Exhibit No.:	_____
Issue(s):	Weather
Witness/Type of Exhibit:	Mantle/Direct
Sponsoring Party:	Public Counsel
Case No.:	GO-2019-0058 GO-2019-0059

DIRECT TESTIMONY

OF

LENA M. MANTLE

Submitted on Behalf of the Office of the Public Counsel

SPIRE MISSOURI, INC.
D/B/A SPIRE

CASE NO. GO-2019-0058
CASE NO. GO-2019-0059

November 16, 2018

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of Spire Missouri, Inc. d/b/a Spire's Request to Decrease WNAR	)))	Case No. GO-2019-0058
In the Matter of Spire Missouri, Inc.'s d/b/a Spire's Request to Increase Its WNAR	)))	Case No. GO-2019-059

AFFIDAVIT OF LENA MANTLE

STATE OF MISSOURI)
) **ss**
COUNTY OF COLE)

Lena Mantle, of lawful age and being first duly sworn, deposes and states:

1. My name is Lena Mantle. I am a Senior Analyst for the Office of the Public Counsel.

2. Attached hereto and made a part hereof for all purposes is my direct testimony.

3. I hereby swear and affirm that my statements contained in the attached testimony are true and correct to the best of my knowledge and belief.

Lena M. Mantle
Senior Analyst

Subscribed and sworn to me this 16th day of November 2018.

NOTARY PUBLIC NOTARY SEAL STATE OF MISSOURI

JERENE A. BUCKMAN
My Commission Expires
August 23, 2021
Cole County
Commission #13754037

Jerene A. Buckman
Notary Public

My Commission expires August 23, 2021.

DIRECT TESTIMONY

OF

LENA M. MANTLE

SPIRE MISSOURI, INC.

CASE NOS. GO-2019-0058 & GO-2019-0059

Q. Would you state your name and business address?

A. My name is Lena M. Mantle and my business address is P.O. Box 2230, Jefferson City, Missouri 65102. I am a Senior Analyst for the Office of the Public Counsel ("OPC").

Q. Would you describe your experience and your qualifications?

A. I worked for the Missouri Public Service Commission Staff ("Staff") from August 1983 until I retired in December 2012. During the time that I was employed at the Missouri Public Service Commission ("Commission"), I worked as an Economist, Engineer, Engineering Supervisor, and Manager of the Energy Department. In August 2014, I started working for the OPC in my current position, as a Senior Analyst

Attached as Schedule LMM-D-1 is a brief summary of my experience with OPC and Staff along with a list of the Commission cases in which I filed testimony, Commission rulemakings in which I participated, and Commission reports to which I contributed. I am a Registered Professional Engineer in the State of Missouri.

Q. What is the purpose of your testimony?

A. I explain the intent of Spire's Weather Normalization Adjustment Rider ("WNAR") and describe why the Commission should use the Staff's methodology

to set the normal heating degree days ("HDD")[1] to use to calculate Spire's WNAR rate.

Q. What is the intent of the WNAR?

A. In its *Amended Report and Order* in Spire's last rate cases, GR-2017-0215 and GR-2017-0216, the Commission found:

> 11. With a volumetric rate, the goal of the companies to increase revenues by selling more gas is misaligned with the goal of conservation for customers. This misalignment is best resolved by using Staff's climatic normal and weather normalization because annual natural gas usage is 95 percent correlated with annual heating degree days (HDD).
>
> 12. Weather variations cause the greatest variations in revenues for the companies.
>
> 13. Based on Staff's weather normalization regressions, a mechanism based solely on weather could account for over 97 percent of usage variation within a given year. Thus, a weather normalization adjustment rider would account for most of the variations due to weather. (footnotes omitted)[2]

The Commission then ordered the implementation of the WNAR as follows:

> However, because annual natural gas usage is 95 percent correlated with annual HDD, using Staff's climatic normal and weather normalization in the form of the WNAR tariff would more accurately resolve the revenue stabilization issue because it is specifically linked to weather fluctuations.[3]

It is clear from the Commission's order that the intent of the WNAR is to accurately resolve revenue fluctuations due to weather.

Q. Have you provided expert testimony regarding weather or weather normalization before the Commission?

[1] A heating degree day is a measure of how cold it is. Typically it is calculated as the difference between 65 and the mean daily temperature when the mean daily temperature is below 65.
[2] Pages 80-81.
[3] Page 84.

A. Yes. I provided testimony regarding weather normalization numerous times before the Commission. In addition, I participated in the development of the Staff's methodology for calculating normal weather in the early 1990's from which the normal weather methodology that Staff used to determine its recommended WNAR rates in cases GR-2019-0058 and GR-2019-0059 originates.

Q. What in this methodology is important in these cases?

A. Every year there is some form of abnormal weather with different extremes. Staff's methodology of determining normal-weather HDD calculates 365 days of "normal" HDD utilizing a method that ranks, by year for thirty years, the daily HDD and calculates an averages for each rank to obtain a "normal" HDD for each rank. For example, the coldest day in each year (the day with the largest HDD) is given the rank of 1 in every year in the 30 year time period. The coldest "normal" HDD is calculated by averaging the HDD that ranked 1 of each year. The second coldest normal HDD is calculated by averaging the second ranking HDD in each calendar year. This is continued for each rank through 365.

Staff then assigns this coldest "normal" HDD to the calendar month in which the coldest day typically occurs. Within that month, this coldest day HDD is then assigned to the coldest day that actually occurred in the month that is being "normalized." The same calculation and assignment to a day is done for the second coldest day and of the period being assigned to a date. This process finally results in 365 "normal" daily values that are assigned to months and days. Thus the actual assignment of normal HDD to a given date varies based on the actual weather in the time period for which the normalization is being conducted. This results in volatility in the normal HDD consistent with the volatility of the actual weather that occurred.

Q. Why is this process important?

A. This methodology preserves the other factors that impact usage (e.g. economic conditions, conservation) by minimizing the weather adjustment each day while retaining the day-to-day volatility in weather that is "normal" in Missouri.

Q. What is your understanding of Staff's position in this case?

A. It is my understanding Staff's position is that these daily normal HDD, which stay the same for every year, should be reassigned based on the actual weather in each calculation of the WNAR rate. With Staff's methodology the "normal" weather that is calculated from the ranking of coldest days to warmest days is reassigned based on the time period that is being adjusted.

Q. What is your understanding of Spire's position in these cases?

A. It is my understanding that Spire is <u>not</u> opposed to Staff's methodology, but it is Spire's belief that Spire's filed tariff sheet does not allow a reassignment of the daily normal in each calculation of the WNAR rate.

Q. What is OPC's position with respect to the normal weather that should be used in these WNAR cases?

A. OPC agrees with Staff that its method of calculating daily normal HDD, which retains the values determined in the last rate case, should be assigned to the days in a manner that results in as little weather adjustment as possible, resulting in the most accurate adjustment in each WNAR.

Q. What do Spire's tariff sheets say?

A. Tariff sheets No. 13 for Spire Missouri East and Spire Missouri West state that the normal HDD will be "based upon Staff's daily normal weather as determined in the most recent rate case." There is no mention in the tariff sheets regarding keeping the normal HDD on exactly the same dates.

The Commission stated in its Report and Order that using Staff's climatic normal and weather normalization in the form of the WNAR tariff would more accurately resolve the revenue stabilization issue because it is specifically linked to weather fluctuations. Using the complete methodology to set the tariff sheet to determine the rider will provide a more accurate adjustment.

Q. Does this conclude your direct testimony?

A. Yes, it does.

Education and Work Experience Background of

Lena M. Mantle, P.E.

In my position as Senior Analyst for the Office of the Public Counsel ("OPC") I provide analytic and engineering support for the OPC in electric, gas, and water cases before the Commission. I have worked for the OPC since August, 2014.

I retired on December 31, 2012 from the Public Service Commission Staff as the Manager of the Energy Unit. As the Manager of the Energy Unit, I oversaw and coordinated the activities of five sections: Engineering Analysis, Electric and Gas Tariffs, Natural Gas Safety, Economic Analysis, and Energy Analysis sections. These sections were responsible for providing Staff positions before the Commission on all of the electric and gas cases filed at the Commission. This included reviews of fuel adjustment clause filings, resource planning compliance, gas safety reports, customer complaint reviews, territorial agreement reviews, electric safety incidents and the class cost-of-service and rate design for natural gas and electric utilities.

Prior to being the Manager of the Energy Unit, I was the Supervisor of the Engineering Analysis Section of the Energy Department from August, 2001 through June, 2005. In this position, I supervised engineers in a wide variety of engineering analysis including electric utility fuel and purchased power expense estimation for rate cases, generation plant construction audits, review of territorial agreements, and resolution of customer complaints all the while remaining the lead Staff conducting weather normalization in electric cases.

From the beginning of my employment with the Commission in the Research and Planning Department in August, 1983 through August, 2001, I worked in many areas of electric utility regulation. Initially I worked on electric utility class cost-of-service analysis, fuel modeling and what has since become known as demand-side management. As a member of the Research and Planning Department under the direct supervision of Dr. Michael Proctor, I participated in the development of a leading-edge methodology for weather normalizing hourly class energy for rate design cases. I took the lead in developing personal computer programming of this methodology and applying this methodology to weather-normalize electric usage in numerous electric rate cases. I was also a member of the team that assisted in the development of the Missouri Public Service Commission electronic filing and information system ("EFIS").

I received a Bachelor of Science Degree in Industrial Engineering from the University of Missouri, at Columbia, in May, 1983. I am a registered Professional Engineer in the State of Missouri.

Lists of the cases I have filed testimony as an OPC, the Missouri Public Service Commission rules in which I participated in the development of or revision to, the Missouri Public Service Commission Testimony Staff reports that I contributed to and the cases that I provided testimony in follow.

Office of Public Counsel Case Listing

Case	Filing Type	Issue
ER-2018-0145 & ER-2018-0146	Direct, Rebuttal, Surrebuttal	Purchased Power, Customer Bills, Crossroads, Resource Planning
EO-2018-0092	Rebuttal, Surrebuttal	OPC Opposition of Request for Approval of Changes to Resource Plan
GR-2017-0215 & GR-2017-0216	Direct, Rebuttal, Surrebuttal	Energy Efficiency and Low-Income Programs
EO-2017-0065	Direct, Rebuttal, Surrebuttal	Fuel Adjustment Clause Prudence Review
ER-2016-0285	Direct, Rebuttal, Surrebuttal	Fuel Adjustment Clause
ER-2016-0156	Direct, Rebuttal, Surrebuttal	Fuel Adjustment Clause, Resource Planning
ER-2016-0023	Direct, Rebuttal, Surrebuttal	Fuel Adjustment Clause
WR-2015-0301	Direct, Rebuttal, Surrebuttal	Revenues, Environmental Cost Recovery Mechanism
ER-2014-0370	Direct, Rebuttal, Surrebuttal	Fuel Adjustment Clause
ER-2014-0351	Direct, Rebuttal, Surrebuttal	Fuel Adjustment Clause
ER-2014-0258	Direct, Rebuttal, Surrebuttal	Fuel Adjustment Clause
EC-2014-0224	Surrebuttal	Policy, Rate Design

Missouri Public Service Commission Rules

4 CSR 240-3.130	Filing Requirements and Schedule of Fees for Applications for Approval of Electric Service Territorial Agreements and Petitions for Designation of Electric Service Areas
4 CSR 240-3.135	Filing Requirements and Schedule of Fees Applicable to Applications for Post-Annexation Assignment of Exclusive Service Territories and Determination of Compensation
4 CSR 240-3.161	Electric Utility Fuel and Purchased Power Cost Recovery Mechanisms Filing and Submission Requirements
4 CSR 240-3.162	Electric Utility Environmental Cost Recovery Mechanisms Filing and Submission Requirements
4 CSR 240-3.190	Reporting Requirements for Electric Utilities and Rural Electric Cooperatives
4 CSR 240-14	Utility Promotional Practices
4 CSR 240-18	Safety Standards
4 CSR 240-20.015	Affiliate Transactions
4 CSR 240-20.017	HVAC Services Affiliate Transactions
4 CSR 240-20.090	Electric Utility Fuel and Purchased Power Cost Recovery Mechanisms
4 CSR 240-20.091	Electric Utility Environmental Cost Recovery Mechanisms
4 CSR 240-22	Electric Utility Resource Planning
4 CSR 240-80.015	Affiliate Transactions
4 CSR 240-80.017	HVAC Services Affiliate Transactions

Staff Direct Testimony Reports

ER-2012-0175	Capacity Allocation, Capacity Planning
ER-2012-0166	Fuel Adjustment Clause
ER-2011-0028	Fuel Adjustment Clause
ER-2010-0356	Resource Planning Issues
ER-2010-0036	Environmental Cost Recovery Mechanism
HR-2009-0092	Fuel Adjustment Rider
ER-2009-0090	Fuel Adjustment Clause, Capacity Requirements
ER-2008-0318	Fuel Adjustment Clause
ER-2008-0093	Fuel Adjustment Clause, Experimental Low-Income Program
ER-2007-0291	DSM Cost Recovery

Missouri Public Service Commission Staff Testimony

Case No.	Filing Type	Issue
ER-2012-0175	Rebuttal, Surrebuttal	Resource Planning Capacity Allocation
ER-2012-0166	Rebuttal, Surrebuttal	Fuel Adjustment Clause
EO-2012-0074	Direct/Rebuttal	Fuel Adjustment Clause Prudence
EO-2011-0390	Rebuttal	Resource Planning Fuel Adjustment Clause
ER-2011-0028	Rebuttal, Surrebuttal	Fuel Adjustment Clause
EU-2012-0027	Rebuttal, Surrebuttal	Fuel Adjustment Clause
ER-2010-0356	Rebuttal, Surrebuttal	Resource Planning Allocation of Iatan 2
EO-2010-0255	Direct/Rebuttal	
ER-2010-0036	Supplemental Direct, Surrebuttal	Fuel Adjustment Clause
ER-2009-0090	Surrebuttal	Capacity Requirements
ER-2008-0318	Surrebuttal	Fuel Adjustment Clause
ER-2008-0093	Rebuttal, Surrebuttal	Fuel Adjustment Clause Low-Income Program
ER-2007-0004	Direct, Surrebuttal	Resource Planning
GR-2007-0003	Direct	Energy Efficiency Program Cost Recovery
ER-2007-0002	Direct	Demand-Side Program Cost Recovery
ER-2006-0315	Supplemental Direct, Rebuttal	Energy Forecast Demand-Side Programs Low-Income Programs
ER-2006-0314	Rebuttal	Jurisdictional Allocation Factor
EA-2006-0309	Rebuttal, Surrebuttal	Resource Planning
ER-2005-0436	Direct, Rebuttal, Surrebuttal	Low-Income Programs Energy Efficiency Programs Resource Planning
EO-2005-0329	Spontaneous	Demand-Side Programs Resource Planning

Missouri Public Service Commission Staff Case Listing (cont.)

EO-2005-0293	Spontaneous	Demand-Side Programs Resource Planning
ER-2004-0570	Direct, Rebuttal, Surrebuttal	Reliability Indices Energy Efficiency Programs Wind Research Program
EF-2003-0465	Rebuttal	Resource Planning
ER-2002-424	Direct	Derivation of Normal Weather
EC-2002-1	Direct, Rebuttal	Weather Normalization of Class Sales Weather Normalization of Net System
ER-2001-672	Direct, Rebuttal	Weather Normalization of Class Sales Weather Normalization of Net System
ER-2001-299	Direct	Weather Normalization of Class Sales Weather Normalization of Net System
EM-2000-369	Direct	Load Research
EM-2000-292	Direct	Load Research
EM-97-515	Direct	Normalization of Net System
ER-97-394, et. al.	Direct, Rebuttal, Surrebuttal	Weather Normalization of Class Sales Weather Normalization of Net System Energy Audit Tariff
EO-94-174	Direct	Weather Normalization of Class Sales Weather Normalization of Net System
ER-97-81	Direct	Weather Normalization of Class Sales Weather Normalization of Net System TES Tariff
ER-95-279	Direct	Normalization of Net System
ET-95-209	Rebuttal, Surrebuttal	New Construction Pilot Program
EO-94-199	Direct	Normalization of Net System
ER-94-163	Direct	Normalization of Net System
ER-93-37	Direct	Weather Normalization of Class Sales Weather Normalization of Net System
EO-91-74, et. al.	Direct	Weather Normalization of Class Sales Weather Normalization of Net System
EO-90-251	Rebuttal	Promotional Practices Variance
ER-90-138	Direct	Weather Normalization of Net System
ER-90-101	Direct, Rebuttal, Surrebuttal	Weather Normalization of Class Sales Weather Normalization of Net System
ER-85-128, et. al.	Direct	Demand-Side Update
ER-84-105	Direct	Demand-Side Update