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MISSOURI PUBLIC SERVICE COMMISSION

FINANCIAL AND BUSINESS ANALYSIS DIVISION

FINANCIAL ANALYSIS DEPARTMENT

SURREBUTTAL / CROSS-SURREBUTTAL TESTIMONY

OF

SEOUNG JOUN WON, PhD

SPIRE MISSOURI INC., d/b/a Spire

CASE NO. GR-2025-0107

Jefferson City, Missouri
June 2025

****** Denotes Confidential Information ******

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SEOUNG JOUN WON, PhD

SPIRE MISSOURI INC.,
d/b/a Spire

CASE NO. GR-2025-0107

Q. Please state your name and business address.

A. My name is Seoung Joun Won and my business address is 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") as a member of Commission Staff ("Staff") and my title is Regulatory Compliance Manager for the Financial Analysis Department, in the Financial and Business Analysis Division.

Q. Are you the same Seoung Joun Won who filed direct testimony on April 23, 2025, and the rebuttal testimony on the same topic filed May 30, 2025, in this proceeding?

A. Yes, I am.

Q. What is the purpose of your surrebuttal testimony?

A. The purpose of my surrebuttal testimony is to respond to the rebuttal testimonies of Adam W. Woodard and David Murray regarding cost of capital issues such as return on equity ("ROE"), cost of debt, capital structure, and overall rate of return ("ROR"). Mr. Woodard filed his testimony on behalf of Spire Missouri Inc., d/b/a Spire ("Spire Missouri"), a subsidiary of Spire, Inc. ("Spire Inc."). Mr. Murray filed testimony on behalf of the Missouri Office of the Public Counsel ("OPC").

I. EXECUTIVE SUMMARY

Q. Please provide an overview of your response to the rebuttal testimony of Mr. Woodard.

A. In his rebuttal testimony, Mr. Woodard did not revise his position from his direct testimony proposing an ROE of 10.50% and a hypothetical capital structure consisting of 55.00% common equity and 45.00% long-term debt.[1] Mr. Woodard's proposed ROE and equity ratio are too high compared to the 2025 (January through May) average for U.S. natural gas utilities, which is 9.72% for ROE and 50.93% for the equity ratio.[2] In addition, Mr. Woodard presented incorrect arguments in his rebuttal testimony, based on a misunderstanding of financial and statistical fundamentals. Staff will address the major issues related to Mr. Woodard's disagreement with Staff's cost of equity ("COE") and ROE estimation methods.

Q. Please provide an overview of your response to the rebuttal testimony of Mr. Murray.

A. Mr. Murray maintained his position recommending an ROE of 9.50% within a range of 9.00% to 9.50% and revised his recommendation of a hypothetical ratemaking capital structure to consist of 45.86% common equity, 44.95% long-term debt and 9.19% short-term debt.[3] Mr. Murray adopted capital structure ratios consistent with Spire Inc.'s typical capital structure ratios for the period encompassing the ordered test year, September 30, 2024.[4] Staff will respond to Mr. Murray's arguments in his rebuttal testimony regarding ROE and ratemaking capital structure issues.

[1] On page 2, lines 10-16, Woodard's Rebuttal Testimony.
[2] RRA, S&P Capital IQ Pro, Retrieved on June 2, 2025.
[3] Schedule DM-R-4, Murray's Rebuttal Testimony.
[4] On page 2, lines 14-16, Murray's Rebuttal Testimony.

II. RESPONSE TO THE TESTIMONY OF SPIRE MISSOURI WITNESS

Q. Please summarize Mr. Woodard's rebuttal testimony.

A. Mr. Woodard's updated COE analyses were prepared using market data through May 15, 2025, but he did not revise his proposed ROE or ratemaking capital structure.[5] In response to Staff's direct testimony, Mr. Woodard stated in his rebuttal testimony that he disagreed with Staff's recommended ROE of 9.63%. To justify his higher proposed ROE of 10.50%, Mr. Woodard addressed issues related to market and economic conditions, COE and ROE estimation methodologies, and modeling inputs. In addition, Mr. Woodard disagreed with Staff regarding the amount of short-term debt that should be included in Spire Missouri's ratemaking capital structure.[6] During its review of his rebuttal testimony, Staff found that Mr. Woodard mischaracterized Staff's arguments due to his misunderstanding of Staff's methods and of financial and statistical fundamentals.

Q. What are the specific areas in which Staff is responding to Spire Missouri's witness?

A. The areas in which Staff addresses issues with Mr. Woodard's rebuttal testimony regarding his proposed ROE and ratemaking capital structure include:

- Proxy Group
- Discount Cash Flow
- Capital Asset Pricing Model
- Bond Yield Plus Risk Premium
- Ratemaking Capital Structure
- ROE and Equity Ratio Comparison

Staff will discuss each in turn, below.

[5] On page 2, lines 6-16, Woodard's Rebuttal Testimony.
[6] On pages 18-20, Woodard Rebuttal Testimony.

1. Proxy Group

Q. Why does Mr. Woodard not agree with Staff's proxy group?[7]

A. Mr. Woodard disagrees with Staff's proxy group for two reasons. First, Staff's proxy group is too small.[8] Second, Staff's proxy group includes Spire Missouri's parent company, Spire Inc.[9]

Q. Do you agree with Mr. Woodard that Staff's proxy group is too small to properly estimate a just and reasonable ROE for Spire Missouri in this proceeding?[10]

A. No, I do not. Staff's proxy group includes five companies, exceeding the generally accepted minimum of three.[11] In the selection of a proxy group for estimating the COE and authorized ROE, comparability is more important than size. The main purpose of a proxy group is to reflect the risk and financial characteristics of the target utility (e.g., Spire Missouri) as closely as possible. This ensures that the estimated COE is appropriate and the authorized ROE is fair. A smaller group of highly comparable companies (in terms of business operations, regulatory environment, capital structure, and risk profile) will yield more meaningful and defensible results than a larger group of loosely similar firms.

While a larger group can improve statistical robustness, increasing the group size at the expense of comparability introduces bias and undermines the reliability of the estimation. In regulatory settings, this tradeoff is often viewed unfavorably because it undermines the fundamental goal of estimating a COE and authorized ROE that accurately reflects the

[7] On pages 7-8, Woodard Rebuttal Testimony.
[8] On page 7, lines 7-23, Woodard Rebuttal Testimony.
[9] On page 8, lines 12-20, Woodard Rebuttal Testimony.
[10] On page 7, lines 7-23, Woodard Rebuttal Testimony.
[11] Footnote No. 131, 171 FERC ¶ 61,155, Docket No. PL19-4-000.

risk profile of the regulated utility. The regulatory principles from *Hope* and *Bluefield* require that the authorized ROE reflect the specific risk of the regulated utility.[12] Including non-comparable companies - e.g., firms with different business models, financial status, risk exposures, or levels of regulation - can distort the risk-return relationship within the proxy group. Including non-comparable firms increases statistical variability, thereby reducing the reliability of the estimation results. A larger sample size may improve the precision of the estimate, but only if the data are homogenous in relevant characteristics (e.g., capital structure, market risk, regulation, etc.). Otherwise, it results in biased ROE estimates that do not represent the target utility's true COE. The Federal Energy Regulatory Commission ("FERC") has clearly indicated that the proxy group must consist of risk-comparable companies, not merely a large number of companies.[13]

Mr. Woodard stated that Staff should include NiSource Inc. ("NI"), Chesapeake Utilities Corporation ("CPK"), and New Jersey Resources ("NJR") in its proxy group.[14] However, these companies do not meet Staff's proxy group criteria for the comparability test. Staff requires a reliable history of dividend payments for the Discounted Cash Flow ("DCF") model, but NI's financial records show several instances of decreased revenue per share and dividend per share over the past ten years.[15] For credit quality comparability, Staff required that at least two major credit rating agencies assign an investment-grade rating, as is the case for Spire Missouri. CPK and NJR do not have credit ratings from either S&P or Moody's,

[12] Fed. Power Comm'n v. Hope Nat'l Gas Co., 320 U.S. 591 (1944), and Bluefield Waterworks and Improvement Co. v. Pub. Serv. Comm'n of W. Va., 262 U.S. 679 (1923).
[13] FERC Opinion No. 531, 147 FERC ¶ 61,234 (2014).
[14] On page 7, lines 7-21, Woodard Rebuttal Testimony.
[15] Value Line Report, Published November 22, 2024.

only from Fitch.[16] In fact, Mr. Woodard did not provide any substantive evidence demonstrating how the exclusion of three companies (NI, CPK, and NJR) introduces bias into the COE analysis. Without any evidence of bias in the COE analysis using Staff's proxy group, Mr. Woodard's claim of a 'too small size' is baseless. As explained above, Staff's position, that using a smaller proxy group is better than including non-comparable companies, is appropriate for estimating the COE in determining a just and reasonable authorized ROE.

Q. Do you agree with Mr. Woodard that Staff's proxy group should exclude Spire Inc. because it could introduce circularity or bias?[17]

A. No, I do not. The purpose of using a proxy group in COE estimation is to obtain a reasonable and market-based estimate of the return investors require for investing in a company that is not publicly traded or lacks sufficient market data like a regulated utility subsidiary. Many regulated operating utilities are not publicly traded and therefore lack observable market data such as stock prices or risk measures like Beta. A proxy group of comparable publicly traded companies provides the necessary data inputs for models like DCF and the Capital Asset Pricing Model ("CAPM"). A well-constructed proxy group helps ensure that the estimated COE is consistent with market expectations for similar risk profiles.

Naturally, the parent company could be included in the proxy group for COE analysis because the parent is often publicly traded, whereas a regulated utility subsidiary is not in many cases. The ROR analysts rely on market data - such as Beta, stock price, and earnings forecasts - that might only be available for the parent company. Furthermore, the parent typically controls the subsidiary's financial policies, meaning the parent's market data may still reflect the

[16] Schedule AWW-D-3, Woodard's Direct Testimony and S&P RatingDirect.
[17] On page 8, lines 12-17, Woodard's Rebuttal Testimony.

economic risks of the regulated entity. Because Spire Inc. does not engage too much in non-regulated or unrelated business activities (90%+ regulated business mix),[18] Spire Inc. does not distort the COE estimate for Spire Missouri. Therefore, there is no circularity that produces bias in the COE estimation using the proxy group, which includes Spire Inc.

Q. Do you agree with Mr. Woodard statement, "Avoiding self-referential bias aligns with the standards set forth in *Hope* and *Bluefield*, which require rates to be commensurate with returns on investments in other enterprises of comparable risk."?[19]

A. No, I do not. First, there is no empirical evidence of self-referential bias resulting from including the parent company in the proxy group. Mr. Woodard claims to present empirical evidence of circularity bias and stated, "If the examined company is included, it could introduce circularity or bias as the company's market data (e.g., dividends, growth or beta) would include the estimate, potentially skewing the result."[20] However, Mr. Woodard did not present any empirical evidence demonstrating self-referential bias arising from the inclusion of the parent company's market data, such as dividends, growth, and Beta.[21] Instead of presenting actual market data, he offered an example based on a hypothetical scenario, but even his numerical example fails to show how bias would be generated by including the parent company's data.[22] Mr. Woodard's responses, which include an unsupported claim of circularity bias, are presented in Schedules SJW-s3 through SJW-s6.

[18] Staff's Data Request No. 0066, and on page 3, Spire Inc. Investor Presentation (December 2024).
[19] On page 8, lines 18-20, Woodard's Rebuttal Testimony.
[20] On page 8, lines 15-18, Woodard's Rebuttal Testimony.
[21] Staff Data Request No. 0083.2.
[22] Staff Data Request, No. 0083.1.

Second, Mr. Woodard's concern about self-referential bias resulting from including the parent company in the proxy group is theoretically baseless. Mr. Woodard assumed that COE estimates based on a proxy group consisting of publicly traded parent companies could determine the authorized ROE for a privately-owned operating utility. In his response to Staff's data request to explain why the proxy group in a rate case should not include the parent company due to circular logic, Mr. Woodard stated,[23]

> As stated in Mr. Woodard's rebuttal testimony, the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks. *Hope* at 603. In order to create an acceptable proxy group for estimating cost of equity that can be used to set a just and reasonable return on equity commensurate with returns observed in other enterprises of comparable risk, the target company, or its parent, must be removed from the proxy group. This is not a novel consideration. Cost of equity estimates should be the basis for setting returns on investments, which are compared with returns on investments in other enterprises of comparable risk.

As shown in his response above, his circular logic concern is only valid under the assumption that the market-based COE is a comparable concept to the authorized ROE. In other words, Mr. Woodard assumed that the 'comparable returns' standard from the *Hope* decision means the Commission's authorized ROE should be determined based on the market-based COE estimates. Therefore, if the market value-based concept of COE is not the same as the book value-based concept of an authorized ROE, Mr. Woodard's claim of self-referential bias resulting from including the parent company is invalid.

Q. Why is the market value-based concept of COE not the same as the book value-based concept of an authorized ROE?

[23] Staff's Data Request No. 0083.3.

A. COE is the return required by investors and an authorized ROE is the return set by a regulatory utility commission. Although Mr. Woodard implicitly assumed that COE and authorized ROE are the same concept, Staff's position is that they are not. Observed utility COEs have been, generally, significantly lower than ROEs in recent years.[24] Because observed COEs have been significantly lower lately, instead of directly recommending the estimated COEs, Staff had recommended the authorized ROE be compared to the change in COE from one period to the next period.

The easiest way to understand the difference between COE and authorized ROE is to consider how the two return measures are used in practice. When investors buy common equity stock of a company, they want to know the expected rate of return and compare it to their required rate of return from their investment. The COE can be thought of as the minimum expected rate of return that a company must offer its investors to induce the purchase of its shares in the primary market and to maintain its share price in the secondary market.[25] The important point here is that investors pay their money based on the market value of the common equity stock and not just based on the book value of the equity of a company. To calculate the expected minimum rate of return of common equity, investors estimate COE using the stock valuation of models such as the DCF or the CAPM.[26] Investors' expected return from their common stock can be easily calculated by multiplying the COE by the market value of a common stock.

[24] Steve Huntoon, Nice Work If You Can Get It, Public Utility Fortnightly, August 2016. http://energy-counsel.com/docs/Nice-Work-If-You-Can-Get-It-Fortnightly-August-2016.pdf.
[25] On page 378, CFA Program Curriculum, 2020, Level I, Volume 4.
[26] On page 379, CFA Program Curriculum, 2020, Level I, Volume 4.

In contrast, an authorized ROE has a very different financial context. The purpose of an authorized ROE is to calculate just and reasonable rates for utility companies. In utility rate proceedings, rates are decided by the revenue requirement determined by the Commission. The revenue requirement is calculated, in part, by multiplying its rate base by the allowed ROR. The allowed ROR is the weighted average cost of capital, which includes the authorized ROE and cost of debt. The rate base calculation is based on the book value of the utility's regulatory assets. The book value of equity is calculated by subtracting a company's total liabilities from its total assets. Clearly, the two concepts, COE and ROE, are different; therefore, there is no reason market COE estimates and recommended authorized ROEs should be the same.

Q. How do investors consider the Commission's authorized ROE differently from the market value COE?

A. The book value of common equity is not as volatile as stock prices. Since COE is associated with the market value of common stock, which can have a volatile value, if the COE is directly used to set an authorized ROE value and to calculate the revenue requirement, an authorized ROE would be as volatile as the stock market. With an authorized ROE as volatile as the stock market, the overall revenue requirement would be just as volatile. Investors of utility common stock expect and require a reliable revenue stream based on just and reasonable utility rates. Investors understand that utility rates that are either higher or lower than just and reasonable levels are unsustainable and ultimately harm both ratepayers and investors. Therefore, for ratemaking purposes, a reliable and stable earning multiplier associated with the rate base, based on utility book value, needs to be produced. To properly meet the expectations and requirements of investors when they choose to invest in or lend their money to a utility company, rather than in some other investment opportunity, just and reasonable rates are required.

Q. Does this mean that COE estimation procedures are useless in the ratemaking process?

A. No, it does not. COE estimates provide valuable equity financial market information including investors expected minimum rates of return based on the market value of stocks. Specifically, the comparison of COE estimates for two different rate proceedings provides important information to calculate and recommend a just and reasonable authorized ROE. In many rate proceedings, Staff found that the changes in the COE over time, such as between rate proceeding periods, provide essential information on whether to increase or decrease authorized ROE recommendations considering financial market changes. However, simply equating COE estimates with ROE recommendations is not appropriate.

Q. Why does a simple calculation of COE estimates not produce a just and reasonable authorized ROE?

A. In its Amended Report and Order in the Spire Missouri rate proceedings, Case Nos. GR-2017-0215 and GR-2017-0216, the Commission stated:

> To determine a return on equity, the Commission must consider the expectations and requirements of investors when they choose to invest their money in Spire Missouri rather than in some other investment opportunity. As a result, **the Commission cannot simply find a rate of return on equity that is unassailably scientifically, mathematically, or legally correct**. Such a "correct" rate does not exist. Instead, the Commission must use its judgment to establish a rate of return on equity attractive enough to investors to allow the utility to fairly compete for the investors' dollar in the capital market without permitting an excessive rate of return on equity that would drive up rates for Spire's ratepayers. [Emphasis added.][27]

[27] On page 28, Amended Report and Order, Case No. GR-2017-0215.

As the Commission explained above, setting authorized ROEs is not a purely mathematical exercise where the results of COE estimation models are simply accepted from the results of a mathematical formula. If COE estimates determined by market value-based methods such as the DCF and the CAPM are simply quoted for the authorized ROE, the result would be neither just nor reasonable to investors or ratepayers. As explained earlier, the COE and the authorized ROE are developed in different financial contexts. Setting fair and reasonable ROEs involves judgment, which sometimes requires adjusting COE estimates to reflect what is deemed just and fair, considering other authorized ROEs with comparable risk.

More importantly, finding a just and reasonable authorized ROE in utility rate regulation is a long-term iterative procedure. After a utility rate proceeding, a set of new utility rates go into effect based on an authorized ROE determined by the Commission. Under the new rates, the utility company will soon have its performance results. If the new rates are overpriced, ratepayers will overpay and the company and its stock price will generally outperform. If the new rates are underpriced, the company will have a lower net income than the market expected. Because of the disappointing earnings report, investors would not be attracted to the company's stock and its stock price will underperform the total stock market. Therefore, a company may file its next rate proceeding sooner than originally expected based upon the performance results of the current set of rates.

2. Discount Cash Flow

Q. What are Mr. Woodard's issues with Staff's DCF analysis?

A. Mr. Woodard raised three issues regarding Staff's DCF analysis based on his misunderstanding of Staff's methods. First, Mr. Woodard disagreed with Staff's average stock

price calculation and insisted that the current stock price is the most up-to-date measure of value, in adherence to the efficient market hypothesis.[28] Second, Mr. Woodard disagreed with Staff's use of historical dividends instead of current dividends, based on his incorrect note stemming from a mischaracterization of Staff's data.[29] Third, Mr. Woodard disagreed with Staff's growth rate used in its DCF analysis.[30]

Q. Do you agree with Mr. Woodard's concern about Staff's average stock price calculation?

A. No, I do not. As Mr. Woodard recognized, Staff's average stock price calculation involves taking the high and low stock prices for each month of the quarter, then averaging those six values to determine the input stock price for the DCF analysis.[31] While Mr. Woodard asserted the current stock price is the most up-to-date measure of value in adherence to the efficient market hypothesis,[32] the average of the high and low stock prices is considered better than simply using the current or average stock price for DCF analysis as a proxy for market value because the average reduces short-term noise. Daily or current stock prices can be heavily affected by short-term volatility, news, or temporary sentiment. Taking the average of high and low prices over a period - such as the 52-week high and low - smooths out extremes and can provide a more stable estimate of market valuation, particularly for the perpetual time-period consideration in a DCF analysis. In addition. the average of the high and low reflects the market's perception of intrinsic value bounds of the DCF analysis. This gives a sense of the reasonable valuation range in which the market has traded the stock.

[28] On page 9, lines 14-19, Woodard's Rebuttal Testimony.
[29] On page 10, lines 1-10, Woodard's Rebuttal Testimony.
[30] On page 10, lines 10-21, Woodard's Rebuttal Testimony.
[31] On page 9, lines 14-19, Woodard's Rebuttal Testimony.
[32] On page 9, lines 18-19, Woodard's Rebuttal Testimony.

Although it is true that the strong form of the Efficient Market Hypothesis ("EMH") assumes that all information - public and private, including insider information - is fully reflected in current stock prices, in practice, this extreme hypothesis is not applicable in the real world.[33] Especially in less liquid stocks or during abnormal market periods in 2025, the current or simple average price may not reflect stock fundamentals.[34] Since averaging the extremes can dampen the effect of distortion due to temporary mispricing, comparing this to an average of high and low prices provides a benchmark range, rather than anchoring to a possibly unrepresentative point. Considering the volatility of stock prices, Mr. Woodard's assertion that the current spot price is preferable to Staff's average stock price in the DCF analysis is unreasonable.

Q. Do you agree with Mr. Woodard's concern about Staff's dividend input data for the DCF analysis?

A. No, I do not. Mr. Woodard asserted that Staff used the incorrect historical dividend in 4 out of the 5 proxy group companies.[35] This is untrue. For the dividend information, Staff used the actual 2024 Dividends Declared per Share data from the Value Line report published in the first quarter of 2025.[36] At the time Staff prepared its direct testimony in this proceeding, this was the most recent actual data available. Value Line also provided 2025 and 2026 data in the same report, but those data are estimated values, not actual dividends. Staff does not use estimated dividend data, as there is no guarantee the estimates will be

[33] Eugene, F. (1970). Efficient capital markets: A review of theory and empirical work. Journal of finance, 25, 383-417.
[34] Stock fundamentals are key metrics for a company, such as cash flow and return on assets. Analysts often perform fundamental analysis to analyze a stock by looking at its fundamentals.
[35] On page 10, lines 4-10, Woodard's Rebuttal Testimony.
[36] Value Line, https://investors.valueline.com/User/Loggedon.

realized. The actual realized dividend data for the year are only available in the report for the following year. Therefore, Mr. Woodard's use of 'current' actually means 'estimated,' and the estimated dividend data are inappropriate for the infinite time period of calculation in the DCF analysis.

Q. Do you agree with Mr. Woodard's concern about Staff's growth rate used in its DCF analysis?

A. No, I do not. Mr. Woodard stated two concerns regarding Staff's growth rate. The first is the calculation method of Staff's sustainable growth rate. However, Mr. Woodard mischaracterized the weighting of Staff's sustainable growth rate inputs from Value Line reports (short-term growth rates) and the Congressional Budget Office ("CBO") (Gross Domestic Product ("GDP')). Mr. Woodard stated, "It is assumed from Staff's workpapers that the Value Line inputs are only given 20% weighting while the CBO input is given 80% weighting, but it is unclear why growth is weighted in this arbitrary manner."[37] This is untrue. As calculated in Column [7] in Schedule SJW-d12, the weighting of Staff's sustainable growth rate for the DCF analysis is 80% short-term growth and 20% GDP.[38] Interestingly, this weighted ratio is consistent with FERC's Opinion No. 575,[39] in the case that Mr. Woodard referenced.[40]

The justification for compositing a company's growth rate and GDP growth to produce a sustainable rate comes from basic economic principles and valuation logic.

[37] On page 10, lines 13-15, Woodard' Rebuttal Testimony.
[38] Schedule SJW-d12, Won's Direct Testimony.
[39] Paragraph 131, *Entergy Arkansas, Inc.*, Opinion No. 575, 175 FERC ¶ 61,136 (2021).
[40] On page 10, lines 20-21, Woodard' Rebuttal Testimony.

It is widely accepted that a company's long-term growth rate should not exceed GDP growth.[41] No company can grow faster than the economy forever without eventually becoming larger than the economy itself. For mature companies, dividend growth is often expected to align with the rate of nominal GDP growth.[42] This is especially relevant in models like the DCF analysis, where the terminal growth rate represents the company's growth into perpetuity. There is also significant empirical evidence that mature companies' long-run growth rates tend to converge to GDP growth or lower.[43]

The second issue is the source of the growth rate for the DCF analysis. Mr. Woodard disagrees with Staff's use of the growth rate from the Value Line report because Value Line estimates are produced by a single analyst and are usually not included in consensus estimates.[44] However, there is no guarantee that the consensus estimate is better than Value Line. While consensus estimates are timely and frequently updated and reflect current market expectations, it could be subject to analyst optimism or herd behavior and sometimes excludes longer-term fundamentals or structural trends. Founded in 1931, Value Line is one of the oldest investment research firms in the U.S.[45] In addition, Mr. Woodard also utilized Value Line growth data in his DCF analysis.[46]

[41] Solow, R. M. (1956). A contribution to the theory of economic growth. The quarterly journal of economics, 70(1), 65-94.
[42] Brigham, E. F., & Houston, J. F. (2019). Fundamentals of financial management. Cengage Learning.
[43] Coad, A. (2009). The growth of firms: A survey of theories and empirical evidence. Edward Elgar Publishing.
[44] On page 10, lines 17-18, Woodard' Rebuttal Testimony.
[45] Value Line, https://research.valueline.com/.
[46] Schedule AWW-D-6, Woodard's Direct Testimony.

3. Capital Asset Pricing Model

Q. Do you agree with Mr. Woodard that only the arithmetic mean should be used in driving a historical market risk premium ("MRP") for the CAPM?[47]

A. No, I do not. The MRP is the difference between the expected return on a market portfolio and the risk-free rate. There are many theoretical and empirical studies to support the use of geometric means to calculate MRP. A prominent MRP expert and the Kerschner Family chair professor of Finance at the Stern School of Business at New York University, Aswath Damodaran, stated that conventional wisdom argues for the use of the arithmetic average to calculate MRP, but, in reality, the argument for geometric average premiums is stronger.[48] Dr. Damodaran also stated that there are strong arguments that can be made for the use of geometric average in both empirical studies and the asset pricing model theory.[49]

In addition, research sponsored by the Society of Actuaries' Pension Section Research Committee found that the geometric mean was superior to the arithmetic mean in predicting long-term returns for calculating equity risk premium ("ERP"), and the arithmetic mean produces forecasts much higher than actual returns over most time-periods.[50] Moreover, many other theoretical and empirical studies support the use of geometric means to calculate MRP.[51]

Q. What is Staff's method to calculate the MRP in the CAPM analysis?

A. Staff calculated MRP by subtracting the risk-free rate from the expected market return. For the risk-free rate, Staff used the average yield on 30-year U.S. Treasury bonds for

[47] On page 12, lines 12-26, Woodard's Rebuttal Testimony.
[48] Damodaran, A. (1999). Estimating Equity Risk Premiums.
[49] Ibid.
[50] Modugno, V. (2012). Estimating Equity Risk Premiums.
[51] Sadler, R. (2017). Estimation of the Market Risk Premium: A review of weighting of arithmetic and geometric means, Report to the ERA on Gas Rate of Return Guidelines.

the first quarter of 2025, which was 4.71%.[52] For the MRP estimate, Staff used an average of long-term geometric mean and arithmetic mean from two data sets: (1) the long-term historical return differences between large company stocks and long-term government bonds from 1926-2024,[53] and (2) the long-term historical return differences between S&P 500 and long-term government bonds from 1928-2024.[54]

Q. Why do you use the averaging of both arithmetic and geometric means when calculating the MRP in the CAPM analysis instead of just using geometric means?

A. Whether to use "arithmetic" or "geometric" mean returns when calculating the average return for calculating the MRP in the CAPM analysis is one of many on-going controversial research topics in financial analysis.[55] Many theoretical and empirical studies and financial reports presented MRP estimates using both arithmetic means and geometric means.[56] The geometric mean return is a multi-period rate of return so it should be used in the CAPM together with the yield on a long-term government security. In contrast, the arithmetic mean return is a single period rate of return and therefore it should be used in association with a short-term risk-free rate in the CAPM.[57]

For typical investment horizons, the proper compounding rate for forecasting returns is in between the arithmetic and geometric means.[58] Many financial analysts use a compromise

[52] Schedule SJW-d13, Won's Direct Testimony.
[53] Duff & Phelps, the Stocks, Bonds, Bills, and Inflation (SBBI®) Monthly Dataset.
[54] Risk Premium, Damodaran Online, Stern School of Business, NYU.
[55] Sadler, R. (2017). Estimation of the Market Risk Premium: A review of weighting of arithmetic and geometric means, Report to the ERA on Gas Rate of Return Guidelines.
[56] Ibbotson, R. G. (2011). The equity risk premium. Rethinking the Equity Risk Premium, CFA Research Foundation Publications, 4, 18-26.
[57] Soenen, L., & Johnson, R. (2008). The equity market risk premium and the valuation of overseas investments. Journal of Applied Corporate Finance, 20(2), 113-121.
[58] Jacquier, E., Kane, A., & Marcus, A. J. (2003). Geometric or arithmetic mean: A reconsideration. Financial Analysts Journal, 59(6), 46-53.

of the two, a weighted average of arithmetic and geometric mean.[59] Therefore, Staff's method to consider both arithmetic and geometric means when calculating the MRP in the CAPM analysis is a widely accepted approach in financial analysis.[60] Using both methods and determining the average of high and low bounds ensures a fair and reasonable result.

Q. Do you have any concerns about Mr. Woodard's MRP in his CAPM analysis?

A. Yes, I do. Compared to other reliable MRPs, Mr. Woodard's revised MRP of 7.00% is too high.[61] Interestingly, Mr. Woodard stated "Other measures of the MRP also moved higher as the often-cited Kroll MRP adjusted from 5.00% to 5.50%."[62] As Mr. Woodard recognized, Kroll, formerly known as Duff & Phelps, is a global financial advisory firm widely recognized for its work in valuation, corporate finance, investigations, compliance, and risk management.[63] Although it increased by 50 basis points on April 15, 2025, the most recent Kroll-recommended MRP is 5.5%, which is 150 basis points lower than Mr. Woodard's MRP of 7.0%.[64] Mr. Woodard's unreasonably high MRP inflated his CAPM COE estimate.

4. Bond Yield Plus Risk Premium

Q. Do you agree with Mr. Woodard that Staff's data sets for the bond yield plus risk premium ("BYPRP") analysis are skewed as Staff's rolling average?[65]

[59] Blume, M. E. (1974). Unbiased estimators of long-run expected rates of return. Journal of the American Statistical Association, 69(347), 634-638.
[60] Hammond, B., & Leibowitz, M. (2011). Rethinking the equity risk premium: An overview and some new ideas. Rethinking the Equity Risk Premium, 1-17.
[61] AWW-R-9, Mr. Woodard's Rebuttal Testimony.
[62] On page 3, lines 22-23, Woodard's Rebuttal Testimony.
[63] Kroll, https://www.kroll.com/en.
[64] Kroll, Kroll Cost of Capital Inputs Updated to Reflect Heightened Uncertainty in Global Economy, April 2025, https://media-cdn.kroll.com/jssmedia/cost-of-capital/kroll-cost-of-capital-inputs-updated-to-reflect-heightened-uncertainty-in-global-economy.pdf.
[65] On page 13, lines 16-17, Woodard's Rebuttal Testimony.

A. No, I do not. Using rolling periods (also called moving windows or rolling windows) in time series analysis is a basic statistical technique that is introduced in many standard textbooks.[66] Rolling periods involve calculating a statistic (e.g., mean, variance, regression coefficient) over a fixed-length window that moves through the data set. This approach is used to observe how relationships or metrics evolve over time, making it particularly valuable for detecting non-stationarity or structural changes in time series. In time series regression models, using a rolling average is important because time series data often contains short-term fluctuations, random noise, or missing values. Smoothing out these fluctuations allows analysts to better detect underlying trends or patterns in the data, making regression models more stable and interpretable. Specifically, the rolling average is helpful in BYPRP analysis because past values (lags) of variables often predict current values. Therefore, Mr. Woodard's claim that Staff's use of a rolling average causes skewness in the BYPRP data sets is inconsistent with standard statistical methodology. In addition, Mr. Woodard's statement, "Staff's rolling average is not trailing but prospective and terminates in December of 2024 despite the rest of the analysis running through the end of Q1 2025"[67] is a baseless argument because Staff's use of data at the end of the period does not distort the relationship between variables in the regression model.

Q. Do you agree with Mr. Woodard's statement, "The larger issue is that the regression analysis is performed without an independent variable. The independent variable (risk premium) is mathematically dependent on the dependent variable (bond yield)"?[68]

[66] Shumway, R. H., Stoffer, D. S., & Stoffer, D. S. (2000). Time series analysis and its applications (Vol. 3, p. 4). New York: springer.
[67] On page 13, lines 16-18, Woodard's Rebuttal Testimony.
[68] On page 13, lines 19-22, Woodard's Rebuttal Testimony.

A. No, I do not. Mr. Woodard made his claim based on a misunderstanding of basic statistics and Staff's BYPRP analysis. First of all, Mr. Woodard does not understand fundamental concepts such as independent and dependent variables in a regression model. As defined in my direct testimony, Staff used the regression model:

Risk Premium (%) = 9.4667% – 0.9509 Bond Yield (%).[69]

Staff's regression model investigates the relationship between a bond yield and the corresponding risk premium. In this equation, the risk premium is the dependent variable (also called the outcome variable or explained variable), and the market-determined bond yield is the independent variable. In other words, the model examines how the risk premium is determined based on a given bond yield, which is established in the bond market.

Q. Do you agree with Mr. Woodard statement, "This type of analysis is not determinative regardless of construction as a proper regression would compare bond yields as the dependent variable and authorized ROEs (directly) as the independent variable to avoid endogeneity and collinearity issues."?[70]

A. No, I do not. This statement contains too many nonsensical components. First, Mr. Woodard misused terminology without a proper understanding of basic statistical analysis. For example, in the regression model used for the BYPRP analysis, the authorized ROE is the value we aim to estimate given the bond yield. Therefore, the authorized ROE should be the dependent variable, and the bond yield should be the independent variable. As another example, Mr. Woodard raised the issue of collinearity. In statistics, collinearity refers to a linear

[69] On page 48, line 10, and Schedule SJW-d14-2, Won's Direct Testimony.
[70] On page 14, lines 6-9, Woodard's Rebuttal Testimony.

relationship between two or more independent variables in a regression model.[71] In other words, collinearity can only arise when the model includes at least two independent variables. However, as shown above, Staff's regression model includes only one independent variable. Therefore, a collinearity issue is not possible in Staff's regression model.

Second, even if we assume that Mr. Woodard used correct statistical terminology, his argument undermines his own Risk Premium analysis. Using proper terminology, Mr. Woodard's claim can be restated as follows: bond yields should be treated as the independent variable and authorized ROEs as the dependent variable to avoid endogeneity. In econometrics, endogeneity broadly refers to situations in which an independent variable is correlated with the error term - that is, the unexplained variation in the dependent variable.[72] In other words, Mr. Woodard claimed that the bond yield is correlated with the unexplained variation in the risk premium, but not with the unexplained variation in the authorized ROE. However, this is theoretically impossible because of the following Mr. Woodard equations which are presented in his direct testimony:

$$\text{Authorized ROE} = \alpha + \beta \text{ Bond Yield} + \varepsilon,$$[73] and

$$\text{Risk Premium} = \alpha + (\beta - 1) \times \text{Bond Yield}.$$[74]

As Mr. Woodard assumed in his direct testimony, β represents how authorized equity returns change with bond yields. Therefore, if the bond yield is correlated with the unexplained variation in the risk premium, it implies that the bond yield should also be correlated with the

[71] Britannica, https://www.britannica.com/topic/collinearity-statistics.
[72] Wooldridge, J. M. (2006). Introductory Econometrics: A Modern Approach 3rd ed. Cengage learning.
[73] On page 31, line 18, Woodard's Direct Testimony.
[74] On page 32, line 13, Woodard's Direct Testimony.

unexplained variation in the authorized ROE. It would be true that some level of endogeneity could be a limitation of the regression model used in the risk premium analysis. However, it is clear that Mr. Woodard's proposed solution to the endogeneity issue resolves nothing and is merely a self-contradictory claim. Mr. Woodard's responses, which attempt to justify his incorrect understanding of regression analysis and related terminology, are presented in Schedules SJW-s7 through SJW-s8.

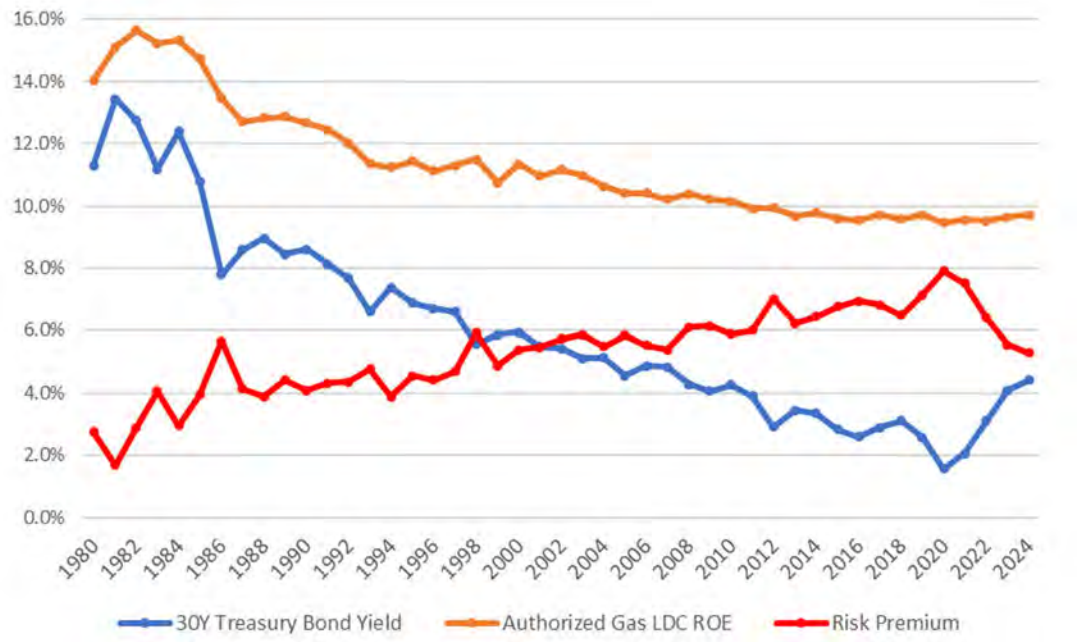
Q. Do you agree with Mr. Woodard statement, "Authorized ROEs and bond data inputs are readily available back to 1980, and an analysis of a larger pool of data would be more determinative."?[75]

A. No, I do not. While it is true that authorized ROEs and bond data inputs are readily available dating back to 1980, there is no evidence that analyzing a larger pool of data would be more determinative, especially if there are structural breaks within the time series data.[76] Staff found no evidence that the relationship between utility bond yields and authorized ROEs over a period longer than 11 years is statistically stable and consistent enough to be used for calculating a reliable risk premium through a regression model. Both Staff's BYPRP and Mr. Woodard's risk premium analysis utilized a regression analysis based on an inverse relationship between authorized ROE and bond yield.[77] If the inverse relationship is consistent over time,[78] the variation in authorized ROEs will be well explained by bond yields. However, the relationship between the two financial variables keeps changing and is inconsistent over time. Staff found that Mr. Woodard's regression model, which used 44 years of data, from the 1980 through 2024, is inappropriate for his risk premium estimation. Because the relationship

[75] On page 14, lines 14-15, Woodard's Rebuttal Testimony.
[76] Baltagi, B. H., Feng, Q., & Kao, C. (2016). Estimation of heterogeneous panels with structural breaks. Journal of Econometrics, 191(1), 176-195.
[77] On pages 29-33, Woodard Direct Testimony.
[78] On page 33, lines 18-19, Woodard Direct Testimony.

between authorized ROEs and 30-year Treasury bond yields has been inconsistent and statistically unstable over the past 44 years, Mr. Woodard's risk premium, based on his regression analysis using this data, is not reliable.[79] As shown in Figure 1, there has not been a consistent relationship over the past 40 years among major variables such as 30-year Treasury bond yields, authorized natural gas utility ROEs, and risk premiums. Therefore, Mr. Woodard's risk premium analysis cannot reliably estimate an authorized ROE using his regression analysis.

Figure 1. Mr. Woodard's Data of 30-Year Treasury Bond yield, Authorized Natural Gas Utility ROE, and Risk Premium (1980-2024)[80]



In a regression analysis, the extent to which this variation is explained is measured by the R-squared value of the regression model. The R-squared value of Staff's BYPRP regression

[79] Schedule AWW-R-16, Woodard's Rebuttal Testimony.
[80] Board of Governors of the Federal Reserve System (US), Market Yield on U.S. Treasury Securities at 30-Year Constant Maturity, Quoted on an Investment Basis [DGS30], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/DGS30, June 10, 2025, and S&P Market Intelligence.

model, using 11 years of data, is 96.4%.[81] In contrast, in Mr. Woodard's risk premium analysis regression model, using 44 years of data, the R-squared value is only 91%.[82] These results indicate that the variation in authorized ROEs is 96.4% explained by bond yields using Staff's regression model, but only 91% explained by bond yields using Mr. Woodard's model. In other words, Mr. Woodard's 40-year dataset shows less consistency over time in the inverse relationship between authorized ROE and bond yield compared to Staff's 11-year dataset. Furthermore, Mr. Woodard's risk premium estimate is unreliable due to the inconsistent relationships shown in Figure 1. Therefore, there is no evidence that Staff's BYPRP would be considered more appropriate if Staff used a period longer than 11 years.

Q. Do you agree with Mr. Woodard statement, "The results of this approach suggest 10.71% with a R-square of 0.89 based on 1,323 observations."?[83]

A. No, I do not. Mr. Woodard's regression analyses are based on inappropriate models and irrelevant input datasets, as presented in Schedule AWW-R-25 of his rebuttal testimony. Mr. Woodard conducted regression analyses and compared R-squared values across four scenarios, but the results fail to provide any evidence that Staff's BYPRP analysis is deficient.

5. Ratemaking Capital Structure

Q. What is Mr. Woodard's proposed ratemaking capital structure in his rebuttal testimony?

[81] Schedule SJW-d14-2, Won's Direct Testimony.
[82] Schedule AWW-D-17, Woodard's Direct Testimony.
[83] On page 15, lines 9-10, Woodard's Rebuttal Testimony.

A. Mr. Woodard continues to recommend that the Commission consider adopting a hypothetical capital structure consisting of 55% equity and 45% long-term debt.[84] Regarding the amount of short-term debt included in the ratemaking capital structure, Mr. Woodard disagreed with the Commission's decision in Case No. GR-2021-0108 ("2021 Spire Case"). In that case, the Commission ordered the use of a 13-month average of short-term debt relative to the balance of short-term assets.[85] Mr. Woodard claimed that this decision should not be used in this proceeding because the company had taken on significant short-term debt at that time to cover the extraordinary gas costs incurred from Winter Storm Uri.[86]

Q. Do you agree with Mr. Woodard's proposed ratemaking capital structure?

A. No, I do not. Staff recommends using Spire Missouri's stand-alone capital structure as of May 31, 2025, incorporating the amount of short-term debt in accordance with the Commission's order in Case No. GR-2021-0108, which requires the use of a 13-month average of short-term debt relative to the balance of short-term assets. As of March 31, 2025, the 13-month average of short-term debt exceeds the 13-month average balance of short-term assets by ** [redacted] **.[87] Staff expert Kimberly K. Bolin will continue to examine the levels of short-term assets and short-term debt through the true-up period ending May 31, 2025. Based on the results of the true-up analysis, Staff will recommend Spire Missouri's ratemaking capital structure in this proceeding, including the true-up short-term debt amount.

[84] On page 17, lines 10-11, Woodard's Rebuttal Testimony.
[85] On page 96, Amended Report and Order issued November 12, 2021, in Case No. GR-2021-0108.
[86] On page 17, lines 19-21, Woodard's Rebuttal Testimony.
[87] On page 4, lines 8-10, Kimberly K. Bolin's Rebuttal Testimony.

6. ROE and Equity Ratio Comparison

Q. Do you have any supporting evidence that Mr. Woodard's proposed ROE of 10.50% and equity ratio 55% are unreasonable compared to other commissions' decision in the U.S.?

A. Yes. In regards to testing the reasonableness of authorized ROE, Staff recognizes that the Commission may be interested in recent authorized ROEs for other natural gas utility companies in the U.S. as a test of reasonableness of Staff's recommendation for authorized ROE. Table 1 presents information compiled and published by Regulatory Research Associates ("RRA"), which details the average authorized ROEs for fully litigated and settled natural gas utility cases from commissions across the U.S. for the years 2021 through May 2025, along with the number of cases considered:

Table 1: Average Authorized ROEs in the U.S. (2021-2025)[88]

	Natural Gas Utility								
	Fully Litigated			Settled			Natural Gas Total		
Year	ROE (%)	Equity (%)	Case (No.)	ROE (%)	Equity (%)	Case (No.)	ROE (%)	Equity (%)	Case (No.)
2021	9.63	50.59	13	9.53	51.02	30	9.56	50.89	43
2022	9.67	52.51	9	9.47	50.70	24	9.53	51.22	33
2023	9.77	53.37	21	9.52	51.01	22	9.64	52.19	43
2024	9.58	50.30	15	9.66	51.39	25	9.63	50.96	40
2025	9.90	50.00	1	9.71	50.99	14	9.72	50.93	15

During the period from January to May 2025, the average authorized ROEs for natural gas utilities are 9.90% for one fully litigated case and 9.71% for fourteen settled cases, resulting in an overall average of 9.72%.[89] Although Staff's recommended ROE of 9.63% is 19 basis

[88] S&P Capital IQ Pro: Regulatory Research Association, retrieved June 2, 2025. For the year 2025, the data covers the period from January 1 to May 31.
[89] Schedules SJW-s1 and SJW-s2, Won's Surrebuttal Testimony.

points lower than the national average of 9.72% for U.S. natural gas utilities, it is reasonable given that the Commission-authorized ROE of 9.37% in the 2021 Spire Case was also 19 basis points below the 2021 national average of 9.56%.[90]

During the same period, the average authorized equity ratios for natural gas utilities were 50.00% for one fully litigated case and 50.99% for fourteen settled cases, resulting in an overall average of 50.93%.[91] Mr. Woodard's proposed ROE of 10.50% and equity ratio of 55.00% are unreasonably high compared to the most recent authorized averages of 9.72% for ROE and 50.93% for equity ratio. As of March 31, 2025, Spire Missouri's actual equity ratio was 50.59%, with 41.47% long-term debt and 7.84% short-term debt,[92] which is close to the U.S. natural gas utilities' average equity ratio of 50.93%.

continued on next page

[90] On page 97, *Amended Report and Order* issued November 12, 2021, in Case No. GR-2021-0108.
[91] Schedules SJW-s1 and SJW-s2, Won's Surrebuttal Testimony.
[92] Schedule SJW-r1, Won's Rebuttal Testimony.

III. RESPONSE TO THE TESTIMONY OF OPC WITNESS

Q. What are the specific areas in which Staff is responding to OPC's witness?

A. Staff is responding to the rebuttal testimony of Mr. Murray. The areas in which Staff addresses issues of Mr. Murray's rebuttal testimony include:

- Capital Structure., and
- Authorized ROE.

Staff will discuss each in turn, below.

1. Capital Structure

Q. What capital structure did Mr. Murray support for Spire Missouri in this proceeding?

A. Mr. Murray recommended the Commission adopt capital structure ratios consistent with Spire Inc.'s typical capital structure ratios for the period encompassing the ordered test year in this case, September 30, 2024.[93] Based on that, Mr. Murray recommended a hypothetical ratemaking capital structure to consist of 45.86% common equity, 44.95% long-term debt and 9.19% short-term debt.[94]

Q. Do you agree with Mr. Murray statement, "The Company's, Staff's, and MIEC's recommended ratemaking capital structures are based on Spire Missouri's per books long-term capital balances (i.e. common equity and long-term debt), but based on differing periods"?[95]

A. No, I do not. As I clearly stated in my direct testimony, Staff will continue monitoring Spire Missouri's short-term assets and short-term debt through the true-up period

[93] On page 2, lines 14-16, Murray's Rebuttal Testimony.
[94] Schedule DM-R-4, Murray's Rebuttal Testimony.
[95] On page 2, lines 16-18, Murray's Rebuttal Testimony.

ending May 31, 2025, and, if appropriate, will state any change in position on this capital structure issue no later than in its true-up direct testimony.[96] In her rebuttal testimony, Ms. Bolin recognized that the 13-month average of short-term debt exceeds the 13-month average balance of short-term assets by ** [redacted] ** as of March 31, 2025.[97] As stated in my rebuttal testimony, Ms. Bolin will continue to examine the amounts of short-term assets and short-term debt through the true-up period ending May 31, 2025.[98] Therefore, Staff's recommended capital structure includes not only Spire Missouri's per-books long-term capital balances but also a short-term debt component in Spire Missouri's ratemaking capital structure, based on the results of the true-up analysis.[99]

Q. What is Mr. Murray's response to your original recommended capital structure in your direct testimony?

A. Mr. Murray disagreed with Staff's use of Spire Missouri's standalone capital structure for the ratemaking procedure in this proceeding. In his rebuttal testimony, Mr. Murray listed five statements of Staff with which he disagreed:[100]

> Spire Missouri operates as an independent entity when considering Spire Missouri's procurement of financing and the cost of that financing... [first statement][101]

> …Since January 2022, Spire Missouri has not received long-term financing from Spire Inc. or other Spire Inc. subsidiaries… [second statement][102]

[96] On page 38, lines 18-20, Won's Direct Testimony.
[97] On page 4, lines 8-10, Kimberly K. Bolin's Rebuttal Testimony.
[98] On page 42, lines 7-9, Won's Rebuttal Testimony.
[99] On page 42, lines 10-12, Won's Rebuttal Testimony.
[100] On pages 6-7, Murray's Rebuttal Testimony.
[101] On page 6, lines 24-26, Murray's Rebuttal Testimony.
[102] On page 7, lines 1-3, Murray's Rebuttal Testimony.

> …Spire Missouri's stand-alone capital structure supports its own credit rating. The debt is rated by credit rating agencies based on the stand-alone credit quality of Spire Missouri… [third statement][103]
>
> …[the financial relationship of] Spire Inc. rais[ing] short-term funding through its [consolidated] commercial paper program and loan[ing] funds to Spire Missouri [is] normal in the utilities sector…[fourth statement][104]
>
> …no proceeds from Spire Inc.'s long-term debt issuances have been used to infuse equity into Spire Missouri. Therefore, Staff does not find evidence that Spire Inc. has used "double leverage" for investing in Spire Missouri. [fifth statement][105]

Q. How do you respond to Mr. Murray's disagreement with your first statement?

A. Mr. Murray disagreed with my statement that Spire Missouri operates as an independent entity with respect to the procurement of financing, arguing that Spire Missouri relies on Spire Inc.'s consolidated commercial paper program for indirect access to commercial paper via affiliate notes payable to Spire Inc.,[106] and that Spire Inc. shares a credit facility with both Spire Missouri and Spire Alabama.[107] However, Mr. Murray's claim is inappropriate given the context of Staff's statement, which concerns the process of determining whether the capital structure of the operating subsidiary utility or that of the holding company is more appropriate for use in Spire Missouri's ratemaking in this proceeding.[108] While Mr. Murray noted that Spire Inc. has a consolidated commercial paper program and shares a credit facility with its other subsidiaries, such short-term debt arrangements are a common financing practice among utilities in the U.S. If a utility were required to use its parent company's capital structure

[103] On page 7, lines 4-6, Murray's Rebuttal Testimony.
[104] On page 7, lines 7-10, Murray's Rebuttal Testimony.
[105] On page 7, lines 11-14, Murray's Rebuttal Testimony.
[106] On page 7, lines 16-21, Murray's Rebuttal Testimony.
[107] On page 7, line 26, Murray's Rebuttal Testimony.
[108] On pages 35-36, Won's Direct Testimony.

for ratemaking solely because of short-term debt sharing, then almost all major utilities operating in the U.S. would have to use their parent's capital structure for ratemaking.

Q. How do you respond to Mr. Murray's disagreement with your second statement?

A. Mr. Murray disagreed with my statement because Spire Missouri has received long-term equity financing from Spire Inc. and has retained 87.92% of its earnings over this period.[109] However, these statements are yet another set of out-of-context arguments. First, without Spire Inc.'s equity investment in Spire Missouri, Spire Inc. could not even be the parent company of Spire Missouri - so there would be no need to examine the financial relationship between them.

Second, in the context of determining the appropriate ratemaking capital structure, Staff investigates whether there is long-term debt financing from the parent company to the operating utility subsidiary. If that is the case, Staff recommends using the parent company's capital structure for ratemaking purposes. For example, Staff recommended using the capital structure of American Water Works Company, Inc. ("AWWC") for the ratemaking of Missouri-American Water Company ("MAWC")[110] because the vast majority (over 98%) of MAWC's long-term debt had been obtained from AWWC through American Water Capital Corporation ("AWCC"), a financial subsidiary of AWWC.[111]

Third, Mr. Murray's claim does not make sense if the definition of retained earnings is properly understood. Retained earnings are the portion of a company's net income that is not distributed as dividends but is instead retained by the company to reinvest in the business or

[109] On page 8, lines 12-22, Murray's Rebuttal Testimony.
[110] On page 27, lines 2-7, Kelli Malki's Direct / Rebuttal Testimony, WR-2024-0320.
[111] Staff Data Request No. 0037, WR-2024-0320.

strengthen its financial position. The purpose of increasing retained earnings is to bolster a company's internal financial strength by preserving a portion of its profits rather than distributing them to equity owners. The main reasons for increasing retained earnings include reinvestment in infrastructure improvements for utility upgrades and the expansion of new services or acquisitions. Therefore, a retained earnings rate of 87.92% cannot be considered evidence of Spire Missouri's financial dependence on Spire Inc.

Q. How do you respond to Mr. Murray's disagreement with your third statement?

A. Mr. Murray disagreed with my statement that S&P Global Ratings assigns Spire Missouri a stand-alone credit rating based on its own credit risk profile.[112] Mr. Murray claimed that S&P Global Ratings assigns Spire Missouri an issuer credit rating based on Spire Inc.'s credit risk profile, which reflects Spire Inc.'s significantly higher proportion of debt in its capital structure compared to Spire Missouri.[113] While it is true that S&P assigned Spire Missouri an issuer credit rating of 'BBB+' based on Spire Inc.'s consolidated financials, S&P also reported a stand-alone credit profile of 'a-', a group credit rating of 'bbb+', and an anchor rating of 'a-', which include assessments of both business and financial risk profiles.[114] A copy of the S&P rating report is presented in Table 2. As shown in Table 2, S&P provided a stand-alone credit profile for Spire Missouri that does not consider Spire Inc.'s consolidated financial risk profile. If the fact that S&P considers Spire Inc.'s credit profile when assessing Spire Missouri's issuer credit rating is enough to conclude that Spire Missouri is financially dependent on Spire Inc., then no financially independent utility subsidiaries would exist, because credit agencies consider the consolidated financial risk profile when determining an operating subsidiary's

[112] On page 36, lines 5-8, Won's Direct Testimony.
[113] On page 9, lines 10-13, Murray's Rebuttal Testimony.
[114] Rating Component Scores (page 4), S&P RatingDirect, Legislation In Missouri Would Improve Spire Missouri Inc.'s Regulatory Framework, Published March 25, 2025.

issuer credit rating. Therefore, Staff's statement is accurate: Spire Missouri's stand-alone capital structure supports its own credit rating, and its debt is rated by credit rating agencies based on its stand-alone credit quality.

Table 2. S&P Ratings Published March 25, 2025[115]

**

[redacted]

**

Q. How do you respond to Mr. Murray's disagreement with your fourth statement?

A. Mr. Murray disagreed with my statement that it is common for utility companies to participate in consolidated commercial paper programs,[116] citing the fact that Ameren Missouri, Evergy Metro, and Evergy Missouri West issue commercial paper directly to

[115] Mr. Murray provided similar information on page 9 of Schedule DM-R-1C, in his Rebuttal Testimony.
[116] On page 36, lines 13-16, Won's Direct Testimony.

third-party investors.[117] However, the truth is that Ameren Missouri has borrowed from Ameren Corp. and its regulated affiliates solely through its participation in the regulated money pool arrangement.[118] Evergy Missouri West received or provided short-term advances from or to Evergy Inc. through its money pool.[119] Evergy Metro participates in Evergy Inc.'s money pool and received overnight loans from the Money Pool in this period.[120] The Empire District Electric Company has received from or provided short-term advances to Liberty Utilities Corp. and Algonquin Power & Utilities Corp. through its money pool.[121] According to the Certified Rate of Return Analyst ("CRRA") Guide regarding ratemaking capital structure, the matter is whether the subsidiary utility obtains **all** of its capital from its parent, or issues its own debt and preferred stock.[122] In summary, the point is that sharing short-term borrowing arrangements - such as a commercial paper program or money pool - is a common practice and does not constitute evidence of a subsidiary's financial dependency on its parent company, nor does it justify using the parent company's capital structure for ratemaking.

Q. How do you respond to Mr. Murray's disagreement with your fifth statement?

A. Mr. Murray disagreed with my statement that no evidence of double leverage exists[123] because Staff's narrow interpretation of double leverage does not consider the fact that Spire Inc. balances its consolidated capital structure on the business risk of its subsidiaries, including Spire Missouri.[124] To justify his claim of double leverage he stated, "The absence of

[117] On page 10, lines 1-6, Murray's Rebuttal Testimony.
[118] Staff Data Request No. 0125(2), ER-2024-0319.
[119] Staff Data Request No. 0124(3), ER-2024-0189.
[120] Staff Data Request No. 0126(1), ER-2022-0129.
[121] Staff Data Request No. 0089, ER-2024-0261.
[122] The Society of Utility and Regulatory Financial Analysts, The Cost of Capital – A Practitioner's Guide.
[123] On page 37, lines 1-3, Won's Direct Testimony.
[124] On page 11, lines 7-10, Murray's Rebuttal Testimony.

a proper relationship is supported by the fact that S&P determined that Spire Missouri's hypothetical stand-alone credit profile ("SACP") is 'A-', but ultimately assigns Spire Missouri a 'BBB+' credit rating due to Spire Inc.'s weaker credit profile."[125] However, Mr. Murray's statement is self-contradictory because he claims not to agree that Spire Missouri's capital structure supports its own credit rating[126] If Mr. Murray believes that Spire Missouri is financially dependent on Spire Inc., and that Spire Missouri's capital structure does not support its own credit rating, then how is it possible that Spire Missouri's stand-alone credit profile is stronger than Spire Inc.'s weaker credit profile?

Q. What is your summary of Mr. Murray's rebuttal testimony regarding Staff's ratemaking capital structure recommendation?

A. The reasons Mr. Murray provided for using Spire Inc.'s capital structure reflect his personal views and subjective judgment. Many statements in the quoted sentences are either Mr. Murray's speculation or directly contradict information provided by Spire Missouri. If Mr. Murray's claims were a valid reason to use a parent company's capital structure, then the ratemaking capital structure of almost all operating utilities would be based on their parent company's capital structure as well.

Q. What were the Commission's decisions in the past Spire Missouri rate cases regarding Mr. Murray's proposed Spire Missouri ratemaking capital structure?

A. In the 2017 Spire East and Spire West Cases and the 2021 Spire Case, the Commission ruled that the appropriate capital structure to use to set Spire Missouri's ROR is

[125] On page 11, lines 25-27, Murray's Rebuttal Testimony.
[126] On page 12, lines 14-16, Murray's Rebuttal Testimony.

Spire Missouri's own standalone capital structure.[127] The Commission's decision to use the operating subsidiary-specific capital structure and not Spire Inc.'s consolidated capital structure is supported by the facts in this proceeding, including that Spire Missouri has an independently determined capital structure with its own long-term debt issuances secured by its own assets.[128] As explained above, Mr. Murray's position to use Spire Inc.'s capital structure for the ratemaking of Spire Missouri has continued to be rejected by the Commission. Mr. Murray's recommended hypothetical capital structure in this proceeding is not consistent with the Commission's decisions in previous Spire Missouri rate cases.[129] Staff found no reason to recommend a change for the Commission's decision on capital structure in this proceeding.[130]

Q. What are the generally accepted criteria of the regulatory standard regarding ratemaking capital structure?

A. The Society of Utility and Regulatory Financial Analysts ("SURFA") lists the following four guidelines for determining when to use a parent company's capital structure in its guidebook, The Cost of Capital – A Practitioner's Guide ("CRRA Guide"):

> 1. Whether the subsidiary utility obtains **all** of its capital from its parent, or issues its own debt and preferred stock;
>
> 2. Whether the parent guarantees **any** of the securities issued by the subsidiary;

[127] On page 44, Amended Report and Order issued March 7, 2018, in Case Nos. GR-2017-0215 and GR-2017-0216, and on page 96, Amended Report and Order issued November 12, 2021, in Case No. GR-2021-0108.
[128] On page 43, Amended Report and Order issued March 7, 2018, in Case Nos. GR-2017-0215 and GR-2017-0216.
[129] On page 43, Amended Report and Order issued March 7, 2018, in Case Nos. GR-2017-0215 and GR-2017-0216, and on page 96, Amended Report and Order issued November 12, 2021, in Case No. GR-2021-0108.
[130] On page 23, lines 5-17, Won's Direct Testimony.

3. Whether the subsidiary's capital structure is independent of its parent (i.e., existence of double leverage, absence of proper relationship between risk and leverage of utility and **non**-utility subsidiaries); and,

4. Whether the parent (or consolidated enterprise) is diversified into **non**-utility operations.[131]

Q. What is the proper ratemaking capital structure of Spire Missouri based on the CRRA Guide?

A. According to criteria in the CRRA guide, Spire Missouri's standalone capital structure is the proper ratemaking capital structure of this proceeding. There are no reasons suggested in the guidelines indicating that it is appropriate to use Spire Inc.'s capital structure to set Spire Missouri's ROR. For the first guideline, Spire Missouri has not received any long-term financing, debt, or preferred stock, from Spire Inc.[132] Spire Missouri's stand-alone capital structure supports its own bond rating.[133] Actually, Spire Missouri's stand-alone credit profile of a- is higher than Spire Inc.'s bbb+.[134] For the second guideline, Spire Inc. or Spire Inc.'s other subsidiaries do not guarantee the securities issued by Spire Missouri.[135] For the third guideline, Staff has not found the existence of double leverage, or the absence of a proper relationship between risk and leverage of utility and non-utility subsidiaries.[136] For the fourth guideline, there are no significant concerns about the financial relationship between

[131] David C. Parcell in The Cost of Capital – A Practitioner's Guide prepared for SURFA, Chapter 4.
[132] Staff's Data Request No. 0065(1).
[133] Rating Direct, S&P Capital IQ.
[134] S&P RatingDirect, 'Legislation In Missouri Would Improve Spire Missouri Inc.'s Regulatory Framework' Published March 25, 2025, and 'Spire's Fiscal 2024 Financial Measures Below Expectations But Higher Cash Flow Anticipated In Fiscal 2025' Published January 2, 2025.
[135] Staff's Data Request No. 0065(5 & 6).
[136] Staff's Data Request No. 0067.

Spire Missouri's regulated utility service and Spire Inc.'s non-regulated business because the non-regulated business accounts for less than 10% of Spire Inc.'s overall business mix.[137]

Q. What is your opinion about Mr. Murray's statement, "Spire Missouri's hypothetical stand-alone credit profile ("SACP") is 'A-', but ultimately assigns Spire Missouri a 'BBB+' credit rating due to Spire Inc.'s weaker credit profile."?[138]

A. Since Spire Inc. has a weaker credit profile than Spire Missouri, Spire Missouri cannot be financially dependent on Spire Inc., except for equity investment. In other words, this supports the conclusion that Spire Missouri is financially independent from its parent company, Spire Inc. Therefore, based on the CRRA criteria for ratemaking capital structure, Spire Missouri's standalone capital structure is the appropriate one for this proceeding. In addition, using Spire Inc.'s capital structure for ratemaking does not address any issues arising from the fact that Spire Inc.'s business and financial risk constrain Spire Missouri's credit rating.

Q. What is Staff's overall opinion about Mr. Murray's rebuttal testimony concerning Staff's capital structure?

A. At this time, Staff finds no reason to disagree with the Commission's last decision that Spire Missouri's standalone capital structure be used for ratemaking purposes. Mr. Murray's recommendation is not compatible with typical regulatory practices on when to use a parent company's capital structure instead of a subsidiary's own capital structure for the subsidiary's ratemaking.[139] Therefore, Staff will maintain the recommendation in this case that

[137] Staff's Data Request No. 0066.
[138] On page 11, lines 26-28, Murray's Rebuttal Testimony.
[139] Pettway, R. H., & Jordan, B. D. (1983). Diversification, double leverage, and the cost of capital. Journal of Financial Research, 6(4), 289-300.

Spire Missouri's stand-alone capital structure should be used as the ratemaking capital structure in this proceeding. As the Commission ordered in the 2021 Spire Case, the amount of short-term debt included in Spire Missouri's ratemaking capital structure should be determined by the average short-term debt in excess of short-term assets over a 13-month period ended May 31, 2025, the true-up date of in this proceeding.[140]

2. Authorized ROE

Q. What ROE did Mr. Murray support for Spire Missouri in this proceeding?

A. Mr. Murray recommended 9.50% based on a range of 9.00% to 9.50% in his direct testimony.[141] In his rebuttal testimony Mr. Murray continued to support setting Spire Missouri's authorized ROE at 9.50%.[142]

Q. What is Mr. Murray's response to Staff's recommended ROE?

A. Mr. Murray did not disagree with Staff's recommended ROE of 9.63%, but stated that the Commission should disregard any ROE above 9.63%.[143] However, Mr. Murray did not provide any specific evidence or reasoning why the Commission should disregard any ROE above 9.63%.

Q. What are Staff's concerns regarding Mr. Murray's response about an authorized ROE?

A. While Staff does not agree with all of Mr. Murray's responses to Staff's recommended ROE, it does not have any major concerns with his recommended ROE of 9.50%

[140] On page 96, Amended Report and Order issued November 12, 2021, in Case No. GR-2021-0108.
[141] On page 2, lines 3-4, Murray's Direct Testimony.
[142] DM-R-4, Murray's Rebuttal Testimony.
[143] On page 34, line 3, Murray's Rebuttal Testimony.

since it falls within Staff's recommended range of 9.38% to 9.88%.[144] As Staff reported, no authorized ROEs were less than 9.50% compared to nine (9) authorized ROEs in Staff's recommended range (9.38% to 9.88%) across all eleven (11) natural gas utility cases in the five months of 2025.[145] The other two (2) natural gas utilities have been authorized an ROE of 9.90%.[146]

Q. Do you agree with Mr. Murray that it is logical to recommend an ROE range of 50 basis points considering the narrow range of only 10 basis points based on Dr. Won's regression analysis?[147]

A. No, I do not. A reasonable ROE range of 50 basis points is based on the most commonly accepted margin of error of 5% in the estimation process.[148] It is not directly related to the range of my regression analysis estimates.

Q. Do you agree with Mr. Murray's concerns with the high-end of Staff's CAPM range premised on an MRP estimate of 7.00%?[149]

A. No, I do not. First of all, as Mr. Murray recognized, Staff does not rely on some of its higher COE estimates, including the 7.00%, in determining its recommended authorized ROE.[150] Second, Staff's high-end estimate using a 7.00% MRP was excluded from the range of Staff's CAPM-based COE estimates.[151] Third, Staff also relies on a lower-end MRP of

[144] Schedule SJW-d16, Won's Direct Testimony.
[145] S&P Global Market Intelligence, Retrieved in January 2, 2024.
[146] Ibid.
[147] On page 34, lines 1-5, Murray's Rebuttal Testimony.
[148] Penn State University (STAT 500: Confidence Intervals), https://online.stat.psu.edu/stat500/book/export/html/474?utm_source=chatgpt.com.
[149] On pages 34-36, Murray's Rebuttal Testimony.
[150] On page 34, lines 6-7, Murray's Rebuttal Testimony.
[151] Schedule SJW-d13, Won's Direct Testimony.

4.52% in developing the CAPM COE range.[152] Therefore, Staff's CAPM COE estimates are more closely aligned with its average MRPs of 5.71% rather than 7.00%.[153]

Q. Do you agree with Mr. Murray that Staff's CAPM risk measure Beta of 0.90 is too high and that a lower historical Beta of 0.70 should be considered?[154]

A. No, I do not. In CAPM analysis, aligning the time periods of input parameters, such as Beta and the risk-free rate, is essential for producing reliable results. Arbitrarily selected input values with mismatched timing can lead to unreasonable COE estimates. While historical Beta is an important measure for evaluating a company's risk profile over time, it should not be used with the current risk-free rate. A ROR analysis should ensure that the timing of the risk-free rate, measured by the 30-year Treasury bond yield, is aligned with the timing of the risk factor, measured by Beta, in CAPM-based COE estimates.

Q. Does this conclude your response to the rebuttal testimony of OPC's witness?

A. Yes, it does.

continued on next page

[152] On page 46, lines 4-6, Won's Direct Testimony.
[153] Schedule SJW-d13, Won's Direct Testimony.
[154] On pages 36-37, Murray's Rebuttal Testimony.

IV. SUMMARY AND CONCLUSIONS

Q. Please summarize the conclusions of your surrebuttal testimony.

A. Spire Missouri witness Mr. Woodard's recommended ROE of 10.50% remains unfair and unreasonable compared to the average authorized ROE of 9.72% for U.S. natural gas utilities in 2025 (January through May).[155] OPC witness Mr. Murray's recommended ROE of 9.50% is within Staff's recommended range of authorized ROE. Considering the current volatile economic conditions and the Commission's prior decision authorizing a 9.37% ROE for Spire Missouri,[156] Staff continues to recommend an authorized ROE of 9.63% for this proceeding, within a reasonable range of 9.38% to 9.88%.

Both Mr. Woodard and Mr. Murray proposed non-actual capital structures that are inconsistent with the most recent Commission order from the 2021 Spire Case. Mr. Woodard proposed a non-actual capital structure consisting of 55% common equity and 45% long-term debt.[157] Mr. Murray proposed a hypothetical capital structure that consists of 45.86% common equity, 44.95% long-term debt and 9.19% short-term debt based on his consideration of Spire Inc.'s consolidated capital structure.[158]

Currently, Staff is in the process of updating the changes to Spire Inc.'s and Spire Missouri's actual capital structures and costs of debt for its true-up testimony. Staff will make its final recommendation of ROR in its true-up testimony in this proceeding after investigating the reason for any material changes in Spire Inc.'s and Spire Missouri's actual capital structure over the duration of this case.

Q. Does this conclude your surrebuttal testimony?

A. Yes.

[155] RRA, S&P Capital IQ Pro, Retrieved on June 2, 2025.
[156] On page 97, Amended Report and Order issued November 12, 2021, in Case No. GR-2021-0108.
[157] On page 2, lines 10-16, Woodard's Rebuttal Testimony.
[158] Schedule DM-R-4, Murray's Rebuttal Testimony.

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

In the Matter of Spire Missouri Inc. d/b/a Spire's Request for Authority to Implement a General Rate Increase for Natural Gas Service Provided in the Company's Missouri Service Areas	))))	Case No. GR-2025-0107

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 *Surrebuttal / Cross-Surrebuttal Testimony of Seoung Joun Won, PhD*; 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 26th day of June 2025.

D. SUZIE MANKIN
Notary Public - Notary Seal
State of Missouri
Commissioned for Cole County
My Commission Expires: April 04, 2029
Commission Number: 12412070

Notary Public

Spire Missouri, Inc., d/b/a Spire
Case No. GR-2025-0107

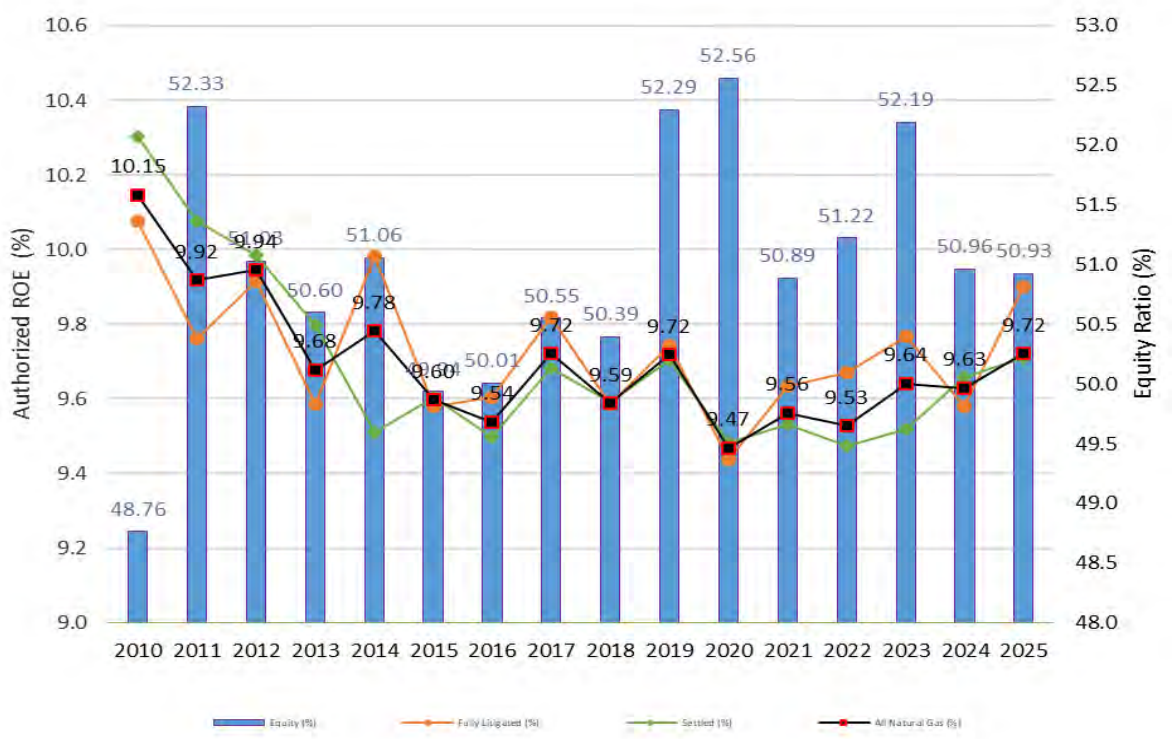
	Natural Gas Utility								
	Fully Litigated			Settled			Natural Gas Total		
Year	ROE (%)	Equity (%)	Case (No.)	ROE (%)	Equity (%)	Case (No.)	ROE (%)	Equity (%)	Case (No.)
2010	10.08	48.72	27	10.30	48.87	12	10.15	48.76	39
2011	9.76	52.64	8	10.08	51.82	8	9.92	52.33	16
2012	9.92	51.06	21	9.99	50.97	14	9.94	51.03	35
2013	9.59	51.98	12	9.80	48.53	9	9.68	50.60	21
2014	9.98	52.86	15	9.51	48.61	11	9.78	51.06	26
2015	9.58	51.17	5	9.60	49.32	11	9.60	49.94	16
2016	9.61	52.11	10	9.50	48.60	16	9.54	50.01	26
2017	9.82	50.39	7	9.68	50.63	17	9.72	50.55	24
2018	9.59	50.56	17	9.59	50.27	23	9.59	50.39	40
2019	9.74	52.00	12	9.70	52.47	21	9.72	52.29	33
2020	9.44	52.38	12	9.48	52.66	23	9.47	52.56	35
2021	9.63	50.59	13	9.53	51.02	30	9.56	50.89	43
2022	9.67	52.51	9	9.47	50.70	24	9.53	51.22	33
2023	9.77	53.37	21	9.52	51.01	22	9.64	52.19	43
2024	9.58	50.30	15	9.66	51.39	25	9.63	50.96	40
2025	9.90	50.00	1	9.71	50.99	14	9.72	50.93	15
Average	9.72	51.51	14	9.69	50.46	18	9.70	50.98	31

Note:

Source: S&P Global Market Intelligence, Retrieved in June 2, 2025

For the year 2025, the data covers the period from January 1 to May 31.

Spire Missouri, Inc., d/b/a Spire
Case No. GR-2025-0107



Note:

Source: S&P Global Market Intelligence, Retrieved in June 2, 2025

For the year 2025, the data covers the period from January 1 to May 31.

Schedule SJW-s2

Spire Missouri
GR-2025-0107

Response to Data Request 0083

Question:

On page 22, line 16-17, in his direct testimony, Mr. Adam Woodard stated "Spire Inc. is excluded from both modeled groups to avoid circular references."
(1) Please explain the meaning of a "circular reference."
(2) Please explain why Mr. Woodard wants to avoid a circular reference.
(3) Please explain what kind of estimation error could be introduced in the calculation of the cost of equity for Spire Missouri if Spire Inc. is included in the modeled group.
Requested by: Seoung Joun Won (seoungjoun.won@psc.mo.gov)

Response:

This practice is consistent with other utilities in the state (see recent Ameren and Evergy cost of capital testimony). The inclusion of the target company could skew the comparative analysis, introduce circular logic, and potentially distort key financial metrics. Examples of the resulting statistical bias would be self-referencing beta and averaging the company with itself. This is particularly true the smaller the proxy group.

Signed by: Adam Woodard

Spire Missouri
GR-2025-0107

Response to Data Request 0083.1

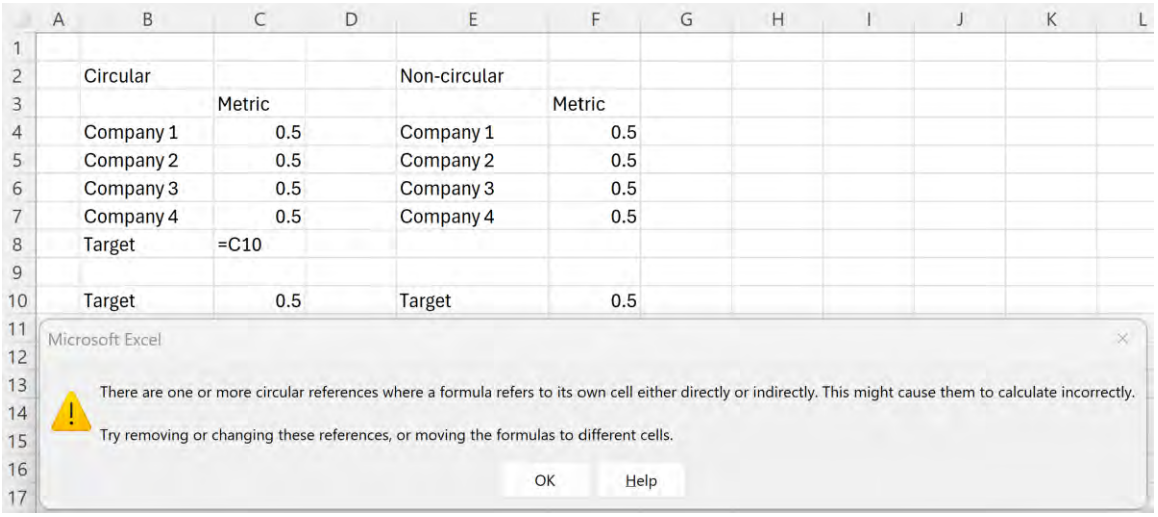
Question:

In response to Staff's Data Request No. 0083, Mr. Woodard stated "This practice is consistent with other utilities in the state (see recent Ameren and Evergy cost of capital testimony). The inclusion of the target company could skew the comparative analysis, introduce circular logic, and potentially distort key financial metrics. Examples of the resulting statistical bias would be self-referencing beta and averaging the company with itself."
(1) Please provide the definition of 'circular logic' that Mr. Woodard used in his response.
(2) Please explain what statistical bias is and how it would result from using a self-referencing beta and averaging the company with itself when estimating the cost of equity for Spire Missouri if Spire Inc. is included in the proxy group.
(3) Provide a numerical example of (2). Requested by: Seoung Joun Won (seoungjoun.won@psc.mo.gov)

Response:

It is possible a call may be beneficial to talk through this; however, here are the responses:

1. Circular logic is a logical dilemma where the result of an equation is being used to solve the equation.
2. A statistical bias is when the method or data used to generate something skews the result. Spire Missouri is a subsidiary of Spire Inc., and therefore, including Spire Inc. would mean that Spire Missouri is being included in the proxy group.
3. See below and attached.



Signed by: Adam Woodard

Spire Missouri
GR-2025-0107

Response to Data Request 83.2

Question:
On page 8, lines 15–18, in his rebuttal testimony, Mr. Adam Woodard stated, "If the examined company is included, it could introduce circularity or bias as the company's market data (e.g., dividends, growth or beta) would include the estimate, potentially skewing the result." Please provide evidence and calculations supporting the statement regarding
(1) dividends,
(2) growth, and
(3) beta. All calculations should be provided in an executable MS Excel file.
Requested by: Seoung Joun Won (seoungjoun.won@psc.mo.gov)

Response:
The Company provided analysis on two robust proxy groups and singular cost of equity analysis on Spire Inc. for reference purposes. In contrast, Staff provided a much smaller proxy group that included the parent of Spire Missouri. Doing so results in the target company being compared with itself, instead of just external enterprises with comparable risk, which in turn may result in skewed estimates. The Company does not have calculations supporting the statement beyond what was already provided in response to DR 83.1.

Signed by: Adam Woodard

Spire Missouri
GR-2025-0107

Response to Data Request 83.3

Question:
On page 8, lines 18–20, in his rebuttal testimony, Mr. Adam Woodard stated, "Avoiding self-referential bias aligns with the standards set forth in Hope and Bluefield, which require rates to be commensurate with returns on investments in other enterprises of comparable risk."
(1) Please provide any statements in Hope and Bluefield indicating that the proxy group in a rate case should not include the parent company due to circular logic, if any exist.
(2) Please explain how the estimated cost of equity using the proxy group can be used to compare rates to returns on investments in other enterprises of comparable risk.
Requested by: Seoung Joun Won (seoungjoun.won@psc.mo.gov)

Response:
As stated in Mr. Woodard's rebuttal testimony, the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks. *Hope* at 603. In order to create an acceptable proxy group for estimating cost of equity that can be used to set a just and reasonable return on equity commensurate with returns observed in other enterprises of comparable risk, the target company, or its parent, must be removed from the proxy group. This is not a novel consideration. Cost of equity estimates should be the basis for setting returns on investments, which are compared with returns on investments in other enterprises of comparable risk.

Signed by: Adam Woodard

Spire Missouri
GR-2025-0107

Response to Data Request 318

Question:
On page 13, lines 19–22, in his rebuttal testimony, Mr. Adam Woodard stated, "The larger issue is that the regression analysis is performed without an independent variable. The independent variable (risk premium) is mathematically dependent on the dependent variable (bond yield)." In the context of this statement, please respond to the following:
(1) Please provide definitions of mathematically dependent, independent variable, and dependent variable.
(2) Please explain how the risk premium is considered an independent variable.
(3) Please explain how the bond yield is considered a dependent variable.
(4) Please explain why the risk premium is mathematically dependent on the bond yield.
Requested by: Seoung Joun Won (seoungjoun.won@psc.mo.gov)

Response:
The Company is explaining how Staff's regression model is performed. In Staff's model it appears risk premium is treated as an independent variable and bond yield is treated as a dependent variable. However, risk premium is derived from, and therefore dependent on, bond yield.

Signed by: Adam Woodard

Spire Missouri
GR-2025-0107

Response to Data Request 319

Question:
On page 14, lines 6-9, in his rebuttal testimony, Mr. Adam Woodard stated, "This type of analysis is not determinative regardless of construction as a proper regression would compare bond yields as the dependent variable and authorized ROEs (directly) as the independent variable to avoid endogeneity and collinearity issues." In the context of this statement, please respond to the following:
(1) Please provide definitions of endogeneity and collinearity.
(2) Please explain how the bond yield is considered a dependent variable.
(3) Please explain how ROE is considered an independent variable.
(4) Please explain why there are endogeneity and collinearity issues.
Requested by: Seoung Joun Won (seoungjoun.won@psc.mo.gov)

Response:
1. Endogeneity occurs when an explanatory variable is correlated with the error term in a regression model. This violates one of the key assumptions of Ordinary Least Squares (OLS) regression, leading to biased and inconsistent parameter estimates. Collinearity occurs when two or more independent variables in a regression model are highly correlated with each other. This doesn't bias the estimates but increases their standard errors, making it harder to detect significant effects.
2. The statement was intended to suggest that bond yield should be used as the dependent variable in the regression analysis.
3. The statement was intended to suggest that ROE should be used as the independent variable in the regression analysis.
4. The endogeneity and collinearity issues referenced were due to the independent variable (bond yield) being mathematically dependent on the dependent variable (risk premium).

Signed by: Adam Woodard