

Exhibit No.:
Issue(s): *Weather Normalization*
Witness: *Michael D. Irwin*
Sponsoring Party: *MoPSC Staff*
Type of Exhibit: *Direct Testimony*
Case No.: *GR-2024-0369*
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MISSOURI PUBLIC SERVICE COMMISSION

INDUSTRY ANALYSIS DIVISION

WATER, SEWER, GAS, AND STEAM DEPARTMENT

DIRECT TESTIMONY

OF

MICHAEL D. IRWN

**UNION ELECTRIC COMPANY,
d/b/a Ameren Missouri**

CASE NO. GR-2024-0369

Jefferson City, Missouri
February 2025

1 **DIRECT TESTIMONY**

2 **OF**

3 **MICHAEL D. IRWIN**

4 **UNION ELECTRIC COMPANY,**
5 **d/b/a Ameren Missouri**

6 **CASE NO. GR-2024-0369**

7 Q. Please state your name and business address.

8 A. My name is Michael D. Irwin, and my business address is 200 Madison Street,
9 Jefferson City, Missouri 65102

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

11 A. I am employed by the Missouri Public Service Commission (“Commission”)
12 as a Senior Research/Data Analyst in the Water, Sewer, Gas, and Steam Department;
13 Industry Analysis Division. My credentials and a listing of cases in which I have filed testimony
14 previously before the Commission are attached to this direct testimony as Schedule MDI-d1.

15 Q. What is the purpose of your direct testimony?

16 A. The purpose of my direct testimony is to describe the weather variables and
17 present the results of the weather normalization analysis of natural gas usage for
18 Ameren Missouri.

19 **WEATHER NORMALIZATION**

20 Q. What is weather normalization?

21 A. Although natural gas can be used for multiple appliances, such as ovens, clothes
22 dryers, and water heaters, the primary use for natural gas in Missouri is space heating.
23 This primary use is heavily dependent on weather conditions. Abnormal weather conditions,

1 such as winter storms or periods of warmer-than-usual temperatures, have expected and
2 sometimes profound impacts on natural gas usage. To provide an accurate representation of
3 “normal” natural gas usage required for setting appropriate rates, adjustments need to be made
4 to account for abnormal weather conditions in order to reflect normal weather conditions.
5 Staff utilizes temperature data from existing weather stations representative of customer regions
6 to calculate normal weather and adjusts natural gas usage for the test year in order to account
7 for abnormal weather and “normalize” natural gas usage. After abnormal usage data has been
8 normalized, it can then be used to calculate rates for normal usage.

9 **TEMPERATURE DATA**

10 Q. How and where does Staff obtain weather data used for these analyses?

11 A. Weather normalization calculations rely on weather data obtained from the
12 Midwestern Regional Climate Center (“MRCC”) and monthly revenue data provided by
13 Ameren Missouri through data requests. MRCC is a cooperative program between the
14 National Centers for Environmental Information (“NCEI”) and Purdue University, Indiana.
15 The NCEI is a part of the U.S. Department of Commerce’s National Oceanic and
16 Atmospheric Administration (“NOAA”).

17 Q. What does this data consist of?

18 A. The weather data sets consist of 30 years of actual daily maximum temperature
19 (“Tmax”) and daily minimum temperature (“Tmin”) observations. Staff used these daily
20 temperatures to develop a set of normal mean daily temperature (“MDT”) values.

21 Q. What weather stations were used?

22 A. MRCC weather data from Columbia Regional Airport (“COU”) and
23 Cape Girardeau Municipal Airport (“CGI”) were used for actual and normal weather variables.

1 These weather stations are selected based on the availability and reliability of the weather data
2 as well as their approximate location to Ameren Gas's customer base. In central and eastern
3 Missouri, Ameren provides natural gas service to parts of Audrain, Boone, Callaway, Cole,
4 Cooper, Dent, Gasconade, Howard, Lincoln, Miller, Moniteau, Montgomery, Morgan, Phelps,
5 Pike, Ralls, Randolph, Saline, St. Charles, and Warren Counties. In southeastern Missouri,
6 Ameren provides natural gas service to parts of Cape Girardeau, Butler, and Stoddard Counties.

7 Q. How are these temperature data used?

8 A. Since natural gas sales are predominantly influenced by "ambient air
9 temperature," MDT and a derivative measure, heating degree days ("HDD"), are the measures
10 used in adjusting test year natural gas sales.

11 **HEATING DEGREE DAYS**

12 Q. What are Heating Degree Days (HDDs)?

13 A. HDDs were originally developed as a weather measure that could be used to
14 determine the relationship between temperature and gas usage. When the MDT is below 65°F,
15 the HDD is calculated as the difference between 65°F and the MDT. When the MDT is
16 above 65°F, the HDD is zero.

17 Q. How are HDDs used to normalize usage data?

18 A. Staff calculated the average use per customer per day and the number of HDDs
19 per day for each of the twelve months of the update period based on the number of customers,
20 usage, and HDDs per billing cycle per month Ameren Missouri's residential, general service,
21 and standard transportation rate classes, those classes traditionally impacted by weather.
22 After these adjustments, the difference between normal and actual HDDs are calculated for
23 each billing cycle, and these differences are multiplied by the estimate rendered from a

1 regression analysis to determine the change in usage for each billing cycle due to
2 abnormal weather.

3 **REGRESSION ANALYSIS**

4 Q. Please describe this regression analysis.

5 A. The regression equation develops quantitative measures that describe the
6 relationship between daily usage per customer in gas per hundred cubic feet (ccf) to the daily
7 HDDs. The regression equation estimates a change in the daily natural gas usage per customer
8 whenever the daily average weather changes by a HDD. These values can then be used to adjust
9 each class's monthly usage for normal weather conditions.

10 Q. Did Staff and Ameren utilize the same Actual Weather data?

11 A. Yes, in general. Staff and Ameren both used Actual Weather data from weather
12 stations at Columbia and Cape Girardeau airports, but Staff used data through the June 30, 2024,
13 update period to utilize the most recent data available. Ameren only used weather data through
14 the test year, so it did not include weather data for April through June 2024.

15 Q. Did Staff and Ameren utilize the same Normal Weather data?

16 A. Yes, Ameren used Normal Weather provided by Staff. Staff from PSC's
17 Tariff/Rate Design Department provide Normal Weather data to Ameren on a monthly basis to
18 provide consistency between Staff and Ameren in natural gas usage analyses.

19 **RESULTS**

20 Q. Did Staff compare Ameren's regression results of a daily class usage weather
21 normalization model to the billing cycle usage per customer weather normalization model that
22 Staff used?

1 A. Yes, Staff and Ameren weather normalization adjustment factors for the
2 Residential, General Service, and Standard Transport classes in the Panhandle Eastern and
3 Texas Eastern systems were compared.

4 Q. After this analysis, what is Staff's recommendation?

5 A. After comparing Staff and Ameren weather normalization adjustment factors,
6 only small differences between the two approaches were found. Considering these *de minimis*
7 differences, and that Staff utilized data through the update period of June 30, 2024, Staff finds
8 Ameren's calculations to be reasonable and recommends Ameren's proposed weather
9 normalization be approved.

10 Q. Does this conclude your direct testimony?

11 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 Natural Gas Service) Case No. GR-2024-0369

AFFIDAVIT OF MICHAEL D. IRWIN

STATE OF MISSOURI)
)
COUNTY OF COLE) ss.

COMES NOW MICHAEL D. IRWIN and on his oath declares that he is of sound mind and lawful age; that he contributed to the foregoing *Direct Testimony of Michael D. Irwin*; and that the same is true and correct according to his best knowledge and belief.

Further the Affiant sayeth not.


MICHAEL D. IRWIN

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 20th day of February 2025.

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

Michael D. Irwin

Present Position

I have been a Senior Research/Data Analyst for the Water, Sewer, Gas, and Steam Department in the Industry Analysis Division of the Missouri Public Service Commission (Commission) since February 2024. In my current position, my duties include, but are not limited to, analyzing data and composing testimony related to utility rate cases; corresponding with Staff, utilities, and Office of the Public Counsel; and reviewing and revising utility tariffs.

Educational Background and Work Experience

I received a Master of Science and a Bachelor of Science in Biology from Western Illinois University in 1998 and 1994, respectively. Prior to my position at the Commission, I was employed by the Missouri Department of Natural Resources from 2000 to 2024 in the following positions: Water Quality Assessment Specialist, Volunteer Water Quality Monitoring Program Quality Assurance/Quality Control Specialist, Biological Assessment Specialist, Section 401 Water Quality Certification Scientist, and Environmental Program Supervisor. Through my years at the agency, my responsibilities included reviewing and analyzing Missouri surface water quality data, developing Missouri Water Quality Standards for metal pollutants, designing and implementing in-depth water quality studies, reviewing and analyzing aquatic biological survey data, authoring Water Quality Certifications to ensure federally authorized projects complied with Missouri Water Quality Standards, and supervising five wastewater and stormwater general permit writers and the agency's Water Quality Certification Coordinator.

Previous Testimony Before the Public Service Commission

Case Number	Company	Type of Filing	Issue
WR-2024-0104	Liberty Utilities (Missouri Water), LLC	Direct	Billing Determinants