| | |
|---|---|
| *Exhibit No.:* | |
| *Issue(s):* | *Weather* |
| *Witness:* | *Seoung Joun Won, PhD* |
| *Sponsoring Party:* | *MoPSC Staff* |
| *Type of Exhibit:* | *Rebuttal Testimony* |
| *Case Nos.:* | *GO-2019-0058 and GO-2019-0059* |
| *Date Testimony Prepared:* | *December 20, 2018* |

# MISSOURI PUBLIC SERVICE COMMISSION

## COMMISSION STAFF DIVISION

## TARIFF/RATE DESIGN DEPARTMENT

## REBUTTAL TESTIMONY

## OF

## SEOUNG JOUN WON, PhD

## SPIRE MISSOURI, INC., d/b/a SPIRE

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

*Jefferson City, Missouri*
*December 2018*

**TABLE OF CONTENTS OF**

**REBUTTAL TESTIMONY**

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


EXECUTIVE SUMMARY ..... 1

DAILY NORMAL WEATHER ..... 2

STAFF'S RANKING METHOD ..... 6

CONCLUSION ..... 7

**REBUTTAL TESTIMONY**

**OF**

**SEOUNG JOUN WON, PhD**

**SPIRE MISSOURI, INC., d/b/a SPIRE**

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

Q. Please state your name and business address.

A. My name is Seoung Joun Won and my business address is Missouri Public Service Commission, P. O. Box 360, Jefferson City, Missouri 65102.

Q. Who is your employer and what is your present position?

A. I am employed by the Missouri Public Service Commission ("Commission") and my title is Regulatory Economist III in the Tariff/Rate Design Department, Commission Staff Division.

Q. Are you the same Seoung Joun Won who filed Direct Testimony in both GO-2019-0058 and GO-2019-0059?

A. Yes, I am.

## EXECUTIVE SUMMARY

Q. What is the purpose of your rebuttal testimony?

A. The purpose of my rebuttal testimony is to address issues with the weather data that Spire Missouri Inc. d/b/a Spire's ("Spire") Mr. Scott A. Weitzel used for weather normalization adjustment rider ("WNAR") adjustments.

Q. Which aspects of the weather data used by Mr. Weitzel are you going to address?

A. I am addressing the issue of daily normal weather used in Spire's WNAR adjustments, and am responding to Spire's concerns with Staff's ranking method.

**DAILY NORMAL WEATHER**

Q. What are Staff's concerns about the daily normal weather used in Spire's WNAR adjustments?

A. Mr. Weitzel incorrectly used Staff's daily normal weather in Spire's WNAR adjustments. The accumulation period of the current cases, GO-2019-0058 and GO-2019-0059, is April through July 2018. Therefore, daily normal weather ranked on 2018 actual daily temperature data should be used for WNAR adjustments. However, Spire used daily normal weather ranked on 2016 actual daily temperature data to compare to 2018 actual daily weather.[1] Using this invalid daily normal weather introduced a bias in Spire's WNAR adjustments.

According to Spire's WNAR tariff, for each day, normal heating degree days ("HDD") should be decided by Staff's daily normal weather as determined in the most recent rate cases. In this case, the applicable rate cases are GR-2017-0215 for Spire (East) and GR-2017-0216 for Spire (West). Although 2018 normal daily HDD data can be easily obtained if Staff's most recent rate case workpapers are properly used, Spire insists on using 2016 normal weather founded on an incorrect interpretation of the WNAR tariff.[2] Staff witness Michael L. Stahlman explains how Spire's interpretation of the WNAR tariff is not correct in his direct and rebuttal testimonies.

[1] Since the test period in Spire's last rate case was 2016, Staff developed daily normal weather for 2016 in order to compare to 2016 actual daily weather. However, 2016 was a leap year so the daily normal contained an extra day.

[2] There is no technical difficulty in the calculation of proper normal weather. Only a one-step action is needed to produce 2018 normal weather from Staff's weather workpaper. That is to update 2016 actual weather to 2018 actual weather.

Q. What are the consequences of using improper normal daily HDD for WNAR adjustments?

A. If improper normal daily HDD is used for the WNAR adjustments then the relationship between gas usage and HDD is not valid anymore. The calculation of the WNAR adjustments is performed under the assumption that the relationship between gas usage and associated HDD that is determined during the most recent case is correct and is not changed during the accumulation period. There is no foundation of validity regarding the WNAR adjustments if that assumption does not hold because improper normal daily HDD are used. Therefore, to be used in Spire's WNAR adjustments, proper normal daily HDD must be ranked on actual daily temperature data of the accumulation period that is in 2018, not in 2016.

Q How is normal daily HDD to be used for the WNAR adjustments?

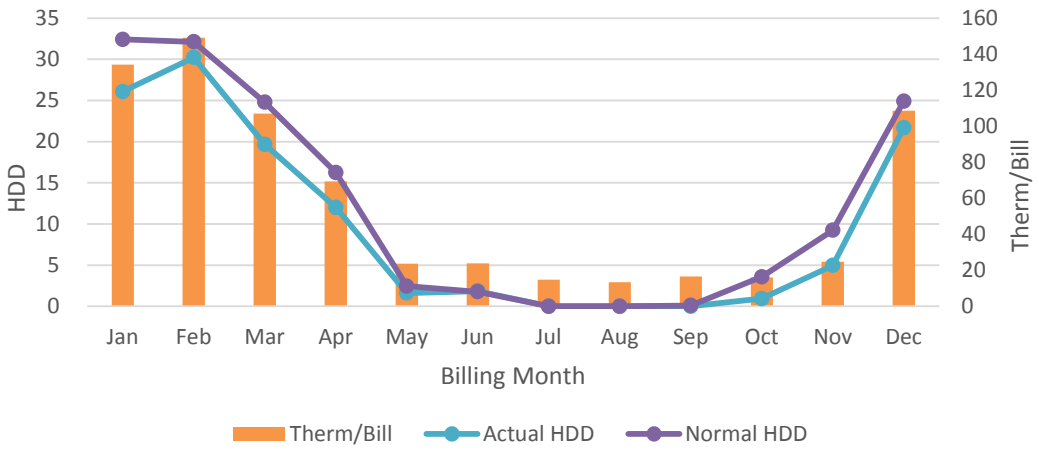
A. WNAR is a mechanism that adjusts current revenue due to variation from normal weather outside of rate cases. Revenue of the accumulation period is decided by gas usage of the period. Actual daily gas usage is mostly dependent on actual daily HDD. The relationship between actual usage and actual HDD is determined in the rate cases using regression models. Using that relationship, the gas usage amount of the WNAR adjustment is calculated by the difference between normal HDD and actual HDD and a factor that is determined by weather normalization regression models as explained in Spire's WNAR tariff. The factor that is used in Spire's WNAR adjustments is determined by regression models for weather normalization of rate cases.

Q. What was the relationship between gas usage and HDD?

A. The relationship between gas usage and HDD is a positive correlation. In other words, customer gas usage increases when HDD increases because of cold weather.

The relationship can be explained using Spire's most recent rate case data. Figure 1 presents a comparison of actual gas usage and normal HDD in 2016. The usage data is taken from a billing cycle in the residential class of GR-2017-0215, Spire (East) rate case.

Figure 1. Actual and Normal HDD and Residential Gas Usage




As shown in Figure 1, residential customer gas usage is strongly correlated to the associated actual HDD. For instance, the gas usage in the January billing month is less than the gas usage in the February billing month even though it does not usually happen. This is an anticipated result because the actual HDD in the January 2016 billing period is less than the actual HDD in February 2016. Therefore, in accordance with the weather normalization procedure, the gas usage of the January billing month was adjusted upwards because the normal HDD for January 2016 was higher than the actual HDD of the January 2016 billing month.

Q. What is the evidence of the invalidity of Spire's method?

A. The theoretical evidence already has been explained above that if the relationship between gas usage and normal HDD is not preserved then Spire's WNAR

adjustments will be biased. There is also empirical evidence to prove that Spire's method is invalid.

Figure 1 provides empirical evidence that the relationship between actual gas usage and the actual HDD is positively correlated. That is, as the actual HDD increased, the actual gas usage increased as well. Likewise, as the actual HDD decreased, the actual gas usage decreased by a similar factor. To be put more simply, the actual gas usage and the actual HDD had similar shapes in the figure.

Figure 2. Daily HDD Comparison for January

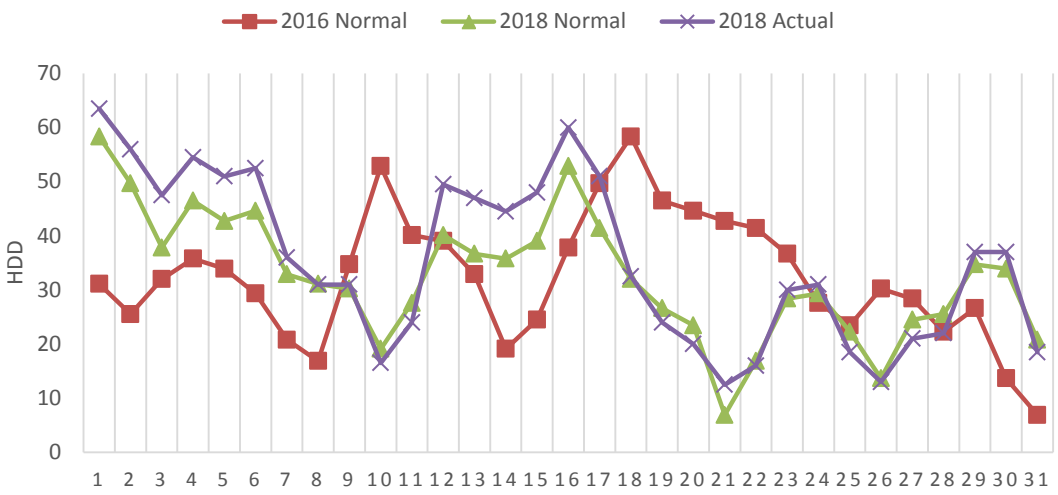



Figure 2 shows that there is not a positive correlation between the normal daily HDD of 2016 and actual daily HDD of 2018. That is, there is no discernable relationship between increases and decreases in the normal daily HDD of 2016 and the value of the actual daily HDD of 2018. The lines created by the different sets of data are not close to having the same shape in the figure.

Since Figure 1 demonstrates that actual gas usage is positively correlated with the actual daily HDD and Figure 2 demonstrates that the normal daily HDD of 2016 and the

actual daily HDD of 2018 are not positively correlated, it must therefore be the case that the relationship between actual gas usage of 2018 and the normal daily HDD of 2016 are not positively correlated.

In summary, as shown in Figure 2, the variations of 2018 actual HDD and 2018 normal HDD is synchronized but the 2016 normal HDD shows variation that is not relevant to 2018's weather. In other words, the relationship between usage and HDD is broken if Spire's method where 2016 normal HDD is used in conjunction with 2018 actual HDD. Therefore, the adjusted revenue will be biased if the 2016 normal HDD is used for Spire's WNAR adjustments in conjunction with 2018 data. Furthermore, Spire's incorrect way of using 2016 normal daily HDD will introduce unnecessarily volatile WNAR adjustments.

**STAFF'S RANKING METHOD**

Q. In his direct testimony Mr. Weitzel states that:

> Although Staff witness Seoung Joun Won expressed Staff's preference for using the ranking methodology to normalize weather in the rate cases, he never addressed its re-application and use in calculating future WNAR adjustments. Nor did the Staff address use of the ranking methodology in its testimony relating to WNAR.

does Staff agree with his testimony?

A. No, I do not. If normal daily HDD is not properly allocated within the calendar month by the rank of actual daily temperature, then it is not Staff's method for calculating normal weather. As explained in line 27, page 92 through line 4, page 93 of Staff's Direct Cost of Service ("COS") Report for Spire's most recent rate cases, GR-2017-0215 and GR-2017-0216, Staff explained that:

> 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.**44** [3]
>
> (Emphasis added).

In other words, ranking based on actual temperature is an essential element of Staff's normal weather. Therefore, Staff's normal weather without proper rankings of the associated actual temperature is no longer Staff's normal weather.

In addition, as reference number 44 noted in the COS Report, Staff explained in a more detail the ranking method for normal weather in the peer viewed paper. Furthermore, as direct workpapers in rate cases GR-2017-0215 and GR-2017-0216, Staff provided excel files that automatically generate proper normal HDD for given actual weather input data. Therefore, contrary to the assertion of Mr. Weitzel, Staff did address the ranking method of normal weather for Spire's WNAR.

## CONCLUSION

Q. What is your conclusion of this rebuttal testimony?

A. Staff recommends that the Commission order the use of Staff's ranked average method actual and normal weather for Spire's WNAR adjustment, consistent with the WNAR tariff.

Q. Does this conclude your rebuttal testimony?

A. Yes, it does.

[3] **44** Won, S. J., Wang, X. H., & Warren, H. E. (2016). Climate normals and weather normalization for utility regulation. Energy Economics, 54, 405-416.

**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 |
| | | and |
| In the Matter of Spire Missouri, Inc.'s d/b/a Spire's Request to Increase Its WNAR | ) ) | Case No. GO-2019-0059 |

**AFFIDAVIT OF SEOUNG JOUN WON, PhD**

| | | |
|---|---|---|
| STATE OF MISSOURI | ) | |
| | ) | ss. |
| COUNTY OF COLE | ) | |

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

Further the Affiant sayeth not.

**SEOUNG JOUN WON, 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 18th day of December 2018.

D. SUZIE MANKIN
Notary Public - Notary Seal
State of Missouri
Commissioned for Cole County
My Commission Expires: December 12, 2020
Commission Number: 12412070

Notary Public