("LGS) classes.

A. Staff has a few concerns that I will address in my testimony: (1) the Company conducted a regression analysis using twenty years of daily temperature and energy usage data; (2) the Company's twenty-year weather period overlapped with the test period that Mr. Fox studied in his WN adjustment analysis.

WEATHER NORMALIZATION MODEL

Q. What is Staffs concern regarding the Company's utilization of twenty years of actual weather data for its WN regression analysis?

A. Staff has a concern about the lack of uniformity in the utilization of weather data. For the most recent rate case[3], the Company utilized a thirty-year weather data to calculate the WN adjustment. However, Mr. Fox calculated normal weather using a twenty-year timeframe instead of a thirty-year timeframe.[4] The current timeframe of National Oceanic and Atmospheric Administration ("NOAA")[5] is 1991-2020. The Staff's WN adjustment utilizes a thirty-year timeframe as it is a firmly established industry practice. In his direct testimony, Staff witness Mr. Francisco Del Pozo discusses the specific information regarding the weather data and its timeframe[6].

Q. Does the twenty-year weather period of the Company overlap with the test period being analyzed by Mr. Fox in his WN adjustment analysis?

A. Yes.

Q. Is Staff concerned about the overlap between the weather timeframe and the test period being analyzed in the Company's WN adjustment analysis?

[3] GR-2018-0013 Direct Testimony of Mr. Charles Evans Page 2 lines 22-24.
[4] GR-2024-0106 Mr. Eric Fox's Direct Testimony Page 13 Lines 8-10.
[5] NOAA's approach uses a thirty-year period with a fixed time period that is updated every ten years.
[6] GR-2024-0106 Mr. Del Pozo's Direct Testimony pages 3 through 5.

A. Yes. The twenty-year weather period should not overlap with the test period under consideration in this rate case. The company's weather data was collected over a period of twenty years, starting from January 1, 2002, and ending on December 31, 2022, which also includes the test-year period. Staff's weather data covered a thirty-year period starting from January 1, 1993, and ending on December 31, 2022. However, the data for the test-year period from January 1, 2023, to December 31, 2023, was not included. The thirty-year historical period serves as a control period, ensuring that there is no interaction between the control period and the experimental period.

Q. Explain why there should not be no interaction between the control period and the experimental period.

A. The fundamental problem of causal inference is that we can observe only one of these potential outcomes, because each unit will receive either treatment or control, not both.[7] Therefore, the utility company's test-year time period ("experimental period") required to exclude 2022 year out of the 20-year time period. If we include both the control period and the experimental period in the regression analysis, there might be a potential problem of serial correlation with time-series data.[8] If there is a serial correlation[9], it will violate one of the assumptions of the basic regression analysis with time series data. The assumption is that there is no serial correlation.[10]

Q. Do you have any recent WN adjustment analyses in this filing?

A. Yes.

[7] Holland PW. Statistics and causal inference. *Journal of the American Statistical Association.* 1986; 81:945–60.
[8] Temporal data at regular time intervals, for example, daily, weekly, monthly, or annually.
[9] Serial correlation, as a statistical concept, is also known as autocorrelation. In serial correlation, the observations are correlated across time.
[10] Wooldridge, J.M. (2013). Introductory Econometrics A Modern Approach. Page 341.

Q. Please provide a detailed explanation of the latest WN adjustment analyses.

A. Liberty Midstates provided the revised DR 0209 following the submission of direct testimony. Staff performed WN adjustment analyses by rate classes using the revised DR 0209.

CONCLUSION

Q. What is your recommendation to the Commission in this case?

A. Staff recommends that the Commission use Staff's weather normalization adjustments, which are based on the revised DR 0209.

Q. Does this conclude your rebuttal testimony?

A. Yes it does.

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

In the Matter of the Request of Liberty Utilities (Midstates Natural Gas) Corp. d/b/a Liberty to Implement a General Rate Increase for Natural Gas Service in the Missouri Service Areas of the Company	)))))	Case No. GR-2024-0106

AFFIDAVIT OF HARI K. POUDEL, PHD

STATE OF MISSOURI)
) ss.
COUNTY OF COLE)

COMES NOW HARI K. POUDEL, PhD and on his oath declares that he is of sound mind and lawful age; that he contributed to the foregoing *Rebuttal Testimony of Hari K. Poudel, PhD*; and that the same is true and correct according to his best knowledge and belief.

Further the Affiant sayeth not.

HARI K. POUDEL, PhD

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 15th day of August 2024.

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