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Issue(s): *Revenue - Weather*
Witness: *Francisco Del Pozo*
Sponsoring Party: *MoPSC Staff*
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Case No.: *GR-2024-0106*
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MISSOURI PUBLIC SERVICE COMMISSION

INDUSTRY ANALYSIS DIVISION

TARIFF/RATE DESIGN DEPARTMENT

DIRECT TESTIMONY

OF

FRANCISCO DEL POZO

LIBERTY UTILITIES (Midstates Natural Gas) CORP.,

d/b/a Liberty

CASE NO. GR-2024-0106

Jefferson City, Missouri
July 2024

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CASE NO. GR-2024-0106

Q. Please state your name and business address.

A. My name is Francisco Del Pozo, 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") as an Economist for the Tariff/Rate Design Department, in the Industry Analysis Division.

Q. Please describe your educational and work background.

A. I have a Master of Science degree in Agricultural Economics awarded from Kansas State University, Bachelor of Science in Forestry Engineering from La Molina National University, and several specialized trainings on macro and micro economic analysis. I have more than 15 years of experience in regulatory, risk management programs and agricultural trade policy research. My previous professional experience includes working as an Economist and Risk Management Specialist for the United States Department of Agriculture. I started my career with the Commission as an Economist in April 2022.

Q. Have you previously testified in proceedings before the Missouri Public Service Commission?

A. Yes. I have provided written testimonies in multiple cases before the Missouri Public Service Commission. Please see Schedule FAD-d1.

EXECUTIVE SUMMARY

Q. What is the purpose of your direct testimony?

A. The purpose of my direct testimony is to discuss the weather variables, as well as the methodology Staff used to calculate Liberty Utilities (Midstates Natural Gas) Corp., d/b/a Liberty ("Liberty Midstates") normal weather.

WEATHER VARIABLES

Q. What weather variables did Staff use for the Liberty Midstates divisions?

A. Staff obtained weather data from the Midwest Regional Climate Center ("MRCC").[1] Kansas City International Airport ("MCI") weather data was used for the WEMO[2] division, while the Columbia Regional Airport ("COL") weather data was used for the SEMO division. The Cape Girardeau Airport ("CGI") weather data was used for the NEMO division. The weather data sets consist of actual daily maximum temperature ("T_{max}") and daily minimum temperature ("T_{min}") observations. Staff used these daily temperatures to develop a set of normal mean daily temperature ("MDT")[3] values.

Natural gas sales are predominantly influenced by "ambient air temperature,"[4] so MDT and the derivative measure, heating degree days ("HDD"), are the measures of weather used in adjusting test year natural gas sales. HDDs were originally developed as a weather measure that could be used to determine the relationship between temperature and gas usage. HDDs are based on the difference of MDT from a comfort level of 65°F. [5]

[1] http://mrcc.isws.illinois.edu/CLIMATE/
[2] Western, Southeast, Northeast, Division Service Area (WEMO, SEMO, NEMO) defined in Lines 7-9, Page 4 of the direct testimony of Mr. Eric Fox, GR-2024-0106
[3] By National Climatic Data Center convention, MDT is average of daily maximum temperature (T_{max}) and daily minimum temperature (T_{min}) e.g. MDT = (T_{max} + T_{min}) /2
[4] Ambient air temperature is the outside temperature of the surrounding air without taking into account the humidity or wind in the air.
[5] Where MDT < 65°F, HDD = 65 – MDT; otherwise, HDD = 0.

Q. Why did Staff use the weather variables of the Columbia Regional Airport?

A. The weather variables recorded at the Columbia Regional Airport weather station data from the MRCC meet the most important conditions required by the weather normalization model used for this rate case (30-year normal weather), albeit a distant station, does have sufficient and consistent data that reasonably capture the temperature trends.

NORMAL WEATHER

Q. What is a climate "normal" for this current case?

A. According to the National Oceanic and Atmospheric Administration ("NOAA"), a climate "normal" is defined as the arithmetic mean of a climatological element computed over three consecutive decades.[6] In developing climate normal temperatures, the NOAA focuses on the monthly maximum and minimum temperature time series to produce the serially-complete monthly temperature ("SCMT") data series.[7]

Staff utilized the SCMT published in July 2011 by the National Climatic Data Center ("NCDC") of the NOAA. For the purposes of normalizing the test year gas usage and revenues, Staff used the adjusted T_{max} and T_{min} daily temperature series for the 30-year period of January 1, 1993, through December 31, 2022, at MCI, COL, and CGI. The series are consistent with NOAA's SCMT during the most recent NOAA 30-year normal period ending 2020.

There may be circumstances under which inconsistencies and biases in the 30-year time series of daily temperature observations occur, (e.g., such as the relocation, replacement, or recalibration of the weather instruments). Changes in observation procedures or in an instrument's environment may also occur during the 30-year period. NOAA accounted for

[6] Retrieved on October 17, 2013, https://www.ncdc.noaa.gov/data-access/land-based-station-data/land-based-datasets/climate-normals.
[7] Retrieved on October 17, 2013, http://www1.ncdc.noaa.gov/pub/data/normals/1981-2010/source-datasets/.The SCMT, computed by the NOAA, includes adjustments to make the time series of daily temperatures homogeneous.

documented and undocumented anomalies in calculating its SCMT.[8] The meteorological and statistical procedures used in the NOAA's homogenization for removing documented and undocumented anomalies from the T_{max} and T_{min} monthly temperature series is explained in a peer-reviewed publication.[9]

Subsequent to determining the homogenized monthly temperature time series described above, NOAA also calculates monthly normal temperature variables based on a 30-year normal period, e.g., maximum, minimum, average temperatures, and HDDs. These monthly normals are not directly usable for Staff's purposes because NOAA daily normal temperatures and HDD values are derived by statistically "fitting" smooth curves through these monthly values. As a result, NOAA daily normal HDD values reflect smooth transitions between seasons and do not directly relate to the 30-year time series of MDT as used by Staff. However, in order for Staff to develop adjustments to normal HDD for gas usage, Staff must calculate a set of normal daily HDD values that reflect the actual daily and seasonal variability.

Q. How did Staff calculate normal weather estimates?

A. Staff used a ranking method to calculate normal weather estimates of daily normal temperature values, ranging from the temperature that is "normally" the hottest to the temperature that is "normally" the coldest, thus estimating "normal extremes." Staff ranked MDTs for each month of the 30-year history from hottest to coldest and then calculated the normal daily temperature values by averaging the ranked MDTs for each rank, irrespective of the calendar date. The ranking process results in the normal extreme being the average of the

[8] Arguez, A., I. Durre, S. Applequist, R. S. Vose, M. F. Squires, X. Yin, R. R. Heim, Jr., and T. W. Owen, 2012: NOAA's 1981-2010 U.S. Climate Normals: An Overview. Bulletin of the American Meteorological Society, 93, 1687-1697.

[9] Menne, M.J., and C.N. Williams, Jr., (2009) Homogenization of temperature series via pairwise comparisons. J. Climate, 22, 1700-1717.

most extreme temperatures in each month of the 30-year normal period. The second most extreme temperature is based on the average of the second most extreme day of each month, and so forth. Staff's calculation of daily normal temperatures is not the same as NOAA's calculation of smoothed daily normal temperatures because Staff calculated its normal daily temperatures based on the rankings of the actual temperatures of the test year, and the test year temperatures do not follow smooth patterns from day to day. More details of a ranking method for normal weather are explained in a peer-reviewed publication.[10] Using these normal daily temperatures, Staff calculated normal HDD for each day of the test year. This information was made available to Staff witness Hari K. Poudel, PhD to calculate the weather normalization adjustments.

CONCLUSION

Q. Do you have any recommendations in this case?

A. Yes, I recommend reliance on the weather normal Staff derived from weather data from the MRCC[11] as the basis for weather normalization adjustments in this case.

Q. Does this conclude your direct testimony?

A. Yes.

[10] Won, S. J., Wang, X. H., & Warren, H. E. (2016). Climate normals and weather normalization for utility regulation. Energy Economics, 54, 405-416.

[11] Staff obtained weather data from the Midwest Regional Climate Center (MRCC) application tools, Stations ID 234358 (MCI), 231791 (COL), 231289 (CG). https://mrcc.purdue.edu/CLIMATE/. Staff utilized data recorded at the MCI weather station for the WEMO division, the COL weather station for the SEMO division and CGI weather station for the NEMO division; for the temperature series for the 30-year period of January 1, 1993, through December 31, 2022, at MCI, COL, and CGI.

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 FRANCISCO DEL POZO

STATE OF MISSOURI)
) ss.
COUNTY OF COLE)

COMES NOW FRANCISCO DEL POZO and on his oath declares that he is of sound mind and lawful age; that he contributed to the foregoing *Direct Testimony of Francisco Del Pozo*; and that the same is true and correct according to his best knowledge and belief.

Further the Affiant sayeth not.

FRANCISCO DEL POZO

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 July 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

Francisco A. del Pozo

Education

2007	M. S., Agricultural Economics, Kansas State University, Manhattan.
2007	B.S., Forestry Engineering, Summa Cum Laude, La Molina National Agricultural University, Lima, Peru.

Professional Experience

2022 -	Regulatory Economist, Missouri Public Service Commission
2019-	Technical Advisor, AVCON Industries, Newton, Kansas.
2009-2017	Agricultural Economist, United States Department of Agriculture (Foreign Agricultural Service and Risk Management Agency), Washington DC and Kansas City, MO.
2007 – 2009	Congressional Hunger Fellow, United Nations Food and Agriculture Organization, Rome, Italy
2006	Economic Research Service of the United States Department of Agriculture (USDA), Summer Fellowship Program
2003-2006	Graduate Teaching/Research Assistant, Kansas State University
1997-2002	Program Manager, National Project on Watershed Management and Soil Conservation. Lima, Peru.
1996	Research Assistant, ADEFOR- Forestry Research Center. Cajamarca, Peru.

Recent Case Summary

Case Number	Company	Issues
GA-2023-0441	Spire Missouri	CCN Case
GA-2023-0374	Spire Missouri	CCN Case
GO-2024-0180	Missouri American Water	Carbon Offset Innit. Case
GA--2024-0100	Spire Missouri	CCN Case
GE-2023-0393	Spire Missouri	Tariff Rule Variation
GA-2023-0110	Spire Missouri	CCN
GR-2023-0038	Spire Missouri	C&I Custom Rebate Program
ER-2022-0337	Ameren Missouri	Electric Tariffs to Adjust to Revenues
GR-2021-0320	Liberty Utilities	Gas Rate Case
ER-2022-0129	Evergy Missouri Metro	Electric Rate Case

Expert Professional Presentations and Publications

Foreign Agricultural Service (USDA), Washington, DC July 2012
In the Matter of USDA review of proposals for several free trade agreements tariff lines, developed and presented results scenarios of the tariff rate quotas using computational econometric methods in Both English and Spanish languages during high level trade negotiation meetings with foreign government representatives from Panama, Colombia and CAFTA-DR groups.

United Nations Food and Agriculture Organization, Rome, Italy (FAO) June 2009
In the Matter of the policy analysis to prevent trade disruptions during due to increase of agricultural commodities, presented a research on the linking trade barriers imposed by countries in the Western Hemisphere based on the case of Argentina's move to restrict agricultural exports during the 2008 food price crisis causing distortions on prices paid to local agricultural producers with the matrix serving as a key tool for the Regional Office for the Latin America and Caribbean Office of FAO.

Agricultural Economics Department, Kansas State University. May 2007
Size of Entry in Food Economy Firms in the United States between 1977 to 1992," M.S. Thesis, Manhattan, Kansas.

Forestry Department, La Molina National Agricultural University. June 1997
Determination of coefficient of sawing of plantations of Pinus in the Andean region