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MISSOURI PUBLIC SERVICE COMMISSION

FINANCIAL AND BUSINESS ANALYSIS DIVISION

FINANCIAL ANALYSIS DEPARTMENT

DIRECT TESTIMONY

OF

RANDALL T. JENNINGS

MISSOURI-AMERICAN WATER COMPANY

CASE NO. WR-2022-0303

Jefferson City, Missouri
November 2022

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

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DIRECT TESTIMONY

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RANDALL T. JENNINGS

MISSOURI-AMERICAN WATER COMPANY

CASE NO. WR-2022-0303

Q. Please state your name and business address.

A. My name is Randall Jennings 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 Senior Utility Regulatory Auditor for the Financial Analysis Department, in the Financial and Business Analysis Division.

Q. Have you provided your educational background and work experience in this file?

A. Yes. My education background and work experience is attached to this testimony as Schedule RTJ-d1.

Q. Have you previously filed testimony before the Commission?

A. Yes, I have previously filed testimony before the Commission on carrying costs. Please refer to Schedule RTJ-d1, attached to this Direct Testimony, for a list of my testimony, recommendations, or memorandums previously filed with the Commission and the associated issues.

Q. On behalf of whom are you testifying in this proceeding?

A. I am testifying in this Direct Testimony before the Commission on behalf of Staff.

Q. What is the purpose of your direct testimony?

A. In this testimony, Staff presents evidence and provides a recommendation regarding the appropriate rate of return ("ROR") to be used in establishing the water and wastewater service rates of Missouri-American Water Company ("MAWC"), a wholly-owned subsidiary of American Water Works Company, Inc. ("AWWC").

Staff's analyses and conclusions are supported by the data presented in the attached Confidential Schedules RTJ-d2 through RTJ-d17. Staff's workpapers will be provided to the parties at the time of the filing of this Direct Testimony. Staff will make any additional source documents of specific interest available upon the request of any party to this case or the Commission.

I. EXECUTIVE SUMMARY

Q. Please provide a summary of your methodology and findings concerning the ROR that should be utilized in setting rates for MAWC's water and wastewater utility operations in this proceeding.

A. Staff estimated the market-based cost of common equity ("COE") for MAWC using a comparative COE analysis. Staff's analysis takes into account changes in economic and capital market conditions over time by employing two widely-used and well-respected COE estimation methodologies: the discounted cash flow model ("DCF") and

the capital asset pricing model ("CAPM").[1] The comparative COE analysis method allowed Staff to calculate the change in authorized return on equity ("ROE") based on the change in its COE estimate from period to period by using the Commission's most recent decision. The Commission's most recent, fully-litigated rate case is Spire Missouri's natural gas rate case, Case No. GR-2021-0108, in 2021 ("2021 Spire Case").[2] By using the Commission's decision in the 2021 Spire Case as a benchmark, Staff calculated a reasonable range of authorized ROEs and a recommended ROE[3] for MAWC.

Staff also considered the current economic and financial market conditions when recommending an ROE. The current utility COE estimates are unusually and unsustainably high partially due to the effects of the COVID-19 pandemic and the invasion of Ukraine by Russia. When COVID-19 hit in 2020, it caused massive volatility in the financial markets.[4] Gross domestic product ("GDP") fell sharply, followed by an equally sharp recovery through 2021.[5] The recovery from the COVID-19 pandemic spurred fears of higher inflation and, consequently, higher market risk.[6] The market risk increased for utilities as investors believed that regulators would not adjust revenues fast enough to compensate for the rising input costs.[7] In June 2022, the consumer price index soared at an annual rate of 9.1%, a new 40-year high

[1] *Ass'n of Bus. Advocating Tariff Equity v. Midcontinent Indep. Sys. Operator, Inc.,* Opinion No. 569, 169 FERC ¶ 61,129 (2019).
[2] In the most recent Spire Missouri general rate case, Case No. GR-2021-0108, the Commission set the authorized ROE at 9.37% for ratemaking purposes.
[3] COE is the return required by investors; ROE is the return set by a regulatory utility commission. Although some experts contend that COE and ROE are synonymous, Staff's position is that they need not be. Observed utility COEs have been generally significantly lower than ROEs in recent years.
[4] Federal Reserve Economic Data, retrieved October 20, 2022, https://fred.stlouisfed.org/series/VIXCLS.
[5] Bureau of Economic Analysis, U.S. Department of Commerce, retrieved October 12, 2022, https://www.bea.gov/news/2022/gross-domestic-product-first-quarter-2022-advance-estimate.
[6] S&P Global, Markets in Motion, retrieved October 12, 2022, https://www.spglobal.com/en/research-insights/featured/inflation.
[7] Hartford Funds, Insight, Which Equity Sectors Can Combat Higher Inflation?, retrieved October 20, 2022, https://www.hartfordfunds.com/dam/en/docs/pub/whitepapers/WP597.pdf.

driven by increases in the cost of energy, mainly due to a 98% increase in fuel oil prices.[8] On June 15, 2022, the Federal Reserve ("Fed") stated that "Inflation remains elevated, reflecting supply and demand imbalances related to the pandemic, higher energy prices, and broader price pressures. The invasion of Ukraine by Russia is causing tremendous human and economic hardship. The invasion and related events are creating additional upward pressure on inflation and are weighing on global economic activity. In addition, COVID-related lockdowns in China are likely to exacerbate supply chain disruptions."[9] In support of its goals of achieving maximum employment and returning inflation to a rate of two percent over the longer run, the Federal Open Market Committee ("FOMC") raised the target range for the federal funds rate to 3.00% – 3.25% and anticipates that ongoing increases in the target range will be appropriate.[10]

Q. Please summarize the result of your comparative COE analysis and recommended ROR.

A. In the *Amended Report and Order* of the 2021 Spire Case issued on November 12, 2021, the Commission found that a 9.37% ROE was fair and reasonable for calculating the revenue requirement for Spire Missouri.[11] For the current rate case, Staff recommends that the Commission set MAWC's authorized ROE at 9.73%, the midpoint of

[8] Bureau of Labor Statistics, Consumer Price Index News Release, published July 13, 2022 and retrieved October 12, 2022, https://www.bls.gov/news.release/archives/cpi_07132022.htm.
[9] Federal Reserve issues Federal Open Market Committee (FOMC) statement, published June 15, 2022, and, retrieved September 21, 2022, https://www.federalreserve.gov/newsevents/pressreleases/monetary20220615a.htm.
[10] Federal Reserve issues Federal Open Market Committee (FOMC) statement, published September 21, 2022, and, retrieved October 20, 2022, https://www.federalreserve.gov/newsevents/pressreleases/monetary20220921a.htm.
[11] On page 97, *Amended Report and Order* issued November 12, 2021, in Case No. GR-2021-0108.

a reasonable range of 9.48% and 9.98%.[12] Staff considered the current high inflation rate and the expected rise in interest rates in making these recommendations. Staff's recommended authorized ROE is based on water utilities' COE estimates rising by approximately 46 basis points since the period of the 2021 Spire Case.[13] Staff's recommendation of a 9.73% authorized ROE will fairly compensate MAWC for its current market COE and balance the interests of all stakeholders, particularly considering that the current market COE estimates for MAWC are presently in the range of 9.48% to 9.98%.[14]

Staff also recommends that the Commission use MAWC's parent company AWWC's consolidated capital structure of 40.71% common equity, 0.02% preferred stock, and 59.28% long-term debt as of June 30, 2022, for purposes of setting MAWC's ROR in this proceeding.[15] Among other reasons, AWWC's capital structure is the appropriate capital structure for use in this proceeding because MAWC is not publicly traded and is almost entirely dependent upon AWWC through American Water Capital Corporation ("AWCC") for financing despite the fact that MAWC's debt is secured by its own assets and not the assets of its parent company, AWWC, or any of AWWC's other subsidiaries.[16] Additionally, MAWC does not have a stand-alone capital structure to support its own bond rating.[17] Consistent with Staff's capital structure recommendation, Staff also recommends at this time that the Commission use AWWC's cost of debt value of ** [redacted] **, resulting in the overall midpoint ROR of 6.38%, taken from the calculated range of 6.28% to 6.48%.[18]

[12] Schedule RTJ-d16, Jennings' Direct Testimony.
[13] Schedule RTJ-d15, Jennings' Direct Testimony.
[14] Schedule RTJ-d16, Jennings' Direct Testimony.
[15] Schedule RTJ-d6, Jennings' Direct Testimony.
[16] Staff's Data Request No. 0061.
[17] S&P Capital IQ Pro.
[18] Schedule RTJ-d16, Jennings' Direct Testimony.

Q. Please explain how your direct testimony is organized.

A. Staff's testimony is organized into five sections. First, Staff discusses the applicable regulatory principles concerning cost of capital and ROR analysis that supports the just and reasonable rates for MAWC's water and wastewater utility services. Second, Staff reviews the current economic environment and capital market conditions. Third, Staff presents the corporate analysis of MAWC and its parent company's business profile and credit ratings. Fourth, Staff explains its cost of capital and ROR analysis using AWWC's capital structure. Fifth, Staff concludes with a presentation of Staff's recommended ROE, cost of debt, and capital structure for calculating MAWC's allowed ROR for ratemaking purposes.

II. REGULATORY PRINCIPLES

Q. Please describe the regulatory principles that guide the determination of a just and reasonable ROR for a regulated utility.

A. The determination of a fair ROR is guided by principles of economic and financial theory, as well as by certain minimum Constitutional standards. Investor-owned public utilities, such as MAWC, are private property that the state may not confiscate without appropriate compensation. The United States Supreme Court has described the minimum characteristics of a Constitutionally-acceptable ROR in two frequently-cited cases: *Bluefield Waterworks & Improvement Co. v. Public Service Commission of West Virginia* and *Federal Power Commission v. Hope Natural Gas Co.*[19]

[19] *Bluefield Waterworks & Improvement Co. v. Public Service Commission of West Virginia,* 262 U.S. 679, 43 S.Ct. 675, 67 L.Ed. 1176 (1923); *Federal Power Commission v. Hope Natural Gas Co.*, 320 U.S. 591, 64 S.Ct. 281, 88 L.Ed. 333 (1944).

From these two decisions, Staff derives and applies the following principles to guide it in recommending a just and reasonable ROR:

1. A return consistent with returns on investments of comparable risk;
2. A return that allows the utility to attract capital on reasonable terms; and
3. A return sufficient to assure confidence in the utility's financial integrity.

Embodied in these three principles is the economic theory of the opportunity cost of investment. The opportunity cost of investment is the return that investors forego in order to invest in similar risk investment opportunities that vary depending on market and business conditions.

Methodologies of financial analysis have advanced greatly since the *Bluefield* and *Hope* decisions.[20] Additionally, today's utilities compete for capital in a global market rather than a local market. Nonetheless, the parameters defined in those cases are readily met using current methods and theory. The principle of commensurate return is based on the concept of risk. Financial theory holds that the return an investor may expect is reflective of the degree of risk inherent in the investment; risk being a measure of the likelihood that an investment will not perform as expected by that investor. Any line of business carries with it its own risks, and it follows, therefore, that the return MAWC's shareholders may expect is equal to that required by shareholders of comparable-risk utility companies.

Q. How does Staff estimate a just and reasonable authorized ROE regarding commensurate return and comparable-risk?

[20] Neither the Discounted Cash Flow ("DCF") nor the Capital Asset Pricing Model ("CAPM") methods were in use when those decisions were issued.

A. Staff employed a comparative COE analysis for authorized ROE estimation. COE is a market-determined, minimum return investors are willing to accept for their investment in a company, compared to returns on other available investments. Using market data, COE can be directly estimated. An authorized ROE, on the other hand, is a Commission-determined return granted to monopoly industries, allowing them the opportunity to earn just and reasonable compensation for their investments in the rate base. Stock market data cannot directly determine an authorized ROE. However, Staff can estimate a just and reasonable authorized ROE anticipated by the financial market by using a previous Commission-determined ROE and changes in estimated COEs over different periods of time that are measured for a comparable group of companies having similar risks.

Q. What are Staff's conclusions regarding the regulatory principles that guide the determination of a just and reasonable ROE in this proceeding?

A. Staff relied primarily on the analysis of a comparable group of companies to estimate the COE for MAWC, applying this comparable-company approach through the use of both the DCF method and the CAPM analysis. Properly used and applied in appropriate circumstances, both the DCF and the CAPM can provide accurate estimates of utilities' COE. It is a well-accepted economic theory that a company that earns its cost of capital will be able to attract capital and maintain its financial integrity. Therefore, Staff's recommendation of an authorized ROE, based on a COE derived from the comparison of peer companies, is consistent with the principles set forth in *Bluefield* and *Hope*.

continued on next page

III. MARKET CONDITIONS

Q. Why is consideration of economic and capital market conditions important for ROE analysis?

A. Determining whether a cost of capital estimate is just and reasonable requires a good understanding of current economic and capital market conditions, with the former having a significant impact on the latter. In the comparative COE analysis, input values for COE estimate models change from the former time-period to the latter time-period to reflect the current economic and capital market conditions. With this in mind, Staff emphasizes that an estimate of a utility's COE, which ultimately has a direct effect on an authorized ROE recommendation, should pass the "common sense" test when considering the broader current economic and capital market conditions.

1. Economic Condition

Q. Please summarize the current economic conditions regarding COE.

A. After recovering in 2021 from the COVID-19 pandemic recession, economic activity edged down during the first and second quarters of 2022.[21] Recent indicators point to modest growth in spending and production, continuing job gains and the unemployment rate remaining low. The invasion of Ukraine by Russia and its related events are creating upward pressure on inflation and are weighing on global economic activity. Additionally, COVID-19-related lockdowns in China are likely to exacerbate supply chain

[21] Bureau of Economic Analysis, Gross Domestic Product, Second Quarter 2022, Retrieved August 1, 2022, https://www.bea.gov/news/2022/gross-domestic-product-second-quarter-2022-advance-estimate.

disruptions.[22] The exact impact of these issues on the U.S. economy is uncertain. On November 2, 2022, the FOMC decided to raise the target range for the federal funds rate to between 3.75% and 4.00%.[23] During the FOMC meeting, the participants assessed appropriate monetary policy and determined the target level for the federal funds rate. In assessing the appropriate stance of monetary policy, the FOMC will continue to monitor the implications of incoming information for the economic outlook and that assessment will take into account a wide range of information including readings on the public health, labor market conditions, inflation pressures and inflation expectations, and financial and international developments.[24] The Fed anticipates that ongoing increases to the target range will be appropriate in order to attain a stance of monetary policy that is sufficiently restrictive to return inflation to 2 percent over time and they will continue to reduce its holdings of Treasury securities and agency debt and agency mortgage-backed securities as described in its plans issued in May, 2022.[25]

The price investors are willing to pay for a share of stock includes the expectation of high inflation and potential increases to the federal funds rate and has already been factored in since the beginning of 2021.[26] This means that lower real returns from investments are already reflected in the current financial market. Therefore, high inflation rates do not necessarily mean a higher cost of capital than presently reflected.

Q. Please explain the current economic conditions using economic indicators.

[22] Federal Reserve issues Federal Open Market Committee (FOMC) Statement, published September 21, 2022, https://www.federalreserve.gov/newsevents/pressreleases/monetary20220921a.htm.
[23] Federal Reserve issues Federal Open Market Committee (FOMC) Statement, published November 2, 2022, https://www.federalreserve.gov/newsevents/pressreleases/monetary20221102a.htm.
[24] Ibid.
[25] Ibid.
[26] Forbes, Jonathan Ponciano, Here's The Biggest Risk For The Stock Market This Year, According To Morgan Stanley Experts, Published January 4, 2021, retrieved October 20, 2022, https://www.forbes.com/sites/jonathanponciano/2021/01/04/biggest-risk-for-stock-market-this-year/?sh=31bfed21f80e.

A Since 2020, the economy has experienced enormous volatility. Real GDP fell by 32.9% in the second quarter of 2020, after a 5% decline in the first quarter.[27] The third and fourth quarters of 2020 saw real GDP increase by 33.4% and 4.3%, respectively.[28] Subsequently, the first, second, third, and fourth quarters of 2021 had corresponding real GDP growth rates of 6.3%, 6.7%, 2.3%, and 6.9%. Real GDP decreased at an annual rate of 1.4% and 0.9% in the first and second quarters of 2022, respectively.[29] In July 2022, the Congressional Budget Office ("CBO") projected growth rates for real GDP of 1.9% and real potential GDP of 1.8% over the next decade.[30] The CBO also projected a long-term nominal GDP growth rate of 4.40%,[31] up from the 4.20%[32] it previously projected in March 2021.

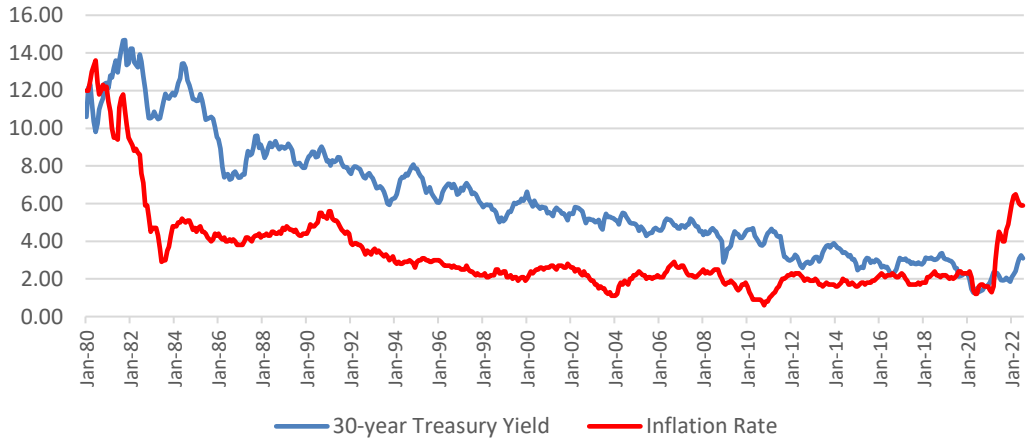
Regarding COVID-19, there has been an increased availability of vaccines, increased vaccination rates, and in March 2022, the Fed gave assurances that indicators of economic activity and employment continued to strengthen.[33] During economic recovery, utilities tend to underperform the broader market, which, consequently, pushes the COE for utilities higher. In July 2022, the Fed stated "inflation remains elevated, reflecting supply and demand imbalances related to the pandemic, higher food and energy prices and broader price pressures."[34] Compounded by the current fears of continued rising inflation, the share prices

[27] Percentage change from the preceding quarter.
[28] Bureau of Economic Analysis, retrieved October 20, 2022, https://www.bea.gov/news/2021/gross-domestic-product-first-quarter-2021-advance-estimate.
[29] Bureau of Economic Analysis, Gross Domestic Product, Second Quarter 2022, Retrieved October 20, 2022, https://www.bea.gov/news/2022/gross-domestic-product-second-quarter-2022-advance-estimate.
[30] Congressional Budget Office, The 2022 Long-Term Budget Outlook, Figure B-1, page 40, https://www.cbo.gov/system/files/2022-07/57971-LTBO.pdf.
[31] Ibid.
[32] The 2021 Long-Term Budget Outlook (cbo.gov), page 34, https://www.cbo.gov/system/files/2021-03/56977-LTBO-2021.pdf.
[33] Federal Reserve, Press Release, March 16, 2022, https://www.federalreserve.gov/monetarypolicy/files/monetary20220316a1.pdf.
[34] Federal Reserve issues Federal Open Market Committee (FOMC) Statement, published July 27, 2022, https://www.federalreserve.gov/newsevents/pressreleases/monetary20220727a.htm.

of water utility equities are currently depressed in comparison to prices seen in 2021, causing dividend yields to be increased and COEs to be elevated.[35] All else being equal, high inflation expectations lead to higher interest rates.

With the COVID-19 pandemic causing widespread economic shutdown and pushing interest rates higher, the Fed intervened in March 2020 to cut the federal discount rate to a range of 0% to 0.25%.[36] In June 2022, to fight inflation, the Fed increased the target for the federal funds rate for the third time in 2022 to a range of 1.50% to 1.75%. At the time, it was the largest single rate hike since 1994. The Fed also anticipated that ongoing increases in the target range would be appropriate.[37] The Fed also stated it would continue reducing its holdings of Treasury securities and agency debt and agency mortgage-backed securities.[38]

Figure 1. 30-Year Treasury yield and Inflation Rate 1980-2022[39]



[35] Figure 2, Jennings' Direct Testimony.
[36] Federal Reserve, Press Release, March 15, 2020, https://www.federalreserve.gov/monetarypolicy/files/monetary20200315a1.pdf.
[37] Federal Reserve Board - Federal Reserve issues FOMC statement, published June 15, 2022, https://www.federalreserve.gov/newsevents/pressreleases/monetary20220615a.htm.
[38] Ibid.
[39] Jennings' Direct Workpaper.

Figure 1 compares 30-Year Treasury yields and the U.S. inflation rate from January 1980 through June 2022. The effects of the COVID-19 pandemic and high inflation fears have increased market risk and, consequently, pushed utilities' COEs higher. The aggregate effect of the Fed's actions was an incline in 30-Year Treasury yields from 1.69% on December 3, 2021, to a high of 3.45% on June 14, 2022.[40] With interest rates expected to continue rising, it is reasonable to expect utilities' COEs to remain elevated in near future. However, this expectation may not be true and is dependent on other economic and financial conditions. As shown in Figure 1, there is no perfectly positive correlation between inflation rates and 30-Year Treasury yields.

The Fed has a dual mandate: maximum employment and stable prices.[41] In June 2022, the unemployment rate (3.6%) was higher than the pre-pandemic level (3.5%) from February 2020.[42] In the FOMC meeting held on June 14-15, 2022, the Fed's growth forecast indicated policy makers expected the U.S. economy to grow by 1.7% and unemployment to rise to 3.7% by year-end.[43] Currently, U.S. economic conditions, including higher inflation and interest rates as discussed in this testimony, indicate a higher COE than the 2021 Spire Case.

2. Capital Market Conditions

Q. Why is the consideration of capital market conditions important for COE analyses?

[40] Federal Reserve Economic Data, Market Yield on U.S. Treasury Securities at 30-Year Constant Maturity, https://fred.stlouisfed.org/series/DGS30.
[41] Fed, What economic goals does the Federal Reserve seek to achieve through its monetary policy? https://www.federalreserve.gov/faqs/what-economic-goals-does-federal-reserve-seek-to-achieve-through-monetary-policy.htm.
[42] Bureau of Labor Statistics Data (bls.gov), https://data.bls.gov/timeseries/LNS14000000.
[43] Fed, Summary of Economic Projections, published June 15, 2022, https://www.federalreserve.gov/monetarypolicy/files/fomcprojtabl20220615.pdf.

A. The capital market conditions are important to estimating COE because they have a direct impact on input values of COE models. A utility company's cost of capital reflects its mix of equity and debt financing, so it is affected by the equity and debt markets. For example, equity market conditions have a direct impact on input values such as dividend yields in the DCF model, and debt market conditions directly affect the input values such as the risk-free rate of 30-Year Treasury bond yields in the CAPM method.

2.1 Utility Equity Market

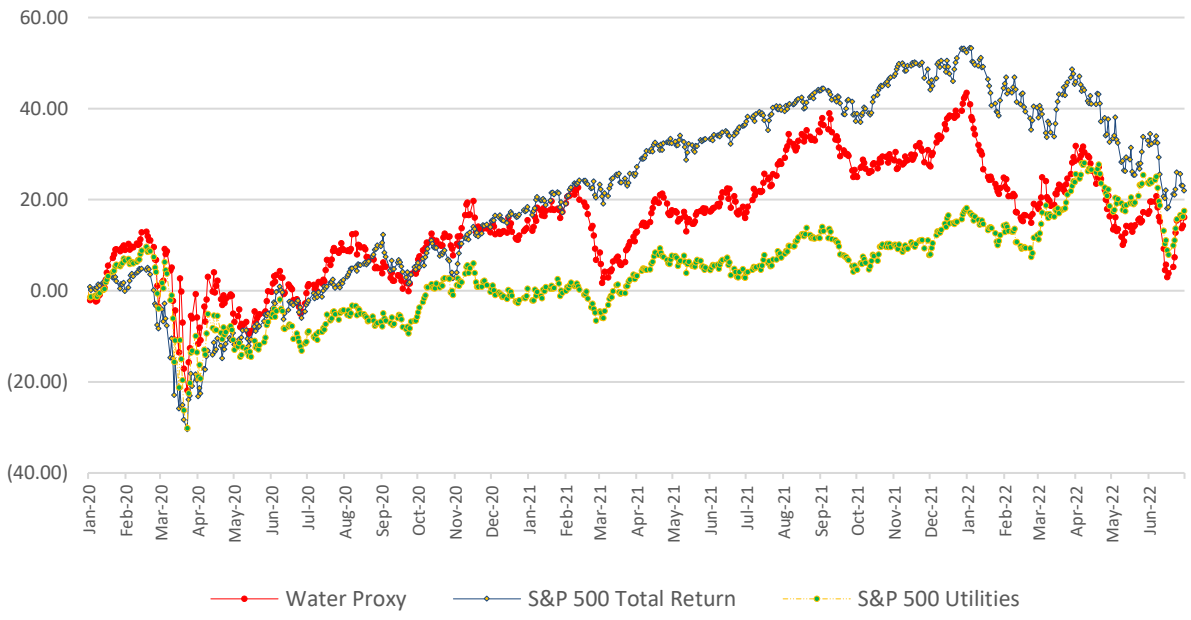
Q. Please explain the current utility equity market conditions.

A. After the 2020 stock market crash caused by the COVID-19 pandemic, the utilities sector underperformed the broader market. At the onset of the economic shutdown in March 2020, the index-value of the Standard and Poor's ("S&P") 500 and the Dow Jones Industrial Average fell approximately 12.5% and 13.74%, respectively.[44] Figure 2 shows the volatility experienced by the stock market since January 2020:

continued on next page

[44] S&P Capital IQ Pro.

Figure 2. Total Return 2020-2022[45]



The total return of the water utility proxy group decreased from the point of reference on January 2, 2020, to an approximate loss of twenty percent (-20%) in March 2020, only to rebound to a gain of approximately forty percent (40%) by January 3, 2022 over the point of reference on January 2, 2020. Subsequently, the proxy group's total return lowered to approximately sixteen percent (16%) on June 30, 2022. A detailed analysis of the performance of the equity market since January 2020 reveals tremendous volatility. As shown in Figure 2, from March 2021 to January 2022 the S&P 500 and Staff's proxy group outperformed the S&P 500 Utilities. In Q1 2022, the S&P 500 and Staff's proxy group both performed better than the S&P 500 Utilities but the spread between each of the three diminished. By the end of

[45] Jennings' Direct Workpaper.

Q2 2022 the S&P 500, S&P 500 Utilities, and Staff's proxy group were following similar trends and, as of June 30, 2022, had returns of 21.97%, 17.58%, and 16.18%, respectively.

The average stock price of Staff's water utility proxy group was higher in Q2 2022 than in Q1 2021 when Staff presented testimony for the 2021 Spire Case.[46] Staff also analyzed projected growth rates, another variable that can cause changes in COE. The average projected growth rate for Staff's proxy group decreased from 6.58% to 6.50% from the period of Q1 2021 to Q2 2022, respectively.[47] Higher stock prices and lower projected growth rates both indicate a lower COE.

Q. Please explain how current utility equity market conditions affect the DCF COE estimation.

A. The combined effect of the utility sector's incline in 2022 after its unusual decline in 2020 and subsequent sluggish recovery is that the utility sector has been relatively undervalued since the COVID-19 recession. The average stock price for Staff's proxy group of companies was $80.93 in Q2 2022 compared to $78.64 in Q1 2021.[48] Inclining stock prices, all else remaining the same, means a decreasing COE.[49] The net effect of the changes in stock prices, dividend yields, and projected growth rates indicates the DCF COE estimate decreased by approximately 11 basis points since Staff conducted its analysis for the 2021 Spire Case.[50] However, only considering the equity market and using only the DCF model is not sufficient to estimate a proper COE. To recommend a just and reasonable authorized ROE for the purpose of ratemaking for MAWC in this proceeding under a rising interest rate environment, Staff

[46] Wall Street Journal; Average Monthly Highest and Lowest.
[47] Schedule RTJ-d11, Jennings' Direct Testimony.
[48] Schedule RTJ-d12, Jennings' Direct Testimony.
[49] In the DCF COE model, inclining stock prices, all else being equal, leads to lower dividend yields. Dividend yields are a component of COE.
[50] Schedule RTJ-d13, Jennings' Direct Testimony.

also considered other factors like the utility debt market and utilized a CAPM COE comparative analysis.

2.2 Utility Debt Market

Q. Please explain the current utility debt market conditions.

A. The utility debt market has not been stable in terms of bond yield changes. Average public utility bond yields fell from 4.48% in January 2019, to 2.76% in August 2020.[51] This downward trend in public utility bond yields reversed after the Fed started its Treasury bond-buying activity.[52] In June 2022 the Fed decided to raise the target range for the federal funds rate to between 1.50% and 1.75%.[53] Compared to the yield in August 2020, public utility bond yields rose by 215 basis points to 4.91% in June 2022.[54] The changes in public utility bond yields mirrored the changes in the 30-Year Treasury bond yields. With a few exceptions, 30-Year Treasury bond yields have historically been positively correlated with public utility bond yields.[55] The biggest factor currently driving interest rates is the fear of continued higher inflation. The Fed clearly stated the FOMC is strongly committed to returning inflation to its 2% objective,[56] and projected continued increase in the federal fund rate until the middle of 2023.[57]

[51] Schedule RTJ-d4-1, Jennings' Direct Testimony.
[52] Brookings, The Hutchins Center Explains, https://www.brookings.edu/research/fed-response-to-covid19/.
[53] Federal Reserve Board - Federal Reserve issues FOMC Statement, published June 15, 2022, https://www.federalreserve.gov/newsevents/pressreleases/monetary20220615a.htm.
[54] Schedule RTJ-d4-1, Jennings' Direct Testimony.
[55] Schedule RTJ-d4-3, Jennings' Direct Testimony.
[56] Federal Reserve issues Federal Open Market Committee (FOMC) Statement, published September 21, 2022, https://www.federalreserve.gov/newsevents/pressreleases/monetary20220921a.htm.
[57] Figure 5, Summary of Economic Projections, published September 21, 2022, https://www.federalreserve.gov/monetarypolicy/files/fomcprojtabl20220921.pdf.

Q. Have the utility debt market conditions changed since the Commission last ordered an authorized ROE in the 2021 Spire Case?

A. Yes. Since the Commission last ordered an authorized ROE of 9.37% in the 2021 Spire Case,[58] the 30-Year Treasury bond yield increased 97 basis points from 2.07% in Q1 2021 to 3.04% in Q2 2022.[59] Average public utility bond yields increased 150 basis points from 3.18% in Q1 2021 to 4.68% in Q2 2022.[60] The average A and Baa public utility bond yields increased from 3.15% and 3.42% in Q1 2021 to 4.64% and 4.97% in Q2 2022, respectively.[61]

Q. Are the changed utility debt market conditions reflected in Staff's COE analysis in this case?

A. Yes. Staff's comparative COE analysis covers the two periods of Q1 2021 and Q2 2022. Q1 2021 is the measurement period used to derive the last ordered authorized ROE from the Commission in Case No. GR-2021-0108 for Spire Missouri. For the current rate case, Staff compared the average utility bond yields for the three-month period of January, February, and March 2021 to the three-month period of April, May, and June 2022. The three-month average utility bond yield was 3.18% in the 2021 Spire Case compared to 4.68% in the current rate case, an increase of 150 basis points.[62]

Q. Is there a correlation between utility debt yields and stock prices?

A. Although utilities' COEs are not perfectly correlated to changes in utility debt yields, it is widely recognized in the investment community that regulated utility stocks are a

[58] On page 97, *Amended Report and Order* issued November 12, 2021, in Case No. GR-2021-0108.
[59] Schedule RTJ-d4-2, Jennings' Direct Testimony.
[60] Schedule RTJ-d4-1, Jennings' Direct Testimony.
[61] Schedule RTJ-d4-5, Jennings' Direct Testimony.
[62] Schedule RTJ-d4-1, Jennings' Direct Testimony.

close alternative to bond investments and, therefore, the two values are highly correlated over time. In general, as interest rates increase, utility stock prices decrease, pushing COE up as investors substitute stocks with bonds in search for higher yields.[63] However, as explained above, the average stock price for the water utility proxy group has increased since the 2021 Spire Case.

Q. Please explain how the current utility debt market conditions affect COE estimation.

A. In the past, interest rates were typically the main driver of COE change. Lower interest rates would normally mean lower COEs, all other things being equal. Currently, we see higher COEs based upon expected higher interest rates. Staff compared interest rates during the 2021 Spire Case measurement period (Q1 2021) to the current MAWC rate case measurement period (Q2 2022) and noticed that prime interest rates increased by about 0.69% or 69 basis points.[64]

The combined net result of the increase in interest rates and the changes in overall market conditions is an increase in COE since the 2021 Spire Case. Staff's COE estimates of the water proxy group have also increased since the 2021 Spire Case. The current COE, as estimated by the DCF and CAPM, rose by 46 basis points over the earlier data point of the 2021 Spire Case.[65]

[63] Forbes Advisor, How To Invest When Interest Rates Are Low, Updated: Apr 15, 2022 and retrieved October 20, 2022, https://www.forbes.com/advisor/investing/low-interest-rates/#:~:text=While%20bond%20prices%20are%20directly%20affected%20by%20interest,mean%20companies%20may%20borrow%20less%20to%20fund%20growth.
[64] Fed, http://research.stlouisfed.org/fred2/data/MPRIME.txt. Average prime interest rates for Q1 2021 and Q2 2022. The average of prime interest rate for Q1 2021 was 3.25%. The average of prime interest rate for Q2 2022 was 3.94%. (3.94% - 3.25% = 0.69%).
[65] Schedule RTJ-d15, Jennings' Direct Testimony.

Staff is cautious in using the CAPM model. The current CAPM COE estimate could be upward biased because of rapid interest rate increases by the Fed due to uncommon economic conditions and the Fed's efforts to bring inflation under control. Because of these rises in interest rates, there may be corresponding increases in the risk-free rate, a key component in the CAPM analysis.

IV. CORPORATE ANALYSIS

Q. Please provide the corporate profile of MAWC.

A. MAWC provides water and wastewater services to residential customers in Missouri. MAWC was formerly known as The Saint Joseph Water Company and changed its name to MAWC in December 1983.[66] The Saint Joseph Water Company, headquartered in Saint Louis, Missouri was incorporated in 1879. As of August 31, 1993, MAWC has operated as a subsidiary of AWWC. MAWC does not have any published independent ratings from the major credit agencies. As of June 30, 2022, MAWC provides water and wastewater service to 474,973 and 17,809 customers respectively, all in Missouri.[67]

Q. Please provide the corporate profile of AWWC.

A. The following summary from AWWC's Form 10-K filing with the United States Securities and Exchange Commission ("SEC") in February 2022 provides a good description of AWWC's current business operations and current organizational structure:

> American Water is the largest and most geographically diverse, publicly-traded water and wastewater utility company in the United States, as measured by both operating revenues and population served. The Company employs approximately 6,400 professionals who provide drinking water, wastewater and other related services to over 14 million

[66] S&P Intelligence IQ Pro.
[67] Staff's Data Request No. 0023.

> people in 24 states. The Company's primary business involves the ownership of utilities that provide water and wastewater services to residential, commercial, industrial, public authority, fire service and sale for resale customers, collectively presented as the "Regulated Businesses." The Company's utilities operate in approximately 1,700 communities in 14 states in the United States, with 3.4 million active customers with services provided by its water and wastewater networks. Services provided by the Company's utilities are subject to regulation by PUCs. The Company also operates other market-based businesses that provide water, wastewater and other services to residential and smaller commercial customers, the U.S. government on military installations, as well as municipalities and utility customers, collectively presented as the "Market-Based Businesses." These Market-Based Businesses are not subject to economic regulation by state PUCs.[68]

AWWC, formerly known as American Water Works & Guarantee Company (founded in 1886), reorganized and changed its name in 1947 to AWWC.[69] Per the AWWC corporate website, as of the first quarter of this year, AWWC has 7,100 employees to provide services to more than 14 million people in 46 states.

Q. What are the credit ratings for MAWC, AWCC, and AWWC?

A. MAWC does not have a public credit rating as a stand-alone entity. MAWC has obtained Private Monitored Unsecured Credit Ratings of ** [redacted] ** and ** [redacted] **, from Moody's and S&P, respectively.[70] These ratings are higher than or equal to water utilities' average bond ratings 'Baa1' and 'A' characterized by Moody's and S&P, respectively.[71]

AWWC and AWCC are currently rated by Moody's and S&P. The corporate credit ratings publicly assigned to both AWWC and AWCC by Moody's and S&P are 'Baa1' and 'A', respectively.[72] Although AWWC and AWCC are assigned individual credit ratings, because

[68] February 16, 2022 10-K Filing, United States Securities and Exchange Commission; https://www.sec.gov/ix?doc=/Archives/edgar/data/0001410636/000141063622000048/awk-20211231.htm
[69] American Water Works Company website; https://www.amwater.com/corp/faqs.
[70] Staff's Data Request No. 0057.
[71] S&P Capital IQ Pro, retrieved September 12, 2022; https://www.capitaliq.spglobal.com.
[72] S&P Capital IQ Pro, retrieved August 31, 2022; https://www.capitaliq.spglobal.com.

AWCC's purpose is to manage and issue financing for AWWC, Staff understands that the credit quality of AWCC is based on AWWC's consolidated credit quality.

AWCC is a wholly-owned subsidiary of AWWC that was created for the special purpose of serving as the primary funding vehicle for AWWC and its subsidiaries. AWCC issues debt financing, which in turn loans those proceeds to AWWC subsidiaries through internal loan agreements. MAWC is dependent upon its loan agreements with AWCC for the majority of MAWC's debt financing.[73]

Because MAWC's credit rating is not publicly available, and it is a wholly-owned subsidiary of AWWC, and it is primarily dependent upon AWCC (which is dependent upon AWWC's consolidated credit quality) for debt financing, MAWC is effectively dependent upon AWWC's consolidated credit rating.

V. CAPITAL STRUCTURE

Q. What issues did Staff consider to determine its capital structure for MAWC?

A. Staff first considered which capital structure should be used for the purpose of ratemaking in this proceeding: the parent company AWWC's consolidated capital structure or the operation company MAWC's standalone capital structure. Second, Staff considered whether to use an actual current capital structure or a hypothetical or targeted future capital structure. For a proper recommendation on these issues, Staff reviewed the financial relationship between AWWC and MAWC and both companies' historical, current, and targeted capital structures.

[73] Staff's Data Request No. 0040.

Q. What has been Staff's recommendation regarding MAWC's capital structures used for the purpose of ratemaking in previous general rate cases?

A. In MAWC's last three general rate cases, Case Nos. WR-2020-0344, WR-2017-0285, and WR-2015-0301, Staff has consistently recommended the Commission use AWWC's capital structure for MAWC's ratemaking capital structure.

Q. Have there been any significant changes in MAWC's capital structure that should alter Staff's recommendation of using AWWC's capital structure instead of MAWC's capital structure for the purpose of ratemaking?

A. There has not been any discernible change to MAWC's or AWWC's capital structure policy since the last rate case to cause Staff to change its recommendation. Staff offers the following reasons for recommending AWWC's capital structure be used to set MAWC's authorized ROR:

First, MAWC does not operate as an independent entity, at least when considering MAWC's procurement of financing and the cost of that financing. For example, MAWC has a Financial Services Agreement with AWCC through which AWCC arranges short-term borrowings and performs cash management for MAWC.[74] Under the cash management program, operating cash surpluses and deficits of each participating AWWC affiliate are lent to or borrowed from AWCC on a daily basis, showing heavy integration of MAWC's financial management with AWWC's other operations. While MAWC has accessed the capital markets directly in the past by issuing tax-advantaged bonds through the State Environmental Improvement and Energy Resources Authority, MAWC has not done so for over a decade.

[74] See Financial Service Agreement, attached as Appendix 2 to MAWC's Application filed in Case No. WF-2002-1096.

AWCC has been the primary source of long-term and short-term debt financing for MAWC and this appears to continue to be the case. As of June 30, 2022, more than 97 percent of the long-term debt issued since January 1, 2020, shown on MAWC's balance sheet was obtained by means of debt issuances by AWCC.[75]

Second, MAWC's stand-alone capital structure does not support its own public credit rating.[76] MAWC has obtained Private Monitored Unsecured Credit Ratings from Moody's and S&P.[77] Debt issued by AWCC is rated by credit rating agencies based on the consolidated credit quality of AWWC. Therefore, the cost of any debt that MAWC receives from AWCC is based on the consolidated creditworthiness of AWWC (i.e. the business risk and financial risk associated with AWWC's consolidated operations).

Third, AWWC is primarily a regulated water distribution utility, meaning the business risks of AWWC are similar to those of MAWC in terms of sector risk. If the business risks of the parent company are similar to those of the subsidiary, then each entity should be able to incur similar amounts of financial risk. Presumably, this should cause their capital structures to be fairly similar. Because AWWC's consolidated operations drives the cost of debt and equity capital, AWWC's capital structure is the capital structure that will be analyzed by investors when determining the required ROR for debt issued by AWCC and equity issued by AWWC. AWWC's SEC Form 10-K filings indicate that AWWC's debt percentage in its capital structure has continued to remain approximately 59% from 2020 to 2021 and has remained at approximately the same level through June 30, 2022.[78] In

[75] Staff's Data Request Nos. 0052 and No. 0053.1.
[76] S&P Capital IQ Pro.
[77] Staff's Data Request No. 0057.
[78] Schedule RTJ-d5-2, Jennings' Direct Testimony.

contrast, MAWC reported approximately 47.7% debt in its capital structure from 2020 to 2021, and has averaged approximately 48.2% debt through the first two quarters of 2022.[79] Not only would it be unreasonable and inappropriate to use MAWC's standalone capital structure to set MAWC's ROR, it would be more costly for ratepayers because of the higher equity ratio in MAWC's capital structure.

Fourth, due to diversified equity investments in subsidiaries, it is reasonable to assume that AWWC can take on greater leverage than MAWC because of its lesser financial and business risk. Staff notes that it is not always appropriate to use the parent company's cost of common equity if the parent company's risk profile is significantly different from that of its regulated subsidiaries.

Finally, it appears that all debt issued by AWCC and loaned to MAWC is essentially guaranteed by AWWC.[80] Although there are internal loan documents between MAWC and AWCC, the ultimate responsibility for the payment of the debt service on the debt through AWCC rests with AWWC. The subsidiary's use of debt financing backed by the parent supports Staff's recommendation to use AWWC's consolidated capital structure.

Q. Please explain the financial relationship between AWWC and MAWC regarding capital structure for the purpose of ratemaking in this proceeding.

A. MAWC does not operate as a financially independent entity, when considering MAWC's procurement of financing and the cost of that financing. AWWC, through its subsidiary, AWCC, has been the primary source of long-term financing for MAWC and this continues to be the case.[81] As of June 30, 2022, 97.8% of MAWC's long-term debt issued

[79] Ibid.
[80] Staff's Data Request No. 0040.3.
[81] Staff's Data Request No. 0040.

since January 1, 2020, was received by means of debt issuances by AWCC. The remaining 2.2% of long-term debt was obtained by MAWC through the Missouri Department of Natural Resources, funded by Drinking Water Refunding Revenue Bonds (State Revolving Funds Program).[82]

MAWC has also received equity infusions directly from AWWC.[83] AWWC assets do not secure MAWC debt and MAWC assets do not secure AWWC debts.[84] The MAWC Board of Directors is responsible for final financing decisions involving MAWC.

In addition, AWWC's unregulated operations contributed approximately 14% of its consolidated operating revenues in the years 2019 through 2021.[85] In comparison, in the 2021 Spire Case, in which Spire Missouri's independent capital structure was used, Spire Inc.'s unregulated operations contributed approximately 5% of the parent company's revenue. AWWC's unregulated operations contribute almost three times as much revenue as Spire Inc's. Whether or not the parent company is diversified into non-utility operations, is a factor to consider when determining which capital structure should be used.[86]

Q. Have MAWC and AWWC indicated to Staff that they would target specific capital structures in the future?

A. Yes. MAWC periodically monitors the capital structures of peer companies and maintains a consistent equity ratio above 50%.[87] In addition, AWWC's investor

[82] Staff's Data Request Nos. 0052 and No. 0053.
[83] Staff's Data Request No. 0058.
[84] Staff's Data Request No. 0061.
[85] Staff's Data Request No. 0063.
[86] The Cost of Capital – A Practitioner's Guide by David C. Parcell.
[87] Staff's Data Request No. 0044.

presentation showed its long-term target equity ratio to be greater than or equal to 40% for its capital structure.[88]

Q. What are the actual capital structures of MAWC and AWWC?

A. MAWC's capital structure as of June 30, 2022 is approximately 49.86% common equity and 50.14% long-term debt, while AWWC's capital structure consists of approximately 40.71% common equity, 0.02% preferred stock, and 59.28% long-term debt.[89] Table 1 below shows the average capital structures of MAWC and AWWC for Q4 2021 through Q2 2022 subsequent to the last MAWC rate case (Case No. WR-2020-0344). As seen in Table 1, the average equity ratios for Q4 2021 through Q2 2022 were approximately 51.80% and 41.32% for MAWC and AWWC, respectively:

Table 1. Comparison Average Capital Structure Q4 2021 – Q2 2022[90]

	MAWC	AWWC
Common Equity	51.80%	41.32%
Preferred Stock	0.00%	0.02%
Long-Term Debt	48.20%	58.66%
	100.00%	100.0%

Q. What is Staff's recommended capital structure for MAWC in this proceeding?

A. Considering MAWC's financial relationship with AWWC, Staff recommends the Commission set MAWC's ROR based on AWWC's capital structure. The capital structure Staff used for its analysis in this case is AWWC's actual capital structure, as of June 30, 2022, and set MAWC's capital structure to be composed of 40.71% common equity, 0.02% preferred

[88] Ibid.
[89] Schedule RTJ-d5-2, Jennings' Direct Testimony.
[90] Ibid.

stock, and 59.28% long-term debt. The actual capital structure most accurately represents the proper ratemaking structure and reflects the composition upon which debt and equity financing will be based. Schedules RTJ-d5-1 and RTJ-d5-2 to this testimony, and incorporated by reference herein, presents AWWC and MAWC's historical capital structures and the associated capital ratios. Staff will continue to monitor AWWC's and MAWC's updated capital structures through the end of the true-up period (December 31, 2022), and will update its final recommendation to actual values at that time.

VI. RATE OF RETURN

Q. Please summarize the procedure that Staff used in its ROR analysis.

A. In order to arrive at Staff's recommended ROR, Staff employed the comparative COE analysis. Staff specifically examined and evaluated: (1) the estimated COEs in the current MAWC rate case and the 2021 Spire Case for the selected water companies in the proxy group; (2) the authorized ROE approved by the Commission in the 2021 Spire Case; (3) the 2021 national average authorized ROEs for water and natural gas utilities; (4) Staff's recommended ROE for the current MAWC rate case; (5) the current embedded cost of debt; and (6) the allowed ROR for the purpose of rate making in this proceeding. For this procedure, Staff started with the selection of a water proxy group.

1. Proxy Group

Q. How did Staff select the water proxy group for the comparative COE analysis?

A. Staff used a proxy group consisting of U.S. utilities that Value Line classifies as Water Utilities. Staff screened seven companies by ensuring that companies:[91]

- are publicly traded;
- have more than five years of financial data available;
- have investment grade credit ratings from major U.S. credit rating agencies;
- have long-term growth coverage from at least two analysts;
- have no pending mergers or acquisitions;
- have not reduced dividends since 2017;
- have at least 60% of regulated income from water & wastewater operations; and
- have at least 60% of assets in water & wastewater operations.

Q. What is Staff's water utility proxy group for the comparative COE analysis?

A. The six (6) water utilities that met these criterions are in Table 2 below:

Table 2. Water Utility Proxy Group

Water Utility Companies	Ticker
American States Water Co	AWR
American Water Works Company Inc.	AWK
California Water Service Group	CWT
Essential Utilities Inc.	WTRG
Middlesex Water Company	MSEX
SJW Group	SJW

2. Cost of Common Equity

Q. Please explain how Staff conducted its comparative COE analysis.

A. Staff conducted its COE analysis for MAWC by comparing the change in the COE analysis between the first quarter of 2021 (the reference time period of the

[91] Schedule RTJ-d9, Jennings' Direct Testimony.

2021 Spire Case) and the second quarter of 2022 using the same proxy group of water utility companies as shown in Table 2. The analysis Staff used to determine MAWC's COE consisted of Staff's DCF COE and CAPM COE analyses. These two analyses are widely accepted in the financial industry as a means to determine a fair and reasonable rate of return for regulated utility companies.[92]

Staff determined that the COE comparative analysis using DCF and CAPM is the most proper analysis to use in this case to recommend an ROE to the Commission for MAWC. Staff estimated the COE for each time period for the proxy group using its DCF and CAPM analyses. Staff also used the result of a bond yield plus risk premium method as a check of reasonableness of its DCF and CAPM COE estimates. Staff then compared the result of its current DCF and CAPM COE estimates to the DCF and CAPM COE estimates from the time period of the 2021 Spire Case. Comparing these DCF and CAPM COE estimates allowed Staff to determine the approximate amount of change in COE between Q1 2021 and Q2 2022. Once the amount of change between Q1 2021 and Q2 2022 for the proxy group was determined, Staff was then able to determine the amount of change between time periods and ultimately recommend a current range of authorized ROE.

Q. Please explain the DCF model used for Staff's COE comparative analysis.

A. The DCF model used for Staff's COE comparative analysis is a widely used model by investors to evaluate stable-growth investment opportunities, such as regulated utility companies. The premise of the DCF model is that an investment in common stock is worth the present value of the infinite stream of dividends discounted at a market rate commensurate with

[92] *Ass'n of Bus. Advocating Tariff Equity v. Midcontinent Indep. Sys. Operator, Inc.,* Opinion No. 569, 169 FERC ¶ 61,129 (2019).

the investment's risk. Using the following formula for the DCF model, investors determine a common stock price:

$$P = D/(k - g),$$

where P is the common stock price,
D is the current dividend,
k is investors' required return from the stock, and
g is the expected growth rate in dividends.

Staff uses an adjusted dividend yield $(1 + .5g)D$ to account for the fact that the dividends are paid on a quarterly basis.[93] For the growth rate, Staff used the average of analysts' projected earnings per share ("EPS"), dividends per share ("DPS"), and book value per share ("BVPS") and the projected nominal GDP growth rate.[94]

It is important that the growth rate used in Staff's constant-growth DCF model reflect the long-term investment horizon assumption implied in the constant-growth DCF model. The Federal Energy Regulatory Commission ("FERC") also agreed as much when it ruled, in Opinion 569, that the exclusive use of analysts' short-term growth rates in the constant-growth DCF was inappropriate.[95] The formulation of the COE using the constant-growth DCF formula is:

$$k = (1 + .5g)D \,/\, P \; + \; g.$$

Q. What is the result of the comparative COE analysis using the DCF model?

A. For the current rate case, the average DCF COE estimates of Staff's water proxy

[93] *Ass'n of Bus. Advocating Tariff Equity v. Midcontinent Indep. Sys. Operator, Inc.,* Opinion No. 569, 169 FERC ¶ 61,129 (2019).
[94] *Entergy Arkansas, Inc*., Opinion No. 575, 175 FERC ¶ 61,136 (2021).
[95] *Ass'n of Bus. Advocating Tariff Equity v. Midcontinent Indep. Sys. Operator, Inc.,* Opinion No. 569, 169 FERC ¶ 61,129 (2019).

group is 7.934%.[96] Staff then recalculated COE using the DCF model for the 2021 Spire Case time frame, using the same proxy group of water utility companies in Table 2. The 2021 recalculation resulted in an average DCF COE estimate of Staff's proxy group of 8.045%.[97] Based on a comparative DCF analysis, the COE estimate for water utility companies has decreased by approximately 11 basis points from the last 2021 Spire Case.

Q. Please explain the CAPM used for Staff's COE comparative analysis.

A. The CAPM is built on the premise that the variance in returns over time is the appropriate measure of risk, but only the non-diversifiable variance (systematic risk) is rewarded. Systematic risks, also called market risks, are unanticipated events that affect almost all assets to some degree because the effects are economy wide. Systematic risk in an asset, relative to the average, is measured by the beta of that asset.[98] Unsystematic risks, also called asset-specific risks, are unanticipated events that affect single assets or small groups of assets. Because unsystematic risks can be freely eliminated by diversification, the appropriate reward for bearing risk depends on the level of systematic risk.

The CAPM shows that the expected return for a particular asset depends on the pure time value of money (measured by the risk free rate), the amount of the reward for bearing systematic risk (measured by the market risk premium ("MRP")), and the amount of systematic risk incurred by the asset (measured by beta). Specifically, the CAPM methodology estimates the cost of equity by taking the risk-free rate and adding the MRP multiplied by beta.[99]

[96] Schedule RTJ-d13, Jennings' Direct Testimony.
[97] Ibid.
[98] Beta is a measure of the volatility—or systematic risk—of a security or portfolio compared to the market as a whole. (Investopedia, retrieved October 13, 2022).
[99] Roger A. Morin, New Regulatory Finance (Public Utilities Reports, Inc. 2006).

The MRP is calculated by subtracting the risk-free rate from the expected market return. The general form of the CAPM is as follows:

$$k = R_f + \beta(R_m - R_f)$$

where, k is the expected return on equity for a security,
R_f is the risk-free rate,
R_m is the expected market return,
β is beta, and
$R_m - R_f$ is the MRP.

For the risk-free rate of each time period, Staff used the average yield on 30-Year U.S. Treasury bonds which was 3.04% for the second quarter of 2022 and 2.07% for the first quarter of 2021. For Staff's CAPM analysis, it relied on betas provided by Value Line.[100] For the MRP estimate, Staff relied on four sets of data for the second quarter of 2022 and the first quarter of 2021. The first data set is the long-term geometric mean of historical return differences between large company stocks and long-term government bonds from 1926-2021, resulting in MRP estimates of 4.61% and 4.63%, respectively.[101] The second data set is the long-term arithmetic mean of historical return differences between large company stocks and long-term government bonds from 1926-2021, resulting in MRP estimates of 6.03% and 6.07%, respectively.[102] The third data set is the long-term geometric mean of historical return differences between S&P 500 and long-term government bonds from 1928-2021, resulting in MRP estimates of 5.13% and 4.84%, respectively.[103] The fourth data set is the long-term arithmetic mean of historical return differences between S&P 500 and long-term government bonds from 1928-2021, resulting in MRP estimates of 6.71% and 6.43%, respectively.[104]

[100] Value Line, https://valueline.com/?msclkid=4ed36370d16911eca58154b129389016.
[101] Duff & Phelps, the Stocks, Bonds, Bills, and Inflation (SBBI®) Monthly Dataset.
[102] Ibid.
[103] Risk Premium, Damodaran Online, Stern School of Business, NYU.
[104] Ibid.

Q. What is the result of Staff's comparative COE analysis using the CAPM method?

A. For the current rate case, the average CAPM COE estimates of Staff's proxy group is 7.44%.[105] Staff then recalculated COE using the CAPM method for the 2021 Spire Case time period, using the same proxy group of water utility companies in Table 2. The 2021 recalculation resulted in an average CAPM COE estimate of Staff's proxy group of 6.40%.[106] Based on a comparative CAPM analysis, the average COE estimate has increased by approximately 103 basis points since the 2021 Spire Case time period.

3. Test of Reasonableness

Q. Did Staff test the reasonableness of its COE estimates using any other methods?

A. Yes. Staff used the bond yield-plus risk premium method to test the reasonableness of its COE estimates. The bond yield-plus risk premium method, called the "rule of thumb" test of reasonableness in the Chartered Financial Analyst ("CFA") study guide, estimates the COE by simply adding an equity risk premium to the yield-to-maturity ("YTM") of the subject company's long-term debt.[107] Based on general U.S. capital-market experience and regulated utilities, the equity risk premium is approximately in the range of 3% to 5%.[108] For the second quarter of 2022, "A" rated and "Baa" rated long-term utility bonds had average yields of 4.64% and 4.97%, respectively.[109] Adding the 3% to 5% risk premium, the "rule of thumb" indicates a cost of common equity between 7.64% and 9.97%. The bond yield-plus

[105] Schedule RTJ-d14, Jennings' Direct Testimony.
[106] Ibid.
[107] Stowe, J. D., Robinson, T. R., Pinto, J. E., & McLeavey, D. W. (2002) Analysis of Equity Investment: Valuation. Association for Investment Management and Research.
[108] Roger A. Morin, New Regulatory Finance (Public Utilities Reports, Inc. 2006).
[109] Mergent Bond Record.

risk premium COE estimate's range of 7.64% to 9.97% supports the reasonableness of Staff's average COE estimate of 7.68% using the DCF and CAPM methods.[110]

4. Return on Equity

Q. Has the Commission authorized an ROE for any major water and/or wastewater utility rate case in the past 10 years?

A. No, the last MAWC rate cases (WR-2015-0301, SR-2015-0302, WR-2017-0285, SR-2017-0286, WR-2020-0344, and SR-2020-0345) ended with settlements but not authorized ROEs. The Commission did not comment on or authorize a specific ROE in WR-2017-0285 but approved a Stipulation and Agreement that used the range of 9.5% to 10.0% for ROE for the purposes of calculating the revenue requirement. [111]

Q. What is the most recent Commission authorized ROE?

A. The most recent Commission authorized ROE was 9.37% in the 2021 Spire Case.

Q. Please explain the methodology used by Staff to determine its recommended authorized ROE in this proceeding.

A. In the 2021 Spire Case, the Commission authorized an ROE of 9.37%.[112] Using a water utility proxy group, Staff analyzed the average COE during the same time period (Q1 2021). Based on the result of Staff's COE analysis for the water utility proxy group, the average COE of the water proxy group was 7.22%. With the same proxy group, Staff's COE analysis in the current MAWC rate case results in an average COE of 7.68%.[113] The difference

[110] Schedule RTJ-d15, Jennings' Direct Testimony.
[111] On pages 2 and 3 of "Attachment B", *Order Approving Stipulations and Agreements* issued May 2, 2018 in case WR-2017-0285.
[112] On page 38, *Amended Report and Order* issued July 23, 2020, in Case No. ER-2019-0374.
[113] Schedule RTJ-d15, Jennings' Direct Testimony.

between the two water utility COEs is an increase of approximately 46 basis points since the 2021 Spire Case time period.

Staff then examined the authorized ROEs for natural gas rate cases nationwide in 2021 and found the average to be 9.56%.[114] Staff also examined the authorized ROEs for water utility rate cases nationwide in 2021 and found the average to be 9.46%[115], a difference of 10 basis points between the two industries.

Staff took the increase of 46 basis points between water utility COEs from Q1 2021 and Q2 2022 and subtracted the 10 basis point industry difference between natural gas and water utility national average ROEs during 2021, resulting in a net increase of 36 basis points. If there is no significant change in the Commission's perspective on the relationship between the COE estimate and the authorized ROE, it is reasonable to conclude that the current water utility ROE should be approximately 36 basis points higher than the most recent Commission authorized natural gas ROE of 9.37% in the 2021 Spire Case. This results in a recommended ROE of 9.73% for this proceeding.[116]

To recommend a just and reasonable ROE, Staff considered MAWC's unique risk profile and the current financial and economic market conditions. The current U.S. inflation rate is at its highest level in 40 years.[117] To combat inflation, the Fed started to increase interest rates as Fed Chair Powell announced interest rate increases in 2022.[118] The most recent meeting of the FOMC anticipates that ongoing increases in the target range for the federal funds rate

[114] Schedule RTJ-d17, Jennings' Direct Testimony.
[115] Ibid.
[116] Schedule RTJ-d15, Jennings' Direct Testimony.
[117] Yahoo!Finance, Inflation surges 9.1% in June, most since November 1981, published July 13, 2022, https://finance.yahoo.com/news/june-cpi-preview-inflation-likely-surged-to-new-40-year-high-last-month-215233961.html.
[118] Transcript of Chair Powell's Press Conference, December 15, 2021; https://www.federalreserve.gov/mediacenter/files/FOMCpresconf20211215.pdf.

will be appropriate.[119] Considering all of the above information that Staff has reviewed, Staff recommends the Commission authorize an ROE of 9.73% for MAWC in this proceeding.

Q. Does Staff have any supporting evidence the Commission can consider to determine the reasonableness of Staff's ROE recommendation?

A. Yes. Staff recognizes that the Commission may be interested in recent authorized ROEs for other water utility companies in the U.S. as a test of reasonableness of Staff's recommendation of authorized ROE. Table 3 presents information compiled and published by Regulatory Research Associates ("RRA") which details the average fully litigated and other authorized ROEs from Commissions around the U.S. in the years 2010 - 2022 along with the number of cases considered:

Table 3: Authorized ROE's from Commissions in the U.S. (2010-2022) [120]

	Fully Litigated		Water Utility Other		Water Total	
Year	ROE (%)	Case (No.)	ROE (%)	Case (No.)	ROE (%)	Case (No.)
2010	9.85	6	10.29	24	10.18	30
2011	9.78	3	10.19	5	10.01	8
2012	9.76	3	9.92	20	9.90	23
2013	9.67	2	9.74	10	9.72	12
2014	9.46	3	9.62	14	9.59	17
2015		0	9.76	13	9.76	13
2016	9.70	4	9.72	10	9.71	14
2017	9.83	2	9.49	9	9.56	11
2018	9.53	10	9.39	12	9.46	22
2019	9.73	3	9.59	8	9.63	11
2020	8.48	2	9.33	6	9.04	8
2021	9.37	3	9.60	7	9.46	10
2022	9.90	2	9.55	2	9.73	4

[119] Transcript of Chair Powell's Press Conference, September 21, 2022; https://www.federalreserve.gov/mediacenter/files/FOMCpresconf20220921.pdf .
[120] S&P Capital IQ Pro: Regulatory Research Association, retrieved September 22, 2022.

In 2022 to date, the average authorized ROE of water utilities for fully litigated and other cases is 9.90% and 9.55%, respectively, for an overall average of 9.73%. Considering the current trend of inclined interest rates, Staff's recommended authorized ROE of 9.73% is generally consistent with ROEs recently authorized for other water utilities around the country. It is Staff's position that in order for MAWC to be competitive on the capital market, it needs to have the opportunity to earn an ROE that is reasonably consistent with ROEs awarded to other water utilities around the country.

5. Embedded Costs of Debt and Preferred Stock

Q. What embedded cost of debt and preferred stock should the Commission authorize for MAWC in this proceeding?

A. The embedded cost of debt the Commission should authorize for MAWC in this proceeding is AWWC's embedded cost of debt, as of June 30, 2022, of ** [redacted] **.[121] The embedded cost of preferred stock the Commission should use for MAWC in this proceeding is AWWC's embedded cost of preferred stock, as of June 30, 2022, of ** [redacted] **.[122] Staff will update its embedded cost of debt throughout this proceeding through the true-up period, as additional information becomes available.

VII. CONCLUSION

Q. What is Staff's conclusion?

A. Considering the current financial and economic markets, particularly including the surge in the inflation rate and interest rates, and MAWC's risk profile, Staff's comparative

[121] Staff's Data Request No. 0040.1.
[122] Ibid.

COE analysis supports a just and reasonable ROE of 9.73%, the mid-point in a range of 9.48% to 9.98%, for MAWC. Because of the rapidly changing economic outlook, Staff will update its ROE if there are significant changes in the economic outlook that necessitate an update.

Staff's recommended ROE of 9.73% for MAWC and embedded cost of debt of ** [redacted] ** and cost of preferred stock ** [redacted] ** applied to a capital structure of 59.28% long-term debt, 0.02% Preferred Stock and 40.71% common equity, results in an allowed ROR of 6.38%.[123] Staff will continue to monitor AWWC's and MAWC's capital structures and cost of debt through the true-up period and will make its final recommendation at that time.

Q. Does this conclude your direct testimony?

A. Yes, it does.

[123] Schedule RTJ-d16, Jennings' Direct Testimony.

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

In the Matter of Missouri-American Water Company's Request for Authority to Implement General Rate Increase for Water and Sewer Service Provided in Missouri Service Areas	)))))	Case No. WR-2022-0303

AFFIDAVIT OF RANDALL T. JENNINGS

STATE OF MISSOURI)
) ss.
COUNTY OF COLE)

COMES NOW RANDALL T. JENNINGS and on his oath declares that he is of sound mind and lawful age; that he contributed to the foregoing *Direct testimony of Randall T. Jennings*; and that the same is true and correct according to his best knowledge and belief.

Further the Affiant sayeth not.

RANDALL T. JENNINGS

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 17th day of November 2022.

D. SUZIE MANKIN
Notary Public - Notary Seal
State of Missouri
Commissioned for Cole County
My Commission Expires: April 04, 2025
Commission Number: 12412070

Notary Public

Randall T. Jennings

Credentials & Case Participation

Present Position:

I am a Senior Utility Regulatory Auditor in the Financial Analysis Department of the Financial and Business Analysis Division of the Missouri Public Service Commission. I have been employed by the Missouri Public Service Commission Since October 2021.

Educational Background and Work Experience:

I earned a Bachelor of Science degree in Business Administration from Drury University in Springfield, MO. I was previously employed as a Regulatory Auditor and Supervisor with the Missouri Division of Professional Registration for 11 years and prior to that as an Investigator for the Missouri Attorney General for 8 years.

Case Participation:

Company Name	Case Number	Case Type / Type of Testimony	Utility Type
The Raytown Water Company	WF-2021-0427	Finance – Staff Memorandum	Water
Evergy Missouri West, Inc.	EF-2022-0103	Finance – Staff Memorandum	Electric
Summit Natural Gas of Missouri, Inc.	GR-2022-0122	Tariff Revision – Rebuttal & Surrebuttal Testimony	Gas
Missouri American Water Company	WF-2022-0161	Finance – Staff Memorandum	Water
Union Electric Company d/b/a Ameren Missouri	EF-2022-0164	Finance – Staff Memorandum Financing Compliance – Staff Memorandum	Electric
Spire Missouri Inc.	GF-2022-0169	Finance – Staff Memorandum	Gas
Summit Natural Gas of Missouri, Inc.	GF-2022-0216	Finance – Staff Memorandum	Gas
S.K. & M. Water and Sewer Company	SR-2022-0239 WR-2022-0240	Rate Case – Staff Memorandum	Sewer Water
Argyle Estates Water Supply	WR-2022-0345	Rate Case – Staff Memorandum	Water

DIRECT TESTIMONY

FOR

MISSOURI-AMERICAN WATER COMPANY

CASE NO. WR-2022-0303

SCHEDULES

RTJ-d2-2 through RTJ-d17

BY

Randall T. Jennings

Financial Analysis

MISSOURI PUBLIC SERVICE COMMISSION

November 22, 2022

** Denotes Confidential Information **

Missouri-American Water Company
WR-2022-0303

List of Schedules

Schedule	Description of Schedule
	List of Schedules
RTJ-d2-1	Federal Reserve Discount Rates and Federal Reserve Funds Rates Changes
RTJ-d2-2	Graph of Federal Reserve Discount Rates and Federal Funds Rates Changes
RTJ-d3-1	Rate of Inflation
RTJ-d3-2	Graph of Rate of Inflation
RTJ-d4-1	Average Yields on Moody's Public Utility Bonds
RTJ-d4-2	Average Yields on Thirty-Year U.S. Treasury Bonds
RTJ-d4-3	Graph of Average Yields on Mergent's Public Utility Bonds and Thirty-Year U.S. Treasury Bonds
RTJ-d4-4	Graph of Monthly Spreads Between Yields on Moody's Public Utility Bonds and 30-Year U.S. Treasury Bonds
RTJ-d4-5	Graph of Average Yields on A and BBB+ Utility Bonds
RTJ-d5-1	Historical Consolidated Capital Structures (Dollar)
RTJ-d5-2	Historical Consolidated Capital Structures (Percentage)
RTJ-d6	Capital Structure
RTJ-d7	Rate Making Cost of Long-Term Debt
RTJ-d8	Rate Making Cost of Preferred Stock
RTJ-d9	Criteria for Selecting Comparable Utility Companies
RTJ-d10	Comparable Utility Companies
RTJ-d11	Historical and Projected Growth Rates
RTJ-d12	Average High / Low Stock Price
RTJ-d13	DCF Model Analysis of COE Estimates
RTJ-d14	CAPM Analysis of COE Estimates
RTJ-d15	Return on Equity
RTJ-d16	Rate of Return
RTJ-d17	Authorized Return on Equity

Missouri-American Water Company
WR-2022-0303

Federal Reserve Discount Rate and Federal Reserve Funds Rate

Date	Federal Reserve Discount Rate	Federal Reserve Funds Rate	Date	Federal Reserve Discount Rate	Federal Reserve Funds Rate	Date	Federal Reserve Discount Rate	Federal Reserve Funds Rate
Jan 2001	5.52	5.50	Jan 2006	5.50	4.50	Jan 2011	0.75	0.13
Feb	5.00	5.50	Feb	5.50	4.50	Feb	0.75	0.13
Mar	4.81	5.00	Mar	5.75	4.75	Mar	0.75	0.13
Apr	4.28	4.50	Apr	5.75	4.75	Apr	0.75	0.13
May	3.73	4.00	May	6.00	5.00	May	0.75	0.13
Jun	3.47	3.75	June	6.25	5.25	Jun	0.75	0.13
Jul	3.25	3.75	July	6.25	5.25	Jul	0.75	0.13
Aug	3.16	3.50	Aug	6.25	5.25	Aug	0.75	0.13
Sep	2.77	3.00	Sep	6.25	5.25	Sep	0.75	0.13
Oct	2.02	2.50	Oct	6.25	5.25	Oct	0.75	0.13
Nov	1.58	2.00	Nov	6.25	5.25	Nov	0.75	0.13
Dec	1.33	1.75	Dec	6.25	5.25	Dec	0.75	0.13
Jan 2002	1.25	1.75	Jan 2007	6.25	5.25	Jan 2012	0.75	0.13
Feb	1.25	1.75	Feb	6.25	5.25	Feb	0.75	0.13
Mar	1.25	1.75	Mar	6.25	5.25	Mar	0.75	0.13
Apr	1.25	1.75	Apr	6.25	5.25	Apr	0.75	0.13
May	1.25	1.75	May	6.25	5.25	May	0.75	0.13
Jun	1.25	1.75	Jun	6.25	5.25	Jun	0.75	0.13
Jul	1.25	1.75	Jul	6.25	5.25	Jul	0.75	0.13
Aug	1.25	1.75	Aug	5.75	5.25	Aug	0.75	0.13
Sep	1.25	1.75	Sep	5.25	4.75	Sep	0.75	0.13
Oct	1.25	1.75	Oct	5.00	4.75	Oct	0.75	0.13
Nov	0.83	1.25	Nov	5.00	4.50	Nov	0.75	0.13
Dec	0.75	1.25	Dec	4.75	4.25	Dec	0.75	0.13
Jan 2003	2.25	1.25	Jan 2008	3.50	3.50	Jan 2013	0.75	0.13
Feb	2.25	1.25	Feb	3.50	3.00	Feb	0.75	0.13
Mar	2.25	1.25	Mar	2.50	2.25	Mar	0.75	0.13
Apr	2.25	1.25	Apr	2.25	2.25	Apr	0.75	0.13
May	2.25	1.25	May	2.25	2.00	May	0.75	0.13
Jun	2.00	1.25	Jun	2.25	2.00	Jun	0.75	0.13
Jul	2.00	1.00	Jul	2.25	2.00	Jul	0.75	0.13
Aug	2.00	1.00	Aug	2.25	2.00	Aug	0.75	0.13
Sep	2.00	1.00	Sep	2.25	2.00	Sept	0.75	0.13
Oct	2.00	1.00	Oct	1.25	1.25	Oct	0.75	0.13
Nov	2.00	1.00	Nov	1.25	1.25	Nov	0.75	0.13
Dec	2.00	1.00	Dec	0.50	0.13	Dec	0.75	0.13
Jan 2004	2.00	1.00	Jan 2009	0.50	0.13	Jan 2014	0.75	0.13
Feb	2.00	1.00	Feb	0.50	0.13	Feb	0.75	0.13
Mar	2.00	1.00	Mar	0.50	0.13	Mar	0.75	0.13
Apr	2.00	1.00	Apr	0.50	0.13	Apr	0.75	0.13
May	2.00	1.00	May	0.50	0.13	May	0.75	0.13
Jun	2.25	1.00	Jun	0.50	0.13	Jun	0.75	0.13
Jul	2.25	1.25	Jul	0.50	0.13	Jul	0.75	0.13
Aug	2.50	1.50	Aug	0.50	0.13	Aug	0.75	0.13
Sep	2.75	1.50	Sep	0.50	0.13	Sep	0.75	0.13
Oct	2.75	1.75	Oct	0.50	0.13	Oct	0.75	0.13
Nov	3.00	2.00	Nov	0.50	0.13	Nov	0.75	0.13
Dec	3.25	2.25	Dec	0.50	0.13	Dec	0.75	0.13
Jan 2005	3.25	2.25	Jan 2010	0.50	0.13	Jan 2015	0.75	0.13
Feb	3.50	2.50	Feb	0.75	0.13	Feb	0.75	0.13
Mar	3.75	2.50	Mar	0.75	0.13	Mar	0.75	0.13
Apr	3.75	2.75	April	0.75	0.13	Apr	0.75	0.13
May	4.00	3.00	May	0.75	0.13	May	0.75	0.13
Jun	4.25	3.00	Jun	0.75	0.13	Jun	0.75	0.13
Jul	4.25	3.25	Jul	0.75	0.13	Jul	0.75	0.13
Aug	4.50	3.50	Aug	0.75	0.13	Aug	0.75	0.13
Sep	4.75	3.75	Sep	0.75	0.13	Sep	0.75	0.13
Oct	4.75	3.75	Oct	0.75	0.13	Oct	0.75	0.13
Nov	5.00	4.00	Nov	0.75	0.13	Nov	0.75	0.13
Dec	5.25	4.25	Dec	0.75	0.13	Dec	1.00	0.38

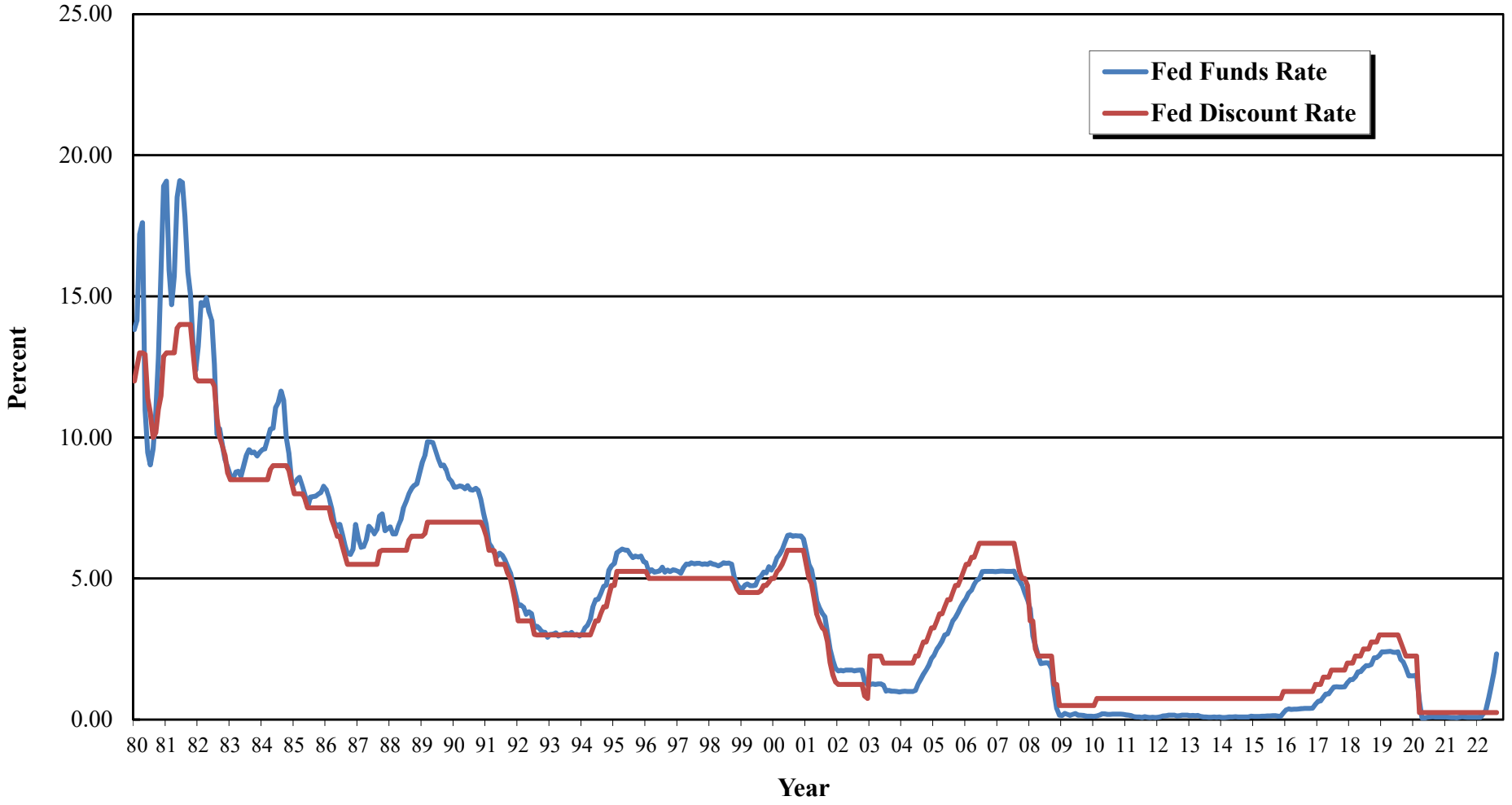
Missouri-American Water Company
WR-2022-0303

Federal Reserve Discount Rate and Federal Reserve Funds Rate

Date	Federal Reserve Discount Rate	Federal Reserve Funds Rate	Date	Federal Reserve Discount Rate	Federal Reserve Funds Rate	Date	Federal Reserve Discount Rate	Federal Reserve Funds Rate
Jan 2016	1.00	0.38	Jan 2021	0.25	0.09			
Feb	1.00	0.38	Feb	0.25	0.08			
Mar	1.00	0.38	Mar	0.25	0.07			
Apr	1.00	0.38	Apr	0.25	0.07			
May	1.00	0.38	May	0.25	0.06			
Jun	1.00	0.38	Jun	0.25	0.08			
Jul	1.00	0.39	Jul	0.25	0.10			
Aug	1.00	0.40	Aug	0.25	0.09			
Sep	1.00	0.40	Sep	0.25	0.08			
Oct	1.00	0.40	Oct	0.25	0.08			
Nov	1.00	0.41	Nov	0.25	0.08			
Dec	1.25	0.54	Dec	0.25	0.08			
Jan 2017	1.25	0.65	Jan 2022	0.25	0.08			
Feb	1.25	0.66	Feb	0.25	0.08			
Mar	1.50	0.79	Mar	0.25	0.20			
Apr	1.50	0.90	Apr	0.25	0.33			
May	1.50	0.91	May	0.25	0.77			
Jun	1.75	1.04	Jun	0.25	1.21			
July	1.75	1.15	Jul	0.25	1.68			
Aug	1.75	1.16	Aug	0.25	2.33			
Sep	1.75	1.15						
Oct	1.75	1.15						
Nov	1.75	1.16						
Dec	2.00	1.30						
Jan 2018	2.00	1.41						
Feb	2.00	1.42						
Mar	2.25	1.51						
Apr	2.25	1.69						
May	2.25	1.70						
Jun	2.50	1.82						
Jul	2.50	1.91						
Aug	2.50	1.91						
Sep	2.75	1.95						
Oct	2.75	2.19						
Nov	2.75	2.20						
Dec	3.00	2.27						
Jan 2019	3.00	2.40						
Feb	3.00	2.40						
Mar	3.00	2.41						
Apr	3.00	2.42						
May	3.00	2.39						
Jun	3.00	2.38						
Jul	3.00	2.40						
Aug	2.75	2.13						
Sept	2.50	2.04						
Oct	2.25	1.83						
Nov	2.25	1.55						
Dec	2.25	1.55						
Jan 2020	2.25	1.55						
Feb	2.25	1.58						
Mar	0.25	0.65						
Apr	0.25	0.05						
May	0.25	0.05						
Jun	0.25	0.08						
Jul	0.25	0.09						
Aug	0.25	0.10						
Sep	0.25	0.09						
Oct	0.25	0.09						
Nov	0.25	0.09						
Dec	0.25	0.09						

MISSOURI-AMERICAN WATER COMPANY
Case No. WR-2022-0303

Federal Reserve Discount Rates and Federal Funds Rates
1980 - 2022



SCHEDULE RTJ-d2-2

Missouri-American Water Company
WR-2022-0303

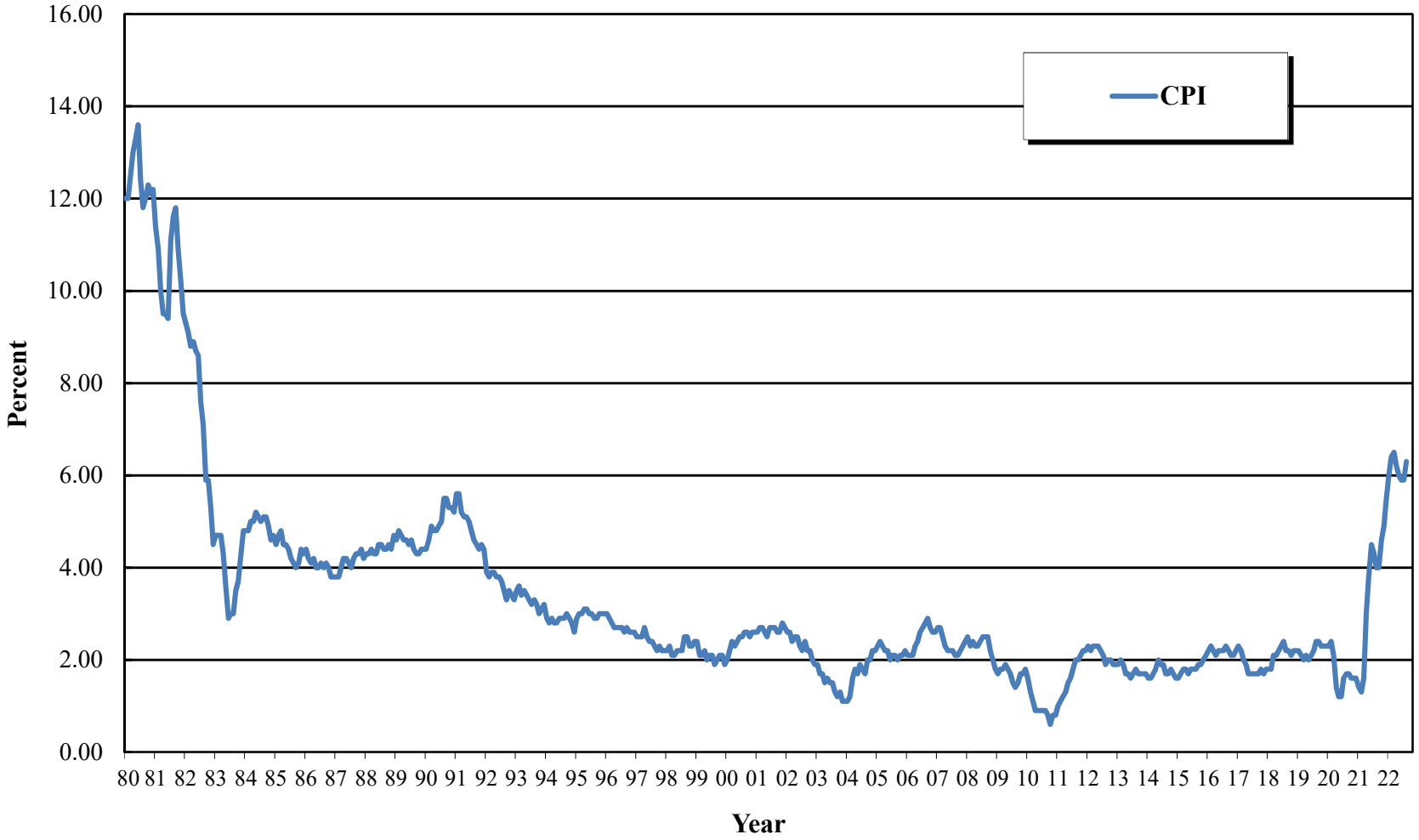
Rate of Inflation

Mo/Year	Rate (%)	Mo/Year	Rate (%)	Mo/Year	Rate (%)	Mo/Year	Rate (%)	Mo/Year	Rate (%)	Mo/Year	Rate (%)	Mo/Year	Rate (%)
Jan 1980	12.00	Jan 1987	3.80	Jan 1994	2.90	Jan 2001	2.60	Jan 2008	2.50	Jan 2015	1.60	Jan 2022	6.00
Feb	12.00	Feb	3.80	Feb	2.80	Feb	2.70	Feb	2.30	Feb	1.70	Feb	6.40
Mar	12.50	Mar	4.00	Mar	2.90	Mar	2.70	Mar	2.40	Mar	1.80	Mar	6.50
Apr	13.00	Apr	4.20	Apr	2.80	Apr	2.60	Apr	2.30	Apr	1.80	Apr	6.20
May	13.30	May	4.20	May	2.80	May	2.50	May	2.30	May	1.70	May	6.00
Jun	13.60	Jun	4.10	Jun	2.90	Jun	2.70	Jun	2.40	Jun	1.80	Jun	5.90
Jul	12.40	Jul	4.00	Jul	2.90	Jul	2.70	Jul	2.50	Jul	1.80	Jul	5.90
Aug	11.80	Aug	4.20	Aug	2.90	Aug	2.70	Aug	2.50	Aug	1.80	Aug	6.30
Sep	12.00	Sep	4.30	Sep	3.00	Sep	2.60	Sep	2.50	Sep	1.90		
Oct	12.30	Oct	4.30	Oct	2.90	Oct	2.60	Oct	2.20	Oct	1.90		
Nov	12.10	Nov	4.40	Nov	2.80	Nov	2.80	Nov	2.00	Nov	2.00		
Dec	12.20	Dec	4.20	Dec	2.60	Dec	2.70	Dec	1.80	Dec	2.10		
Jan 1981	11.40	Jan 1988	4.30	Jan 1995	2.90	Jan 2002	2.60	Jan 2009	1.70	Jan 2016	2.20		
Feb	10.90	Feb	4.30	Feb	3.00	Feb	2.60	Feb	1.80	Feb	2.30		
Mar	10.00	Mar	4.40	Mar	3.00	Mar	2.40	Mar	1.80	Mar	2.20		
Apr	9.50	Apr	4.30	Apr	3.10	Apr	2.50	Apr	1.90	Apr	2.10		
May	9.50	May	4.30	May	3.10	May	2.50	May	1.80	May	2.20		
Jun	9.40	Jun	4.50	Jun	3.00	Jun	2.30	Jun	1.70	Jun	2.20		
Jul	11.10	Jul	4.50	Jul	3.00	Jul	2.20	Jul	1.50	Jul	2.20		
Aug	11.60	Aug	4.40	Aug	2.90	Aug	2.40	Aug	1.40	Aug	2.30		
Sep	11.80	Sep	4.40	Sep	2.90	Sep	2.20	Sep	1.50	Sep	2.20		
Oct	10.90	Oct	4.50	Oct	3.00	Oct	2.20	Oct	1.70	Oct	2.10		
Nov	10.20	Nov	4.40	Nov	3.00	Nov	2.00	Nov	1.70	Nov	2.10		
Dec	9.50	Dec	4.70	Dec	3.00	Dec	1.90	Dec	1.80	Dec	2.20		
Jan 1982	9.30	Jan 1989	4.60	Jan 1996	3.00	Jan 2003	1.90	Jan 2010	1.60	Jan 2017	2.30		
Feb	9.10	Feb	4.80	Feb	2.90	Feb	1.70	Feb	1.30	Feb	2.20		
Mar	8.80	Mar	4.70	Mar	2.80	Mar	1.70	Mar	1.10	Mar	2.00		
Apr	8.90	Apr	4.60	Apr	2.70	Apr	1.50	April	0.90	Apr	1.90		
May	8.70	May	4.60	May	2.70	May	1.60	May	0.90	May	1.70		
Jun	8.60	Jun	4.50	Jun	2.70	Jun	1.50	Jun	0.90	Jun	1.70		
Jul	7.60	Jul	4.60	Jul	2.70	Jul	1.50	Jul	0.90	July	1.70		
Aug	7.10	Aug	4.40	Aug	2.60	Aug	1.30	Aug	0.90	Aug	1.70		
Sep	5.90	Sep	4.30	Sep	2.70	Sep	1.20	Sep	0.80	Sep	1.70		
Oct	5.90	Oct	4.30	Oct	2.60	Oct	1.30	Oct	0.60	Oct	1.80		
Nov	5.30	Nov	4.40	Nov	2.60	Nov	1.10	Nov	0.80	Nov	1.70		
Dec	4.50	Dec	4.40	Dec	2.60	Dec	1.10	Dec	0.80	Dec	1.80		
Jan 1983	4.70	Jan 1990	4.40	Jan 1997	2.50	Jan 2004	1.10	Jan 2011	1.00	Jan 2018	1.80		
Feb	4.70	Feb	4.60	Feb	2.50	Feb	1.20	Feb	1.10	Feb	1.80		
Mar	4.70	Mar	4.90	Mar	2.50	Mar	1.60	Mar	1.20	Mar	2.10		
Apr	4.30	Apr	4.80	Apr	2.70	Apr	1.80	Apr	1.30	Apr	2.10		
May	3.60	May	4.80	May	2.50	May	1.70	May	1.50	May	2.20		
Jun	2.90	Jun	4.90	Jun	2.40	Jun	1.90	Jun	1.60	Jun	2.30		
Jul	3.00	Jul	5.00	Jul	2.40	Jul	1.80	Jul	1.80	Jul	2.40		
Aug	3.00	Aug	5.50	Aug	2.30	Aug	1.70	Aug	2.00	Aug	2.20		
Sep	3.50	Sep	5.50	Sep	2.20	Sep	2.00	Sep	2.00	Sep	2.20		
Oct	3.70	Oct	5.30	Oct	2.30	Oct	2.00	Oct	2.10	Oct	2.10		
Nov	4.30	Nov	5.30	Nov	2.20	Nov	2.20	Nov	2.20	Nov	2.20		
Dec	4.80	Dec	5.20	Dec	2.20	Dec	2.20	Dec	2.20	Dec	2.20		
Jan 1984	4.80	Jan 1991	5.60	Jan 1998	2.20	Jan 2005	2.30	Jan 2012	2.30	Jan 2019	2.20		
Feb	4.80	Feb	5.60	Feb	2.30	Feb	2.40	Feb	2.20	Feb	2.10		
Mar	5.00	Mar	5.20	Mar	2.10	Mar	2.30	Mar	2.30	Mar	2.00		
Apr	5.00	Apr	5.10	Apr	2.10	Apr	2.20	Apr	2.30	Apr	2.10		
May	5.20	May	5.10	May	2.20	May	2.20	May	2.30	May	2.00		
Jun	5.10	Jun	5.00	Jun	2.20	Jun	2.00	Jun	2.20	Jun	2.10		
Jul	5.00	Jul	4.80	Jul	2.20	Jul	2.10	Jul	2.10	Jul	2.20		
Aug	5.10	Aug	4.60	Aug	2.50	Aug	2.10	Aug	1.90	Aug	2.40		
Sep	5.10	Sep	4.50	Sep	2.50	Sep	2.00	Sep	2.00	Sept	2.40		
Oct	4.90	Oct	4.40	Oct	2.30	Oct	2.10	Oct	2.00	Oct	2.30		
Nov	4.60	Nov	4.50	Nov	2.30	Nov	2.10	Nov	1.90	Nov	2.30		
Dec	4.70	Dec	4.40	Dec	2.40	Dec	2.20	Dec	1.90	Dec	2.30		
Jan 1985	4.50	Jan 1992	3.90	Jan 1999	2.40	Jan 2006	2.10	Jan 2013	1.90	Jan 2020	2.30		
Feb	4.70	Feb	3.80	Feb	2.10	Feb	2.10	Feb	2.00	Feb	2.40		
Mar	4.80	Mar	3.90	Mar	2.10	Mar	2.10	Mar	1.90	Mar	2.10		
Apr	4.50	Apr	3.90	Apr	2.20	Apr	2.30	Apr	1.70	Apr	1.40		
May	4.50	May	3.80	May	2.00	May	2.40	May	1.70	May	1.20		
Jun	4.40	Jun	3.80	Jun	2.10	June	2.60	Jun	1.60	Jun	1.20		
Jul	4.20	Jul	3.70	Jul	2.10	July	2.70	Jul	1.70	Jul	1.60		
Aug	4.10	Aug	3.50	Aug	1.90	Aug	2.80	Aug	1.80	Aug	1.70		
Sep	4.00	Sep	3.30	Sep	2.00	Sep	2.90	Sept	1.70	Sep	1.70		
Oct	4.10	Oct	3.50	Oct	2.10	Oct	2.70	Oct	1.70	Oct	1.60		
Nov	4.40	Nov	3.40	Nov	2.10	Nov	2.60	Nov	1.70	Nov	1.60		
Dec	4.30	Dec	3.30	Dec	1.90	Dec	2.60	Dec	1.70	Dec	1.60		
Jan 1986	4.40	Jan 1993	3.50	Jan 2000	2.00	Jan 2007	2.70	Jan 2014	1.60	Jan 2021	1.40		
Feb	4.20	Feb	3.60	Feb	2.20	Feb	2.70	Feb	1.60	Feb	1.30		
Mar	4.10	Mar	3.40	Mar	2.40	Mar	2.50	Mar	1.70	Mar	1.60		
Apr	4.20	Apr	3.50	Apr	2.30	Apr	2.30	Apr	1.80	Apr	3.00		
May	4.00	May	3.40	May	2.40	May	2.20	May	2.00	May	3.80		
Jun	4.00	Jun	3.30	Jun	2.50	Jun	2.20	Jun	1.90	Jun	4.50		
Jul	4.10	Jul	3.20	Jul	2.50	Jul	2.20	Jul	1.90	Jul	4.30		
Aug	4.00	Aug	3.30	Aug	2.60	Aug	2.10	Aug	1.70	Aug	4.00		
Sep	4.10	Sep	3.20	Sep	2.60	Sep	2.10	Sep	1.70	Sep	4.00		
Oct	4.00	Oct	3.00	Oct	2.50	Oct	2.20	Oct	1.80	Oct	4.60		
Nov	3.80	Nov	3.10	Nov	2.60	Nov	2.30	Nov	1.70	Nov	4.90		
Dec	3.80	Dec	3.20	Dec	2.60	Dec	2.40	Dec	1.60	Dec	5.50		

Source: U.S. Dept. of Labor, Bureau of Labor Statistics, Consumer Price Index - All Urban Consumers less food and energy,
Change for 12-Month Period, Bureau of Labor Statistics,
https://www.bls.gov/cpi/data.htm

MISSOURI-AMERICAN WATER COMPANY
Case No. WR-2022-0303

Rate of Inflation
1980 - 2022



SCHEDULE RTJ-d3-2

Missouri-American Water Company
WR-2022-0303

Average Yields on Moody's Public Utility Bonds

Mo/Year	Rate (%)	Mo/Year	Rate (%)	Mo/Year	Rate (%)	Mo/Year	Rate (%)	Mo/Year	Rate (%)	Mo/Year	Rate (%)	Mo/Year	Rate (%)
Jan 1980	12.12	Jan 1987	8.77	Jan 1994	7.31	Jan 2001	7.76	Jan 2008	6.08	Jan 2015	3.83	Jan 2022	3.25
Feb	13.48	Feb	8.81	Feb	7.44	Feb	7.69	Feb	6.28	Feb	3.91	Feb	3.48
Mar	14.33	Mar	8.75	Mar	7.83	Mar	7.59	Mar	6.29	Mar	3.97	Mar	4.02
Apr	13.50	Apr	9.30	Apr	8.20	Apr	7.81	Apr	6.36	Apr	3.96	Apr	4.34
May	12.17	May	9.82	May	8.32	May	7.88	May	6.38	May	4.38	May	4.79
Jun	11.87	Jun	9.87	Jun	8.31	Jun	7.75	Jun	6.50	Jun	4.60	Jun	4.91
Jul	12.12	Jul	10.01	Jul	8.47	Jul	7.71	Jul	6.50	Jul	4.63	Jul	4.84
Aug	12.82	Aug	10.33	Aug	8.41	Aug	7.57	Aug	6.48	Aug	4.54	Aug	4.80
Sep	13.29	Sep	11.00	Sep	8.65	Sep	7.73	Sep	6.59	Sep	4.68		
Oct	13.53	Oct	11.32	Oct	8.88	Oct	7.64	Oct	7.70	Oct	4.63		
Nov	14.07	Nov	10.82	Nov	9.00	Nov	7.61	Nov	7.80	Nov	4.73		
Dec	14.48	Dec	10.99	Dec	8.79	Dec	7.86	Dec	6.87	Dec	4.69		
Jan 1981	14.22	Jan 1988	10.75	Jan 1995	8.77	Jan 2002	7.69	Jan 2009	6.77	Jan 2016	4.62		
Feb	14.84	Feb	10.11	Feb	8.56	Feb	7.62	Feb	6.72	Feb	4.44		
Mar	14.86	Mar	10.11	Mar	8.41	Mar	7.83	Mar	6.85	Mar	4.40		
Apr	15.32	Apr	10.53	Apr	8.30	Apr	7.74	Apr	6.90	Apr	4.16		
May	15.84	May	10.75	May	7.93	May	7.76	May	6.83	May	4.06		
Jun	15.27	Jun	10.71	Jun	7.62	Jun	7.67	Jun	6.54	Jun	3.93		
Jul	15.87	Jul	10.96	Jul	7.73	Jul	7.54	Jul	6.15	Jul	3.70		
Aug	16.33	Aug	11.09	Aug	7.86	Aug	7.34	Aug	5.80	Aug	3.73		
Sep	16.89	Sep	10.56	Sep	7.62	Sep	7.23	Sep	5.60	Sep	3.80		
Oct	16.76	Oct	9.92	Oct	7.46	Oct	7.43	Oct	5.64	Oct	3.90		
Nov	15.50	Nov	9.89	Nov	7.40	Nov	7.31	Nov	5.71	Nov	4.21		
Dec	15.77	Dec	10.02	Dec	7.21	Dec	7.20	Dec	5.86	Dec	4.39		
Jan 1982	16.73	Jan 1989	10.02	Jan 1996	7.20	Jan 2003	7.13	Jan 2010	5.83	Jan 2017	4.24		
Feb	16.72	Feb	10.02	Feb	7.37	Feb	6.92	Feb	5.94	Feb	4.25		
Mar	16.07	Mar	10.16	Mar	7.72	Mar	6.80	Mar	5.90	Mar	4.30		
Apr	15.82	Apr	10.14	Apr	7.88	Apr	6.68	April	5.87	Apr	4.19		
May	15.60	May	9.92	May	7.99	May	6.35	May	5.59	May	4.19		
Jun	16.18	Jun	9.49	Jun	8.07	Jun	6.21	Jun	5.62	Jun	4.01		
Jul	16.04	Jul	9.34	Jul	8.02	Jul	6.54	Jul	5.41	July	4.06		
Aug	15.22	Aug	9.37	Aug	7.84	Aug	6.78	Aug	5.10	Aug	3.92		
Sep	14.56	Sep	9.43	Sep	8.01	Sep	6.58	Sep	5.10	Sep	3.93		
Oct	13.88	Oct	9.37	Oct	7.76	Oct	6.50	Oct	5.20	Oct	3.97		
Nov	13.58	Nov	9.33	Nov	7.48	Nov	6.44	Nov	5.45	Nov	3.88		
Dec	13.55	Dec	9.31	Dec	7.58	Dec	6.35	Dec	5.64	Dec	3.85		
Jan 1983	13.46	Jan 1990	9.44	Jan 1997	7.79	Jan 2004	6.23	Jan 2011	5.64	Jan 2018	3.91		
Feb	13.60	Feb	9.66	Feb	7.68	Feb	6.17	Feb	5.73	Feb	4.15		
Mar	13.28	Mar	9.75	Mar	7.92	Mar	6.01	Mar	5.62	Mar	4.21		
Apr	13.03	Apr	9.87	Apr	8.08	Apr	6.38	Apr	5.62	Apr	4.24		
May	13.00	May	9.89	May	7.94	May	6.68	May	5.38	May	4.36		
Jun	13.17	Jun	9.69	Jun	7.77	Jun	6.53	Jun	5.32	Jun	4.37		
Jul	13.28	Jul	9.66	Jul	7.52	Jul	6.34	Jul	5.34	Jul	4.35		
Aug	13.50	Aug	9.84	Aug	7.57	Aug	6.18	Aug	4.78	Aug	4.33		
Sep	13.35	Sep	10.01	Sep	7.50	Sep	6.01	Sep	4.61	Sep	4.41		
Oct	13.19	Oct	9.94	Oct	7.37	Oct	5.95	Oct	4.66	Oct	4.56		
Nov	13.33	Nov	9.76	Nov	7.24	Nov	5.97	Nov	4.37	Nov	4.65		
Dec	13.48	Dec	9.57	Dec	7.16	Dec	5.93	Dec	4.47	Dec	4.51		
Jan 1984	13.40	Jan 1991	9.56	Jan 1998	7.03	Jan 2005	5.80	Jan 2012	4.48	Jan 2019	4.48		
Feb	13.50	Feb	9.31	Feb	7.09	Feb	5.64	Feb	4.47	Feb	4.35		
Mar	14.03	Mar	9.39	Mar	7.13	Mar	5.86	Mar	4.59	Mar	4.26		
Apr	14.30	Apr	9.30	Apr	7.12	Apr	5.72	Apr	4.54	Apr	4.18		
May	14.95	May	9.29	May	7.11	May	5.60	May	4.36	May	4.10		
Jun	15.16	Jun	9.44	Jun	6.99	Jun	5.39	Jun	4.26	Jun	3.93		
Jul	14.92	Jul	9.40	Jul	6.99	Jul	5.50	Jul	4.12	Jul	3.79		
Aug	14.29	Aug	9.16	Aug	6.96	Aug	5.51	Aug	4.18	Aug	3.36		
Sep	14.04	Sep	9.03	Sep	6.88	Sep	5.54	Sep	4.17	Sept	3.44		
Oct	13.68	Oct	8.99	Oct	6.88	Oct	5.79	Oct	4.04	Oct	3.45		
Nov	13.15	Nov	8.93	Nov	6.96	Nov	5.88	Nov	3.95	Nov	3.48		
Dec	12.96	Dec	8.76	Dec	6.84	Dec	5.83	Dec	4.10	Dec	3.45		
Jan 1985	12.88	Jan 1992	8.67	Jan 1999	6.87	Jan 2006	5.77	Jan 2013	4.24	Jan 2020	3.34		
Feb	13.00	Feb	8.77	Feb	7.00	Feb	5.83	Feb	4.29	Feb	3.16		
Mar	13.66	Mar	8.84	Mar	7.18	Mar	5.98	Mar	4.29	Mar	3.59		
Apr	13.42	Apr	8.79	Apr	7.16	Apr	6.28	Apr	4.08	Apr	3.31		
May	12.89	May	8.72	May	7.42	May	6.39	May	4.24	May	3.22		
Jun	11.91	Jun	8.64	Jun	7.70	June	6.39	Jun	4.63	Jun	3.10		
Jul	11.88	Jul	8.46	Jul	7.66	July	6.37	Jul	4.78	Jul	2.77		
Aug	11.93	Aug	8.34	Aug	7.86	Aug	6.20	Aug	4.85	Aug	2.76		
Sep	11.95	Sep	8.32	Sep	7.87	Sep	6.03	Sept	4.90	Sep	2.88		
Oct	11.84	Oct	8.44	Oct	8.02	Oct	6.01	Oct	4.78	Oct	2.98		
Nov	11.33	Nov	8.53	Nov	7.86	Nov	5.82	Nov	4.86	Nov	2.89		
Dec	10.82	Dec	8.36	Dec	8.04	Dec	5.83	Dec	4.88	Dec	2.80		
Jan 1986	10.66	Jan 1993	8.23	Jan 2000	8.22	Jan 2007	5.96	Jan 2014	4.72	Jan 2021	2.94		
Feb	10.16	Feb	8.00	Feb	8.10	Feb	5.91	Feb	4.64	Feb	3.13		
Mar	9.33	Mar	7.85	Mar	8.14	Mar	5.87	Mar	4.64	Mar	3.48		
Apr	9.02	Apr	7.76	Apr	8.14	Apr	6.01	Apr	4.52	Apr	3.33		
May	9.52	May	7.78	May	8.56	May	6.03	May	4.37	May	3.36		
Jun	9.51	Jun	7.68	Jun	8.22	Jun	6.34	Jun	4.42	Jun	3.19		
Jul	9.19	Jul	7.53	Jul	8.17	Jul	6.28	Jul	4.35	Jul	2.99		
Aug	9.15	Aug	7.21	Aug	8.06	Aug	6.28	Aug	4.28	Aug	2.99		
Sep	9.42	Sep	7.01	Sep	8.15	Sep	6.24	Sep	4.40	Sep	3.00		
Oct	9.39	Oct	6.99	Oct	8.08	Oct	6.17	Oct	4.24	Oct	3.13		
Nov	9.15	Nov	7.30	Nov	8.03	Nov	6.04	Nov	4.29	Nov	3.06		
Dec	8.96	Dec	7.33	Dec	7.79	Dec	6.23	Dec	4.18	Dec	3.17		

Source:
Mergent Bond Record

SCHEDULE RTJ-d4-1

Missouri-American Water Company
WR-2022-0303

Average Yields on Thirty-Year U.S. Treasury Bonds

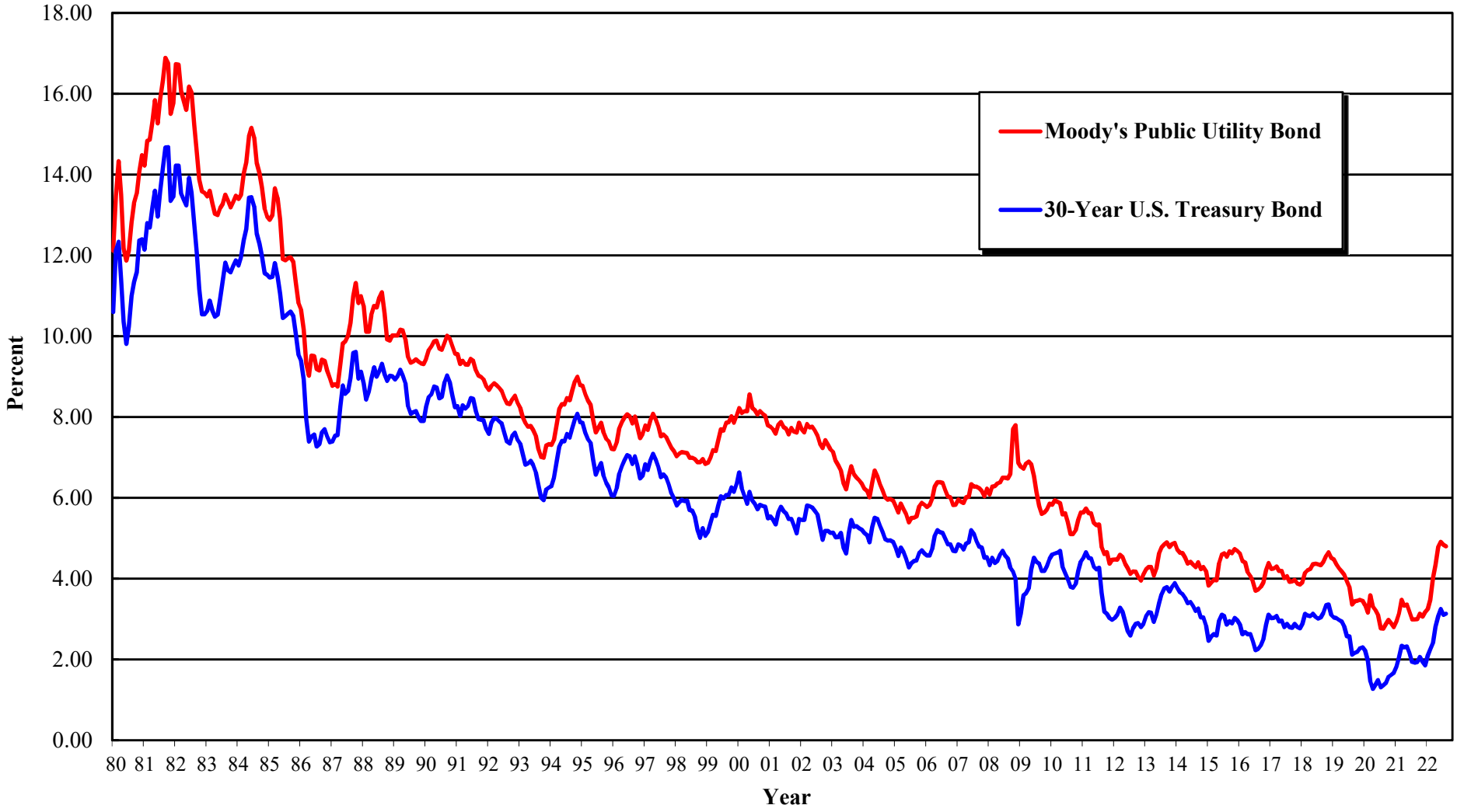
Mo/Year	Rate (%)	Mo/Year	Rate (%)	Mo/Year	Rate (%)	Mo/Year	Rate (%)	Mo/Year	Rate (%)	Mo/Year	Rate (%)	Mo/Year	Rate (%)
Jan 1980	10.60	May 1986	7.52	Sep 1992	7.34	Jan 1999	5.16	May 2005	4.49	Sep 2011	3.18	Jan 2018	2.88
Feb	12.13	Jun	7.57	Oct	7.53	Feb	5.37	Jun	4.28	Oct	3.13	Feb	3.13
Mar	12.34	Jul	7.27	Nov	7.61	Mar	5.58	Jul	4.38	Nov	3.02	Mar	3.09
Apr	11.40	Aug	7.33	Dec	7.44	Apr	5.55	Aug	4.44	Dec	2.98	Apr	3.07
May	10.36	Sep	7.62	Jan 1993	7.34	May	5.81	Sep	4.45	Jan 2012	3.03	May	3.13
Jun	9.81	Oct	7.70	Feb	7.09	Jun	6.04	Oct	4.64	Feb	3.11	Jun	3.05
Jul	10.24	Nov	7.52	Mar	6.82	Jul	5.98	Nov	4.70	Mar	3.28	Jul	3.01
Aug	11.00	Dec	7.37	Apr	6.85	Aug	6.07	Dec	4.62	Apr	3.18	Aug	3.04
Sep	11.34	Jan 1987	7.39	May	6.92	Sep	6.07	Jan 2006	4.57	May	2.93	Sep	3.15
Oct	11.59	Feb	7.54	Jun	6.81	Oct	6.26	Feb	4.57	Jun	2.70	Oct	3.34
Nov	12.37	Mar	7.55	Jul	6.63	Nov	6.15	Mar	4.73	Jul	2.59	Nov	3.36
Dec	12.40	Apr	8.25	Aug	6.32	Dec	6.35	Apr	5.06	Aug	2.77	Dec	3.10
Jan 1981	12.14	May	8.78	Sep	6.00	Jan 2000	6.63	May	5.20	Sep	2.88	Jan 2019	3.04
Feb	12.80	Jun	8.57	Oct	5.94	Feb	6.23	June	5.15	Oct	2.90	Feb	3.02
Mar	12.69	Jul	8.64	Nov	6.21	Mar	6.05	July	5.13	Nov	2.80	Mar	2.98
Apr	13.20	Aug	8.97	Dec	6.25	Apr	5.85	Aug	5.00	Dec	2.88	Apr	2.94
May	13.60	Sep	9.59	Jan 1994	6.29	May	6.15	Sep	4.85	Jan 2013	3.08	May	2.82
Jun	12.96	Oct	9.61	Feb	6.49	Jun	5.93	Oct	4.85	Feb	3.17	Jun	2.57
Jul	13.59	Nov	8.95	Mar	6.91	Jul	5.85	Nov	4.69	Mar	3.16	Jul	2.57
Aug	14.17	Dec	9.12	Apr	7.27	Aug	5.72	Dec	4.68	Apr	2.93	Aug	2.12
Sep	14.67	Jan 1988	8.83	May	7.41	Sep	5.83	Jan 2007	4.85	May	3.11	Sept	2.16
Oct	14.68	Feb	8.43	Jun	7.40	Oct	5.80	Feb	4.82	Jun	3.40	Oct	2.19
Nov	13.35	Mar	8.63	Jul	7.58	Nov	5.78	Mar	4.72	Jul	3.61	Nov	2.28
Dec	13.45	Apr	8.95	Aug	7.49	Dec	5.49	Apr	4.87	Aug	3.76	Dec	2.30
Jan 1982	14.22	May	9.23	Sep	7.71	Jan 2001	5.54	May	4.90	Sept	3.79	Jan 2020	2.22
Feb	14.22	Jun	9.00	Oct	7.94	Feb	5.45	Jun	5.20	Oct	3.68	Feb	1.97
Mar	13.53	Jul	9.14	Nov	8.08	Mar	5.34	Jul	5.11	Nov	3.80	Mar	1.46
Apr	13.37	Aug	9.32	Dec	7.87	Apr	5.65	Aug	4.93	Dec	3.89	Apr	1.27
May	13.24	Sep	9.06	Jan 1995	7.85	May	5.78	Sep	4.79	Jan 2014	3.77	May	1.38
Jun	13.92	Oct	8.89	Feb	7.61	Jun	5.67	Oct	4.77	Feb	3.66	Jun	1.49
Jul	13.55	Nov	9.02	Mar	7.45	Jul	5.61	Nov	4.52	Mar	3.62	Jul	1.31
Aug	12.77	Dec	9.01	Apr	7.36	Aug	5.48	Dec	4.53	Apr	3.52	Aug	1.36
Sep	12.07	Jan 1989	8.93	May	6.95	Sep	5.48	Jan 2008	4.33	May	3.39	Sep	1.42
Oct	11.17	Feb	9.01	Jun	6.57	Oct	5.32	Feb	4.52	Jun	3.42	Oct	1.57
Nov	10.54	Mar	9.17	Jul	6.72	Nov	5.12	Mar	4.39	Jul	3.33	Nov	1.62
Dec	10.54	Apr	9.03	Aug	6.86	Dec	5.48	Apr	4.44	Aug	3.20	Dec	1.67
Jan 1983	10.63	May	8.83	Sep	6.55	Jan 2002	5.45	May	4.60	Sep	3.26	Jan 2021	1.82
Feb	10.88	Jun	8.27	Oct	6.37	Feb	5.45	Jun	4.69	Oct	3.04	Feb	2.04
Mar	10.63	Jul	8.08	Nov	6.26	Mar	5.81	Jul	4.57	Nov	3.04	Mar	2.34
Apr	10.48	Aug	8.12	Dec	6.06	Apr	5.79	Aug	4.50	Dec	2.83	Apr	2.30
May	10.53	Sep	8.15	Jan 1996	6.05	May	5.76	Sep	4.27	Jan 2015	2.46	May	2.32
Jun	10.93	Oct	8.00	Feb	6.24	Jun	5.68	Oct	4.17	Feb	2.57	Jun	2.16
Jul	11.40	Nov	7.90	Mar	6.60	Jul	5.59	Nov	4.00	Mar	2.63	Jul	1.94
Aug	11.82	Dec	7.90	Apr	6.79	Aug	5.28	Dec	2.87	Apr	2.59	Aug	1.92
Sep	11.63	Jan 1990	8.26	May	6.93	Sep	4.96	Jan 2009	3.13	May	2.96	Sep	1.94
Oct	11.58	Feb	8.50	Jun	7.06	Oct	5.18	Feb	3.59	Jun	3.11	Oct	2.06
Nov	11.75	Mar	8.56	Jul	7.03	Nov	5.18	Mar	3.64	Jul	3.07	Nov	1.94
Dec	11.88	Apr	8.76	Aug	6.84	Dec	5.13	Apr	3.76	Aug	2.86	Dec	1.85
Jan 1984	11.75	May	8.73	Sep	7.03	Jan 2003	5.14	May	4.23	Sep	2.95	Jan 2022	2.10
Feb	11.95	Jun	8.46	Oct	6.81	Feb	5.02	Jun	4.52	Oct	2.89	Feb	2.25
Mar	12.38	Jul	8.50	Nov	6.48	Mar	5.03	Jul	4.41	Nov	3.03	Mar	2.41
Apr	12.65	Aug	8.86	Dec	6.55	Apr	5.13	Aug	4.37	Dec	2.97	Apr	2.81
May	13.43	Sep	9.03	Jan 1997	6.83	May	4.76	Sep	4.19	Jan 2016	2.86	May	3.07
Jun	13.44	Oct	8.86	Feb	6.69	Jun	4.62	Oct	4.19	Feb	2.62	Jun	3.25
Jul	13.21	Nov	8.54	Mar	6.93	Jul	5.13	Nov	4.31	Mar	2.68	Jul	3.10
Aug	12.54	Dec	8.24	Apr	7.09	Aug	5.45	Dec	4.49	Apr	2.62	Aug	3.13
Sep	12.29	Jan 1991	8.27	May	6.94	Sep	5.28	Jan 2010	4.60	May	2.63		
Oct	11.98	Feb	8.03	Jun	6.77	Oct	5.30	Feb	4.62	Jun	2.45		
Nov	11.56	Mar	8.29	Jul	6.51	Nov	5.25	Mar	4.64	Jul	2.23		
Dec	11.52	Apr	8.21	Aug	6.58	Dec	5.21	April	4.69	Aug	2.26		
Jan 1985	11.45	May	8.27	Sep	6.50	Jan 2004	5.13	May	4.29	Sep	2.35		
Feb	11.47	Jun	8.47	Oct	6.33	Feb	5.08	Jun	4.13	Oct	2.50		
Mar	11.81	Jul	8.45	Nov	6.11	Mar	4.90	Jul	3.99	Nov	2.86		
Apr	11.47	Aug	8.14	Dec	5.99	Apr	5.28	Aug	3.80	Dec	3.11		
May	11.05	Sep	7.95	Jan 1998	5.81	May	5.51	Sep	3.77	Jan 2017	3.02		
Jun	10.45	Oct	7.93	Feb	5.89	Jun	5.48	Oct	3.87	Feb	3.03		
Jul	10.50	Nov	7.92	Mar	5.95	Jul	5.31	Nov	4.19	Mar	3.08		
Aug	10.56	Dec	7.70	Apr	5.92	Aug	5.15	Dec	4.42	Apr	2.94		
Sep	10.61	Jan 1992	7.58	May	5.93	Sep	4.98	Jan 2011	4.52	May	2.96		
Oct	10.50	Feb	7.85	Jun	5.70	Oct	4.94	Feb	4.65	Jun	2.80		
Nov	10.06	Mar	7.97	Jul	5.68	Nov	4.95	Mar	4.51	July	2.88		
Dec	9.54	Apr	7.96	Aug	5.54	Dec	4.91	Apr	4.50	Aug	2.80		
Jan 1986	9.40	May	7.89	Sep	5.20	Jan 2005	4.77	May	4.29	Sep	2.78		
Feb	8.93	Jun	7.84	Oct	5.01	Feb	4.56	Jun	4.23	Oct	2.88		
Mar	7.96	Jul	7.60	Nov	5.25	Mar	4.77	Jul	4.27	Nov	2.80		
Apr	7.39	Aug	7.39	Dec	5.06	Apr	4.65	Aug	3.65	Dec	2.77		

Sources:
http://research.stlouisfed.org/fred2/data/GS30.txt

SCHEDULE RTJ-d4-2

MISSOURI-AMERICAN WATER COMPANY
Case No. WR-2022-0303

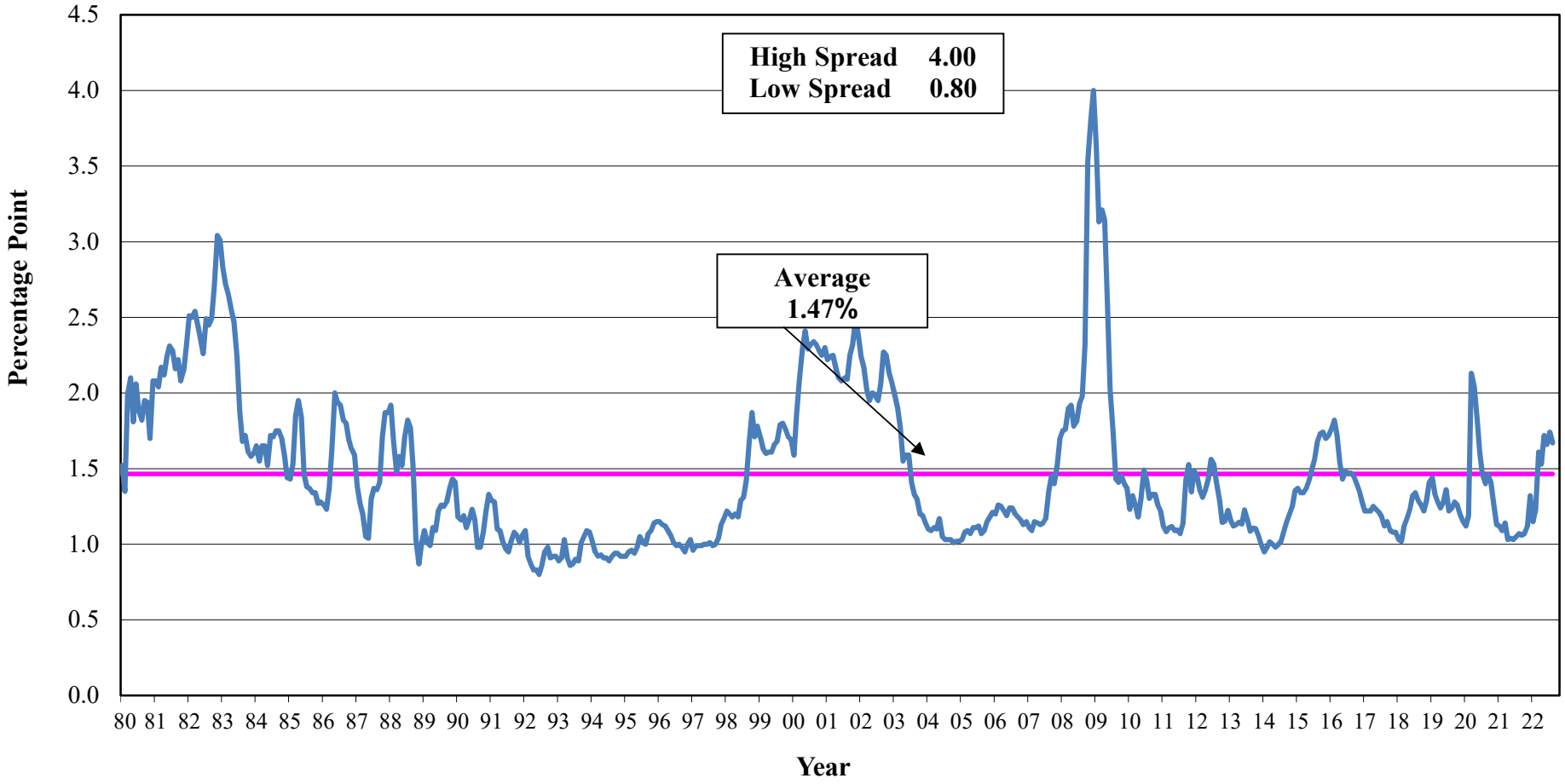
Average Yields on Mergent's Public Utility Bonds and Thirty-Year U.S. Treasury Bonds (1980 - 2022)



SCHEDULE RTJ-d4-3

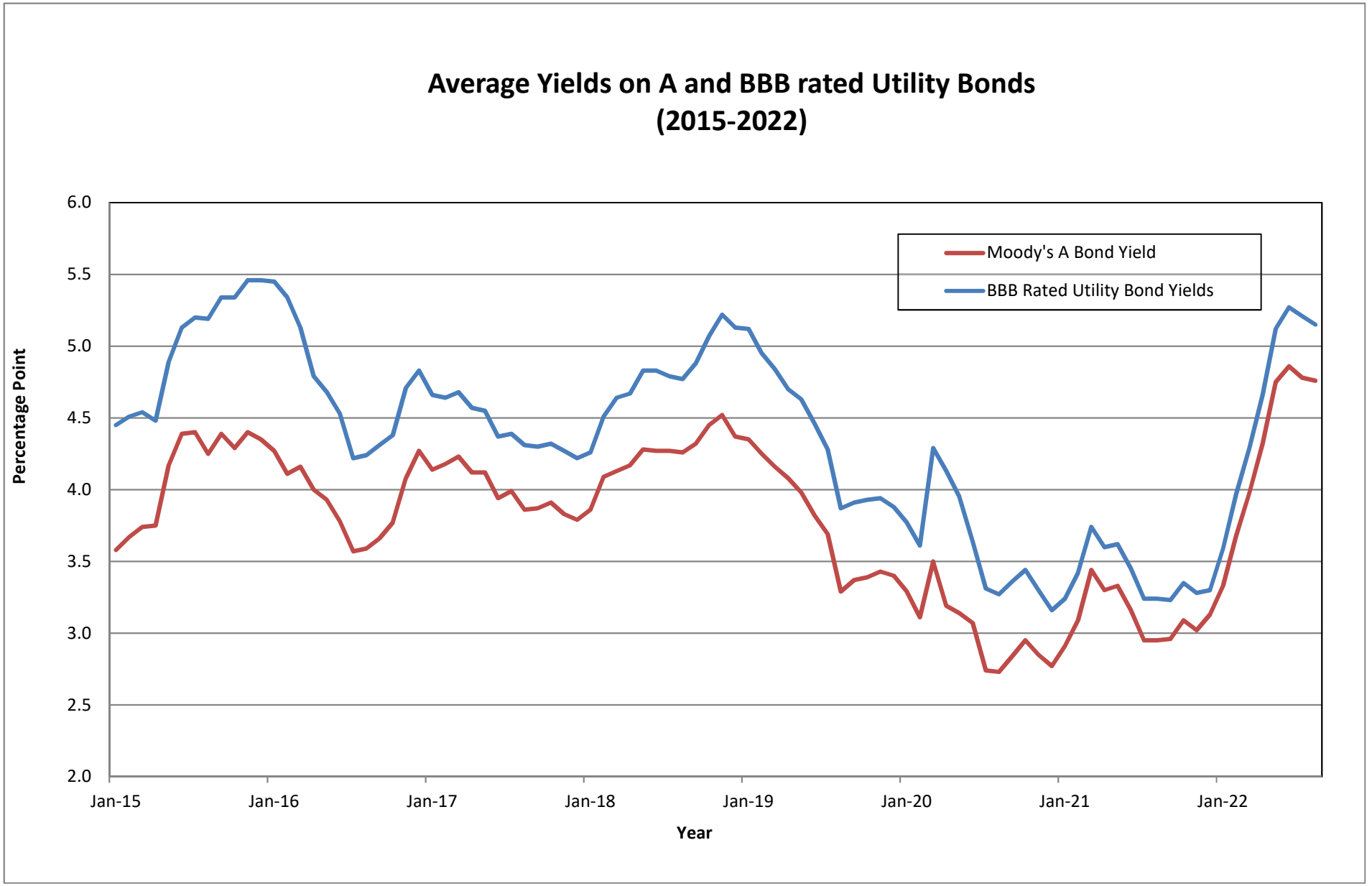
MISSOURI-AMERICAN WATER COMPANY
Case No. WR-2022-0303

Monthly Spreads Between Yields on Moody's Public Utility Bonds and 30-Year U.S. Treasury Bonds (1980 - 2022)



SCHEDULE RTJ-d4-4

MISSOURI-AMERICAN WATER COMPANY
Case No. WR-2022-0303



SCHEDULE RTJ-d4-5

Missouri-American Water Company
WR-2022-0303

Historical Consolidated Capital Structures for American Water Consolidated

(*Dollars in Millions*)

Capital Components	March 31, 2019 [1]	June 30, 2019 [1]	September 30, 2019 [1]	December 31, 2019 [1]
Common Equity	$5,932.0	$6,027.0	$6,190.0	$6,121.0
Preferred Stock	$6.0	$6.0	$6.0	$5.0
Long-Term Debt	$7,568.0	$8,642.0	$8,640.0	$8,639.0
	$13,506.0	**$14,675.0**	**$14,836.0**	**$14,765.0**

Capital Components	March 31, 2020 [1]	June 30, 2020 [1]	September 30, 2020 [1]	December 31, 2020 [1]
Common Equity	$6,243.0	$6,338.00	$6,512.0	$6,454.0
Preferred Stock	$4.0	$4.00	$4.0	$4.0
Long-Term Debt	$8,621.0	$9,589.00	$9,580.0	$9,329.0
	$14,868.0	**$15,931.0**	**$16,096.0**	**$15,787.0**

Capital Components	March 31, 2021 [1]	June 30, 2021 [1]	September 30, 2021 [1]	December 31, 2021 [1]
Common Equity	$6,583.0	$6,690.0	$6,866.0	$7,298.0
Preferred Stock	$3.0	$3.00	$3.0	$3.0
Long-Term Debt	$9,325.0	$10,343.0	$10,349.0	$10,341.0
	$15,911.0	**$17,036.0**	**$17,218.0**	**$17,642.0**

Capital Components	March 31, 2022 [2]	June 30, 2022 [2]	September 30, 2022	December 31, 2022
Common Equity	$7,460.0	$7,570.0		
Preferred Stock	$3.0	$3.0		
Long-Term Debt	$10,347.0	$11,023.0		
	$17,810.0	**$18,596.0**		

Historical Consolidated Capital Structures for Missouri-American Water

(*Dollars in Millions*)

Capital Components	March 31, 2019 [3]	June 30, 2019 [3]	September 30, 2019 [3]	December 31, 2019 [3]
Common Equity	$684.7	$689.3	$708.4	$778.8
Preferred Stock	$0.5	$0.5	$0.5	$0.2
Long-Term Debt	$623.5	$697.6	$697.8	$698.0
Total	**$1,308.7**	**$1,387.4**	**$1,406.6**	**$1,477.0**

Capital Components	March 31, 2020 [3]	June 30, 2020 [3]	September 30, 2020 [3]	December 31, 2020 [3]
Common Equity	$773.9	$824.1	$886.2	$935.6
Preferred Stock	$0.0	$0.0	$0.0	$0.0
Long-Term Debt	$698.2	$807.0	$807.2	$807.4
Total	**$1,472.0**	**$1,631.1**	**$1,693.4**	**$1,743.0**

Capital Components	March 31, 2021 [3]	June 30, 2021 [3]	September 30, 2021 [3]	December 31, 2021 [3]
Common Equity	$930.7	$945.8	$964.5	$952.2
Preferred Stock	$0.0	$0.00	$0.0	$0.0
Long-Term Debt	$807.6	$881.8	$882.3	$882.7
	$1,738.3	**$1,827.7**	**$1,846.8**	**$1,834.9**

Capital Components	March 31, 2022 [2]	June 30, 2022 [2]	September 30, 2022	December 31, 2022
Common Equity	$1,039.8	$1,116.8		
Preferred Stock	$0.0	$0.0		
Long-Term Debt	$910.0	$1,108.6		
	$1,949.8	**$2,225.4**		

Sources:

[1] SEC Form 10-Q and 10-K

[2] WR-2022-0303 DR 0035.1

[3] WR-2022-0303 DR 0059.1

American Water Consolidated "Long-Term Debt" does not include the "Current Portion of Long-term Debt".

Missouri-American Water Company
WR-2022-0303

Historical Consolidated Capital Structures for American Water Consolidated

(*Dollars in Millions)*

Capital Components	March 31, 2019	June 30, 2019	September 30, 2019	December 31, 2019
Common Equity	43.92%	41.07%	41.72%	41.46%
Preferred Stock	0.04%	0.04%	0.04%	0.03%
Long-Term Debt	56.03%	58.89%	58.24%	58.51%
	100.00%	100.00%	100.00%	100.00%

Capital Components	March 31, 2020	June 30, 2020	September 30, 2020	December 31, 2020
Common Equity	41.99%	39.78%	40.46%	40.88%
Preferred Stock	0.03%	0.03%	0.02%	0.03%
Long-Term Debt	57.98%	60.19%	59.52%	59.09%
	100.00%	100.00%	100.00%	100.00%

Capital Components	March 31, 2021	June 30, 2021	September 30, 2021	December 31, 2021
Common Equity	41.37%	39.27%	39.88%	41.37%
Preferred Stock	0.02%	0.02%	0.02%	0.02%
Long-Term Debt	58.61%	60.71%	60.11%	58.62%
	100.00%	100.00%	100.00%	100.00%

Capital Components	March 31, 2022	June 30, 2022	September 30, 2022	December 31, 2022
Common Equity	41.89%	40.71%		
Preferred Stock	0.02%	0.02%		
Long-Term Debt	58.10%	59.28%		
	100.00%	100.00%		

Historical Consolidated Capital Structures for Missouri-American Water

(*Dollars in Millions)*

Capital Components	March 31, 2019	June 30, 2019	September 30, 2019	December 31, 2019
Common Equity	52.32%	49.69%	50.36%	52.73%
Preferred Stock	0.04%	0.03%	0.03%	0.02%
Long-Term Debt	47.65%	50.28%	49.61%	47.26%
Total	100.00%	100.00%	100.00%	100.00%

Capital Components	March 31, 2020	June 30, 2020	September 30, 2020	December 31, 2020
Common Equity	52.57%	50.53%	52.33%	53.68%
Preferred Stock	0.00%	0.00%	0.00%	0.00%
Long-Term Debt	47.43%	49.47%	47.67%	46.32%
Total	100.00%	100.00%	100.00%	100.00%

Capital Components	March 31, 2021	June 30, 2021	September 30, 2021	December 31, 2021
Common Equity	53.54%	51.75%	52.23%	51.89%
Preferred Stock	0.00%	0.00%	0.00%	0.00%
Long-Term Debt	46.46%	48.25%	47.77%	48.11%
	100.00%	100.00%	100.00%	100.00%

Capital Components	March 31, 2022	June 30, 2022	September 30, 2022	December 31, 2022
Common Equity	53.33%	50.18%		
Preferred Stock	0.00%	0.00%		
Long-Term Debt	46.67%	49.82%		
	100.00%	100.00%		

Sources:

SEC Form 10-Q and 10-K

WR-2022-0303 DR 0035.1

WR-2022-0303 DR 0059.1

American Water Consolidated "Long-Term Debt" does not include the "Current Portion of Long-term Debt".

Missouri-American Water Company
WR-2022-0303

Capital Structure as of June 30, 2022
American Water Consolidated
(Dollars in Millions)

Capital Component	Amount	Percentage of Capital
Common Stock Equity	$7,570	40.71%
Preferred Stock	$3	0.02%
Long-Term Debt	$11,023	59.28%
Total Capitalization	**$18,596**	**100.00%**

Capital Structure as of June 30, 2022
Missouri-American Water
(Dollars in Millions)

Capital Component	Amount	Percentage of Capital
Common Stock Equity	$1,117	50.18%
Preferred Stock	$0	0.00%
Long-Term Debt	$1,109	49.82%
Total Capitalization	**$2,225**	**100.00%**

Sources:
SEC Form 10-Q and 10-K
DR 0037

Missouri-American Water Company
WR-2022-0303

Embedded Cost of Long-Term Debt as of June 30, 2022

American Water Consolidated
(In millions)

Total Annual Cost:	** [redacted] **
Total Carrying Value:	** [redacted] **
Embedded Cost = Total Annual Cost/Total Carrying Value	** [redacted] **

Missouri-American Water
(In millions)

Total Annual Cost:	** [redacted] **
Total Carrying Value:	** [redacted] **
Embedded Cost = Total Annual Cost/Total Carrying Value	** [redacted] **

Note:
Source:
Staff Data Request Nos. 0040 & 0040.1

Missouri-American Water Company
WR-2022-0303

Embedded Cost of Preferred Stock as of June 30, 2022

American Water Consolidated
(In millions)

Total Annual Cost:	**	[redacted]	**
Total Carrying Value:	**	[redacted]	**
Embedded Cost = Total Annual Cost/Total Carrying Value	**	[redacted]	**

Missouri-American Water
(In millions)

Total Annual Cost:	N/A
Total Carrying Value:	N/A
Embedded Cost = Total Annual Cost/Total Carrying Value	N/A

Note:
Source:
Staff Dtata Request No. 0040

CONFIDENTIAL
SCHEDULE RTJ-d8

Missouri-American Water Company
WR-2022-0303

WATER PROXY GROUP SCREENING DATA AND RESULTS

			[1]	[2]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	
	Water Utility Companies	Ticker	Stock Publicly Traded	Information Provided by Value Line	5-Year Data Available	Dividends	At Least Investment Grade Credit Rating	S&P Global Rating	Moody's	At least 60% of Regulated Income from Water & Wastewater Utility Operations	At least 60% of Assets are Water Distribution Operations	No Reduced Dividend Since 2017	Positive Growth Rates from at Least Two Sources	Covered by More Than 2 Analyst	Comparable Company Met All Criteria
1	American States Water Co	AWR	Yes	Yes	Yes	Yes	Yes	A+	WR	Yes	Yes	Yes	Yes	Yes	Yes
2	American Water Works Company Inc	AWK	Yes	Yes	Yes	Yes	Yes	A	Baa1	Yes	Yes	Yes	Yes	Yes	Yes
3	California Water Service Group	CWT	Yes	Yes	Yes	Yes	Yes	A+	WR	Yes	Yes	Yes	Yes	Yes	Yes
4	Consolidated Water Co. Ltd.	CWCO	Yes	Yes	Yes	Yes	No	N/A	N/A	Yes		Yes			No
5	Essential Utilities Inc.	WTRG	Yes	Yes	Yes	Yes	Yes	A	N/A	Yes	Yes	Yes	Yes	Yes	Yes
6	Middlesex Water Company	MSEX	Yes	Yes	Yes	Yes	Yes	A	N/A	Yes	Yes	Yes	Yes	Yes	Yes
7	SJW Group	SJW	Yes	Yes	Yes	Yes	Yes	A-	N/A	Yes	Yes	Yes	Yes	Yes	Yes

Note:

[1] Source: The Value Line Investment Survey: Ratings & Reports
[2] Source: The Value Line Investment Survey: Ratings & Reports
[3] Source: Reuters, https://www.reuters.com/
[4] Source: The Value Line Investment Survey: Ratings & Reports
[5] Source: The Value Line Investment Survey: Ratings & Reports
[6] Source: S&P Global Market Intelligence
[7] Source: S&P Global Market Intelligence
[8] Source: S&P Global Market Intelligence
[9] Source: SEC Form 10-K Filings
[10] Source: SEC Form 10-K Filings
[11] Source: The Value Line Investment Survey: Ratings & Reports
[12] Source: S&P Global Market Intelligence, Value Line Investment Survey, Yahoo! Finance, and Zacks
[13] Source: S&P Global Market Intelligence, Value Line Investment Survey, Yahoo! Finance, and Zacks

Missouri-American Water Company
WR-2022-0303

PROXY GROUP LIST

	Water Utility Companies	Ticker
1	American States Water Co	AWR
2	American Water Works Company Inc.	AWK
3	California Water Service Group	CWT
4	Essential Utilities Inc.	WTRG
5	Middlesex Water Company	MSEX
6	SJW Group	SJW

Missouri-American Water Company
WR-2022-0303

Growth Rate Estimates
Based on Dividend per Share (DPS) and Earning per Share (EPS)
for the Comparable Water Utility Companies

			[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]
	2022 Q2		Past 10-Years			Past 5-Year			Projected			Average			Projective	Projective
	Water Utility Companies	Ticker	EPS	DPS	BVPS	EPS	DPS	BVPS	EPS	DPS	BVPS	EPS	DPS	BVPS	Growth	Nominal GDP
1	American States Water Co	AWR	9.00%	9.50%	5.50%	8.50%	8.00%	6.00%	5.50%	9.00%	5.50%	7.67%	8.83%	5.67%	6.67%	3.90%
2	American Water Works Company Inc.	AWK	12.00%	9.50%	4.50%	13.50%	10.00%	5.00%	3.00%	8.50%	8.00%	9.50%	9.33%	5.83%	6.50%	3.90%
3	California Water Service Group	CWT	6.50%	3.50%	6.00%	11.00%	5.00%	7.00%	6.50%	6.50%	5.00%	8.00%	5.00%	6.00%	6.00%	3.90%
4	Essential Utilities Inc.	WTRG	6.00%	7.50%	11.00%	1.00%	7.00%	14.00%	10.00%	8.00%	6.00%	5.67%	7.50%	10.33%	8.00%	3.90%
5	Middlesex Water Company	MSEX	9.50%	3.50%	6.00%	11.00%	6.00%	9.00%	4.50%	5.00%	2.50%	8.33%	4.83%	5.83%	4.00%	3.90%
6	SJW Group	SJW	6.00%	6.50%	9.00%	-6.50%	10.50%	11.50%	14.00%	5.50%	4.00%	4.50%	7.50%	8.17%	7.83%	3.90%
	Average		8.17%	6.67%	7.00%	6.42%	7.75%	8.75%	7.25%	7.08%	5.17%	7.28%	7.17%	6.97%	6.50%	3.90%

	2021 Q1		Past 10-Years			Past 5-Year			Projected			Average			Projective	Projective
	Water Utility Companies	Ticker	EPS	DPS	BVPS	EPS	DPS	BVPS	EPS	DPS	BVPS	EPS	DPS	BVPS	Growth	Nominal GDP
1	American States Water Co	AWR	9.00%	8.50%	5.50%	5.50%	7.50%	5.00%	6.50%	9.50%	5.50%	7.00%	8.50%	5.33%	7.17%	3.80%
2	American Water Works Company Inc.	AWK	10.50%	11.00%	3.50%	8.00%	11.50%	4.50%	8.50%	8.50%	5.00%	9.00%	10.33%	4.33%	7.33%	3.80%
3	California Water Service Group	CWT	5.00%	3.00%	5.00%	8.00%	4.00%	5.00%	6.50%	6.50%	4.00%	6.50%	4.50%	4.67%	5.67%	3.80%
4	Essential Utilities Inc.	WTRG	5.50%	7.50%	9.50%	-1.50%	7.50%	11.50%	10.00%	7.50%	4.50%	4.67%	7.50%	8.50%	7.33%	3.80%
5	Middlesex Water Company	MSEX	9.00%	3.00%	5.50%	12.50%	5.00%	8.00%	4.50%	5.50%	2.50%	8.67%	4.50%	5.33%	4.17%	3.80%
6	SJW Group	SJW	7.00%	6.00%	8.50%	-0.50%	10.00%	12.50%	13.00%	6.00%	4.50%	6.50%	7.33%	8.50%	7.83%	3.80%
	Average		7.67%	6.50%	6.25%	5.33%	7.58%	7.75%	8.17%	7.25%	4.33%	7.06%	7.11%	6.11%	6.58%	3.80%

Note:

[1] Source: The Value Line Investment Survey
[2] Source: The Value Line Investment Survey
[3] Source: The Value Line Investment Survey
[4] Source: The Value Line Investment Survey
[5] Source: The Value Line Investment Survey
[6] Source: The Value Line Investment Survey
[7] Source: The Value Line Investment Survey
[8] Source: The Value Line Investment Survey
[9] Source: The Value Line Investment Survey
[10] =([1]+[4]+[7])/3
[11] =([2]+[5]+[8])/3
[12] =([3]+[6]+[9])/3
[13] =([7]+[8]+[9])/3
[14] Source: Congress Budget Office (CBO), Budget Economic Outlook

Missouri-American Water Company
WR-2022-0303

Average High / Low Stock Price
for the Comparable Water Utility Companies

			[1]	[2]	[3]	[4]	[5]	[6]	[7]
	2022 Q2		April 2022		May 2022		June 2022		(4/01/22 - 6/30/22)
	Company Name	Ticker	Avg High Stock Price	Avg Low Stock Price	Avg High Stock Price	Avg Low Stock Price	Avg High Stock Price	Avg Low Stock Price	Average High/Low Stock Price
1	American States Water Co	AWR	87.44	85.28	78.75	76.73	78.55	76.51	80.54
2	American Water Works Company Inc.	AWK	167.19	163.38	149.21	145.62	147.28	143.12	152.63
3	California Water Service Group	CWT	57.42	55.85	53.17	51.76	53.50	52.02	53.95
4	Essential Utilities Inc.	WTRG	50.19	49.10	45.62	44.42	45.43	44.30	46.51
5	Middlesex Water Company	MSEX	99.45	96.38	89.43	86.60	85.40	82.58	89.97
6	SJW Group	SJW	66.37	64.59	60.92	59.23	61.10	59.51	61.95
								Average	**80.93**

			[1]	[2]	[3]	[4]	[5]	[6]	[7]
	2021 Q1		January 2021		February 2021		March 2021		(1/01/21 - 3/31/21)
	Company Name	Ticker	Avg High Stock Price	Avg Low Stock Price	Avg High Stock Price	Avg Low Stock Price	Avg High Stock Price	Avg Low Stock Price	Average High/Low Stock Price
1	American States Water Co	AWR	81.04	79.28	79.94	78.06	73.79	72.27	77.40
2	American Water Works Company Inc.	AWK	159.26	155.40	161.01	157.56	142.22	138.84	152.38
3	California Water Service Group	CWT	55.64	54.15	58.16	56.74	54.65	53.52	55.48
4	Essential Utilities Inc.	WTRG	47.30	46.07	46.87	45.89	43.49	42.56	45.36
5	Middlesex Water Company	MSEX	74.72	71.96	79.41	76.55	76.94	74.59	75.70
6	SJW Group	SJW	68.71	66.79	68.82	66.98	61.69	60.25	65.54
								Average	**78.64**

Note:

[1] Source: Wall Street Journal, https://www.wsj.com/market-data

[2] Source: Wall Street Journal, https://www.wsj.com/market-data

[3] Source: Wall Street Journal, https://www.wsj.com/market-data

[4] Source: Wall Street Journal, https://www.wsj.com/market-data

[5] Source: Wall Street Journal, https://www.wsj.com/market-data

[6] Source: Wall Street Journal, https://www.wsj.com/market-data

[7] = ([1]+[2]+[3]+[4]+[5]+[6]) / 6

Missouri-American Water Company
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Discounted Cash Flow (DCF) Costs of Common Equity (COE) Estimates
Based on Dividend per Share, Earning per Share, Stock Price, and Growth Rate
for the Comparable Water Utility Companies

2022 Q2 DCF COE estimate

	Water Utility Companies	Ticker	[1] 2021 Dividend per Share	[2] Stock Price	[3] Dividend Yield	[4] Expected Dividend Yield	[5] Projected Growth	[6] Projected GDP Growth	[7] Growth Rate	[8] COE
1	American States Water Co	AWR	1.40	80.54	1.74%	1.79%	6.67%	3.90%	6.11%	7.90%
2	American Water Works Company Inc.	AWK	2.36	152.63	1.55%	1.59%	6.50%	3.90%	5.98%	7.57%
3	California Water Service Group	CWT	0.92	53.95	1.71%	1.75%	6.00%	3.90%	5.58%	7.33%
4	Essential Utilities Inc.	WTRG	1.04	46.51	2.24%	2.32%	8.00%	3.90%	7.18%	9.50%
5	Middlesex Water Company	MSEX	1.11	89.97	1.23%	1.26%	4.00%	3.90%	3.98%	5.24%
6	SJW Group	SJW	1.36	61.95	2.20%	2.27%	7.83%	3.90%	7.05%	9.32%
	Average		1.37	80.93	1.78%	1.83%	6.50%	3.90%	5.98%	7.81%
									DCF Lower Bound	7.60%
									DCF Upper Bound	8.27%
									DCF COE	7.93%

2021 Q1 DCF COE estimate

	Water Utility Companies	Ticker	[1] 2020 Dividend per Share	[2] Stock Price	[3] Dividend Yield	[4] Expected Dividend Yield	[5] Projected Growth	[6] Projected GDP Growth	[7] Growth Rate	[8] COE
1	American States Water Co	AWR	1.28	77.40	1.65%	1.71%	7.17%	3.80%	6.49%	8.20%
2	American Water Works Company Inc.	AWK	2.15	152.38	1.41%	1.46%	7.33%	3.80%	6.63%	8.08%
3	California Water Service Group	CWT	0.85	55.48	1.53%	1.57%	5.67%	3.80%	5.29%	6.87%
4	Essential Utilities Inc.	WTRG	0.97	45.36	2.14%	2.21%	7.33%	3.80%	6.63%	8.84%
5	Middlesex Water Company	MSEX	1.04	75.70	1.37%	1.40%	4.17%	3.80%	4.09%	5.50%
6	SJW Group	SJW	1.28	65.54	1.95%	2.02%	7.83%	3.80%	7.03%	9.05%
	Average		1.26	78.64	1.68%	1.73%	6.58%	3.80%	6.03%	7.75%
									DCF Lower Bound	7.72%
									DCF Upper Bound	8.37%
									DCF COE	8.05%

2021 Q1 DCF COE estimate	8.05%
2022 Q2 DCF COE estimate	7.93%
Difference of Averages between Q1 2021 and Q4 2021	-0.11%

Note:

[1] Source: The Value Line Investment Survey: Ratings & Reports.

[2] Source: The Wall Street Journal; Monthly Average.

[3] = [1] / [2]

[4] = [3] x (1 + .5 x [7])

[5] Source: [13] of Growth Rate RTJ-d11

[6] Source: Congress Budget Office (CBO), Budget Economic Outlook

[7] = (4 x [5] + [6]) / 5

[8] = [4] + [7]

Missouri-American Water Company
WR-2022-0303

Capital Asset Pricing Model (CAPM) Costs of Common Equity (COE) Estimates
Based on Historical Return Differences Between Common Stocks and Long-Term U.S. Treasuries
for the Comparable Water Utility Companies

2022 Q2 CAPM Estimate

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]
				Kroll, LLC (1926-2021)				NYU Stern (1928-2021)				Market Risk Premium				CAPM Cost of Common Equity			
				Large Company Stocks		Long-term G-Bonds		S&P 500		US Treasury Bond		Kroll, LLC		NYU Stern		Kroll, LLC		NYU Stern	
		Risk-Free		Geometric	Arithmetic	Geometric	Arithmetic	Geometric	Arithmetic	Geometric	Arithmetic	Geometric	Arithmetic	Geometric	Arithmetic	Geometric	Arithmetic	Geometric	Arithmetic
	Water Utility Companies	Rate	Beta	Mean Return	Mean Return	Mean Return	Mean Return	Mean Return	Mean Return	Mean Return	Mean Return	Mean Return	Mean Return	Mean Return	Mean Return	Mean Return	Mean Return	Mean Return	Mean Return
1	American States Water Co	3.04%	0.65	10.46%	12.33%	5.85%	6.30%	9.98%	11.82%	4.84%	5.11%	4.61%	6.03%	5.13%	6.71%	6.04%	6.96%	6.38%	7.40%
2	American Water Works Company Inc.	3.04%	0.85	10.46%	12.33%	5.85%	6.30%	9.98%	11.82%	4.84%	5.11%	4.61%	6.03%	5.13%	6.71%	6.96%	8.17%	7.41%	8.75%
3	California Water Service Group	3.04%	0.65	10.46%	12.33%	5.85%	6.30%	9.98%	11.82%	4.84%	5.11%	4.61%	6.03%	5.13%	6.71%	6.04%	6.96%	6.38%	7.40%
4	Essential Utilities Inc.	3.04%	0.95	10.46%	12.33%	5.85%	6.30%	9.98%	11.82%	4.84%	5.11%	4.61%	6.03%	5.13%	6.71%	7.42%	8.77%	7.92%	9.42%
5	Middlesex Water Company	3.04%	0.70	10.46%	12.33%	5.85%	6.30%	9.98%	11.82%	4.84%	5.11%	4.61%	6.03%	5.13%	6.71%	6.27%	7.26%	6.64%	7.74%
6	SJW Group	3.04%	0.80	10.46%	12.33%	5.85%	6.30%	9.98%	11.82%	4.84%	5.11%	4.61%	6.03%	5.13%	6.71%	6.73%	7.87%	7.15%	8.41%
	Average	3.04%	0.77	10.46%	12.33%	5.85%	6.30%	9.98%	11.82%	4.84%	5.11%	4.61%	6.03%	5.13%	6.71%	6.58%	7.67%	6.98%	8.19%
																	CAPM Lower Bound		6.23%
																	CAPM Upper Bound		8.64%
																	Average		7.44%

2021 Q1 CAPM Estimate

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]
				Kroll, LLC (1926-2020)				NYU Stern (1928-2020)				Market Risk Premium				CAPM Cost of Common Equity			
				Large Company Stocks		Long-term G-Bonds		S&P 500		US Treasury Bond		Kroll, LLC		NYU Stern		Kroll, LLC		NYU Stern	
		Risk-Free		Geometric	Arithmetic	Geometric	Arithmetic	Geometric	Arithmetic	Geometric	Arithmetic	Geometric	Arithmetic	Geometric	Arithmetic	Geometric	Arithmetic	Geometric	Arithmetic
	Water Utility Companies	Rate	Beta	Mean Return	Mean Return	Mean Return	Mean Return	Mean Return	Mean Return	Mean Return	Mean Return	Mean Return	Mean Return	Mean Return	Mean Return	Mean Return	Mean Return	Mean Return	Mean Return
1	American States Water Co	2.07%	0.65	10.29%	12.16%	5.65%	6.08%	9.79%	11.64%	4.95%	5.21%	4.63%	6.07%	4.84%	6.43%	5.08%	6.01%	5.22%	6.25%
2	American Water Works Company Inc.	2.07%	0.85	10.29%	12.16%	5.65%	6.08%	9.79%	11.64%	4.95%	5.21%	4.63%	6.07%	4.84%	6.43%	6.00%	7.23%	6.18%	7.53%
3	California Water Service Group	2.07%	0.65	10.29%	12.16%	5.65%	6.08%	9.79%	11.64%	4.95%	5.21%	4.63%	6.07%	4.84%	6.43%	5.08%	6.01%	5.22%	6.25%
4	Essential Utilities Inc.	2.07%	0.95	10.29%	12.16%	5.65%	6.08%	9.79%	11.64%	4.95%	5.21%	4.63%	6.07%	4.84%	6.43%	6.47%	7.84%	6.67%	8.17%
5	Middlesex Water Company	2.07%	0.70	10.29%	12.16%	5.65%	6.08%	9.79%	11.64%	4.95%	5.21%	4.63%	6.07%	4.84%	6.43%	5.31%	6.32%	5.46%	6.57%
6	SJW Group	2.07%	0.85	10.29%	12.16%	5.65%	6.08%	9.79%	11.64%	4.95%	5.21%	4.63%	6.07%	4.84%	6.43%	6.00%	7.23%	6.18%	7.53%
	Average	2.07%	0.78	10.29%	12.16%	5.65%	6.08%	9.79%	11.64%	4.95%	5.21%	4.63%	6.07%	4.84%	6.43%	5.66%	6.77%	5.82%	7.05%
																	CAPM Lower Bound		5.17%
																	CAPM Upper Bound		7.63%
																	Average		6.40%

Note:

[1] Source: 3-Month Average of 30-Year Treasury Bond
[2] Source: Value Line, Investment Survey.
[3] Source: Kroll, LLC, the Stocks, Bonds, Bills, and Inflation (SBBI®) Monthly Dataset.
[4] Source: Kroll, LLC, the Stocks, Bonds, Bills, and Inflation (SBBI®) Monthly Dataset.
[5] Source: Kroll, LLC, the Stocks, Bonds, Bills, and Inflation (SBBI®) Monthly Dataset.
[6] Source: Kroll, LLC, the Stocks, Bonds, Bills, and Inflation (SBBI®) Monthly Dataset.
[7] Source: Risk Premium, Damodaran Online, Stern School of Business, NYU.
[8] Source: Risk Premium, Damodaran Online, Stern School of Business, NYU.
[9] Source: Risk Premium, Damodaran Online, Stern School of Business, NYU.
[10] Source: Risk Premium, Damodaran Online, Stern School of Business, NYU.
[11] = [3] - [5]
[12] = [4] - [6]
[13] = [7] - [9]
[14] = [8] - [10]
[15] = [1] + [2] x [11]
[16] = [1] + [2] x [12]
[17] = [1] + [2] x [13]
[18] = [1] + [2] x [14]

2021 Q1 CAPM COE estimate	6.40%
2022 Q2 CAPM COE estimate	7.44%
Difference of Averages between 2021 Q1 and 2022 Q2	1.03%

Missouri-American Water Company
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AUTHORIZED RETURN ON EQUITY

		COE	
2022 Q2 Estimate	DCF	7.93%	A
	CAPM	7.44%	B
	Average	7.68%	C
2021 Q1 Estimate	DCF	8.05%	D
	CAPM	6.40%	E
	Average	7.22%	F
Water Utility ROE Adjustment		0.46%	G
2021 National AVG ROE Water		9.46%	H
2021 National AVG ROE Natural Gas		9.56%	I
2021 Natural Gas to Water Adjustment		-0.10%	J
Last MO Authorized Gas ROE 2021 Q1		9.37%	K
Estimated ROE 2022 Q2		9.73%	L

Note:

A	Schedule RTJ-d13
B	Schedule RTJ-d14
C	= ([A] + [B]) / 2
D	Schedule RTJ-d13
E	Schedule RTJ-d14
F	= ([D] + [E]) / 2
G	= [C] - [F]
H	Schedule RTJ-d17
I	Schedule RTJ-d17
J	= [H] - [I]
K	Spire Missouri rate Case No. GR-2021-0108
L	= [G] + [J] + [K]

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ALLOWED RATE OF RETURN

Capital Component	Percentage of Capital [1]	Embedded Cost	Allowed Rate of Return Common Equity Return of: Lower **9.48%**	ROE [4] **9.73%**	Upper **9.98%**
Common Stock Equity	40.71%	-	3.86%	3.96%	4.06%
Preferred Stock	0.02%	** [redacted] ** [2]	** [redacted] **	** [redacted] **	** [redacted] **
Long-Term Debt	59.28%	** [redacted] ** [3]	** [redacted] **	** [redacted] **	** [redacted] **
Total	**100.0%**		**6.28%**	**6.38%**	**6.48%**

Note:
[1] Schedule RTJ-d6
[2] Schedule RTJ-d8
[3] Schedule RTJ-d7
[4] Schedule RTJ-d15

CONFIDENTIAL
SCHEDULE RTJ-d16

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Authorized ROE of the U.S Utility by Sector
2010-2022

	Water							Natural Gas					
Order	Fully Litigated		Other		Water Total			Fully Litigated		Settled		Natural Gas Total	
Year	Avg ROE (%)	Case (No.)	Avg ROE (%)	Case (No.)	Avg ROE (%)	Case (No.)		Avg ROE (%)	Case (No.)	Avg ROE (%)	Case (No.)	Avg ROE (%)	Case (No.)
2010	9.85	6	10.29	24	10.18	30		10.08	26	10.30	12	10.15	39
2011	9.78	3	10.19	5	10.01	8		9.76	8	10.08	8	9.92	16
2012	9.76	3	9.92	20	9.90	23		9.92	21	9.99	14	9.94	35
2013	9.67	2	9.74	10	9.72	12		9.59	12	9.80	9	9.68	21
2014	9.46	3	9.62	14	9.59	17		9.98	15	9.51	11	9.78	26
2015		0	9.76	13	9.76	13		9.58	5	9.60	11	9.60	16
2016	9.70	4	9.72	10	9.71	14		9.61	10	9.50	16	9.54	26
2017	9.83	2	9.49	9	9.56	11		9.82	7	9.68	17	9.72	24
2018	9.53	10	9.39	12	9.46	22		9.59	17	9.59	23	9.59	40
2019	9.73	3	9.59	8	9.63	11		9.74	12	9.70	20	9.71	32
2020	8.48	2	9.33	6	9.04	8		9.44	12	9.48	23	9.47	35
2021	9.37	3	9.60	7	9.46	10		9.63	13	9.53	30	9.56	43
2022	9.90	2	9.55	2	9.73	4		9.23	1	9.34	8	9.33	9

Note:
Source: S&P Global Market Intelligence, Retrieved July 28, 2022