BEFORE THE STATE CORPORATION COMMISSION
OF THE STATE OF KANSAS

IN THE MATTER OF THE APPLICATION	**)**	
OF BLACK HILLS/KANSAS GAS UTILITY	**)**	
COMPANY, LLC, d/b/a BLACK HILLS	**)**	
ENERGY, FOR APPROVAL OF THE	**)**	**DOCKET NO. 21-BHCG-418-RTS**
COMMISSION TO MAKE CERTAIN	**)**	
CHANGES IN ITS RATES FOR NATURAL	**)**	
GAS SERVICE	**)**	

Direct Testimony and Exhibits of

J. Randall Woolridge, Ph. D.
For the Citizens' Utility Ratepayer Board

September 10, 2021

Black Hills/Kansas Gas Utility Company, LLC
d/b/a Black Hills Energy

Docket No. 21-BHCG-418-RTS

Direct Testimony of
Dr. J. Randall Woolridge, Ph.D.

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JRW-1	Recommended Cost of Capital
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JRW-3	Summary Financial Statistics for Proxy Group
JRW-4	Capital Structure Ratios and Debt Cost Rates
JRW-5	The Relationship Between Expected ROEs and M/B Ratios Industry Betas
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Q. PLEASE STATE YOUR FULL NAME, ADDRESS, AND OCCUPATION.

A. My name is J. Randall Woolridge, and my business address is 120 Haymaker Circle, State College, PA 16801. I am a Professor of Finance and the Goldman, Sachs & Co. and Frank P. Smeal Endowed University Fellow in Business Administration at the University Park Campus of Pennsylvania State University. I am also the Director of the Smeal College Trading Room and President of the Nittany Lion Fund, LLC. A summary of my educational background, research, and related business experience is provided in Appendix A.

I. SUBJECT OF TESTIMONY AND SUMMARY OF RECOMMENDATIONS

A. I have been asked by the Citizens Utility Ratepayer Board ("CURB") to provide an opinion as to the overall fair rate of return or cost of capital for the Kansas jurisdictional gas utility operations of Black Hills/Kansas Gas Utility Company, LLC, d/b/a Black Hills Energy ("Black Hills" or "Company") and to evaluate Black Hills' rate of return testimony in this proceeding.

Q. HOW IS YOUR TESTIMONY ORGANIZED?

A. First, I review my cost of equity recommendation for Black Hills, and review the primary areas of contention between Black Hills' ROE position and my position. Second, I provide an assessment of capital costs in today's capital markets. Third, I discuss the selection of a proxy group of gas distribution companies for estimating the market cost of equity for Black Hills. Fourth, I evaluate the capital structure and debt cost rate proposed by the Company. Fifth, provide an overview of the concept of the cost of equity capital,

and then estimate the equity cost rate for Black Hills. Finally, I critique the Company's rate of return analysis and testimony.

II. OVERVIEW AND SUMMARY OF POSITIONS

A. Overview

Q. WHAT COMPRISES A UTILITY'S "RATE OF RETURN"?

A. A company's overall rate of return consists of three main categories: (1) capital structure (i.e., ratios of short-term debt, long-term debt, preferred stock and common equity); (2) cost rates for short-term debt, long-term debt, and preferred stock; and (3) common equity cost rate, otherwise known as return on equity ("ROE").

Q. WHAT IS A UTILITY'S ROE INTENDED TO REFLECT?

A. An ROE is most simply described as the allowed rate of profit for a regulated company. In a competitive market, a company's profit level is determined by a variety of factors, including the state of the economy, the degree of competition a company faces, the ease of entry into its markets, the existence of substitute or complementary products/services, the company's cost structure, the impact of technological changes, and the supply and demand for its services and/or products. For a regulated monopoly, the regulator determines the level of profit available to the utility. The United States Supreme Court established the guiding principles for determining an appropriate level

of profitability for regulated public utilities in two cases: (1) *Bluefield* and (2) *Hope*.[1] In those cases, the Court recognized that the fair rate of return on equity should be: (1) comparable to returns investors expect to earn on investments with similar risk; (2) sufficient to assure confidence in the company's financial integrity; and (3) adequate to maintain the company's credit and to attract capital.

Thus, setting the appropriate ROE for a regulated utility requires determining the market-based cost of capital. The market-based cost of capital for a regulated firm represents the return investors could expect from other investments, while assuming no more and no less risk. The purpose of all of the economic models and formulas in cost of capital testimony (including those presented later in my testimony) is to estimate, using market data of similar-risk firms, the rate of return equity investors require for that risk class of firms in order to set an appropriate ROE for a regulated firm.

B. Summary of Positions

Q. PLEASE REVIEW THE COMPANY'S PROPOSED RATE OF RETURN.

A. Black Hills witness Ms. Christianne M. Curran has proposed a capital structure based on its 2020 year-end capitalization of 49.66% long-term debt and 50.34% common equity. Black Hills Witness Mr. Adrien M. McKenzie has recommended a common equity cost rate of 10.15%. Witness McKenzie has employed a Discounted Cash Flow Model

[1] *Federal Power Commission v. Hope Natural Gas Co*., 320 U.S. 591 (1944) ("*Hope*") and *Bluefield Water Works and Improvement Co. v. Public Service Commission of West Virginia*, 262 U.S. 679 (1923) ("*Bluefield*").

("DCF"), a Capital Asset Pricing Model ("CAPM"), an alternative risk premium approach, and an Expected Earnings approach to a proxy group of gas distribution companies. Black Hills' overall rate of return request is 7.05% and is summarized in Table 1.

Table 1
Black Hills' Rate of Return Recommendation

Capital Source	Capitalization Ratios	Cost Rate	Weighted Cost Rate
Long-Term Debt	**49.66%**	**3.91%**	**1.94%**
Common Equity	**50.34%**	**10.15%**	**5.11%**
Total Capital	**100.00%**		**7.05%**

Q. WHAT ARE YOUR RECOMMENDATIONS REGARDING THE APPROPRIATE RATE OF RETURN FOR BLACK HILLS?

A. I have reviewed the Company's proposed capital structure and overall cost of capital. Black Hills' proposed capitalization has more equity and less financial risk than the average current capitalizations of gas distribution companies, as well as Black Hills' parent, Black Hills Corporation. As a result, I make a small adjustment and use a capital structure with a common equity ratio of 50.0%. To estimate an equity cost rate for the Company, I have applied the DCF and CAPM approaches to my proxy group of gas companies ("Gas Proxy Group"). My DCF and CAPM results indicate a ROE range of 7.60%-8.75%. Since I rely primarily on the DCF approach, and given that the Company is at the high end of the range of the proxy group, I conclude that the appropriate ROE is 8.75%. Given my recommended capitalization ratios, debt cost rate, and 8.75% ROE, my rate of return or cost of capital recommendation for Black Hills is 6.33% and is summarized in Table 2 and Exhibit JRW-1.

Table 2
CURB's Rate of Return Recommendation

Capital Source	Capitalization Ratios	Cost Rate	Weighted Cost Rate
Long-Term Debt	**50.00%**	**3.91%**	**1.96%**
Common Equity	**50.00%**	**8.75%**	**4.38%**
Total Capital	**100.00%**		**6.33%**

C. Primary Rate of Return Issues in this Case

Q. PLEASE PROVIDE AN OVERVIEW OF THE PRIMARY ISSUES REGARDING RATE OF RETURN IN THIS PROCEEDING.

A. The primary issues related to the Company's rate of return include the following:

1. Capital Market Conditions – Mr. McKenzie's analyses, ROE results, and recommendations are based on assumptions of higher interest rates and capital costs. However, interest rates and capital costs have remained at historically low levels in recent years. In 2019, interest rates fell due to slow economic growth and low inflation. Interest rates fell even further to record low levels in 2020 due to the impact of the COVID-19 public health crisis on the world's population and economy. The benchmark 30-year Treasury yield has rebounded since mid-2020, but is still in the 2.00% range.

2. <u>Capital Structure</u> – The Company's proposed capital structure has a higher common equity ratio and lower financial risk than other gas companies. Hence, I have used the capital structure with a common equity ratio of 50.0%.

3. <u>DCF Equity Cost Rate</u> - The DCF Equity Cost Rate is estimated by summing the stock's dividend yield and investors' expected long-run growth rate in dividends paid per share. The primary issue with Mr. McKenzie's DCF analysis is that he has relied extensively on the overly optimistic and upwardly biased earnings per share ("EPS") growth rate forecasts of Wall Street analysts and *Value Line*.

I also have used a traditional constant-growth DCF model. In developing a growth rate for my DCF model for the proxy group, I have reviewed thirteen growth rate measures, including historic and projected growth-rate measures, and have evaluated growth in dividends, book value, and earnings per share. I give primary weight to analysts' projected EPS growth rates.

<u>4. CAPM Approach</u> – The CAPM approach requires an estimate of the risk-free interest rate, the beta, and the market or equity risk premium. There are several issues with Mr. McKenzie's CAPM analyses: (1) he has employed a projected 30-year-Treasury rate of 2.90% which is about 100 basis points above current market interest rates; (2) he has employed the Empirical CAPM ("ECAPM") version of the CAPM, which makes inappropriate adjustments to the risk-free rate and the market risk premium; (3) he has included an unwarranted utility size adjustment; and (4) most significantly, he has used a highly overstated market risk premium of 10.2%. Mr. McKenzie has employed analysts' three-to-five-year growth-rate projections for EPS to compute an expected market return and market risk premium. These EPS growth-

rate projections and the resulting expected market returns and market risk premiums include highly unrealistic assumptions regarding future economic and earnings growth and stock returns.

5. <u>Alternative Risk Premium Model</u> - ("Utility Risk Premium" or "URP") - Mr. McKenzie estimates an equity cost rate using an alternative risk premium model, which he calls the Utility Risk Premium ("URP") approach. The risk premium in his URP method is based on the historical relationship between long-term utility bond yields and authorized ROEs for electric utility and gas distribution companies. There are several issues with this approach, which I discuss in more depth later, but the primary problems are that he uses a projected based yield based on forecasted interest rates and his risk premium is a gauge of *Commission* behavior rather than *investor* behavior.

6. <u>Expected Earnings Approach</u> - Mr. McKenzie also uses the Expected Earnings approach to estimate an equity cost rate for the Company. Mr. McKenzie computes the expected ROE as forecasted by *Value Line* for his proxy group of gas utilities. The so-called "Expected Earnings" approach, however, (1) does not measure the market cost of equity capital, (2) is independent of most cost of capital indicators, and (3) has several other empirical problems. Therefore, the Commission should ignore Mr. McKenzie's "Expected Earnings" approach in determining the appropriate ROE for Black Hills.

7. <u>DCF Model Applied to Non-Utility Companies</u> - Mr. McKenzie also estimates an equity cost rate by applying his equity-cost-rate approaches and methodologies to a group of "comparable risk" non-price regulated companies. As I

note in the critique section of this testimony, his approach is fundamentally flawed for two reasons. First, these companies are not truly comparable to the Company. Their lines of business are vastly different from the gas distribution business and they do not operate in a highly regulated environment. Second, the upward bias in the EPS growth rate forecasts of Wall Street analysts is particularly severe for non-utility companies and therefore the DCF equity cost rate estimates for this group are particularly overstated.

8. <u>Flotation Costs</u> - Mr. McKenzie also reports his equity cost rate results should include a flotation cost adjustment. This is untrue, especially because Mr. McKenzie has not provided any evidence that the Company has paid flotation costs. Therefore, the Company should not be allowed to collect additional revenues in the form of a higher ROE for flotation costs that they did not incur.

III. CAPITAL MARKET CONDITIONS AND AUTHORIZED ROES

A. Capital Market Conditions

Q. PLEASE PROVIDE A SUMMARY OF THE UTILITY CAPITAL MARKET INDICATORS IN EXHIBIT JRW-2.

A. Page 1 of Exhibit JRW-2 shows the yields on A-rated public-utility bonds. These yields declined with interest rates in general in the year 2019, and in 2020 they further declined, bottomed out in the 2.5% range, and have recovered to about 3.0% in 2021. The average dividend yield for gas companies is shown on page 2 of Exhibit JRW-2. These yields declined over the last decade, bottoming out at 2.7% in 2017. They have

increased since then, especially in the last year, and now are in the 4.0% range. The average earned ROE and market-to-book ratio for publicly held gas companies are shown on page 3 of Exhibit JRW-2. The average earned ROE for gas companies has been in the 8.0%–9.0% range in recent years, while the average market-to-book ratio reached 2.25X in 2019, but fell off to 1.75X in 2020.

Q. PLEASE REVIEW THE FINANCIAL MARKETS IN 2020.

A. The financial markets began the year 2020 in good form – stock prices rose about five percent in the first six weeks of the year and interest rates declined. Then came weeks of chaos. In the middle of February 2020, the spread of the novel coronavirus went global and the virus became a major risk factor for the world's population and global economy. From mid-February until the third week of March, the S&P 500 declined 35% and investors fled to low-risk financial assets, most notably long-term Treasury bonds. The yield on the benchmark 30-year Treasury bond declined from 2.0% and traded as low as 1.25%, an all-time low. Furthermore, the day-to-day volatility of prices in financial markets was at extremes. The VIX, which is the Chicago Board Options Exchange ("CBOE") volatility index and is known as Wall Street's Fear Index,[2] increased from 15 and traded over 50, a level which has not been seen since the financial crisis in 2008.

In response, the federal government took unprecedented fiscal and monetary actions to support the economy and financial markets. Congress passed and President

[2] The Chicago Board Options Exchange Volatility Index, or VIX, is a real-time market index representing the market's expectations for volatility over the coming 30 days. Investors use the VIX to measure the level of risk, fear, or stress in the market when making investment decisions.

Trump signed a $2 trillion stimulus relief package to help American families and businesses, the biggest economic rescue package in modern American history. The package granted relief to households in the form of stimulus checks sent directly to most Americans, expanded unemployment benefits, expanded paid sick leave, provided temporary student-debt relief and more. The Federal Reserve lowered the target range for its benchmark federal-funds rate to the current range of 0% to 0.25%, which it expects to maintain until the economy has recovered. In addition, the Federal Reserve implemented a broad range of unprecedented programs to support financial market liquidity and economic stability. These included financial asset purchases and the creation of credit facilities to support households, businesses, and state and local governments.

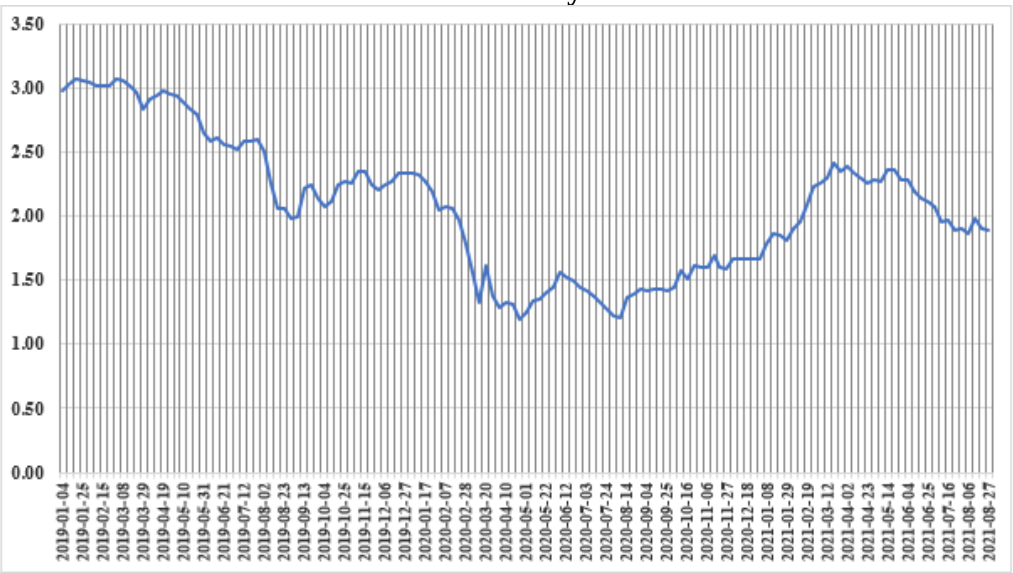
In 2021, President Biden signed a second $1.9 trillion COVID-19 stimulus plan which included $1,400 checks for individuals, billions to help schools and colleges reopen, funding for vaccine distribution, and many other financial resources to help the U.S. recover from the pandemic.

Q. PLEASE REVIEW THE IMPACT OF THE ECONOMY ON INTEREST RATES.

A. Figure 1 shows 30-year Treasury yields over the past two years (2019-2021). These yields were in the 3.0% range at the end of 2018, and declined to the 2.25% range in 2019, due primarily to slow economic growth and low inflation. As noted, in 2020, with the proliferation of the COVID-19 pandemic in February, 30-year Treasury yields declined to record low levels, declining about 100 basis points to the 1.25% range.

They began their recovery in the summer of 2020 and have increased to the 2.25% range in 2021. Despite their recovery, these rates are still at historically low levels.

Figure 1
30-Year Treasury Yields

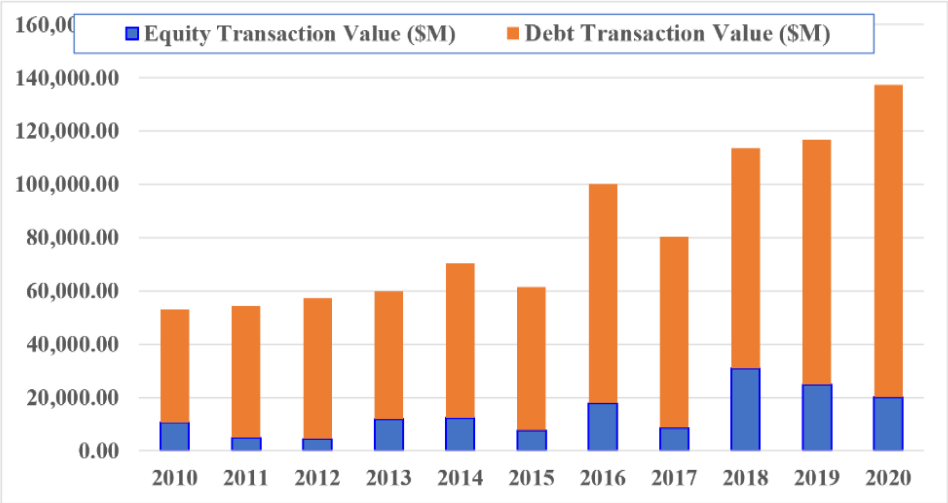


Data Source: https://fred.stlouisfed.org/series/DGS30

Q. HAVE UTILITIES TAKEN ADVANTAGE OF THE LOWER BOND YIELDS TO RAISE CAPITAL?

A. Yes. Figure 2 shows the annual amounts of debt- and equity-capital raised by public utility companies over the past decade. Electric utility and gas distribution companies have taken advantage of the low interest rate and capital cost environment of recent years and raised record amounts of capital in the markets. In fact, in each of the last three years, public utilities have raised a total of over $100 billion in debt and equity.

Figure 2
Debt and Equity Capital Raised by Public Utilities
2010-2020



Source: S&P Global Market Intelligence, S&P Cap IQ, 2021.

Q. PLEASE DISCUSS THE INCREASE IN INTEREST RATES SINCE THE SUMMER OF 2020.

A. As noted, with the economy improving and the passage of the second COVID-19 stimulus plan, interest rates increased about 100 basis points since mid-2020. The increase in rates reflect the prospect that expanded economic growth could lead to higher inflation. Investors' inflation expectation can be seen by looking at the difference between yields on ordinary Treasuries and the yields on inflation-protected Treasuries, known as Treasury Inflation-Protected Securities ("TIPS"). Panel A of Figure 3 shows the expected inflation rate over the next five years. Panel A of Figure 3 shows a noticeable increase over the past year, with an expected inflation rate of 2.57% over the next five years. Panels B and C of Figure 3 show the expected inflation rate over the next ten and thirty years. The expected inflation rates over the next ten and thirty years are 2.41% and 2.26%. When the expected inflation rate is higher over

five years than over ten and thirty years, as is the case now, it is known as a bond-market inversion and it reflects that, despite a short-term expectation of higher inflation, the long-term inflation rate is still a little above 2.0%.[3]

Figure 3
Panel A
5-Year Treasury Yields Minus 5-Year TIPS

Panel B
10-Year Treasury Yields Minus 10-Year TIPS

[3] Paul J. Davies – "Rare Bond-Market Inversion Signals Short-Lived Boost to Inflation," *Wall Street Journal*, February 25, 2021.

Panel C
30-Year Treasury Yields Minus 30-Year TIPS

Date Source: https://fred.stlouisfed.org/

Q. HOW DID THE CHANGE IN INTEREST RATES IN 2020 IMPACT CAPITAL COSTS FOR UTILITIES?

A. As discussed below, with COVID-19 and the record low interest rates in 2020, authorized ROEs for utilities reached record low levels in 2020. However, whereas interest rates declined by about 100 basis points in 2020, authorized ROEs only declined by about 25 basis points. Therefore, utility ROEs never declined to the extent that interest rates declined in 2020.

Q. PLEASE PROVIDE ADDITIONAL INSIGHTS INTO THE REPORTS IN THE FINANCIAL PRESS IN RECENT MONTHS ABOUT THE INCREASE IN REPORTED INFLATION OVER THE PAST YEAR.

A. In the second quarter of 2021, consumer prices have increased from a year ago at inflation rates as high as 5.0%. This has created alarm in the markets that inflation is back at much higher levels than the 2.0% of the past ten years. However, a recent *Wall*

Street Journal article highlighted an issue with the current one-year numbers.[4] Year-over-year comparisons of corporate profits, consumer prices, and other economic and corporate data are reported because they provide a sense of how the economy is changing over time. A year ago, the economy was reeling from the onset of COVID-19 and prices for goods and services like apparel, gasoline, hotels, air flights and car rentals collapsed. As a result, the higher inflation rate of four or five percent being reported over the past year may be overstated as a picture of price pressures in the economy because it is from an extremely deflated base in the second quarter of 2020. The author suggested an approach to looking at this data - look at how the economy compares today with two years ago rather than one. He concludes the following after a review of data over two years: "This subdues the effects of the Covid-19 shock and shows how close activity is to normal." On average, the consumer-price index rose 3.5% every two years during the decade before the Covid-19 crisis. That was within a range between 5.8% in 2012 and 0.8% in 2016."[5] The bottom line is that the current one-year inflation data is coming from a deflated base and hence likely overstates prospective inflation in the future. The fact that the 30-year Treasury yield has remained in the 2.00% range while these one-year inflation rates are being reported suggests that investors understand this issue.

[4] J. Hilsenrath, "The Fed's Inflation View is all About That Base," *Wall Street Journal*, June 6, 2021.

[5] *Id.*

Q. WHAT OTHER ECONOMIC SIGNALS ARE INDICATED BY THE RECENT CHANGES IN INTEREST RATES?

A. As discussed above, the spreads between utility and Treasury bond yields have declined, indicating two things: (1) utility bond yields have not increased as much as Treasury yields since mid-2020; and (2) investors have confidence in the economy and hence their degree of risk aversion is lower. This was highlighted in another recent *Wall Street Journal* article, in which the author indicated the following:[6]

> The spread relative to Treasuries, however, is arguably an even better measure of investors' outlook for the economy, since it shows how much investors feel they need to be compensated for the risk that companies may default on their debt. The narrow speculative-grade bond spreads indicate debt investors think that the economic environment for businesses over the next several years could be better than at any time since the 2008-2009 financial crisis—a striking development after many feared a severe, long-lasting economic downturn just last year.

I have shown the yield differential between 30-year 'A' rated utility bonds and 30-year Treasury yields over the past decade in Figure 4. The yield differential was in the 100 to 150 basis points range in the years prior to 2020. The differential jumped to over 200 basis points in the spring of 2020 as the pandemic spread and the global economy was shut down. However, the yield differential has declined over the past year, and is at its low point of about 100 basis points. As indicted above, this reflects increased confidence in the economy as demonstrated by the lower spread and risk aversion, and also means that utility yields have not increased as much as Treasury yields.

[6] D. Goldfarb, "Corporate Bond Gauge Signals Dwindling Economist Risk," *Wall Street Journal*, April, 22, 2021.

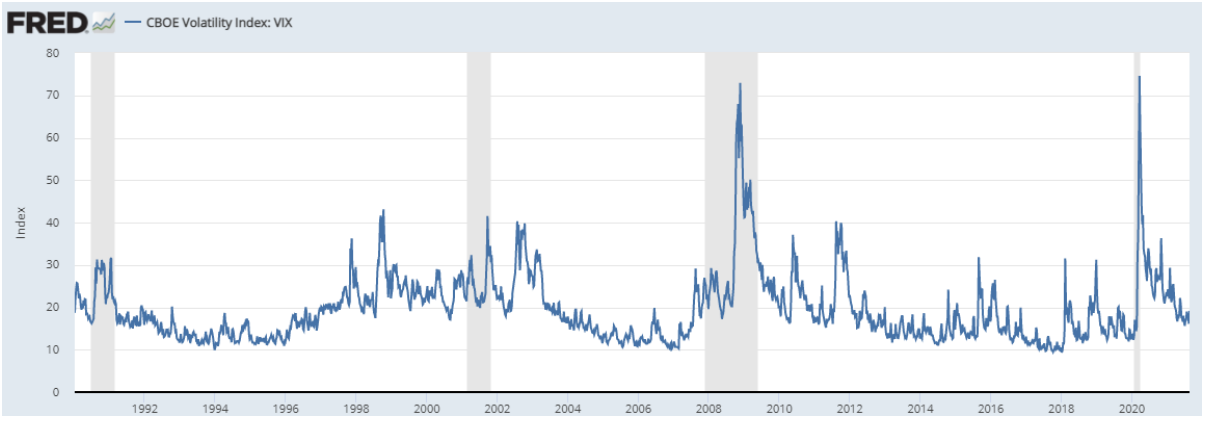
Figure 4
30-Year 'A' Rates Utility Yields Minus 30-Year Treasury Yields
2000-2021

Date Source: https://fred.stlouisfed.org/ and Mergent Bond Yields

Q. IS THERE ANY OTHER EVIDENCE THAT THE FINANCIAL MARKET'S VOLATILITY ASSOCIATED WITH THE PANDEMIC HAS SUBSIDED?

A. Yes. Figure 5 shows the level of the VIX from 2000 to 2021. The VIX increased from 15 to over 50 in 2020, a level which has not been seen since the financial crisis in 2008. It has since decreased and is now below its long-term average of 20.

Figure 5
The VIX
1990-2021



Date Source: https://fred.stlouisfed.org/. Shaded areas represent economic recessions time periods.

Q. PLEASE SUMMARIZE YOUR ASSESSMENT OF THE CURRENT CAPITAL MARKET SITUATION.

A. The U.S. economy has rebounded significantly over the past year after declining nearly twenty percent in the first half of 2020. Gross Domestic Product ("GDP") grew at 6.5% in the first half of 2021 and the economy is now back above pre-COVID-19 levels. The U.S. unemployment rate peaked in the second quarter of 2020 at about 15% and is now about 5.40%. The stock market began its recovery in the third week of March of 2020 and despite the negative health and economic issues with COVID-19, the S&P 500 has come back strong and is at record levels. The 30-year Treasury yield, which dropped to 1.25% in 2020, has come back to its pre-COVID level of 2.00%. But, as noted above, the spread between utility and Treasury bond yields has declined, which means that the yields on utility bonds have not increased as much as Treasury bond yields. Finally, the markets "fear index," the VIX, which topped out over 50, is below its long-time average of 20.

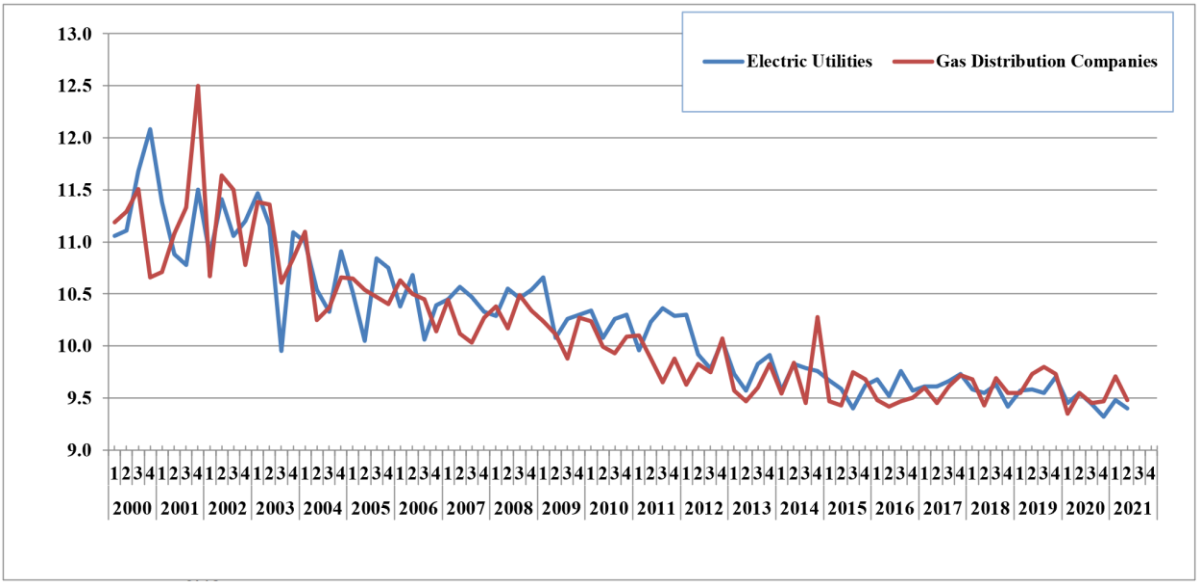
B. Authorized ROEs

Q. PLEASE DISCUSS THE TREND IN AUTHORIZED ROES FOR ELECTRIC AND GAS COMPANIES.

A. In Figure 6, I have graphed the quarterly authorized ROEs for electric and gas companies from 2000 to 2020. Over the years, as interest rates have come down, authorized ROEs for electric utility and gas distribution companies have slowly declined to reflect a low capital-cost environment. In 2020, authorized ROEs for

utilities hit an all-time low. The authorized ROEs for gas distribution companies have declined from 9.94% in 2012, to 9.68% in 2013, 9.78% in 2014, 9.60% in 2015, 9.50% in 2016, 9.72% in 2017, 9.59% in 2018, 9.71% in 2019, 9.46% in 2020, and 9.62% in the first two quarters of 2021, according to Regulatory Research Associates.[7]

Figure 6
Authorized ROEs for Electric Utility and Gas Distribution Companies
2000-2021



Date Source: S&P Global Market Intelligence, RRA *Regulatory Focus*, 2021.

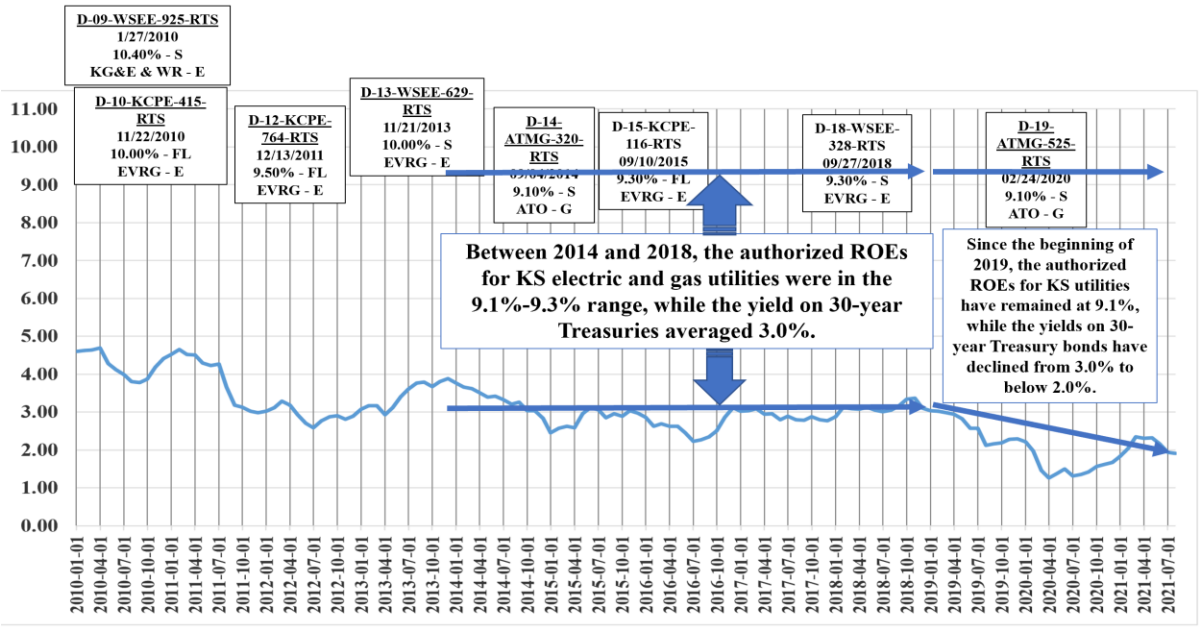
Q. PLEASE DISCUSS AUTHORIZED ROES IN KANSAS.

A. Figure 7 shows the authorized ROEs for electric utilities and gas companies in Kansas and the yields on 30-year Treasury Bonds since 2010. Details on these cases are provided in Table 3. The yield on 30-year Treasury bonds averaged about 3.0% between 2014 and 2018, and authorized ROEs in Kansas ranged from 9.1% to 9.3%. Since January of 2019, while the yield on 30-year Treasury bonds have declined from 3.0% to below 2.0%, there was one gas rate case in Kansas, with a ROE of 9.10%. As

[7] S&P Global Market Intelligence, RRA *Regulatory Focus*, 2021.

such, the authorized ROEs in Kansas have been slow to decline with interest rates and capital costs since 2019.

Figure 7
30-Year Treasury Yields
2010-2021



Date Source: S&P Global Market Intelligence, RRA *Regulatory Focus,* 2021.

Table 3
Authorized ROEs in Kansas and
The Yields on 30-Year Treasury Yields

Company	TKR	Docket	Service	Type	Date	Decision	$ (M)	ROE	CE (%)
Evergy Kansas Central	EVRG	D-09-WSEE-925-RTS (WR)	Electric	Vertically Integrated	1/27/2010	Settled	8.6	10.40	50.13
Evergy Kansas South	EVRG	D-09-WSEE-925-RTS (KG&E)	Electric	Vertically Integrated	1/27/2010	Settled	8.6	10.40	50.13
Empire District Electric	AQN	D-10-EPDE-314-RTS	Electric	Vertically Integrated	6/23/2010	Settled	2.8	NA	NA
Atmos Energy Corp.	ATO	D-10-ATMG-495-RTS	Natural Gas	Distribution	7/30/2010	Settled	3.9	NA	NA
Evergy Metro Inc	EVRG	D-10-KCPE-415-RTS	Electric	Vertically Integrated	11/22/2010	Fully Litigated	21.8	10.00	49.66
Evergy Kansas Central	EVRG	D-12-WSEE-112-RTS	Electric	Vertically Integrated	4/18/2012	Settled	50.0	NA	NA
Atmos Energy Corp.	ATO	D-12-ATMG-564-RTS	Natural Gas	Distribution	8/22/2012	Settled	2.8	NA	NA
Kansas Gas Service Co.	OGS	D-12-KGSG-835-RTS	Natural Gas	Distribution	12/5/2012	Settled	28.0	NA	NA
Evergy Metro Inc	EVRG	D-12-KCPE-764-RTS	Electric	Vertically Integrated	12/13/2012	Fully Litigated	33.2	9.50	51.82
Black Hills Kansas Gas	BKH	D-13-BHCG-404-TAR (GSRS)	Natural Gas	Limited-Issue Rider	2/8/2013	Fully Litigated	0.7	NA	NA
Evergy Kansas Central	EVRG	D-13-WSEE-629-RTS	Electric	Vertically Integrated	11/21/2013	Settled	30.7	10.00	52.63
Kansas Gas Service Co.	OGS	D-14-KGSG-111-TAR (GSRS)	Natural Gas	Limited-Issue Rider	11/21/2013	Fully Litigated	1.5	NA	NA
Atmos Energy Corp.	ATO	D-14-ATMG-221-TAR (GSRS)	Natural Gas	Limited-Issue Rider	1/28/2014	Settled	1.2	NA	NA
Evergy Metro Inc	EVRG	D-14-KCPE-272-RTS	Electric	Vertically Integrated	7/17/2014	Settled	11.5	NA	NA
Atmos Energy Corp.	ATO	D-14-ATMG-320-RTS	Natural Gas	Distribution	9/4/2014	Settled	4.3	9.10	53.00
Black Hills Kansas Gas	BKH	D-14-BHCG-593-TAR (GSRS)	Natural Gas	Limited-Issue Rider	10/7/2014	Fully Litigated	0.6	NA	NA
Kansas Gas Service Co.	OGS	D-15-KGSG-088-TAR (GSRS)	Natural Gas	Limited-Issue Rider	11/25/2014	Fully Litigated	3.5	NA	NA
Black Hills Kansas Gas	BKH	D-14-BHCG-502-RTS	Natural Gas	Distribution	12/16/2014	Settled	5.2	NA	NA
Atmos Energy Corp.	ATO	D-15-ATMG-202-TAR (GSRS)	Natural Gas	Limited-Issue Rider	1/27/2015	Fully Litigated	0.3	NA	NA
Evergy Metro Inc	EVRG	D-15-KCPE-116-RTS	Electric	Vertically Integrated	9/10/2015	Fully Litigated	40.1	9.30	50.48
Evergy Kansas Central	EVRG	D-15-WSEE-115-RTS	Electric	Vertically Integrated	9/24/2015	Settled	185.3	NA	NA
Kansas Gas Service Co.	OGS	D-16-KGSG-104-TAR (GSRS)	Natural Gas	Limited-Issue Rider	11/5/2015	Fully Litigated	2.5	NA	NA
Black Hills Kansas Gas	BKH	D-16-BHCG-277-TAR (GSRS)	Natural Gas	Distribution	2/25/2016	Fully Litigated	0.8	NA	NA
Atmos Energy Corp.	ATO	D-16-ATMG-079-RTS	Natural Gas	Distribution	3/17/2016	Settled	2.2	NA	NA
Kansas Gas Service Co.	OGS	D-16-KGSG-491-RTS	Natural Gas	Distribution	11/29/2016	Settled	15.5	NA	NA
Empire District Electric	AQN	D-17-EPDE-101-RTS	Electric	Vertically Integrated	1/10/2017	NA	NA	NA	NA
Atmos Energy Corp.	ATO	D-17-ATMG-141-TAR (GSRS)	Natural Gas	Limited-Issue Rider	2/9/2017	Fully Litigated	0.8	NA	NA
Black Hills Kansas Gas	BKH	D-17-BHCG-389-TAR (GSRS)	Natural Gas	Limited-Issue Rider	5/23/2017	Fully Litigated	0.6	NA	NA
Evergy Metro Inc	EVRG	D-17-KCPE-201-RTS	Electric	Vertically Integrated	6/6/2017	Settled	(3.6)	NA	NA
Evergy Kansas Central	EVRG	D-17-WSEE-147-RTS	Electric	Vertically Integrated	6/8/2017	Settled	16.4	NA	NA
Kansas Gas Service Co.	OGS	D-18-KGSG-093-TAR (GSRS)	Natural Gas	Limited-Issue Rider	11/16/2017	Fully Litigated	2.9	NA	NA
Atmos Energy Corp.	ATO	18-ATMG-218-TAR (GSRS)	Natural Gas	Limited-Issue Rider	2/27/2018	Fully Litigated	0.8	NA	NA
Black Hills Kansas Gas	BKH	D-18-BHCG-423-TAR (GSRS)	Natural Gas	Limited-Issue Rider	6/19/2018	Fully Litigated	0.6	NA	NA
Evergy Kansas Central	EVRG	D-18-WSEE-328-RTS	Electric	Vertically Integrated	9/27/2018	Settled	(50.3)	9.30	51.24
Kansas Gas Service Co.	OGS	D-19-KGSG-088-TAR (GSRS)	Natural Gas	Limited-Issue Rider	11/8/2018	Fully Litigated	2.4	NA	NA
Evergy Metro Inc	EVRG	D-18-KCPE-480-RTS	Electric	Vertically Integrated	12/13/2018	Settled	(3.9)	9.30	49.09
Kansas Gas Service Co.	OGS	D-18-KGSG-560-RTS	Natural Gas	Distribution	2/5/2019	Settled	21.5	NA	NA
Atmos Energy Corp.	ATO	D-19-ATMG-307-TAR (GSRS)	Natural Gas	Limited-Issue Rider	4/23/2019	Fully Litigated	1.6	NA	NA
Black Hills Kansas Gas	BKH	D-19-BHCG-400-TAR (GSRS)	Natural Gas	Limited-Issue Rider	6/25/2019	Fully Litigated	1.4	NA	NA
Empire District Electric	AQN	D-19-EPDE-223-RTS	Electric	Vertically Integrated	7/30/2019	Settled	0.0	NA	NA
Kansas Gas Service Co.	OGS	D-20-KGSG-090-TAR (GSRS)	Natural Gas	Limited-Issue Rider	11/21/2019	Fully Litigated	4.2	NA	NA
Atmos Energy Corp.	ATO	D-19-ATMG-525-RTS	Natural Gas	Distribution	2/24/2020	Fully Litigated	3.1	9.10	56.32
Black Hills Kansas Gas	BKH	D-20-BHCG-389-TAR (GSRS)	Natural Gas	Limited-Issue Rider	6/23/2020	Fully Litigated	1.6	NA	NA
Kansas Gas Service Co.	OGS	D-21-KGSG-094-TAR (GSRS)	Natural Gas	Limited-Issue Rider	11/17/2020	Fully Litigated	7.5	NA	NA
Atmos Energy Corp.	ATO	D-21-ATMG-180-TAR (GSRS)	Natural Gas	Limited-Issue Rider	1/26/2021	Fully Litigated	1.7	NA	NA
Black Hills Kansas Gas	BKH	D-21-BHCG-434-TAR (GSRS)	Natural Gas	Limited-Issue Rider	7/29/2021	Fully Litigated	1.8	NA	NA

IV. PROXY GROUP SELECTION

Q. PLEASE DESCRIBE YOUR APPROACH TO DEVELOPING A FAIR RATE OF RETURN RECOMMENDATION FOR BLACK HILLS.

A. To develop a fair rate-of-return recommendation for the Company (market cost of equity), I evaluated the return requirements of investors on the common stock of a proxy group of nine publicly held gas distribution companies ("the Gas Proxy Group").

The Gas Proxy Group consists of nine natural gas distribution companies listed by *Value Line* in the Natural Gas Company industry group: Atmos Energy; Chesapeake Utilities, Inc.; New Jersey Resources; NiSource; Northwest Natural Holding Company; One Gas, Inc.; South Jersey Industries; Southwest Gas Corporation; and Spire, Inc.

Q. HOW DOES YOUR GROUP COMPARE TO MR. MCKENZIE'S GROUP OF GAS DISTRIBUTION COMPANIES?

A. The two groups are the same.

Q. PLEASE DISCUSS THE FINANCIAL STATISTICS FOR YOUR PROXY GROUP.

A. On page 1 of Exhibit JRW-3, I list the summary financial statistics for the Gas Proxy Group. The median operating revenues and net plant among members of the Gas Proxy Group are $1,792.9 million and $4,904.3 million, respectively. On average, the group receives 70 percent of revenues from regulated gas operations, has an A-/BBB+ average issuer credit rating from S&P, a mean common equity ratio of 46.1 percent, and a mean earned return on common equity of 7.88 percent.

Q. WHAT ROLE DO BOND RATINGS PLAY IN THE INVESTMENT COMMUNITY?

A. I believe that bond ratings provide a good independent assessment of the investment risk of a company.

Q. HOW DOES THE INVESTMENT RISK OF THE COMPANY COMPARE TO THAT OF YOUR GAS GROUP?

A. As shown in Exhibit JRW-3, the average S&P and Moody's issuer credit rating for the gas group is A-/BBB+ and Baa1. The S&P and Moody's issuer credit ratings for Black

Hills are BBB+ and Baa2. As a result, the investment risk of the Company is at the high end of the range of the Gas Proxy Group.

Q. PLEASE DISCUSS THE INVESTMENT RISK OF THE GAS PROXY GROUP AS MEASURED BY THE RISK METRICS PUBLISHED BY *VALUE LINE*.

A. On page 2 of Exhibit JRW-3, I show the riskiness of the Gas Proxy Group using five different risk measures from *Value Line*. The comparisons of the risk measures include Beta (0.89), Financial Strength (A), Safety (2.0), Earnings Predictability (68), and Stock Price Stability (85).[8] In my opinion, these risk measures indicate that the group's investment risk is relatively low.

V. CAPITAL STRUCTURE RATIOS AND DEBT COST RATES

Q. PLEASE DESCRIBE BLACK HILLS' PROPOSED CAPITAL STRUCTURE AND SENIOR CAPITAL COST RATES.

A. Black Hills witness Ms. Curran has proposed a capital structure based on its 2020 year-end capitalization of 49.66% long-term debt and 50.34% common equity and a long-term debt cost rate of 3.91%.

Q. WHAT ARE THE COMMON EQUITY RATIOS IN THE CAPITALIZATIONS OF THE PROXY GROUP?

A. As shown in Exhibit JRW-3, the average common equity ratio of the companies in the Gas Proxy Group is 46.1%, as of December 31, 2020. As such, Black Hills' proposed

[8] These metrics are defined on page 3 of Exhibit JRW-3.

capitalization for rate setting purposes has more equity and less financial risk than the average current capitalizations of the gas companies in the proxy group.

I have also evaluated the average quarterly common equity ratios of the proxy group companies from 2019-2020 to assess the group's average over time. As shown in Panel B of Page 1 of Exhibit JRW-4, the average quarterly common equity ratios for the group are 44.2% including short-term debt and 50.8% excluding short-term debt.

Q. WHAT IS THE COMMON EQUITY RATIO OF BLACK HILLS' PARENT, BLACK HILLS CORPORATION ("BHC")?

A. In Panel C of Page 1 of Exhibit JRW-4, I have provided the average quarterly common equity ratio for BHC over the 2019-2021 time period. The average quarterly common equity ratios for the group are 40.63% including short-term debt and 52.83% excluding short-term debt. Hence, the Company's proposed capitalization also has much more equity and much less financial risk than Black Hill's parent company, BHC.

Q. IS IT APPROPRIATE TO USE THE COMMON EQUITY RATIOS OF THE PARENT HOLDING COMPANIES OR SUBSIDIARY OPERATING UTILITIES FOR COMPARISON PURPOSES WITH BLACK HILLS' PROPOSED CAPITALIZATION?

A. It is appropriate to use the common equity ratios of the utility holding companies because the *holding companies* are publicly-traded and their stocks are used in the cost-of-equity capital studies. The equities of the *operating utilities* are not publicly-traded and hence their stocks cannot be used to compute the cost-of-equity capital for Black Hills.

Q. IS IT APPROPRIATE TO INCLUDE SHORT-TERM DEBT IN THE CAPITALIZATION IN COMPARING THE COMMON EQUITY RATIOS OF THE HOLDING COMPANIES WITH BLACK HILLS' PROPOSED CAPITALIZATION?

A. Yes. Short-term debt, like long-term debt, has a higher claim on the assets and earnings of the company and requires timely payment of interest and repayment of principal. Thus, in comparing the common-equity ratios of the holding companies with Black Hills' recommendation, it is appropriate to include short-term debt when computing the holding company common-equity ratios. Additionally, the financial risk of a company is based on total debt, which includes both short-term and long-term debt.

Q. PLEASE DISCUSS THE ISSUE OF PUBLIC UTILITY HOLDING COMPANIES, SUCH AS BLACK HILLS CORPORATION, USING DEBT TO FINANCE THE EQUITY IN SUBSIDIARIES SUCH AS BLACK HILLS.

A. Moody's published an article on the use of low-cost, debt financing by public utility holding companies to increase their ROEs. The summary observations included the following about how these holding companies use debt and how an increase in leverage at the parent holding company can "hurt the credit profiles of its regulated subsidiaries":

> U.S. utilities use leverage at the holding-company level to invest in other businesses, make acquisitions and earn higher returns on equity. In some cases, an increase in leverage at the parent can hurt the credit profiles of its regulated subsidiaries.[9]

[9] Moody's Investors' Service, "High Leverage at the Parent Often Hurts the Whole Family," May 11, 2015, p. 1.

This financial strategy has traditionally been known as "double leverage." Noting that double leverage results in a consolidated debt-to-capitalization ratio that is higher at the parent than at the subsidiary because of the additional debt at the parent, Moody's defined double leverage as follows:

> Double leverage is a financial strategy whereby the parent raises debt but downstreams the proceeds to its operating subsidiary, likely in the form of an equity investment. Therefore, the subsidiary's operations are financed by debt raised at the subsidiary level and by debt financed at the holding-company level. In this way, the subsidiary's equity is leveraged twice, once with the subsidiary debt and once with the holding-company debt. In a simple operating-company / holding-company structure, this practice results in a consolidated debt-to-capitalization ratio that is higher at the parent than at the subsidiary because of the additional debt at the parent.[10]

Moody's goes on to discuss the potential risk "down the road" to utilities of this financing corporate strategy if regulators were to ascribe the debt at the parent level to the subsidiaries or adjust the authorized return on capital:

> **Double leverage drives returns for some utilities but could pose risks down the road.** The use of double leverage, a long-standing practice whereby a holding company takes on debt and downstreams the proceeds to an operating subsidiary as equity, could pose risks down the road if regulators were to ascribe the debt at the parent level to the subsidiaries or adjust the authorized return on capital.[11]

Q. PLEASE DISCUSS THE SIGNIFICANCE OF THE AMOUNT OF EQUITY THAT IS INCLUDED IN A UTILITY'S CAPITAL STRUCTURE.

A. A utility's decision as to the amount of equity capital it will incorporate into its capital structure involves fundamental trade-offs relating to the amount of financial risk the

[10] *Id.* at p. 5.

[11] *Id.* at p. 1.

firm carries, the overall revenue requirements its customers are required to bear through the rates they pay, and the return on equity that investors will require.

Q. PLEASE DISCUSS A UTILITY'S DECISION TO USE DEBT VERSUS EQUITY TO MEET ITS CAPITAL NEEDS.

A. Utilities satisfy their capital needs through a mix of equity and debt. Because equity capital is more expensive than debt, the issuance of debt enables a utility to raise more capital for a given commitment of dollars than it could raise with just equity. Debt is, therefore, a means of "leveraging" capital dollars. However, as the amount of debt in the capital structure increases, financial risk increases and the risk of the utility, as perceived by equity investors, also increases. Significantly, for this case, the converse is also true. As the amount of debt in the capital structure decreases, the financial risk decreases. The required return on equity capital is a function of the amount of overall risk that investors perceive, including financial risk in the form of debt.

Q. CAN THE IMPACT OF A UTILTY'S AWARDED ROE BE DETERMINED WITHOUT REFERENCE TO THAT UTILITY'S CAPITAL STRUCTURE?

A. No. A high equity component can amplify the overall impact of a relatively low ROE while a low equity component can mitigate the overall impact of a relatively high ROE. For example, suppose a utility has an authorized ROE and common equity ratio of 10.0% and 50.0%. Financially, the same utility would be at about the same point with an authorized ROE of 9.0% but with a common equity ratio of 55.0%.

Q. IS THERE ALSO A DIRECT CORRELATION BETWEEN THE AMOUNT OF EQUITY IN A COMPANY'S CAPITAL STRUCTURE AND THE REVENUE REQUIREMENTS THAT CUSTOMERS ARE CALLED ON TO BEAR?

A. Yes. Just as there is a direct correlation between the utility's authorized return on equity and the utility's revenue requirements (the higher the return, the greater the revenue requirement), there is a direct correlation between the amount of equity in the capital structure and the revenue requirements that customers are called on to bear. As the equity ratio increases, the utility's revenue requirement increases and the rates paid by customers increase. If the proportion of equity is too high, rates will be higher than they need to be. For this reason, the utility's management should pursue a capital acquisition strategy that results in the proper balance in the capital structure.

Q. CAN A REGULATED UTILITY SAFELY TAKE ON MORE DEBT THAN A NON-REGULATED COMPANY?

A. Yes. Due to regulation and the essential nature of its output, a regulated utility is exposed to less business risk than other companies that are not regulated. This means that a utility can reasonably carry relatively more debt in its capital structure than can most unregulated companies. Thus, a utility should take appropriate advantage of its lower business risk to employ cheaper debt capital at a level that will benefit its customers through lower revenue requirements.

Q. GIVEN THAT BLACK HILLS HAS PROPOSED AN EQUITY RATIO THAT IS MUCH HIGHER THAN (1) THE AVERAGE COMMON EQUITY RATIO OF OTHER ELECTRIC AND GAS UTILITY COMPANIES, AND (2) THE COMMON EQUITY RATIO OF ITS PARENT COMPANY, BLACK HILLS CORPORATION, WHAT SHOULD THE COMMISSION DO IN THIS RATEMAKING PROCEEDING?

A. When a regulated utility's actual capital structure contains a high equity ratio, the options are: (1) to impute a more reasonable capital structure that is comparable to the average of the proxy group used to determine the cost of equity and to reflect the imputed capital structure in revenue requirements; or (2) to recognize the downward impact that an unusually high equity ratio will have on the financial risk of a utility and authorize a common equity-cost rate lower than that of the proxy group.

Q. PLEASE ELABORATE ON THIS "DOWNWARD IMPACT."

A. As I stated earlier, there is a direct correlation between the amount of debt in a utility's capital structure and the financial risk that an equity investor will associate with that utility. A relatively lower proportion of debt translates into a lower required return on equity, all other things being equal. Stated differently, a utility should not be permitted to "have it both ways." Specifically, a utility cannot propose to maintain an unusually high equity ratio and not expect to have the resulting lower risk reflected in its authorized return on equity. The fundamental relationship between lower risk and the appropriate authorized return should not be ignored.

Q. WHAT CAPITAL STRUCTURE ARE YOU RECOMMENDING IN THIS CASE?

A. As noted, the Company's proposed capitalization has more equity and less financial risk than the average current capitalizations of gas distribution companies as well as Black Hill's parent, BHC. Therefore, I am proposing a capital structure that includes a common equity ratio of 50.0%. As such, I am proposing a slight adjustment to the Company's proposed capital structure to reflect the fact the Company's proposed capital structure includes more equity and less debt than other gas companies.

Q. ARE YOU USING THE COMPANY'S PROPOSED DEBT COST RATE OF 3.91%?

A. Yes. The 3.91% long-term debt cost rate appears reasonable.

VI. THE COST OF COMMON EQUITY CAPITAL

A. Overview

Q. WHY MUST AN OVERALL COST OF CAPITAL OR FAIR RATE OF RETURN BE ESTABLISHED FOR A PUBLIC UTILITY?

A. In a competitive industry, the return on a firm's common equity capital is determined through the competitive market for its goods and services. Due to the capital requirements needed to provide utility services and the economic benefit to society from avoiding duplication of these services and the construction of utility-infrastructure facilities, most public utilities are monopolies. Because of the lack of competition and the essential nature of their services, it is not appropriate to permit monopoly utilities to set their own prices.

Thus, regulation seeks to establish prices that are fair to consumers and, at the same time, sufficient to meet the operating and capital costs of the utility, *i.e.*, provide an adequate return on capital to attract investors.

Q. PLEASE PROVIDE AN OVERVIEW OF THE COST OF CAPITAL IN THE CONTEXT OF THE THEORY OF THE FIRM.

A. The total cost of operating a business includes the cost of capital. The cost of common-equity capital is the expected return on a firm's common stock that the marginal investor would deem sufficient to compensate for risk and the time value of money. In equilibrium, the expected and required rates of return on a company's common stock are equal.

Normative economic models of a company or firm, developed under very restrictive assumptions, provide insight into the relationship between a firm's performance or profitability, capital costs, and the value of the firm. Under the economist's ideal model of perfect competition – where entry and exit are costless, products are undifferentiated, and there are increasing marginal costs of production – firms produce up to the point where price equals marginal cost. Over time, a long-run equilibrium is established where price of the firm equals average cost, including the firm's capital costs. In equilibrium, total revenues equal total costs, and because capital costs represent investors' required return on the firm's capital, actual returns equal required returns, and the market value must equal the book value of the firm's securities.

In a competitive market, firms can achieve competitive advantage due to product-market imperfections. Most notably, companies can gain competitive advantage through product differentiation (adding real or perceived value to products) and by achieving economies of scale (decreasing marginal costs of production). Competitive advantage allows firms to price products above average cost and thereby earn accounting profits greater than those required to cover capital costs. When these profits are in excess of those required by investors, or when a firm earns a return on

equity in excess of its cost of equity, investors respond by valuing the firm's equity in excess of its book value.

James M. McTaggart, founder of the international management consulting firm Marakon Associates, described this essential relationship between the return on equity, the cost of equity, and the market-to-book ratio in the following manner:

> Fundamentally, the value of a company is determined by the cash flow it generates over time for its owners, and the minimum acceptable rate of return required by capital investors. This "cost of equity capital" is used to discount the expected equity cash flow, converting it to a present value. The cash flow is, in turn, produced by the interaction of a company's return on equity and the annual rate of equity growth. High return on equity (ROE) companies in low-growth markets, such as Kellogg, are prodigious generators of cash flow, while low ROE companies in high-growth markets, such as Texas Instruments, barely generate enough cash flow to finance growth.
>
> A company's ROE over time, relative to its cost of equity, also determines whether it is worth more or less than its book value. If its ROE is consistently greater than the cost of equity capital (the investor's minimum acceptable return), the business is economically profitable and its market value will exceed book value. If, however, the business earns an ROE consistently less than its cost of equity, it is economically unprofitable and its market value will be less than book value. [12]

As such, the relationship between a firm's return on equity, cost of equity, and market-to-book ratio is relatively straightforward. A firm that earns a return on equity above its cost of equity will see its common stock sell at a price above its book value. Conversely, a firm that earns a return on equity below its cost of equity will see its common stock sell at a price below its book value.

[12] James M. McTaggart, "The Ultimate Poison Pill: Closing the Value Gap," *Commentary* (Spring 1986), p.3.

Q. PLEASE PROVIDE ADDITIONAL INSIGHTS INTO THE RELATIONSHIP BETWEEN ROE AND MARKET-TO-BOOK RATIOS.

A. This relationship is discussed in a classic Harvard Business School case study entitled "Note on Value Drivers." On page 2 of that case study, the author describes the relationship very succinctly:

> For a given industry, more profitable firms – those able to generate higher returns per dollar of equity – should have higher market-to-book ratios. Conversely, firms which are unable to generate returns in excess of their cost of equity [(K)] should sell for less than book value.
>
> | *Profitability* | *Value* |
> |---|---|
> | *If ROE > K* | *then Market/Book > 1* |
> | *If ROE = K* | *then Market/Book =1* |
> | *If ROE < K* | *then Market/Book< 1*[13] |

To assess the relationship by industry, as suggested above, I performed a regression study between estimated ROE and market-to-book ratios using natural gas distribution and electric utility companies. I used all companies in these two industries that are covered by *Value Line* and have estimated ROE and market-to-book ratio data. The results are presented on page 1 of Exhibit JRW-5. The average R-square is 0.50.[14] This demonstrates the strong positive relationship between ROEs and market-to-book ratios for public utilities. Given that the market-to-book ratios have been above 1.0 for a number of years, this also demonstrates that utilities have been earning ROEs above the cost-of-equity capital for many years.

[13] Benjamin Esty, "Note on Value Drivers," Harvard Business School, Case No. 9-297-082, April 7, 1997.

[14] R-square measures the percent of variation in one variable (e.g., market-to-book ratios) explained by another variable (e.g., expected ROE). R-squares vary between zero and 1.0, with values closer to 1.0 indicating a higher relationship between two variables.

Q. WHAT FACTORS DETERMINE INVESTORS' EXPECTED OR REQUIRED RATE OF RETURN ON EQUITY?

A. The expected or required rate of return on common stock is a function of market-wide as well as company-specific factors. The most important market factor is the time value of money, as indicated by the level of interest rates in the economy. Common-stock investor requirements generally increase and decrease with like changes in interest rates. The perceived risk of a firm is the predominant factor that influences investor return requirements on a company-specific basis. A firm's investment risk is often separated into business risk and financial risk. Business risk encompasses all factors that affect a firm's operating revenues and expenses. Financial risk results from incurring fixed obligations in the form of debt in financing its assets.

Q. HOW DOES THE INVESTMENT RISK OF UTILITIES COMPARE WITH THAT OF OTHER INDUSTRIES?

A. Due to the essential nature of their service as well as their regulated status, public utilities are exposed to a lesser degree of business risk than other, non-regulated businesses. The relatively low level of business risk allows public utilities to meet much of their capital requirements through borrowing in the financial markets, thereby incurring greater than average financial risk. Nonetheless, the overall investment risk of public utilities is below most other industries.

Page 2 of Exhibit JRW-5 provides an assessment of investment risk for 94 industries as measured by beta, which, according to modern capital market theory, is the only relevant measure of investment risk. These betas come from the *Value Line Investment Survey.* The study shows that the investment risk of utilities is low

compared to other industries. The average betas for electric, gas, and water utility companies are 0.89, 0.89, and 0.79, respectively.[15] As such, the cost of equity for utilities is the lowest of all industries in the U.S., based on modern capital market theory.

Q. WHAT IS THE COST OF COMMON EQUITY CAPITAL?

A. The costs of debt and preferred stock are normally based on historical or book values and can be determined with a great degree of accuracy. The cost of common-equity-capital, however, cannot be determined precisely and must instead be estimated from market data and informed judgment. This return requirement of the stockholder should be commensurate with the return requirement on investments in other enterprises having comparable risks.

According to valuation principles, the present value of an asset equals the discounted value of its expected future cash flows. Investors discount these expected cash flows at their required rate of return that, as noted above, reflects the time value of money and the perceived riskiness of the expected future cash flows. As such, the cost of common equity is the rate at which investors discount expected cash flows associated with common stock ownership.

Q. HOW CAN THE EXPECTED OR REQUIRED RATE OF RETURN ON COMMON EQUITY CAPITAL BE DETERMINED?

A. Models have been developed to ascertain the cost of common equity capital for a firm. Each model, however, has been developed using restrictive economic assumptions.

[15] The beta for the *Value Line* electric utilities is the simple average of *Value Line*'s Electric East (0.89), Central (0.89), and West (0.90) group betas.

Consequently, judgment is required in selecting appropriate financial valuation models to estimate a firm's cost of common-equity capital, in determining the data inputs for these models, and in interpreting the models' results. All of these decisions must take into consideration the firm involved as well as current conditions in the economy and the financial markets.

Q. HOW DID YOU ESTIMATE THE COST OF EQUITY CAPITAL FOR THE COMPANY?

A. Primarily, I rely on the DCF model to estimate the cost-of-equity capital. Given the investment-valuation process and the relative stability of the utility business, the DCF model provides the best measure of equity-cost rates for public utilities. I have also performed an analysis using the CAPM; however, I give these results less weight because I believe that risk-premium studies, of which the CAPM is one form, provide a less reliable indication of equity-cost rates for public utilities.

Q. PLEASE EXPLAIN WHY YOU BELIEVE THAT THE CAPM PROVIDES A LESS RELIABLE INDICATOR OF EQUITY COST RATES?

A. I believe that the CAPM provides a less reliable measure of a utility's equity-cost rate because it requires an estimate of the market-risk premium. As discussed below, there is a wide variation in estimates of the market-risk premium found in studies by academics and investment firms as well as in surveys of market professionals.

B. Discounted Cash Flow (DCF) Approach

Q. PLEASE DESCRIBE THE THEORY BEHIND THE TRADITIONAL DCF MODEL.

A. According to the DCF model, the current stock price is equal to the discounted value of all future dividends that investors expect to receive from investment in the firm. As such, stockholders' returns ultimately result from current as well as future dividends. As owners of a corporation, common stockholders are entitled to a *pro rata* share of the firm's earnings. The DCF model presumes earnings that are not paid out in the form of dividends are reinvested in the firm to provide for future growth in earnings and dividends. The rate at which investors discount future dividends, which reflects the timing and riskiness of the expected cash flows, is interpreted as the market's expected or required return on the common stock. Therefore, this discount rate represents the cost of common equity. Algebraically, the DCF model can be expressed as:

$$P = \frac{D_1}{(1+k)^1} + \frac{D_2}{(1+k)^2} + \cdots + \frac{D_n}{(1+k)^n}$$

where P is the current stock price, D_1, D_2, D_n are the dividends in (respectively) year 1, 2, and in the future years n, and k is the cost of common equity.

Q. IS THE DCF MODEL CONSISTENT WITH VALUATION TECHNIQUES EMPLOYED BY INVESTMENT FIRMS?

A. Yes. Virtually all investment firms use some form of the DCF model as a valuation technique. One common application for investment firms is called the three-stage DCF

or dividend discount model ("DDM"). The stages in a three-stage DCF model are presented in Exhibit JRW-6. This model presumes that a company's dividend payout progresses initially through a growth stage, then proceeds through a transition stage, and finally assumes a maturity (or steady-state) stage. The dividend-payment stage of a firm depends on the profitability of its internal investments which, in turn, is largely a function of the life cycle of the product or service.

1. **Growth stage**: Characterized by rapidly expanding sales, high profit margins, and an abnormally high growth in earnings per share. Because of highly profitable expected investment opportunities, the payout ratio is low. Competitors are attracted by the unusually high earnings, leading to a decline in the growth rate.

2. **Transition stage**: In later years, increased competition reduces profit margins and earnings growth slows. With fewer new investment opportunities, the company begins to pay out a larger percentage of earnings.

3. **Maturity (steady-state) stage**: Eventually, the company reaches a position where its new investment opportunities offer, on average, only slightly more attractive ROEs. At that time, its earnings growth rate, payout ratio, and ROE stabilize for the remainder of its life. As I will explain below, the constant-growth DCF model is appropriate when a firm is in the maturity stage of the life cycle.

In using the 3-stage model to estimate a firm's cost-of-equity capital, dividends are projected into the future using the different growth rates in the alternative stages, and then the equity-cost rate is the discount rate that equates the present value of the future dividends to the current stock price.

Q. PLEASE BRIEFLY EXPLAIN THE CONCEPT OF "PRESENT VALUE."

A. Present value is the concept that an amount of money today is worth more than that same amount in the future. In other words, money received in the future is not worth as much as an equal amount received today. Present value tells an investor how much he or she would need in today's dollars to earn a specific amount in the future.

Q. HOW DO YOU ESTIMATE STOCKHOLDERS' EXPECTED OR REQUIRED RATE OF RETURN USING THE DCF MODEL?

A. Under certain assumptions, including a constant and infinite expected growth rate, and constant dividend/earnings and price/earnings ratios, the DCF model can be simplified to the following:

$$P = \frac{D_1}{k - g}$$

where P is the current stock price, D_1 represents the expected dividend over the coming year, k is investor's required return on equity, and g is the expected growth rate of dividends. This is known as the constant-growth version of the DCF model. To use the constant-growth DCF model to estimate a firm's cost of equity, one solves for "k" in the above expression to obtain the following:

$$k = \frac{D_1}{P} + g$$

Q. IN YOUR OPINION, IS THE CONSTANT-GROWTH DCF MODEL APPROPRIATE FOR PUBLIC UTILITIES?

A. Yes. The economics of the public utility business indicate that the industry is in the steady-state or constant-growth stage of a three-stage DCF. The economics include the relative stability of the utility business, the maturity of the demand for public utility

services, and the regulated status of public utilities (especially the fact that their returns on investment are effectively set through the ratemaking process). The DCF valuation procedure for companies in this stage is the constant-growth DCF. In the constant-growth version of the DCF model, the current dividend payment and stock price are directly observable. However, the primary problem and controversy in applying the DCF model to estimate equity-cost rates entails estimating investors' expected dividend growth rate.

Q. WHAT FACTORS SHOULD ONE CONSIDER WHEN APPLYING THE DCF METHODOLOGY?

A. One should be sensitive to several factors when using the DCF model to estimate a firm's cost of equity capital. In general, one must recognize the assumptions under which the DCF model was developed in estimating its components (the dividend yield and the expected growth rate). The dividend yield can be measured precisely at any point in time; however, it tends to vary somewhat over time. Estimation of expected growth is considerably more difficult. One must consider recent firm performance, in conjunction with current economic developments and other information available to investors, to accurately estimate investors' expectations.

Q. WHAT DIVIDEND YIELDS HAVE YOU REVIEWED?

A. I have calculated the dividend yields for the companies in the proxy group using the current annual dividend and the 30-day, 90-day, and 180-day average stock prices. These dividend yields are provided on page 2 of Exhibit JRW-7. For the Gas Proxy Group, the mean and median dividend yields using the 30-day, 90-day, and 180-day

average stock prices range from 3.2% to 3.6%. Given this range and recent yield, I am using 3.40% as the dividend yield for the Gas Proxy Group.

Q. PLEASE DISCUSS THE APPROPRIATE ADJUSTMENT TO THE SPOT DIVIDEND YIELD.

A. According to the traditional DCF model, the dividend yield term relates the dividend paid over the coming period to the current stock price. As indicated by Professor Myron Gordon, who is commonly associated with the development of the DCF model for popular use, this is obtained by: (1) multiplying the expected dividend over the coming quarter by 4, and (2) dividing this dividend by the current stock price to determine the appropriate dividend yield for a firm that pays dividends on a quarterly basis.[16]

In applying the DCF model, some analysts adjust the current dividend for growth over the coming year as opposed to the coming quarter. This can be complicated because firms tend to announce changes in dividends at different times during the year. As such, the dividend yield computed upon the basis of presumed growth over the coming quarter as opposed to the coming year can be quite different. Consequently, it is common for analysts to adjust the dividend yield by some fraction of the long-term expected growth rate.

Q. GIVEN THIS DISCUSSION, WHAT ADJUSTMENT FACTOR DO YOU USE FOR YOUR DIVIDEND YIELD?

[16] *Petition for Modification of Prescribed Rate of Return*, Federal Communications Commission, Docket No. 79-05, Direct Testimony of Myron J. Gordon and Lawrence I. Gould at 62 (April 1980).

A. I adjust the dividend yield by one-half (1/2) of the expected growth to reflect growth over the coming year. This is the approach employed by the Federal Energy Regulatory Commission ("FERC").[17] The DCF equity-cost rate ("K") is computed as:

$$K = \left[\left(\frac{D}{P}\right) \times (1 + 0.5g)\right] + g$$

Q. PLEASE DISCUSS THE GROWTH RATE COMPONENT OF THE DCF MODEL.

A. There is debate as to the proper methodology to employ in estimating the growth component of the DCF model. By definition, this component is investors' expectations of the long-term dividend growth rate. Presumably, investors use some combination of historical and/or projected growth rates for earnings and dividends per share and for internal or book-value growth to assess long-term potential.

Q. WHAT GROWTH DATA HAVE YOU REVIEWED FOR THE PROXY GROUPS?

A. I have analyzed a number of measures of growth for companies in the proxy groups. I reviewed *Value Line's* historical and projected growth rate estimates for earnings per share ("EPS"), dividends per share ("DPS"), and book value per share ("BVPS"). In addition, I utilized the average EPS growth-rate forecasts of Wall Street analysts as provided by Yahoo, Zacks and S&P Cap IQ. These services solicit five-year earnings growth-rate projections from securities analysts and compile and publish the means and

[17] Opinion No. 414-A, *Transcontinental Gas Pipe Line Corp.*, 84 FERC ¶61,084 (1998).

medians of these forecasts. Finally, I also assessed prospective growth as measured by prospective earnings retention rates and earned returns on common equity.

Q. PLEASE DISCUSS HISTORICAL GROWTH IN EARNINGS AND DIVIDENDS, AS WELL AS SUSTAINABLE OR INTERNAL GROWTH.

A. Historical growth rates for EPS, DPS, and BVPS are readily available to investors and are presumably an important ingredient in forming expectations concerning future growth. However, one must use historical growth numbers as measures of investors' expectations with caution. In some cases, past growth may not reflect future growth potential. Also, employing a single growth-rate number (for example, for five or ten years) is unlikely to accurately measure investors' expectations, due to the sensitivity of a single growth-rate figure to fluctuations in individual firm performance as well as overall economic fluctuations (*i.e.*, business cycles). Thus, one must appraise the context in which the growth rate is being employed. According to the conventional DCF model, the expected return on a security is equal to the sum of the dividend yield and the expected long-term growth in dividends. Therefore, to best estimate the cost of common-equity capital using the conventional DCF model, one must look to long-term growth rate expectations.

Q. PLEASE DEFINE AND EXPLAIN THE RELEVANCE OF SUSTAINABLE OR INTERNAL GROWTH.

A. A company's sustainable or internal (or "organic") growth occurs when a business expands its own operations rather than relying on takeovers and mergers. It can come about through various means, for example, increasing existing production capacity

through investment in new capital and technology, or development and launch of new products.

Internally generated growth is a function of the percentage of earnings retained within the firm (the earnings retention rate) and the rate of return earned on those earnings (the return on equity). The internal growth rate is computed as the retention rate times the return on equity. Internal growth is significant in determining long-run earnings and, therefore, dividends. Investors recognize the importance of internally-generated growth and pay premiums for stocks of companies that retain earnings and earn high returns on internal investments.

Q. PLEASE DISCUSS THE SERVICES THAT PROVIDE ANALYSTS' EPS FORECASTS.

A. Analysts' EPS forecasts for companies are collected and published by several different investment information services, including Institutional Brokers Estimate System ("I/B/E/S"), Bloomberg, FactSet, S&P Cap IQ, Zacks, First Call, and Reuters, among others. Thompson Reuters publishes analysts' EPS forecasts under different product names, including I/B/E/S, First Call, and Reuters. Bloomberg, FactSet, S&P Cap IQ, and Zacks each publish their own set of analysts' EPS forecasts for companies. These services do not reveal (1) the analysts who are solicited for forecasts; or (2) the identity of the analysts who actually provide the EPS forecasts that are used in the compilations published by the services. I/B/E/S, Bloomberg, FactSet, S&P Cap IQ, and First Call are fee-based services. These services usually provide detailed reports and other data in addition to analysts' EPS forecasts. In contrast, Thompson Reuters and Zacks provide limited EPS forecast data free-of-charge on the Internet. Yahoo! Finance

(http://finance.yahoo.com) lists Thompson Reuters as the source of its summary EPS forecasts. Zacks (www.zacks.com) publishes its summary forecasts on its website. Zacks estimates are also available on other websites, such as MSN.money (http://money.msn.com).

Q. ARE YOU RELYING EXCLUSIVELY ON THE EPS FORECASTS OF WALL STREET ANALYSTS IN ARRIVING AT A DCF GROWTH RATE FOR THE PROXY GROUP?

A. No. There are several issues with using the EPS growth rate forecasts of Wall Street analysts as DCF growth rates. First, the appropriate growth rate in the DCF model is the dividend growth rate, not the earnings growth rate. Nonetheless, over the very long term, dividend and earnings will have to grow at a similar growth rate. Therefore, consideration must be given to other indicators of growth, including prospective dividend growth, internal growth, as well as projected earnings growth. Second, a study by Lacina, Lee, and Xu (2011) has shown that analysts' three-to-five year EPS growth-rate forecasts are not more accurate at forecasting future earnings than naïve random walk forecasts of future earnings.[18] Employing data over a twenty-year period, these authors demonstrate that using the most recent year's actual EPS figure to forecast EPS in the next 3-5 years proved to be just as accurate as using the EPS estimates from analysts' three-to-five year EPS growth-rate forecasts. In the authors' opinion, these results indicate that analysts' long-term earnings growth-rate forecasts should be used with caution as inputs for valuation and cost-of-capital purposes. Finally, and most

[18] M. Lacina, B. Lee & Z. Xu, *Advances in Business and Management Forecasting (Vol. 8),* Kenneth D. Lawrence, Ronald K. Klimberg (ed.), Emerald Group Publishing Limited, pp.77-101.

significantly, it is well known that the long-term EPS growth-rate forecasts of Wall Street securities analysts are overly optimistic and upwardly biased. This has been demonstrated in a number of academic studies over the years.[19] Hence, using these growth rates as a DCF growth rate will provide an overstated equity cost rate. On this issue, a study by Easton and Sommers (2007) found that optimism in analysts' growth rate forecasts leads to an upward bias in estimates of the cost of equity capital of almost 3.0 percentage points.[20]

Q. ARE ANALYSTS' PROJECTED EPS GROWTH RATES FOR UTILITIES LIKEWISE OVERLY OPTIMISTIC AND UPWARDLY BIASED?

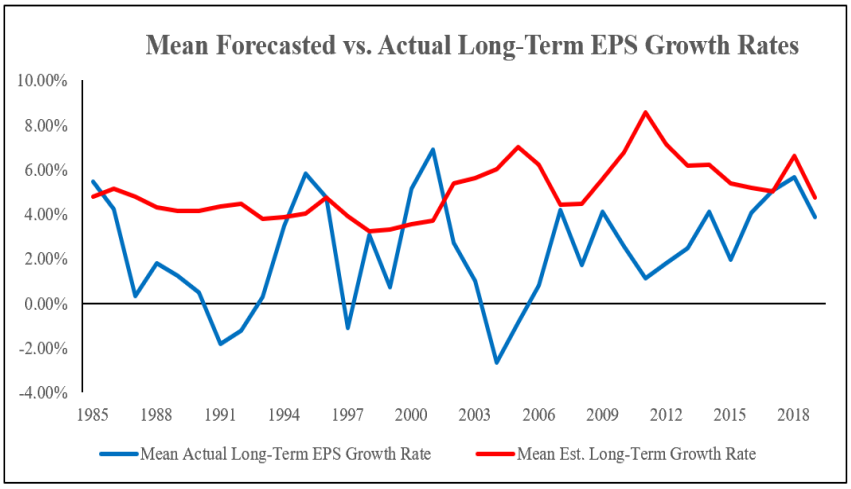
A. Yes. I have completed a study of the accuracy of analysts' EPS growth rates for electric utilities over the 1985-2020 time period. In the study, I used the utilities listed in the East, West, and Central Electric Utilities sectors by *Value Line*. I collected the three-to-five year projected EPS growth rate from I/B/E/S for each utility, and compared that growth rate to the utility's actual subsequent three-to-five year EPS growth rate. As shown in Figure 8, the mean forecasted EPS growth rate (depicted in the red line in Figure 8) is consistently greater than the achieved actual EPS growth rate over the time

[19] The studies that demonstrate analysts' long-term EPS forecasts are overly-optimistic and upwardly biased include: R.D. Harris, "The Accuracy, Bias, and Efficiency of Analysts' Long Run Earnings Growth Forecasts," *Journal of Business Finance & Accounting*, pp. 725-55 (June/July 1999); P. DeChow, A. Hutton, and R. Sloan, "The Relation Between Analysts' Forecasts of Long-Term Earnings Growth and Stock Price Performance Following Equity Offerings," *Contemporary Accounting Research* (2000)*;* K. Chan, L., Karceski, J., & Lakonishok, J., "The Level and Persistence of Growth Rates," *Journal of Finance,* pp. 643−684, (2003); M. Lacina, B. Lee, and Z. Xu, *Advances in Business and Management Forecasting (Vol. 8),* Kenneth D. Lawrence, Ronald K. Klimberg (ed.), Emerald Group Publishing Limited, pp.77-101; and Marc H. Goedhart, Rishi Raj, and Abhishek Saxena, "Equity Analysts, Still Too Bullish," *McKinsey on Finance,* pp. 14-17, (Spring 2010).

[20] Peter D. Easton & Gregory A. Sommers, *Effect of Analysts' Optimism on Estimates of the Expected Rate of Return Implied by Earnings Forecasts*, 45 J. ACCT. RES. 983–1015 (2007).

period, with the exception of 1994-96 and 2000-2002. Over the entire period, the mean forecasted EPS growth rate is over 200 basis points above the actual EPS growth rate. As such, the projected EPS growth rates for electric utilities are overly-optimistic and upwardly-biased.

Figure 8
Mean Forecasted vs. Actual Long-Term EPS Growth Rates
Electric Utilities
1985-2020



Data Source: S&P Global Market Intelligence, Capital IQ, I/B/E/S, 2021.

Q. ARE THE PROJECTED EPS GROWTH RATES OF *VALUE LINE* ALSO OVERLY OPTIMISTIC AND UPWARDLY BIASED?

A. Yes. A study by Szakmary, Conover, and Lancaster (2008) evaluated the accuracy of *Value Line*'s three-to-five-year EPS growth rate forecasts using companies in the Dow Jones Industrial Average over a thirty-year time period and found these forecasted EPS growth rates to be significantly higher than the EPS growth rates that these companies subsequently achieved.[21]

[21] Szakmary, A., Conover, C., & Lancaster, C. (2008), "An Examination of *Value Line*'s Long-Term Projections," *Journal of Banking & Finance*, May 2008, pp. 820-833.

Szakmary, Conover, and Lancaster (SCL) studied the predicted versus the projected stock returns, sales, profit margins, and earnings per share made by *Value Line* over the 1969 to 2001 time period. *Value Line* projects variables from a three-year base period (e.g., 2012-2014) to a future three-year projected period (e.g., 2016-2018). SCL used the sixty-five stocks included in the Dow Jones Indexes (30 Industrials, 20 Transports and 15 Utilities). SCL found that the projected annual stock returns for the Dow Jones stocks were "incredibly overoptimistic" and of no predictive value. The mean annual stock return of 20% for the Dow Jones' stocks *Value Line*'s forecasts was nearly double the realized annual stock return. The authors also found that *Value Line*'s forecasts of earnings per share and profit margins were termed "strikingly overoptimistic." *Value Line*'s forecasts of annual sales were higher than achieved levels, but not statistically significant. SCL concluded that the overly-optimistic projected annual stock returns were attributable to *Value Line*'s upwardly-biased forecasts of earnings per share and profit margins.

Q. IS IT YOUR OPINION THAT STOCK PRICES REFLECT THE UPWARD BIAS IN THE EPS GROWTH RATE FORECASTS?

A. Yes, I do believe that investors are well aware of the bias in analysts' EPS growth-rate forecasts, and therefore stock prices reflect the upward bias.

Q. HOW DOES THAT AFFECT THE USE OF THESE FORECASTS IN A DCF EQUITY COST RATE STUDY?

A. According to the DCF model, the equity cost rate is a function of the dividend yield and expected growth rate. Because I believe that investors are aware of the upward bias in analysts' long-term EPS growth-rate forecasts, stock prices reflect the bias. But

the DCF growth rate needs to be adjusted downward from the projected EPS growth rate to reflect the upward bias in the DCF model.

Q. PLEASE DISCUSS THE HISTORICAL GROWTH OF THE COMPANIES IN THE PROXY GROUP, AS PROVIDED BY *VALUE LINE*.

A. Page 3 of Exhibit JRW-7 provides the 5- and 10-year historical growth rates for EPS, DPS, and BVPS for the companies in the proxy group, as published in the *Value Line Investment Survey*. The median historical growth measures for EPS, DPS, and BVPS for the Gas Proxy Group range from 4.0% to 6.5%, with an average of the medians of 5.6%.

Q. PLEASE SUMMARIZE *VALUE LINE'S* PROJECTED GROWTH RATES FOR THE COMPANIES IN THE PROXY GROUP.

A. *Value Line's* projections of EPS, DPS, and BVPS growth for the companies in the proxy group are shown on page 4 of Exhibit JRW-7. Due to the presence of outliers, the medians are used in the analysis. For the Gas Proxy Group, as shown on page 4 of Exhibit JRW-7, the medians range from 4.5% to 8.0%, with an average of the medians of 6.5%.[22]

Also provided on page 4 of Exhibit JRW-7 are the prospective sustainable growth rates for the companies in the proxy group as measured by *Value Line*'s average projected retention rate and return on shareholders' equity. As noted above, sustainable

[22] It should be noted that *Value Line* uses a different approach in estimating projected growth. *Value Line* does not project growth from today, but *Value Line* projects growth from a three-year base period—2018–2020—to a projected three-year period for the period 2024–2026. Using this approach, the three-year based period can have a significant impact on the *Value L*ine growth rate if this base period includes years with abnormally high or low earnings. For gas companies, this has occurred, with mean/median projected EPS growth rates more than 200 basis points above averages from Zacks and Yahoo Finance. Therefore, I evaluate these growth rates separately from analysts EPS growth rates, and I have given them less weight.

growth is a significant and a primary driver of long-run earnings growth. For the Gas Proxy Group, the median prospective sustainable growth rate is 3.8%.

Q. PLEASE ASSESS GROWTH FOR THE PROXY GROUP AS MEASURED BY ANALYSTS' FORECASTS OF EXPECTED 5-YEAR EPS GROWTH.

A. Yahoo, Zacks, and S&P Cap IQ collect, summarize, and publish Wall Street analysts' long-term EPS growth rate forecasts for the companies in the proxy group. These forecasts are provided for the companies in the proxy group on page 5 of Exhibit JRW-9. I have reported both the mean and median growth rates for the group. Because there is considerable overlap in analyst coverage between the three services, and not all of the companies have forecasts from the different services, I have averaged the expected five-year EPS growth rates from the three services for each company to arrive at an expected EPS growth rate for each company. The mean and median of the analysts' projected EPS growth rates for the Gas Proxy Group are 5.4% and 5.1%.

Q. PLEASE SUMMARIZE YOUR ANALYSIS OF THE HISTORICAL AND PROSPECTIVE GROWTH OF THE PROXY GROUP.

A. Page 6 of Exhibit JRW-7 shows the summary DCF growth rate indicators for the proxy group.

The historical growth rate indicators for my Gas Proxy Group imply a baseline growth rate of 5.6%. The average of the projected EPS, DPS, and BVPS growth rates from *Value Line* is 6.5%, and *Value Line*'s projected sustainable growth rate is 3.8%. The mean/median projected EPS growth rate of Wall Street analysts for the Gas Proxy Group are 5.4% and 5.1%, respectively. The overall range for the projected growth rate indicators (ignoring historical growth) is 3.8% to 6.5%. Giving primary weight to

the projected EPS growth rate of Wall Street analysts, I believe that the appropriate projected growth rate is in the 5.0% to 5.5% range. I will use the midpoint of that range, 5.25%, as my DCF growth rate. This growth rate figure is in the upper end of the range of historic and projected growth rates for the Gas Proxy Group.

Q. WHAT ARE THE RESULTS FROM YOUR APPLICATION OF THE DCF MODEL?

A. My DCF-derived equity cost rate for the group is summarized on page 1 of Exhibit JRW-7 and in Table 4.

Table 4
DCF-derived Equity Cost Rate/ROE

	Dividend Yield	1 + ½ Growth Adjustment	DCF Growth Rate	Equity Cost Rate
Gas Proxy Group	**3.40%**	**1.02625**	**5.25%**	**8.75%**

The result for the Gas Proxy Group is the 3.40% dividend yield, times the one and one-half growth adjustment of 1.02625, plus the DCF growth rate of 5.25%, which results in an equity cost rate of 8.75%.

C. Capital Asset Pricing Model ("CAPM")

Q. PLEASE DISCUSS THE CAPITAL ASSET PRICING MODEL ("CAPM").

A. The CAPM is a risk premium approach to gauging a firm's cost of equity capital. According to the risk-premium approach, the cost of equity is the sum of the interest rate on a risk-free bond (R_f) and a risk premium (RP), as in the following:

$$k = R_f + RP$$

The yield on long-term U.S. Treasury securities is normally used as R_f. Risk premiums are measured in different ways. The CAPM is a theory of the risk and expected returns of common stocks. In the CAPM, two types of risk are associated with a stock: firm-specific risk or unsystematic risk, and market or systematic risk, which is measured by a firm's beta. The only risk that investors receive a return for bearing is systematic risk.

According to the CAPM, the expected return on a company's stock, which is also the equity cost rate (K), is expressed as:

$$K = \left(R_f\right) + \beta \times \left[E(R_m) - \left(R_f\right)\right]$$

Where:

- *K* represents the estimated rate of return on the stock;
- *E(R_m)* represents the expected rate of return on the overall stock market. Frequently, the S&P 500 is used as a proxy for the "market";
- *(R_f)* represents the risk-free rate of interest;
- *[E(R_m) - (R_f)]* represents the expected equity or market risk premium—the excess rate of return that an investor expects to receive above the risk-free rate for investing in risky stocks; and
- *Beta*—(ß) is a measure of the systematic risk of an asset.

To estimate the required return or cost of equity using the CAPM requires three inputs: the risk-free rate of interest (*R_f*), the beta (ß), and the expected equity or market risk premium *[E(R_m) - (R_f)]*. *R_f* is the easiest of the inputs to measure – it is represented by the yield on long-term U.S. Treasury bonds. ß, the measure of systematic risk, is a little more difficult to measure because there are different opinions about what adjustments, if any, should be made to historical betas due to their tendency to regress to 1.0 over time. And finally, an even more difficult input to measure is the expected equity or market risk premium (*E(R_m) - (R_f)*). I will discuss each of these inputs below.

Q. PLEASE DISCUSS EXHIBIT JRW-8.

A. Exhibit JRW-8 provides the summary results for my CAPM study. Page 1 shows the results, and the following pages contain the supporting data.

Q. PLEASE DISCUSS THE RISK-FREE INTEREST RATE.

A. The yield on long-term U.S. Treasury bonds has usually been viewed as the risk-free rate of interest in the CAPM. The yield on long-term U.S. Treasury bonds, in turn, has been considered to be the yield on U.S. Treasury bonds with 30-year maturities.

Q. WHAT RISK-FREE INTEREST RATE ARE YOU USING IN YOUR CAPM?

A. As shown on page 2 of Exhibit JRW-8, the yield on 30-year U.S. Treasury bonds has been in the 1.25% to 4.75% range over the 2010–2021 time period. The current 30-year Treasury yield is near the middle of this range. Given the recent range of yields, I have chosen to use a yield toward the middle of the range as my risk-free interest rate. Therefore, I am using 2.50% as the risk-free rate, or R_f, in my CAPM. This rate is consistent with Duff & Phelps, who are also using 2.50% (see page 7 of Exhibit JRW-8).[23]

Q. DOES YOUR 2.50% RISK-FREE INTEREST RATE TAKE INTO CONSIDERATION FORECASTS OF HIGHER INTEREST RATES?

A. No, it does not. As I discuss later in my testimony, forecasts of higher interest rates have been notoriously wrong for a decade. My 2.50% risk-free interest rate takes into account the range of interest rates in the past and effectively synchronizes the risk-free rate with the market-risk premium. The risk-free rate and the market-risk premium are interrelated in that the market-risk premium is developed in relation to the risk-free

[23] Duff & Phelps, *Cost of Capital Research Center* (2020), https://www.duffandphelps.com/insights/publications/cost-of-capital.

rate. As discussed below, my market-risk premium is based on the results of many studies and surveys that have been published over time. Therefore, my risk-free interest rate of 2.50% is effectively a normalized risk-free rate of interest.

Q. WHAT BETAS ARE YOU EMPLOYING IN YOUR CAPM?

A. Beta (ß) is a measure of the systematic risk of a stock. The market, usually taken to be the S&P 500, has a beta of 1.0. The beta of a stock with the same price movement as the market also has a beta of 1.0. A stock with price movement greater than that of the market, such as a technology stock, is riskier than the market and has a beta greater than 1.0. A stock with below-average price movement, such as that of a regulated public utility, is less risky than the market and has a beta less than 1.0. Estimating a stock's beta involves running a linear regression of a stock's return on the market return.[24]

As shown on page 3 of Exhibit JRW-8, the slope of the regression line is the stock's ß. A steeper line indicates that the stock is more sensitive to the return on the overall market. This means that the stock has a higher ß and greater-than-average market risk. A less steep line indicates a lower ß and less market risk.

Several online investment information services, such as Yahoo and Reuters, provide estimates of stock betas. Usually these services report different betas for the same stock. The differences are usually due to: (1) the time period over which ß is

[24] Regression models describe the relationship between variables by fitting a line to the observed data. Linear regression models use a straight line, while logistic and nonlinear regression models use a curved line. Regression allows one to estimate how a dependent variable changes as the independent variable(s) change.

measured; and (2) any adjustments that are made to reflect the fact that betas tend to regress to 1.0 over time.

Q. PLEASE DISCUSS THE CHANGE IN BETAS IN 2020.

A. I have traditionally used the betas as provided in the *Value Line Investment Survey*. As discussed above, the betas for utilities recently increased significantly as a result of the volatility of utility stocks during the stock-market meltdown associated with the novel coronavirus in March of 2020. Utility betas as measured by *Value Line* have been in the 0.55 to 0.70 range for the past 10 years. But utility stocks were much more volatile relative to the market in March and April of 2020, and this resulted in an increase of above 0.30 to the average utility beta.

Value Line defines their computation of beta as:[25]

> Beta - A relative measure of the historical sensitivity of a stock's price to overall fluctuations in the New York Stock Exchange Composite Index. A Beta of 1.50 indicates a stock tends to rise (or fall) 50% more than the New York Stock Exchange Composite Index. The ''Beta coefficient'' is derived from a regression analysis of the relationship between weekly percentage changes in the price of a stock and weekly percentage changes in the NYSE Index over a period of five years. In the case of shorter price histories, a smaller time period is used, but two years is the minimum. The Betas are adjusted for their long-term tendency to converge toward 1.00. Value Line then adjusts these Betas to account for their long-term tendency to converge toward 1.00.

However, there are several issues with *Value Line* betas:

1. *Value Line* betas are computed using weekly returns, and the volatility of utility stocks during March 2020 was impacted by using weekly and not monthly

[25] *Value Line* (2020) www.valueline.com.

returns. Yahoo Finance uses five years of monthly returns to compute betas, and Yahoo Finance's betas for utilities are lower than *Value Lin*e's.

2. *Value Line* betas are computed using the New York Stock Exchange Index as the market. While about 3,000 stocks trade on the NYSE, most technology stocks are traded on the NASDAQ or over-the-counter market and not the NYSE. Technology stocks, which make up about 25% of the S&P 500, tend to be more volatile. If they were traded on the NYSE, they would increase the volatility of the measure of the market and thereby lower utility betas.

3. Major vendors of CAPM betas such as Merrill Lynch, *Value Line*, and Bloomberg publish adjusted betas. The so-called Blume adjustment cited by *Value Line* adjusts betas calculated using historical-returns data to reflect the tendency of stock betas to regress toward 1.0 over time, which means that the betas of typical low beta stocks tend to increase toward 1.0, and the betas of typical high beta stocks tend to decrease toward 1.0.[26]

The Blume adjustment procedure is calculated as follows:

Regressed Beta = .67 * (Observed Beta) + 0.33

For example, suppose a company has an observed past beta of 0.50. The regressed (Blume-adjusted) beta would be:

Regressed Beta = .67 * (0.50) + 0.33 = 0.67

Blume offered two reasons for betas to regress toward 1.0. First, he suggested it may be a by-product of management's efforts to keep the level of firm's systematic risk

[26] M. Blume, *On the Assessment of Risk*, J. OF FIN. (Mar. 1971).

close to that of the market. He also speculated that it results from management's efforts to diversify through investment projects.

However, there is an issue with using regressed betas for utilities. Specifically, a study by Michelfelder and Theodossiou investigated whether regressed Betas are appropriate for utilities.[27] Conceptually, Michelfelder and Theodossiou suggested that utilities are different from unregulated companies in several areas, which may result in betas not regressing toward 1.0:[28]

> Being natural monopolies in their own geographic areas, public utilities have more influence on the prices of their product (gas and electricity) than other firms. The rate setting process provides public utilities with the opportunity to adjust prices of gas and electricity to recover the rising costs of fuel and other materials used in the transmission and distribution of electricity and gas.

To test for a regression toward 1.0, the authors used monthly holding-period total returns for 57 publicly traded U.S. public utilities for the period from January 1962 to December 2007 using 60, 84, 96, and 108 monthly returns over five different non-lapping periods. They also used alternative time periods and obtained similar results. From their analysis of the data, the authors concluded that "public utility betas do not have a tendency to converge to 1."[29]

> Major vendors of CAPM Betas such as Merrill Lynch, Value Line, and Bloomberg distribute Blume adjusted betas to investors. We have shown empirically that public utility betas do not have a tendency to converge to 1. Short-term Betas of public utilities follow

[27] Richard A. Michelfelder and Panayiotis Theodossiou, *Public Utility Beta Adjustment and Biased Costs of Capital in Public Utility Rate Proceedings*, THE ELECTRICITY J., (Nov. 2013).

[28] *Id.* at 61.

[29] *Id.*

a cyclical pattern with recent downward trends, then upward structural breaks with long-term betas following a downward trend.

The authors concluded that utility betas converge to 0.59 as opposed to 1.0. The implication is that using regressed betas such as those from *Value Line* will result in an inflated expected return using the CAPM for utilities.

Q. GIVEN THIS DISCUSSION, WHAT BETAS ARE YOU USING IN YOUR CAPM?

A. As shown on page 3 of Exhibit JRW-8, the median *Value Line* beta for the Gas Proxy Group is 0.90. At present, I will continue to use *Value Line* betas in my CAPM, which I believe is a conservative approach.

Q. PLEASE DISCUSS THE MARKET RISK PREMIUM.

A. The market-risk premium is equal to the expected return on the stock market (e.g., the expected return on the S&P 500, $E(R_m)$ minus the risk-free rate of interest (R_f)). The market-risk premium is the difference in the expected total return between investing in equities and investing in "safe" fixed-income assets, such as long-term government bonds. However, while the market-risk premium is easy to define conceptually, it is difficult to measure because it requires an estimate of the expected return on the market - $E(R_m)$. As I discuss below, there are different ways to measure $E(R_m)$, and studies have been developed with significantly different magnitudes for $E(R_m)$. As Merton Miller, the 1990 Nobel Prize winner in economics, indicated, $E(R_m)$ is very difficult to measure and is one of the "great mysteries in finance."[30]

[30] Merton Miller, *The History of Finance: An Eyewitness Account*, J. OF APPLIED CORP. FIN., 3 (2000).

Q. PLEASE DISCUSS THE ALTERNATIVE APPROACHES TO ESTIMATING THE MARKET-RISK PREMIUM.

A. Page 4 of Exhibit JRW-8 highlights the primary approaches to, and issues in, estimating the expected market-risk premium. The traditional way to measure the market-risk premium was to use the difference between historical average stock and bond returns. In this case, historical stock and bond returns, also called *ex post* returns, were used as the measures of the market's expected return (known as the *ex ante* or forward-looking expected return). This type of historical evaluation of stock and bond returns is often called the "Ibbotson approach" after Professor Roger Ibbotson, who popularized this method of using historical financial market returns as measures of expected returns. However, this historical evaluation of returns can be a problem because: (1) *ex post* returns are not the same as *ex ante* expectations; (2) market-risk premiums can change over time, increasing when investors become more risk-averse and decreasing when investors become less risk-averse; and (3) market conditions can change such that *ex post* historical returns are poor estimates of *ex ante* expectations.

The use of historical returns as market expectations has been criticized in numerous academic studies, which I discuss later. The general theme of these studies is that the large equity risk premium discovered in historical stock and bond returns cannot be justified by the fundamental data. These studies, which fall under the category "*Ex Ante* Models and Market Data," compute *ex ante* expected returns using market data to arrive at an expected equity risk premium. These studies have also been called "Puzzle Research" after the famous study by Mehra and Prescott in which the

authors first questioned the magnitude of historical equity risk premiums relative to fundamentals.[31]

In addition, there are a number of surveys of financial professionals regarding the market-risk premium, as well as several published surveys of academics on the equity risk premium. Duke University has published a CFO Survey on a quarterly basis for over 10 years.[32] Questions regarding expected stock and bond returns are also included in the Federal Reserve Bank of Philadelphia's annual survey of financial forecasters, which is published as the *Survey of Professional Forecasters*.[33] This survey of professional economists has been published for almost 50 years. In addition, Pablo Fernandez conducts annual surveys of financial analysts and companies regarding the equity risk premiums used in their investment and financial decision making.[34]

[31] Rajnish Mehra & Edward C. Prescott, The Equity Premium: A Puzzle, J. OF MONETARY ECON. 145 (1985).

[32] DUKE UNIVERSITY, *The CFO Survey* (2020) https://www.richmondfed.org/cfosurvey.

[33] FEDERAL RESERVE BANK OF PHILADELPHIA, *Survey of Professional Forecasters* (Feb. 2020), https://www.philadelphiafed.org/-/media/research-and-data/real-time-center/survey-of-professional-forecasters/2019/spfq119.pdf?la=en. The Survey of Professional Forecasters was formerly conducted by the American Statistical Association (ASA) and the National Bureau of Economic Research (NBER) and was known as the ASA/NBER survey. The survey, which began in 1968, is conducted each quarter. The Federal Reserve Bank of Philadelphia, in cooperation with the NBER, assumed responsibility for the survey in June 1990.

[34] Pablo Fernandez, Eduardo Apellániz, & Javier Acín, SURVEY: MARKET RISK PREMIUM AND RISK-FREE RATE USED FOR 81 COUNTRIES IN 2020 (Mar. 25, 2020), IESE Business School Working Paper No. WP-1244-E, Available at SSRN: https://ssrn.com/abstract=3560869 or http://dx.doi.org/10.35139/ssrn.3560869.

Q. PLEASE PROVIDE A SUMMARY OF THE MARKET RISK PREMIUM STUDIES.

A. Derrig and Orr, Fernandez, and Song completed the most comprehensive reviews of the research on the market risk premium.[35] Derrig and Orr's study evaluated the various approaches to estimating market-risk premiums, discussed the issues with the alternative approaches, and summarized the findings of the published research on the market risk premium.

Fernandez examined four alternative measures of the market-risk premium – historical, expected, required, and implied. He also reviewed the major studies of the market-risk premium and presented the summary market-risk premium results.

Song provided an annotated bibliography and highlighted the alternative approaches to estimating the market-risk premium.

Page 5 of Exhibit JRW-8 provides a summary of the results of the primary risk-premium studies reviewed by Derrig and Orr, as well as other more recent studies of the market-risk premium.

In developing page 5 of Exhibit JRW-8, I have categorized the types of studies as discussed on page 4 of Exhibit JRW-8. I have also included the results of studies of the "Building Blocks" approach to estimating the equity risk premium. The Building Blocks approach is a hybrid approach employing elements of both historical and *ex ante* models.

[35] *See* Richard Derrig & Elisha Orr, EQUITY RISK PREMIUM: EXPECTATIONS GREAT AND SMALL, Working Paper (version 3.0), Automobile Insurers Bureau of Massachusetts, (Aug. 28, 2003); Pablo Fernandez, EQUITY PREMIUM: HISTORICAL, EXPECTED, REQUIRED, AND IMPLIED, IESE Business School Working Paper (2007); Zhiyi Song, THE EQUITY RISK PREMIUM: AN ANNOTATED BIBLIOGRAPHY, CFA Institute (2007).

Q. PLEASE DISCUSS PAGE 5 OF EXHIBIT JRW-8.

A. Page 5 of Exhibit JRW-8 provides a summary of the results of the market risk-premium studies that I have reviewed. These include the results of: (1) the various studies of the historical risk premium, (2) *ex ante* market risk premium studies, (3) market risk-premium surveys of CFOs, financial forecasters, analysts, companies and academics, and (4) the Building Blocks approach to the market risk premium. There are results reported for over 30 studies, and the median market-risk premium of these studies is 4.83%.

Q. PLEASE HIGHLIGHT THE RESULTS OF MORE RECENT RISK-PREMIUM STUDIES AND SURVEYS.

A. The studies cited on page 5 of Exhibit JRW-8 include every market risk-premium study and survey I could identify that was published over the past fifteen years and that provided a market risk-premium estimate. Many of these studies were published prior to the financial crisis that began in 2008. In addition, some of these studies were published in the early 2000s at the market peak. It should be noted that many of these studies (as indicated) used data over long periods of time (as long as 50 years of data) and so were not estimating a market-risk premium as of a specific point in time (e.g., the year 2001). To assess the effect of the earlier studies on the market-risk premium, I have reconstructed page 5 of Exhibit JRW-8 on page 6 of Exhibit JRW-8; however, I have eliminated all studies dated before January 2, 2010. The median market-risk-premium estimate for this subset of studies is 5.10%.

Q. PLEASE SUMMARIZE THE MARKET RISK PREMIUM STUDIES AND SURVEYS.

A. As noted above, there are three approaches to estimating the market-risk premium – historic stock and bond returns, *ex ante* or expected returns models, and surveys. The studies on page 6 of Exhibit JRW-8 can be summarized in the following manners:

Historic Stock and Bond Returns - Historic stock and bond returns suggest a market-risk premium in the 4.40% to 6.44% range, depending on whether one uses arithmetic or geometric mean returns.

Ex Ante Models - Market risk premium studies that use expected or ex ante return models indicate a market risk premium in the range of 3.42% to 6.00%.

Surveys – Market-risk premiums developed from surveys of analysts, companies, financial professionals, and academics are lower, with a range from 3.36% to 5.70%.

Building Block – The mean reported market risk premiums reported in studies using the building block approach range from 3.00% to 5.21%.

Q. PLEASE HIGHLIGHT THE *EX ANTE* MARKET RISK-PREMIUM STUDIES AND SURVEYS THAT YOU BELIEVE ARE MOST TIMELY AND RELEVANT.

A. I will highlight several studies/surveys.

Pablo Fernandez conducts annual surveys of financial analysts and companies regarding the equity risk premiums used in their investment and financial decision-

making.[36] His survey results are included on pages 5 and 6 of Exhibit JRW-8. The results of his 2021 survey of academics, financial analysts, and companies, which included 4,000 responses, indicated a mean market-risk premium employed by U.S. analysts and companies of 5.5%.[37] His estimated market-risk premium for the U.S. has been in the 5.00% to 5.60% range in recent years.

Professor Aswath Damodaran of New York University, a leading expert on valuation and the market-risk premium, provides a monthly updated market-risk premium based on projected S&P 500 EPS and stock-price level and long-term interest rates. His estimated market-risk premium, shown graphically in Figure 9 below, has primarily been in the range of 5.0% to 6.0% since 2010. As of May 2021, his estimate of the implied market-risk premium was 3.99%.[38]

Figure 9
Damodaran Market Risk Premium

Source: Aswath Damodaran, Damodaran Online, N.Y. UNIVERSITY,

[36] Pablo Fernandez, Sofia Banuls, and Pablo Acín, A Survey: MARKET RISK PREMIUM AND RISK-FREE RATE USED FOR 88 COUNTRIES IN 2021, IESE Business School (June 2021).

[37] *Id.* at 3.

[38] Aswath Damodaran, *Damodaran Online*, N.Y. UNIVERSITY. http://pages.stern.nyu.edu/~adamodar/.

http://pages.stern.nyu.edu/~adamodar/ (last visited May 9, 2021).

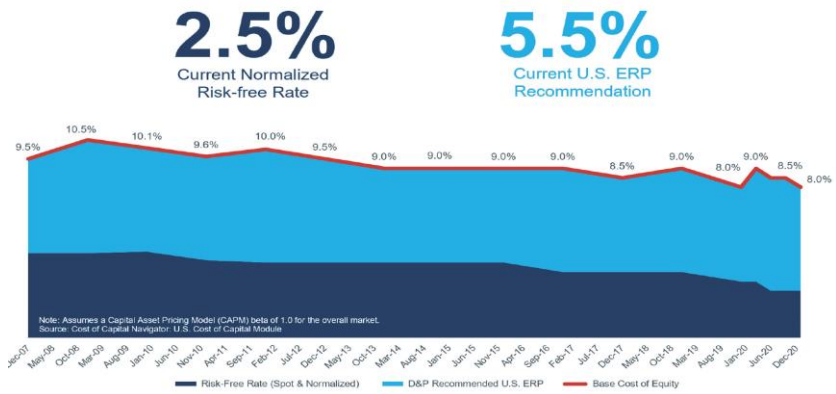
Duff & Phelps, an investment advisory firm, provides recommendations for the normalized risk-free interest rate and market-risk premiums to be used in calculating the cost-of-capital data. Its recommendations over the 2008–2021 time periods are shown on page 7 of Exhibit JRW-8 and are shown graphically in Figure 10. Over the past decade, Duff & Phelps' recommended normalized risk-free interest rates have been in the 2.50% to 4.00% and market-risk premiums have been in the 5.0% to 6.0% range. In early 2020, in the wake of the novel coronavirus in 2020, Duff & Phelps decreased its recommended normalized risk-free interest rate from 3.0% to 2.50% and increased its market-risk premium from 5.00% to 6.00%. Subsequently, on December 9, 2020, Duff & Phelps reduced its recommended market-risk premium to 5.50%.[39]

Finally, KPMG, the international accounting firm, regularly publishes an update to their market risk premium to be used in their valuation practice. KPMG's market risk premium, which was as high as 6.75% in 2020, was lowered on March 31, 2021 to 5.75% and again, on June 30, 2021, to 5.50%.[40]

[39] https://www.duffandphelps.com/insights/publications/cost-of-capital/duff-and-phelps-recommended-us-equity-risk-premium-decreased-december-2020.

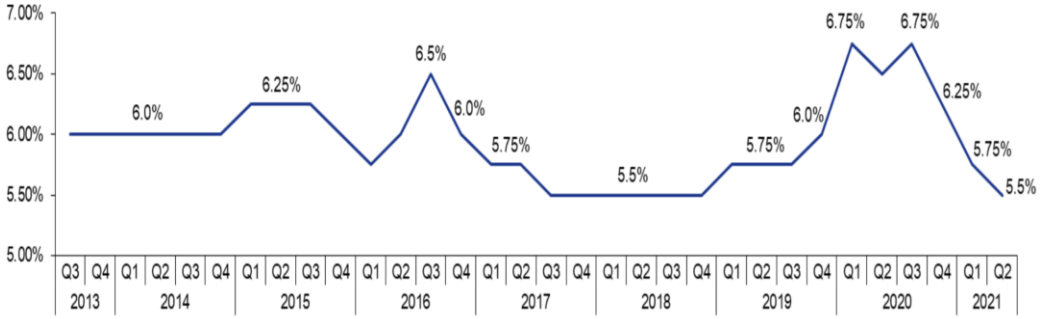
[40] KPMG Corporate Finance NL recommends a MRP of 5.50% as per 30 June 2021. file:///C:/Users/jrw/Downloads/20210630%20-%20MRP%20Research%20Summary.pdf.

Figure 10
Duff & Phelps
Normalized Risk-Free Rate and Market-Risk Premium Recommendations
2007-2021



Source: https://www.duffandphelps.com/insights/publications/cost-of-capital

Figure 11
KPGM
Market-Risk Premium Recommendations
2013-2021



Source:file:///C:/Users/jrw/Downloads/20210630%20-20MRP%20Research%20Summary.pdf

Q. GIVEN THESE RESULTS, WHAT MARKET-RISK PREMIUM ARE YOU USING IN YOUR CAPM?

A. The studies on page 6 of Exhibit JRW-8, and more importantly, the more timely and relevant studies just cited, suggest that the appropriate market-risk premium in the U.S. is in the 4.0% to 6.0% range. I will use an expected market-risk premium of 6.00%, which is the upper end of the range, as the market-risk premium. I gave most weight

to the market risk-premium estimates of Duff & Phelps, KPMG, the Fernandez survey, and Damodaran. This is a conservatively high estimate of the market-risk premium, considering the many studies and surveys of the market-risk premium.

Q. WHAT EQUITY COST RATE IS INDICATED BY YOUR CAPM ANALYSIS?

A. The results of my CAPM study for the proxy groups are summarized on page 1 of Exhibit JRW-8 and in Table 5 below.

Table 5
CAPM-Derived Equity Cost Rate/ROE
$K = (R_f) + ß * [E(R_m) - (R_f)]$

	Risk-Free Rate	Beta	Equity Risk Premium	Equity Cost Rate
Gas Proxy Group	**2.50%**	**0.85**	**6.0%**	**7.6%**

For the Gas Proxy Group, the risk-free rate of 2.50% plus the product of the beta of 0.85 times the equity risk premium of 6.0% results in a 7.6% equity cost rate.

D. Equity Cost Rate Summary

Q. PLEASE SUMMARIZE THE RESULTS OF YOUR EQUITY COST RATE STUDIES.

A. My DCF and CAPM analyses for the Gas Proxy Group indicate equity-cost rates of 8.75% and 7.60%, respectively.

Table 6
ROEs Derived from DCF and CAPM Models

	DCF	CAPM
Gas Proxy Group	**8.75%%**	**7.60%**

Q. GIVEN THESE RESULTS, WHAT IS YOUR ESTIMATED EQUITY COST RATE FOR THE GROUPS?

A. Given these results, I conclude that the appropriate equity-cost rate is in the range of 7.60% to 8.75% for the companies in the Gas Proxy Group. However, since I rely primarily on the DCF model and since the Company is at the high end of the range of the proxy group. I am using 8.75% as my equity cost rate for Black Hills.

Q. PLEASE INDICATE WHY YOUR EQUITY-COST RATE RECOMMENDATION IS APPROPRIATE FOR BLACK HILLS.

A. There are a number of reasons why an equity-cost rate of 8.75% is appropriate and fair for the Company in this case:

1. As shown in Exhibits JRW-2 (page 1), capital costs for utilities, as indicated by long-term, utility-bond yields, are still at historically low levels;
2. As shown in Exhibit JRW-5 (page 2), the gas distribution industry are among the lowest risk industries in the U.S. as measured by beta, especially in light of the economic downturn caused by the COVID-19 pandemic. As such, the cost of equity capital for this industry is the lowest in the U.S., according to the CAPM;
3. My recommended equity-cost rate lies at the high end of the range of my ROE outcomes.

Q. DO YOU BELIEVE THAT YOUR ROE RECOMMENDATION MEETS THE *HOPE* AND *BLUEFIELD* STANDARDS?

A. Yes.

Q. IN MARCH 2015, MOODY'S PUBLISHED AN ARTICLE ON UTILITY ROES AND CREDIT QUALITY. PLEASE DISCUSS YOUR RECOMMENDATION IN LIGHT OF THE MOODY'S ARTICLE.

A. Moody's March 2015 article recognized that authorized ROEs for electric and gas companies were declining due to lower interest rates. The article explains:[41]

> The credit profiles of US regulated utilities will remain intact over the next few years despite our expectation that regulators will continue to trim the sector's profitability by lowering its authorized returns on equity (ROE). Persistently low interest rates and a comprehensive suite of cost recovery mechanisms ensure a low business risk profile for utilities, prompting regulators to scrutinize their profitability, which is defined as the ratio of net income to book equity. We view cash flow measures as a more important rating driver than authorized ROEs, and we note that regulators can lower authorized ROEs without hurting cash flow, for instance by targeting depreciation, or through special rate structures.

Moody's stated that even with lower authorized ROEs, electric and gas companies were earning ROEs of 9.0% to 10.0%, their credit profiles were not being impaired and they were undeterred from raising record amounts of capital.

With respect to authorized ROEs, Moody's recognized that utilities and regulatory commissions were "struggling" to justify higher ROEs in the face of lower interest rates and risk-reducing, cost-recovery mechanisms:[42]

> Robust cost recovery mechanisms will help ensure that US regulated utilities' credit quality remains intact over the next few years. As a result, falling authorized ROEs are not a material credit driver at this

[41] Moody's Investors Service, "Lower Authorized Equity Returns Will Not Hurt Near-Term Credit Profiles," March 10, 2015.

[42] *Id.*

> time, but rather reflect regulators' struggle to justify the cost of capital gap between the industry's authorized ROEs and persistently low interest rates. We also see utilities struggling to defend this gap, while at the same time recovering the vast majority of their costs and investments through a variety of rate mechanisms.

Overall, this article further supports the emerging belief that lower authorized ROEs were unlikely to hurt the financial integrity of utilities or their ability to attract capital.

VII. CRITIQUE OF BLACK HILLS' RATE OF RETURN TESTIMONY

Q. PLEASE SUMMARIZE THE COMPANY'S PROPOSED RATE OF RETURN RECOMMENDATION.

A. Black Hills witness Ms. Curran has proposed a capital structure based on a 2020 year-end capitalization of 49.66% long-term debt and 50.34% common equity. Black Hills Witness Mr. Adrien M. McKenzie has recommended a common equity cost rate of 10.15%.

Q. PLEASE PROVIDE AN OVERVIEW OF THE PRIMARY ISSUES REGARDING RATE OF RETURN IN THIS PROCEEDING.

A. The primary issues related to the Company's rate of return include the following:

1. <u>Capital Market Conditions</u> – Mr. McKenzie's analyses, ROE results, and recommendations are based on assumptions of higher interest rates and capital costs. However, interest rates and capital costs have remained at historically low levels in recent years.

2. Capital Structure – The Company proposed capital structure has a higher common equity ratio and lower financial risk than other gas companies. Hence, I have used the capital structure with a common equity ratio of 50.0%.

3. DCF Equity Cost Rate - The DCF Equity Cost Rate is estimated by summing the stock's dividend yield and investors' expected long-run growth rate in dividends paid per share. The primary issue with Mr. McKenzie's DCF analysis is that he has relied extensively on the overly optimistic and upwardly biased earnings per share ("EPS") growth rate forecasts of Wall Street analysts and *Value Line*.

4. CAPM Approach – The CAPM approach requires an estimate of the risk-free interest rate, the beta, and the market or equity risk premium. There are several issues with Mr. McKenzie's CAPM analyses: (1) he has employed a projected 30-year-Treasury rate of 2.90% which is about 100 basis points above current market interest rates; (2) he has employed the Empirical CAPM ("ECAPM") version of the CAPM, which makes inappropriate adjustments to the risk-free rate and the market risk premium; (3) he has included an unwarranted small firm premium; and (4) most significantly, he has used a highly overstated market risk premium of 10.2%.

5. Alternative Risk Premium Model - ("Utility Risk Premium" or "URP") - Mr. McKenzie estimates an equity cost rate using an alternative risk premium model, which he calls the Utility Risk Premium ("URP") approach. The risk premium in his URP method is based on the historical relationship between long-term utility bond yields and authorized ROEs for electric utility and gas distribution companies. There are several issues with this approach, which I discuss in more depth later, but the primary problems are that he uses a projected based yield based on forecasted interest

rates and his risk premium is a gauge of *Commission* behavior rather than *investor* behavior.

6. <u>Expected Earnings Approach</u> - Mr. McKenzie also uses the Expected Earnings approach to estimate an equity cost rate for the Company. Mr. McKenzie computes the expected ROE as forecasted by *Value Line* for his proxy group of gas companies. The so-called "Expected Earnings" approach, however, (1) does not measure the market cost of equity capital, (2) is independent of most cost of capital indicators, and (3) has several other empirical problems. Therefore, the Commission should ignore Mr. McKenzie's "Expected Earnings" approach in determining the appropriate ROE for Black Hills.

7. <u>DCF Model Applied to Non-Utility Companies</u> - Mr. McKenzie also estimates an equity cost rate by applying his equity-cost-rate approaches and methodologies to a group of "comparable risk" non-price regulated companies. As I note in the critique section of this testimony, his approach is fundamentally flawed for two reasons.

8. <u>Flotation Costs</u> - Mr. McKenzie also reports his equity cost rate results should include a flotation cost adjustment. This is untrue, especially because Mr. McKenzie has not provided any evidence that the Company has paid flotation costs. Therefore, the Company should not be allowed to collect additional revenues in the form of a higher ROE for flotation costs that they did not incur.

Capital market conditions, capital structure, and flotation costs were previously discussed. The other issues are addressed below.

Q. PLEASE REVIEW MR. MCKENZIE'S EQUITY COST RATE APPROACHES AND RESULTS.

A. Mr. McKenzie has developed a proxy group of gas distribution companies and employs DCF, CAPM, utility risk premium, and expected earnings equity cost rate approaches. Mr. McKenzie's equity cost rate estimates for Black Hills are summarized on page 2 of Exhibit JRW-10. Based on these figures, he concludes that the appropriate equity cost rate is 10.15% for Black Hills' gas distribution operations.

A. DCF Approach

Q. PLEASE SUMMARIZE MR. MCKENZIE'S DCF ESTIMATES.

A. On pages 31-42 of Exhibit Nos. KSG Direct Exhibit AMM-4 and AMM-5, Mr. McKenzie develops an equity cost rate by applying the DCF model to his proxy group. Mr. McKenzie's DCF results are summarized on page 2 of Exhibit JRW-10. In the traditional DCF approach, the equity cost rate is the sum of the dividend yield and expected growth. For the DCF growth rate, Mr. McKenzie uses four measures of projected EPS growth: the projected EPS growth of Wall Street analysts as compiled by IBES and Zack's; *Value Line's* projected EPS projected growth rate; and a measure of sustainable growth as computed by the sum of internal ("*br*") and by external ("*sv*") growth. The average of the mean DCF results is 9.2%.

Q. WHAT ARE THE ISSUES IN MR. MCKENZIE'S DCF ANALYSES?

A. Other than a lack of weight, Mr. McKenzie gives his 9.20% DCF result, the primary issue in Mr. McKenzie's DCF analysis is the excessive weight given the overly optimistic and

upwardly-biased EPS growth rate forecasts of Wall Street analysts as the growth rate in his DCF model.

1. Excessive Reliance on Analysts' EPS Growth Rate Forecasts

Q. PLEASE REVIEW MR. MCKENZIE'S DCF GROWTH RATE.

A. In his constant-growth DCF model, Mr. McKenzie's DCF growth rate is the average of the projected EPS growth rate forecasts of: (a) Wall Street analysts as compiled by IBES, Zack's, and *Value Line's* projected EPS projected growth rate; and, (b) a measure of sustainable growth as computed by the sum of internal ("*br*") and by external ("*sv*") growth.

Q. PLEASE DISCUSS MR. MCKENZIE'S EXCLUSIVE RELIANCE ON THE PROJECTED GROWTH RATES OF WALL STREET ANALYSTS AND *VALUE LINE.*

A. It seems highly unlikely that investors today would rely exclusively on the EPS growth rate forecasts of Wall Street analysts and ignore other growth rate measures in arriving at their expected growth rates for equity investments. As I previously indicated, the appropriate growth rate in the DCF model is the dividend growth rate rather than the earnings growth rate. Hence, consideration must be given to other indicators of growth, including historical prospective dividend growth, internal growth, and projected earnings growth. In addition, a study by Lacina, Lee, and Xu (2011) has shown that analysts' long-term earnings growth rate forecasts are not more accurate at forecasting

future earnings than naïve random walk forecasts of future earnings.[43] As such, the weight given to analysts' projected EPS growth rates should be limited. Finally, and most significantly, it is well-known that the long-term EPS growth rate forecasts of Wall Street securities analysts are overly optimistic and upwardly biased.[44] Hence, using these growth rates as a DCF growth rate produces an overstated equity cost rate. A study by Easton and Sommers (2007) found that optimism in analysts' earnings growth rate forecasts leads to an upward bias in estimates of the cost of equity capital of almost 3.0 percentage points.[45] Therefore, exclusive reliance on these forecasts for a DCF growth rate results in failure of one the basic inputs in the equation. In addition, as noted above, a study by Szakmary, Conover, and Lancaster (2008) discovered that the three-to-five-year EPS growth rate forecasts of *Value Line* to be significantly higher than the EPS growth rates that these companies subsequently achieved.[46]

B. CAPM/ECAPM Approach

Q. PLEASE DISCUSS MR. MCKENZIE'S CAPM/ECAPM.

A. On pages 42-51 of his testimony and in Exhibit Nos. AMM-6 and AMM-7, Mr. McKenzie

[43] If earnings follow a random walk, changes in earnings have the same distribution and are independent of each other. If this is the case, past movement or trend of earnings cannot be used to predict earnings. *See* M. Lacina, B. Lee and Z. Xu, *Advances in Business and Management Forecasting (Vol. 8),* Kenneth D. Lawrence, Ronald K. Klimberg (ed.), Emerald Group Publishing Limited, 2011, pp.77-101.

[44] See references in footnotes 19-20.

[45] Easton, P., & Sommers, G. (2007). Effect of analysts' optimism on estimates of the expected rate of return implied by earnings forecasts. *Journal of Accounting Research*, 45(5), 983–1015.

[46] Szakmary, A., Conover, C., & Lancaster, C. (2008). "An Examination of *Value Line*'s Long-Term Projections," *Journal of Banking & Finance*, May 2008, pp. 820-833.

develops an equity cost rate by applying the CAPM model to his proxy groups. As mentioned above, Mr. McKenzie has not used a traditional CAPM, but instead has used a variant of the traditional CAPM, the ECAPM. The traditional CAPM approach requires an estimate of the risk-free interest rate, Beta, and the equity risk premium. Mr. McKenzie calculates a CAPM equity cost rate using the current long-term Treasury bond yield of 1.7% and a projected bond yield of 2.9% and Betas from *Value Line*. A market risk premium is computed for each risk-free rate, and both are based on an expected stock market return of 11.5%. He also adds a "size premium" to his CAPM equity cost rate. The ECAPM makes adjustments to the risk-free rate and the market risk premium in calculating an equity cost rate. The ECAPM version of the CAPM increases these ROE results by about 100 basis points. Mr. McKenzie's reported average CAPM/ECAPM results range from 11.6% to 12.1% for the proxy group.

Q. WHAT ARE THE ERRORS IN MR. MCKENZIE'S CAPM/ECAPM ANALYSIS?

A. The primary errors with Mr. McKenzie's CAPM/ECAPM analysis are: (1) the use of the ECAPM version of the CAPM; (2) the expected market return of 11.50% that is used to compute the market risk premiums; and (3) the size adjustment.

1. <u>The Validity of the ECAPM Approach</u>

Q. DO YOU BELIEVE THAT THE ECAPM IS A VALID METHODOLOGY TO DETERMINE BLACK HILLS' COST OF EQUITY CAPITAL IN THIS PROCEEDING?

A. No. The ECAPM, as popularized by rate of return consultant Dr. Roger Morin, attempts to model the well-known finding of tests of the CAPM that have indicated that the Security Market Line ("SML") is not as steep as predicted by the CAPM. As such, the ECAPM is nothing more than an ad hoc version of the CAPM. Moreover, the ECAPM has not been theoretically or empirically validated in scholarly journals. The ECAPM provides for weights which are used to adjust the risk-free rate and market risk premium in applying the ECAPM. Mr. McKenzie uses 0.25 and 0.75 factors to boost the equity risk premium measure, but provides no empirical justification for those figures.

Beyond the lack of any theoretical or empirical validation of the ECAPM, there are two errors in Mr. McKenzie's ECAPM. I am not aware of any tests of the CAPM that use adjusted betas such as those used by Mr. McKenzie. Adjusted betas address the empirical issues with the CAPM by increasing the expected returns for low beta stocks and decreasing the returns for high beta stocks.

2. Market Risk Premium

Q. PLEASE ASSESS MR. MCKENZIE'S MARKET RISK PREMIUMS DERIVED FROM APPLYING THE DCF MODEL TO THE S&P 500.

A. The primary problem with Mr. McKenzie's CAPM analysis is the improperly inflated magnitude of the market (or equity) risk premium. Mr. McKenzie develops an expected market risk premium by applying the DCF model to the S&P 500 to get an expected market return, and then subtracting the risk-free rate of interest. As shown in Table 7, Mr. McKenzie's estimated market return of 11.5% for the S&P 500 equals the sum of the

dividend yield of 2.1% and expected EPS growth rate of 9.4%. The expected EPS growth rate is the average of the expected EPS growth rates from IBES, Zacks, and *Value Line*. Mr. McKenzie's expected DCF growth rate is inaccurate because the expected EPS growth rates of Wall Street analysts are upwardly biased and the projected growth rate is inconsistent with economic and earnings growth in the U.S.

Table 7
McKenzie Market Risk Premium

Dividend Yield	**2.10%**
+ Expected EPS Growth	**9.40%**
= Expected Market Return	**11.50%**
+ Risk-Free Rate	**1.70%**
= Market Risk Premium	**9.80%**

Q. PLEASE BRIEFLY AGAIN TOUCH UPON THE IMPACT ON RISK PREMIUM ANALYSES BY ANALYSTS' OVERLY OPTIMISTIC EPS GROWTH RATE FORECASTS.

The key point is that Mr. McKenzie's CAPM market risk premium methodology is based entirely on the concept that analysts' projections of companies' three-to-five year EPS growth rates reflect investors' expected *long-term* EPS growth for those companies. However, this seems highly unrealistic given the research on these projections. As previously noted, numerous studies have shown that the long-term EPS growth rate forecasts of Wall Street securities analysts are overly optimistic and upwardly biased.[47] Moreover, a 2011 study showed that analysts' forecasts of EPS

[47] Such studies include: R.D. Harris, "The Accuracy, Bias, and Efficiency of Analysts' Long Run Earnings Growth Forecasts," *Journal of Business Finance & Accounting*, pp. 725-55 (June/July 1999); P. DeChow, A. Hutton, and R. Sloan, "The Relation Between Analysts' Forecasts of Long-Term Earnings Growth and Stock Price Performance Following Equity Offerings," *Contemporary Accounting Research* (2000); K. Chan, L., Karceski, J., & Lakonishok, J., "The Level and Persistence of Growth Rates," *Journal of Finance,* pp. 643−684, (2003); M. Lacina, B. Lee, and Z. Xu, *Advances in Business and Management Forecasting (Vol.*

growth over the next three-to-five are no more accurate than their forecasts of the next single year's EPS growth.[48] The overly-optimistic inaccuracy of analysts' growth rate forecasts leads to an upward bias in equity cost estimates that has been estimated at about 300 basis points.[49] Additionally, the aforementioned study by Szakmary, Conover, and Lancaster (2008) discovered that the three-to-five-year EPS growth rate forecasts of *Value Line*'s to be significantly higher than the EPS growth rates that the evaluated companies subsequently achieved.[50]

Q. **HAVE CHANGES IN REGULATIONS IMPACTING WALL STREET ANALYSTS AND THEIR RESEARCH IMPACTED THE UPWARD BIAS IN THEIR THREE-TO-FIVE YEAR EPS GROWTH RATE FORECASTS?**

A. No. A number of the studies I have cited in my testimony demonstrate that the upward bias has continued despite changes in regulations and reporting requirements over the past two decades. This observation is highlighted by a 2010 McKinsey & Company study entitled "Equity Analysts: Still Too Bullish," which involved a study of the accuracy of analysts' long-term EPS growth rate forecasts. The authors conclude that even after a decade of stricter regulation, analysts' long-term earnings forecasts continue to be excessively optimistic – so much so that, "[*o*]*n average, analysts' forecasts have been almost 100 percent too high.*"[51]

8), Kenneth D. Lawrence, Ronald K. Klimberg (ed.), Emerald Group Publishing Limited, pp.77-101.

48 M. Lacina, B. Lee, & Z. Xu, *Advances in Business and Management Forecasting*, Vol. 8, Kenneth D. Lawrence, Ronald K. Klimberg (ed.), Emerald Group Publishing Limited, pp.77-101.

49 Peter D. Easton & Gregory A. Sommers, "Effect of Analysts' Optimism on Estimates of the Expected Rate of Return Implied by Earnings Forecasts," 45, *Journal of Accounting Research*, pp. 983–1015 (2007).

50 Szakmary, A., Conover, C., & Lancaster, C. (2008). "An Examination of *Value Line*'s Long-Term Projections," *Journal of Banking & Finance*, May 2008, pp. 820-833.

51 Marc H. Goedhart, Rishi Raj, and Abhishek Saxena, "Equity Analysts, Still Too Bullish," *McKinsey on*

> Alas, a recently completed update of our work only reinforces this view—despite a series of rules and regulations, dating to the last decade, that were intended to improve the quality of the analysts' long-term earnings forecasts, restore investor confidence in them, and prevent conflicts of interest. For executives, many of whom go to great lengths to satisfy Wall Street's expectations in their financial reporting and long-term strategic moves, this is a cautionary tale worth remembering. This pattern confirms our earlier findings that analysts typically lag behind events in revising their forecasts to reflect new economic conditions. When economic growth accelerates, the size of the forecast error declines; when economic growth slows, it increases. So as economic growth cycles up and down, the actual earnings S&P 500 companies report occasionally coincide with the analysts' forecasts, as they did, for example, in 1988, from 1994 to 1997, and from 2003 to 2006. *Moreover, analysts have been persistently overoptimistic for the past 25 years, with estimates ranging from 10 to 12 percent a year, compared with actual earnings growth of 6 percent. Over this time frame, actual earnings growth surpassed forecasts in only two instances, both during the earnings recovery following a recession. On average, analysts' forecasts have been almost 100 percent too high.*

To similar effect, in a 2010 *Bloomberg Businessweek* article, the author concluded that Wall Street research regulatory reforms had failed to stop "overly rosy view[s]" of profit prospects:[52]

> **The bottom line:** Despite reforms intended to improve Wall Street research, stock analysts seem to be promoting an overly rosy view of profit prospects.

Finance, pp. 14-17, (Spring 2010) (emphasis added).

[52] Roben Farzad, "For Analysts, Things Are Always Looking Up," *Bloomberg Businessweek* (June 10, 2010), https://www.bloomberg.com/news/articles/2010-06-10/for-analysts-things-are-always-looking-up.

Q. IS MR. MCKENZIE'S MARKET RISK PREMIUM OF 9.80% REFLECTIVE OF THE MARKET RISK PREMIUMS FOUND IN STUDIES AND SURVEYS OF THE MARKET RISK PREMIUM?

A. No. Mr. McKenzie's market risk premium is computed as his expected market return (11.5%) minus the risk-free interest rate (1.7%), which equals 9.80%. This figure is well in excess of market risk premiums either found in studies of the market risk premiums by leading academic scholars, or produced by analyses of historic stock and bond returns, or, found in surveys of financial professionals. Page 6 of Exhibit JRW-9 provides the results of over thirty (30) market risk premiums studies from the past fifteen years. Historic stock and bond returns suggest a market risk premium in the 4.4% to 6.44% range, depending on whether one uses arithmetic or geometric mean returns. There have been many studies using *ex ante* models, and their market risk premiums results vary from as low as 3.42% to as high as 6.25%. Finally, the market risk premiums developed from surveys of analysts, companies, financial professionals, and academics suggest lower market risk premiums, in a range of between 3.36% and 5.70%. The bottom line is that there is no support in historic return data, surveys, academic studies, or reports for investment firms for a market risk premium as high as the 10.2% figure used by Mr. McKenzie.

Q. IS THERE OTHER EVIDENCE THAT INDICATES THAT MR. MCKENZIE'S MARKET RISK PREMIUM COMPUTED USING S&P 500 EPS GROWTH RATE IS EXCESSIVE?

A. Yes. In short, a long-term EPS growth rate of 9.4% is inconsistent with both historic and projected economic and earnings growth in the U.S. Reasons for this inconsistency are: (1) long-term EPS and economic growth is about one-half of Mr. McKenzie's projected EPS growth rate of 9.4%; (2) long-term EPS and GDP growth are directly linked; and (3) more recent trends in GDP growth, as well as projections of GDP growth, suggest slower economic and earnings growth in the future.

Long-Term Historic EPS and GDP Growth rates have been in the 6%-7% Range - I performed a study of the growth in nominal GDP, S&P 500 stock price appreciation, and S&P 500 EPS and DPS growth since 1960. The results are provided on page 1 of Exhibit JRW-10, and a summary is shown in Table 8, below.

Table 8
GDP, S&P 500 Stock Price, EPS, and DPS Growth
1960-Present

Nominal GDP	**6.28**
S&P 500 Stock Price	**7.20**
S&P 500 EPS	**6.53**
S&P 500 DPS	**5.75**
Average	**6.44**

The results show that the historical long-run growth rates for GDP, S&P EPS, and S&P DPS are in the 6% to 7% range. By comparison, Mr. McKenzie's long-run growth rate projections of 9.4% is excessive. These estimates suggest that companies in the U.S. would be expected to increase their growth rate of EPS by 33% in the future, and maintain that growth indefinitely in an economy that is expected to grow at about one-half of Mr. McKenzie's projected growth rates.

There is a Direct Link between Long-Term EPS and GDP Growth - The results in Exhibit JRW-10 and Table 8 show that historically there has been a close link

between long-term EPS and GDP growth rates. Brad Cornell of the California Institute of Technology published a study on GDP growth, earnings growth, and equity returns. He finds that long-term EPS growth in the U.S. is directly related to GDP growth, with GDP growth providing an upward limit on EPS growth. In addition, he finds that long-term stock returns are determined by long-term earnings growth and that "real GDP growth in excess of 3 percent in the long run is highly unlikely in the developed world."[53]

> The long-run performance of equity investments is fundamentally linked to growth in earnings. Earnings growth, in turn, depends on growth in real GDP. This article demonstrates that both theoretical research and empirical research in development economics suggest relatively strict limits on future growth. In particular, real GDP growth in excess of 3 percent in the long run is highly unlikely in the developed world. In light of ongoing dilution in earnings per share, this finding implies that investors should anticipate real returns on U.S. common stocks to average no more than about 4–5 percent in real terms.

The Trend and Projections Indicate Slower GDP Growth in the Future - The components of nominal GDP growth are real GDP growth and inflation. Page 3 of Exhibit JRW-10 shows annual real GDP growth rate over the 1961 to 2020 time period. Real GDP growth has gradually declined from the 5.0% to 6.0% range in the 1960s to the 2.0% to 3.0% range during the most recent five-year period. The second component of nominal GDP growth is inflation. Page 4 of Exhibit JRW-10 shows inflation as measured by the annual growth rate in the Consumer Price Index (CPI) over the 1961 to 2018 time period. The large increase in prices from the late 1960s to

[53] Bradford Cornell, "Economic Growth and Equity Investing," *Financial Analysts Journal* (January- February 2010), p. 63.

the early 1980s is readily evident. Equally evident is the rapid decline in inflation during the 1980s as inflation declined from above 10% to about 4%. Since that time, inflation has gradually declined and has been in the 2.0% range or below over the past five years.

The graphs on pages 2, 3, and 4 of Exhibit JRW-10 provide clear evidence of the decline, in recent decades, in nominal GDP as well as its components, real GDP and inflation. To gauge the magnitude of the decline in nominal GDP growth, Table 9, below, provides the compounded GDP growth rates for 10-, 20-, 30-, 40- and 50-years. Whereas the 50-year compounded GDP growth rate is 6.63%, there has been a monotonic and significant decline in nominal GDP growth over subsequent 10-year intervals. These figures strongly suggest that nominal GDP growth in recent decades has slowed and that a figure in the range of 4.0% to 5.0% is more appropriate today for the U.S. economy.

Table 9
Historical Nominal GDP Growth Rates

10-Year Average	**3.40%**
20-Year Average	**3.63%**
30-Year Average	**4.27%**
40-Year Average	**5.10%**
50-Year Average	**6.12%**

Long-Term GDP Projections also Indicate Slower GDP Growth in the Future - A lower range is also consistent with long-term GDP forecasts. There are several forecasts of annual GDP growth that are available from economists and government agencies. These are listed in Panel B of on page 5 of Exhibit JRW-10. The mean 10-year nominal GDP growth forecast (as of March 2020) by economists in

the recent *Survey of Financial Forecasters* is 4.30%.[54] The Energy Information Administration ("EIA"), in its projections used in preparing *Annual Energy Outlook,* forecasts long-term GDP growth of 4.2% for the period 2019-2050.[55] The Congressional Budget Office ("CBO"), in its forecasts for the period 2019-2029, projects a nominal GDP growth rate of 3.8%.[56] Finally, the Social Security Administration ("SSA"), in its Annual OASDI Report, provides a projection of nominal GDP from 2020-2095.[57] SSA's projected growth GDP growth rate over this period is 4.1%. Overall, these forecasts suggest long-term GDP growth rate in the 4.0% - 4.3% range. The trends and projections indicating slower GDP growth make Mr. McKenzie's market risk premium – computed by using analysts' projected EPS growth rates – look even more unrealistic. Simply stated, Mr. McKenzie's projected EPS growth rate of 9.4% is twice the projected GDP growth.

Q. WHAT ARE THE FUNDAMENTAL FACTORS THAT HAVE LED TO THE DECLINE IN PROSPECTIVE GDP GROWTH?

A. As addressed in a study by the consulting firm McKinsey & Co., two factors drive real GDP growth over time: (1) the number of workers in the economy (employment); and (2) the productivity of those workers (usually defined as output per hour).[58] According to McKinsey, real GDP growth over the past 50 years was driven by population and

[54] https://www.philadelphiafed.org/research-and-data/real-time-center/survey-of-professional-forecasters/

[55] U.S. Energy Information Administration, *Annual Energy Outlook 2020*, Table: Macroeconomic Indicators.

[56] Congressional Budget Office, The *2020 Long-Term Budget Outlook*, June 25, 2020.

[57] Social Security Administration, *2020 Annual Report of the Board of Trustees of the Old-Age, Survivors, and Disability Insurance (OASDI) Program*, Table VI.G4, (July 1, 2020). The 4.1% growth rate is the growth in projected GDP from $22,341 trillion in 2020 to $450,425 trillion in 2095.

[58] McKinsey & Co., "Can Long-Term Growth be Saved?", McKinsey Global Institute, (Jan. 2015).

productivity growth which grew at compound annual rates of 1.7% and 1.8%, respectively.

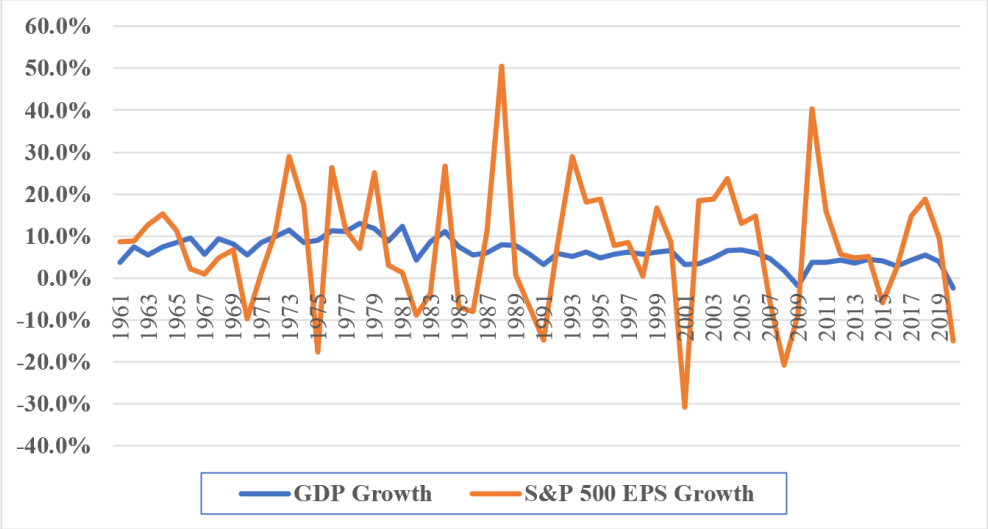
However, global economic growth is projected to slow significantly in the years to come. The primary factor leading to the decline is slow growth in employment (working-age population), which results from slower population growth and longer life expectancy. McKinsey estimates that employment growth will slow to 0.3% over the next fifty years. They conclude that even if productivity remains at the rapid rate of the past fifty years of 1.8%, real GDP growth will fall by 40 percent to 2.1%.

Q. ARE THERE OTHER INSIGHTS OF VALUE INTO THE RELATIONSHIP BETWEEN S&P 500 EPS AND GDP GROWTH?

A. Yes. Figure 12 shows the average annual growth rates for GDP and the S&P 500 EPS since 1960. The one very apparent difference between the two is that the S&P 500 EPS growth rates are much more volatile than the GDP growth rates, when compared using the relatively short, and somewhat arbitrary, annual conventions used in these data sets.[59] Volatility aside, however, it is clear that over the medium to long run, S&P 500 EPS growth does not outpace GDP growth.

[59] Timing conventions such as years and quarters are needed for measurement and benchmarking but are somewhat arbitrary. In reality, economic growth and profit accrual occur on continuous bases. A 2014 study evaluated the timing relationship between corporate profits and nominal GDP growth. The authors found that aggregate accounting earnings growth is a leading indicator of the GDP growth with a quarter-ahead forecast horizon. *See* Yaniv Konchitchki and Panos N. Patatoukas, "Accounting Earnings and Gross Domestic Product," *Journal of Accounting and Economics* 57 (2014), pp. 76–88.

Figure 12
Average Annual Growth Rates
GDP and S&P 500 EPS
1960-2020



Data Sources: GDPA - http://research.stlouisfed.org/fred2/series/GDPA/downloaddata.
S&P EPS - http://pages.stern.nyu.edu/~adamodar/

A fuller understanding of the relationship between GDP and S&P 500 EPS growth requires consideration of several other factors.

Corporate Profits are Constrained by GDP – In a *Fortune* magazine article, Milton Friedman, the winner of the 1976 Nobel Prize in Economic Sciences, warned investors and others not to expect corporate profit growth to sustainably exceed GDP growth, stating, "Beware of predictions that earnings can grow faster than the economy for long periods. When earnings are exceptionally high, they don't just keep booming."[60] In that same article, Friedman also noted that profits must move back down to their traditional share of GDP. In Table 10 below, I show that currently the

[60] Shaun Tully, "Corporate Profits Are Soaring. Here's Why It Can't Last," Fortune, (Dec. 7, 2017), http://fortune.com/2017/12/07/corporate-earnings-profit-boom-end/.

aggregate net income levels for the S&P 500 companies, using 2020 figures, represent 5.47% of nominal GDP.

Table 10
S&P 500 Aggregate Net Income as a Percent of GDP

	2020 Value
Aggregate Net Income for S&P 500	**$1,144,698.40**
2020 Nominal U.S. GDP	**$ 20,934,000.00**
Net Income/GDP (%)	**5.47%**

Data Sources: 2020 Net Income for S&P 500 companies – *Value Line* (April 5, 2021).
2020 Nominal GDP – Moody's - https://www.economy.com/united-states/nominal-gross-domestic-product.

Short-Term Factors Impact S&P 500 EPS – The growth rates in the S&P 500 EPS and GDP can diverge on a year-to-year basis due to short-term factors that impact S&P 500 EPS in a much greater way than GDP. As shown above, S&P EPS growth rates are much more volatile than GDP growth rates. The EPS growth for the S&P 500 companies has been influenced by low labor costs and interest rates, commodity prices, the recovery of different sectors such as the energy and financial sectors, the cut in corporate tax rates, etc. These short-term factors can make it appear that there is a disconnect between the economy and corporate profits.

The Differences between the S&P 500 EPS and GDP – In the last two years, as the EPS for the S&P 500 has grown at a faster rate than U.S. nominal GDP, some have pointed to the differences between the S&P 500 and GDP.[61] These differences

[61] *See* the following studies: Burt White and Jeff Buchbinder, "The S&P and GDP are not the Same Thing," LPL Financial, (Nov. 4, 2014), https://www.businessinsider.com/sp-is-not-gdp-2014-11; Matt Comer, "How Do We Have 18.4% Earnings Growth In A 2.58% GDP Economy?," Seeking Alpha, (Apr. 2018), https://seekingalpha.com/article/4164052-18_4-percent-earnings-growth-2_58-percent-gdp-economy; Shaun Tully, "How on Earth Can Profits Grow at 10% in a 2% Economy?," Fortune, (July 27, 2017), http://fortune.com/2017/07/27/profits-economic-growth/.

include: (a) corporate profits are about two-thirds manufacturing driven, while GDP is two-thirds services driven; (b) consumer discretionary spending accounts for a smaller share of S&P 500 profits (15%) than of GDP (23%); (c) corporate profits are more international-trade driven, while exports minus imports tend to drag on GDP; and (d) S&P 500 EPS is impacted not just by corporate profits but also by share buybacks on the positive side (fewer shares boost EPS) and by share dilution on the negative side (new shares dilute EPS). While these differences may seem significant, it must be remembered that the Income Approach to measure GDP includes corporate profits (in addition to employee compensation and taxes on production and imports) and therefore effectively accounts for the first three factors.[62]

The bottom line is that despite the intertemporal, short-term differences between S&P 500 EPS and nominal GDP growth, the long-term link between corporate profits and GDP is inevitable.

Q. PLEASE PROVIDE ADDITIONAL INSIGHTS INTO THE UNREASONABLENESS OF MR. MCKENZIE'S 9.4% PROJECTED S&P EPS GROWTH RATE IN LIGHT OF PROJECTED GDP GROWTH.

A. Beyond my previous discussion, I have performed the following analysis of S&P 500 EPS and GDP growth in Table 11, below. Specifically, I started with the 2020 aggregate net income for the S&P 500 companies and 2020 nominal GDP for the U.S.

[62] The Income Approach to measuring GDP includes wages, salaries, and supplementary labor income, corporate profits, interest and miscellaneous investment income, farmers' incomes, and income from non-farm unincorporated businesses.

As shown in Table 10, the aggregate profit for the S&P 500 companies represented 5.47% of nominal GDP in 2020. In Table 11, I projected the aggregate net income level for the S&P 500 companies and GDP as of the year 2050. For the growth rate for the S&P 500 companies, I used Mr. McKenzie's projected S&P 500 EPS growth rate of 9.4%. As a growth rate for nominal GDP, I used the average of the long-term projected GDP growth rates from SFF, CBO, SSA, and EIA (4.3%, 3.8%, 4.1%, and 4.0%), which is 4.09%. The projected 2050 level for the aggregate net income level for the S&P 500 companies is $16.95 trillion. Over the same period GDP is expected to grow to $69.7 trillion. As such, if the aggregate net income for the S&P 500 grows in accordance with the growth rate used by Mr. McKenzie, and if nominal GDP grows at rates projected by major government agencies, the net income of the S&P 500 companies will represent growth from 5.47% of GDP in 2020 to 24.33% of GDP in 2050. Obviously, it is implausible for the net income of the S&P 500 to become almost 25% of GDP.

Table 11
Projected S&P 500 Earnings and Nominal GDP
2020-2050
S&P 500 Aggregate Net Income as a Percent of GDP

	2020 Value	Growth Rate	No. of Years	2050 Value
Aggregate Net Income for S&P 500	**$1,144,698.40**	**9.40%**	**30**	**$16,951,601.55**
2020 Nominal U.S. GDP	**$20,934,000.00**	**4.09%**	**30**	**$ 69,682,299.83**
Net Income/GDP (%)	**5.47%**			**24.33%**

Data Sources: 2020 Aggregate Net Income for S&P 500 companies – *Value Line* (April 5, 2021).
2020 Nominal GDP – Moody's - https://www.economy.com/united-states/nominal-gross-domestic-product.
S&P 500 EPS Growth Rate - Mr. McKenzie's projected S&P 500 growth rate of 9.7%;
Nominal GDP Growth Rate – The average of the long-term projected GDP growth rates from SFF, CBO, SSA, and EIA (4.3%, 3.8%, 4.0%, and 4.1%).

Q. PLEASE PROVIDE A SUMMARY ANALYSIS ON GDP AND S&P 500 EPS GROWTH RATES.

A. As noted above, the long-term link between corporate profits and GDP is inevitable. The short-term differences in growth between the two has been highlighted by some notable market observers, including Warren Buffet, who indicated that corporate profits as a share of GDP tend to go far higher after periods where they are depressed, and then drop sharply after they have been hovering at historically high levels. In a famous 1999 *Fortune* article, Mr. Buffet made the following observation:[63]

> You know, someone once told me that New York has more lawyers than people. I think that's the same fellow who thinks profits will become larger than GDP. When you begin to expect the growth of a component factor to forever outpace that of the aggregate, you get into certain mathematical problems. In my opinion, you have to be wildly optimistic to believe that corporate profits as a percent of GDP can, for any sustained period, hold much above 6%.

In sum, Mr. McKenzie's long-term S&P 500 EPS growth rate of 9.40% is grossly overstated. In the end, the big question remains as to whether corporate profits can grow faster than GDP. Jeremy Siegel, the renowned finance professor at the Wharton School of the University of Pennsylvania, believes that going forward, earnings per share can grow about half a point faster than nominal GDP, or about 5.0%, due to the big gains in the technology sector. But he also believes that sustained EPS growth matching analysts' near-term projections is absurd: "The idea of 8% or 10% or 12% growth is ridiculous. It will not happen."[64]

[63] Carol Loomis, "Mr. Buffet on the Stock Market," *Fortune*, (Nov. 22, 1999), https://money.cnn.com/magazines/fortune/fortune_archive/1999/11/22/269071/.

[64] Shaun Tully, "Corporate Profits Are Soaring. Here's Why It Can't Last," *Fortune*, (Dec. 7, 2017),

3. Size Adjustment

Q. PLEASE DISCUSS MR. MCKENZIE'S COMPANY SIZE ADJUSTMENT.

A. Mr. McKenzie includes a size adjustment in his CAPM approach for the size of the companies in the utility group. This adjustment is based on the historical stock market returns studies as performed by Duff & Phelps (formerly Morningstar and before that Ibbotson Associates). There are numerous problems in using historical market returns to compute risk premiums. These errors provide inflated estimates of expected risk premiums. Among the errors are survivorship bias (only successful companies survive – poorly managed companies do not) and unattainable return bias (the Ibbotson procedure presumes monthly portfolio rebalancing). The net result is that Ibbotson's size premiums are poor measures for risk adjustment to account for the size of a utility.

In addition, Professor Annie Wong has tested for a company size premium in utilities and concluded that, unlike industrial stocks, utility stocks do not exhibit a significant company size premium.[65] As explained by Professor Wong, there are several reasons why such a size premium would not be attributable to utilities. Utilities are regulated closely by state and federal agencies and commissions, and hence, their financial performance is monitored on an ongoing basis by both the state and federal governments. In addition, public utilities must gain approval from government entities for common financial transactions such as the sale of securities (or the issuance of debt).

http://fortune.com/2017/12/07/corporate-earnings-profit-boom-end/.

[65] Annie Wong, "Utility Stocks and the Size Effect: An Empirical Analysis," *Journal of the Midwest Finance Association*, pp. 95-101, (1993).

Furthermore, unlike for their industrial counterparts, accounting standards and reporting are fairly standardized for public utilities. Finally, a utility's earnings are predetermined to a certain degree through the ratemaking process in which performance is reviewed by state commissions and other stakeholders. Overall, in terms of regulation, government oversight, performance review, accounting standards, and information disclosure, utilities are much different than industrials, which could account for the lack of a company size premium.

Q. PLEASE DISCUSS THE RESEARCH ON THE COMPANY SIZE PREMIUM IN ESTIMATING THE EQUITY COST RATE.

A. As noted, there are problems with using historical market returns to compute risk premiums. With respect to the small firm premium, Richard Roll (1983) found that one-half of the historic return premium for small companies disappears once biases are eliminated and historic returns are properly computed. The error arises from the assumption of monthly portfolio rebalancing and the serial correlation in historic small firm returns.[66]

Q. WHAT OTHER EVIDENCE CAN YOU PROVIDE REGARDING ISSUES RELATED TO THE SIZE PREMIUM?

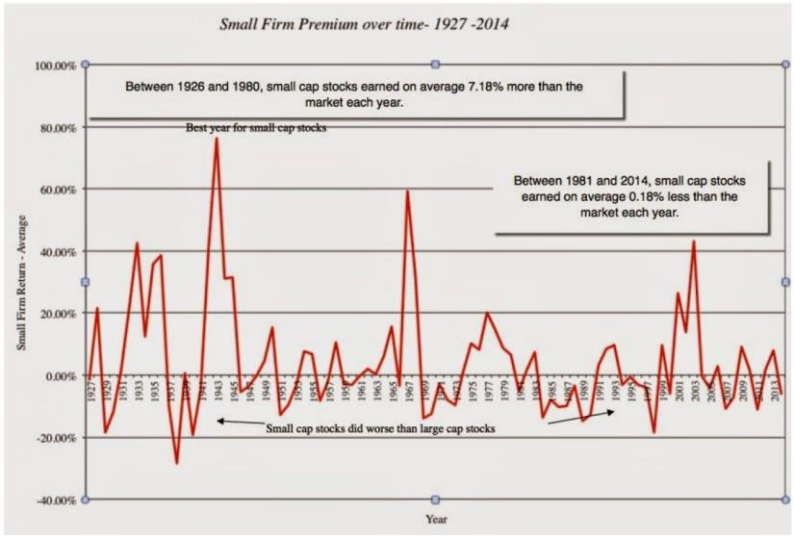
A. Professor Damodaran, a New York University valuation expert, provides a thorough analysis of the company size effect, which he terms the "small firm" or "cap premium." Figure 8 traces the small firm premium over the 1927-2014 time period.[67] Damodaran

[66] *See* Richard Roll, "On Computing Mean Returns and the Small Firm Premium," *Journal of Financial Economics*, pp. 371-86, (1983).

[67] Damodaran – "The Small Cap Premium_ Where is the beef," Business Valuation Review: Winter 2015, Vol. 34, No. 4, pp. 152-157, (2015).

has studied the issue for years and makes a number of observations on the size premium or effect: (1) the effect has largely disappeared since 1980, which is when academic studies appeared indicating a historical size premium; (2) the small firm premium tends to come and go over time; (3) the small firm premium tends to be associated with the January effect (small companies only earn abnormal returns in the first two weeks of January); (4) the small cap premium seems to actually be a microcap premium, as it disappears when companies with market capitalizations below $5 million are removed; (5) Damodaran does not find a small cap premium when he estimates a small firm required return; (6) he has never used a small cap premium when valuing small companies; and (7) he blames three factors for some analysts' continued use of a small cap premium: (i) intuition (it seems smaller companies should be riskier), (ii) inertia (individuals and institutions are slow to change and to adopt new ideas); and (iii) bias (analysts prefer higher discount rates and lower valuations).

Figure 13
The Small Firm Premium
1927-2014



Source: Aswath Damodaran, "The Small Cap Premium - Where is the beef," *Business Valuation Review*, Winter 2015, Vol. 34, No. 4, pp. 152-157, (2015).

C. Utility Risk Premium ("URP") Approach

Q. PLEASE DISCUSS MR. MCKENZIE'S URP APPROACH.

A. On pages 51-55 of his testimony and in Exhibit AMM-8, Mr. McKenzie develops an equity cost rate by applying the URP model to his proxy group. Mr. McKenzie estimates equity cost rates of 9.2% and 9.5% for the group using current and projected BBB-rated utility bond yields of 3.20% and 3.77%. Mr. McKenzie develops an equity cost rate by: (1) regressing the annual authorized returns on equity for gas distribution companies on the Moody's long-term BBB rated public utility bond yields; and (2) adding the appropriate risk premiums established in the regression to current and projected Moody's long-term public utility bond yields.

Q. WHAT ARE THE ISSUES WITH MR. MCKENZIE'S URP APPROACH?

A. There are two issues. First, the bond's yield-to-maturity as a base yield results in an overstatement of investors' return expectations. Second, the risk premium produced from the study is overstated as a measure of investor return requirements and produces an inflated equity cost rate.

1. Base Yield

Q. PLEASE DISCUSS THE BASE YIELD OF MR. MCKENZIE'S URP ANALYSIS.

A. The base yield in Mr. McKenzie's URP analyses is the prospective yield on long-term, BBB-rated public utility bonds. The primary issue is that using this yield on these securities inflates the required return on equity for the Company in two ways: (1) long-term bonds are subject to interest rate risk, a risk which does not affect common stockholders since dividend payments (unlike bond interest payments) are not fixed but tend to increase over time and (2) the base yield in Mr. McKenzie's risk premium study is subject to credit risk since it is not default risk-free like an obligation of the U.S. Treasury. As a result, its yield-to-maturity includes a premium for default risk and therefore, is above its expected return. Hence, using a bond's yield-to-maturity as a base yield results in an overstatement of investors' return expectations.

2. Risk Premium

Q. WHAT ARE THE ISSUES WITH MR. MCKENZIE'S RISK PREMIUM?

A. The most important issue is that Mr. McKenzie's risk premium is not necessarily applicable to measure utility investors' required rate of return. Mr. McKenzie's URP approach is a gauge of *Commission* behavior, not *investor* behavior. Capital costs are determined in the market place through the financial decisions of investors and are reflected in such fundamental factors as dividend yields, expected growth rates, interest rates, and investors' assessment of the risk and expected return of different investments. Regulatory commissions evaluate capital market data in setting authorized ROEs, but also take into account other utility- and rate case-specific information in setting ROEs. As such, Mr. McKenzie's approach and results reflect other factors such as capital structure, credit ratings and other risk measures, service territory, capital expenditures, energy supply issues, rate design, investment and expense trackers, and other factors used by utility commissions in determining an appropriate ROE in addition to capital costs. This may be especially true when, due to the inherent compromises and trade-offs upon which settlements are made, the authorized ROE data includes the results of rate cases that are settled and not fully litigated.

Finally, Mr. McKenzie's methodology produces an inflated required rate of return since utilities have been selling at a market-to-book ratios in excess of 1.0 for many years. This indicates that the authorized rates of return have been greater than the return that investors require. The relationship between ROE, the equity cost rate, and market-to-book ratios was explained on pages 27-28 of this testimony. In short, a

market-to-book ratio above 1.0 indicates a company's ROE is above its equity cost rate. Therefore, the risk premium produced from the study is overstated as a measure of investor return requirements and produces an inflated equity cost rate.

D. Expected Earnings Approach

Q. PLEASE REVIEW MR. MCKENZIE'S EXPECTED EARNINGS APPROACH.

A. On pages 55-58 of his testimony and in Exhibit AMM-9, Mr. McKenzie develops an equity cost rate using his Expected Earnings approach. Mr. McKenzie's approach involves using *Value Line*'s projected ROE for the years 2021-2023/2022-2024 for his proxy groups and then adjusting this ROE to account for the fact the *Value Line* uses year-end equity in computing ROE. Mr. McKenzie reports Expected Earnings results of 9.8% and 9.9% for the group.

Q. PLEASE ADDRESS THE ISSUES WITH MR. MCKENZIE'S EXPECTED (COMPARABLE) EARNINGS APPROACH.

A. There are a number of issues with this so-called Expected Earnings approach. As such, I strongly suggest that the Commission ignore this approach in setting a ROE for Black Hills. These issues include:

The Expected (Comparable) Earnings Approach Does Not Measure the Market Cost of Equity Capital – First and foremost, this accounting-based methodology does not measure investor return requirements. As indicated by Professor Roger Morin, a long-term utility rate of return consultant, "More simply, the Comparable (Expected) Earnings standard ignores capital markets. If interest rates

go up 2% for example, investor requirements and the cost of equity should increase commensurably, but if regulation is based on accounting returns, no immediate change in equity cost results."[68] As such, this method does not measure the market cost of equity because there is no way to assess whether the earnings are greater than or less than the earnings investors require, and therefore this approach does not measure the market cost of equity capital.

The Expected ROEs are Not Related to Investors' Market-Priced Opportunities – The ROE ratios are an accounting measure that do not measure investor return requirements. Investors had no opportunity to invest in the proxy companies at the accounting book value of equity. In other words, the equity's book value *to investors* is tied to market prices, which means that investors' required return on market-priced equity aligns with expected return on book equity only when the equity's market price and book value are aligned. Therefore, a market-based evaluation of the cost of equity to investors in the proxies requires an associated analysis of the proxies' market-to-book ("M/B") ratios. In addition, as I demonstrated in Exhibit JRW-6, there is a strong positive relationship between expected ROEs and the M/B ratios for electric utility and gas distribution companies.

Changes in ROE Ratios do not Track Capital Market Conditions - As also indicated by Morin, "The denominator of accounting return, book equity, is a historical cost-based concept, which is insensitive to changes in investor return requirements. Only stock market price is sensitive to a change in investor requirements. Investors

[68] Roger Morin, *New Regulatory Finance* (2006), p. 293.

can only purchase new shares of common stock at current market prices and not at book value."[69]

The Expected Earnings Approach is Circular - The proxies' ROEs are not determined by competitive market forces, but instead are largely the result of federal and state rate regulation, including the present proceedings.

The Proxies' ROEs Reflect Earnings on Business Activities that are not Representative of Black Hills' Rate-Regulated Utility Activities - The numerators of the proxy companies' ROEs include earnings from business activities that are riskier and produce more projected earnings per dollar of book investment than does regulated gas distribution utility service. These include earnings from: (1) unregulated businesses; (2) gas marketing; and (3) other unregulated business.

Q. PLEASE SUMMARIZE YOUR ANALYSIS OF MR. MCKENZIE'S EXPECTED EARNINGS APPROACH.

A. In short, Mr. McKenzie's Expected Earnings approach does not measure the market cost of equity capital, is independent of most cost of capital indicators, and, as shown above, has a number of other empirical issues. Therefore, the Commission should ignore this approach in determining the appropriate ROE for Black Hills.

[69] *Id.*

E. DCF Model Applied to Non-Utility Group

Q. PLEASE DISCUSS MR. MCKENZIE'S APPLICATION OF THE DCF MODEL TO A PROXY GROUP OF NON-UTILITY COMPANIES?

A. On pages 58-61 of his testimony and Exhibit AMM-10, Mr. McKenzie estimates an equity cost rate for the Company by applying the DCF model to a proxy group of 51 non-utility companies. This group includes such companies as Coca-Cola, Colgate-Palmolive, General Mills, Kellogg, Kimberly-Clark, McCormick, PepsiCo, and Walmart. He reports an average DCF ROE of 10.3% for his non-utility group.

This approach is fundamentally flawed. While many of these companies are large and successful, their lines of business are vastly different from the gas distribution business and they do not operate in a highly regulated environment. As important, the previously discussed upward bias in the EPS growth rate forecasts of Wall Street analysts is particularly severe for non-utility companies and therefore the DCF equity cost rate estimates for this group are particularly overstated.

VII. SUMMMARY AND CONCLUSIONS

Q. DR. WOOLRIDGE, PLEASE SUMMARIZE YOUR TESTIMONY ON THE APPROPRIATE COST OF CAPITAL FOR THE COMPANY.

A. I show that the Company's proposed capital structure includes more common equity ratio and lower financial risk than other gas distribution companies. As a result, I have employed a capital structure with a common equity ratio of 50.0%, which was the

common equity ratio adopted in the Company's last rate case. To estimate an equity cost rate for the Company, I have applied the DCF and CAPM approaches to three proxy group of gas distribution companies. My analyses indicate an equity cost rate in the range of 7.60%-8.75% is appropriate at this time. Given the risk profile of the Company, and since I rely primarily on the DCF approach, I am recommending a ROE in the upper end of the range, 8.75%, for the Company. Given my recommended capitalization ratios, senior capital cost rates, and the 8.75% ROE, my rate of return or cost of capital recommendation for the Company is 6.33% and is summarized in Table 2 and Exhibit JRW-2.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

VERIFICATION

COMMONWEALTH OF PENNSYLVANIA)
)
COUNTY OF CENTRE) ss:

Dr. J. Randall Woolridge, being duly sworn upon his oath, deposes and states that he is a consultant for the Citizens' Utility Ratepayer Board, that he has read and is familiar with the foregoing *Direct Testimony*, and that the statements made herein are true and correct to the best of his knowledge, information, and belief.

Dr. J. Randall Woolridge

SUBSCRIBED AND SWORN to before me this 10th day of September, 2021.

Notary Public

My Commission expires: 11-10-2023

Commonwealth of Pennsylvania - Notary Seal
Ronald E. Flebotte. Notary Public
Centre County
My commission expires November 10, 2023
Commission number 1051083

Appendix A
Educational Background, Research, and Related Business Experience
J. Randall Woolridge

J. Randall Woolridge is a Professor of Finance and the Goldman, Sachs & Co. and Frank P. Smeal Endowed Faculty Fellow in Business Administration in the College of Business Administration of the Pennsylvania State University in University Park, PA. In addition, Professor Woolridge is Director of the Smeal College Trading Room and President and CEO of the Nittany Lion Fund, LLC.

Professor Woolridge received a Bachelor of Arts degree in Economics from the University of North Carolina, a Master of Business Administration degree from the Pennsylvania State University, and a Doctor of Philosophy degree in Business Administration (major area-finance, minor area-statistics) from the University of Iowa. He has taught Finance courses including corporation finance, commercial and investment banking, and investments at the undergraduate, graduate, and executive MBA levels.

Professor Woolridge's research has centered on empirical issues in corporation finance and financial markets. He has published over 35 articles in the best academic and professional journals in the field, including the *Journal of Finance,* the *Journal of Financial Economics,* and the *Harvard Business Review.* His research has been cited extensively in the business press. His work has been featured in the *New York Times*, *Forbes, Fortune, The Economist*, *Barron's*, *Wall Street Journal*, *Business Week*, *Investors' Business Daily*, *USA Today*, and other publications. In addition, Dr. Woolridge has appeared as a guest to discuss the implications of his research on CNN's *Money Line*, CNBC's *Morning Call* and *Business Today*, and Bloomberg's *Morning Call*.

Professor Woolridge's co-authored stock valuation book, *The StreetSmart Guide to Valuing a Stock* (McGraw-Hill, 2003), was released in its second edition. He has also co-authored *Spinoffs and Equity Carve-Outs: Achieving Faster Growth and Better Performance* (Financial Executives Research Foundation, 1999), as well as a textbook entitled *Basic Principles of Finance* (Kendall Hunt, 2011).

Professor Woolridge has also consulted with corporations, financial institutions, and government agencies. In addition, he has directed and participated in university- and company-sponsored professional development programs for executives in 25 countries in North and South America, Europe, Asia, and Africa.

Over the past 35 years Dr. Woolridge has prepared testimony and/or provided consultation services in regulatory rate cases in the rate of return area in following states: Alaska, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Hawaii, Indiana, Kansas, Kentucky, Maryland, Massachusetts, Missouri, Montana, Nebraska, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, South Carolina, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Washington, D.C. He has also testified before the Federal Energy Regulatory Commission.

J. Randall Woolridge

Office Address
302 Business Building
The Pennsylvania State University
University Park, PA 16802
814-865-1160

Home Address
120 Haymaker Circle
State College, PA 16801
814-238-9428

Academic Experience

Professor of Finance, the Smeal College of Business Administration, the Pennsylvania State University (July 1, 1990 to the present).

President, Nittany Lion Fund LLC, (January 1, 2005 to the present)
Director, the Smeal College Trading Room (January 1, 2001 to the present)
Goldman, Sachs & Co. and Frank P. Smeal Endowed University Fellow in Business Administration (July 1, 1987 to the present).

Associate Professor of Finance, College of Business Administration, the Pennsylvania State University (July 1, 1984 to June 30, 1990).
Assistant Professor of Finance, College of Business Administration, the Pennsylvania State University (September, 1979 to June 30, 1984).

Education

Doctor of Philosophy in Business Administration, the University of Iowa. Major field: Finance.
Master of Business Administration, the Pennsylvania State University.
Bachelor of Arts, the University of North Carolina. Major field: Economics.

Books

James A. Miles and J. Randall Woolridge*, Spinoffs and Equity Carve-Outs: Achieving Faster Growth and Better Performance* (Financial Executives Research Foundation), 1999
Patrick Cusatis, Gary Gray, and J. Randall Woolridge, *The StreetSmart Guide to Valuing a Stock* (2nd Edition, McGraw-Hill), 2003.
J. Randall Woolridge and Gary Gray, *The New Corporate Finance, Capital Markets, and Valuation: An Introductory Text* (Kendall Hunt, 2003).

Research

Dr. Woolridge has published over 35 articles in the best academic and professional journals in the field, including the *Journal of Finance,* the *Journal of Financial Economics,* and the *Harvard Business Review*.

Exhibit JRW-1

Black Hills Energy
Recommended Rate of Return

Capital Source	Capitalization Ratios	Cost Rate	Weighted Cost Rate
Long-Term Debt	50.00%	3.91%	1.96%
Common Equity	50.00%	8.75%	4.38%
Total Capital	50.00%		6.33%

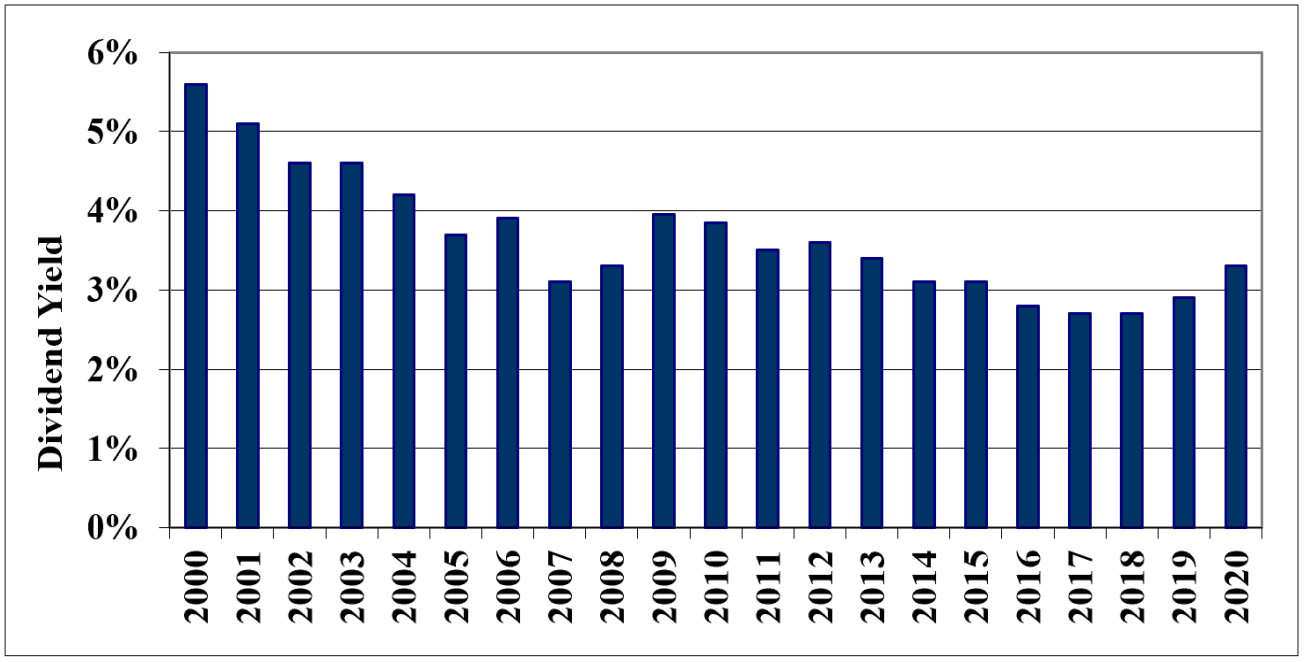
* Capital Structure Ratios are developed in Exhibit JRW-3.

Exhibit JRW-2
Long-Term 'A' Rated Public Utility Bonds

Data Source: Mergent Bond Record

Exhibit JRW-2

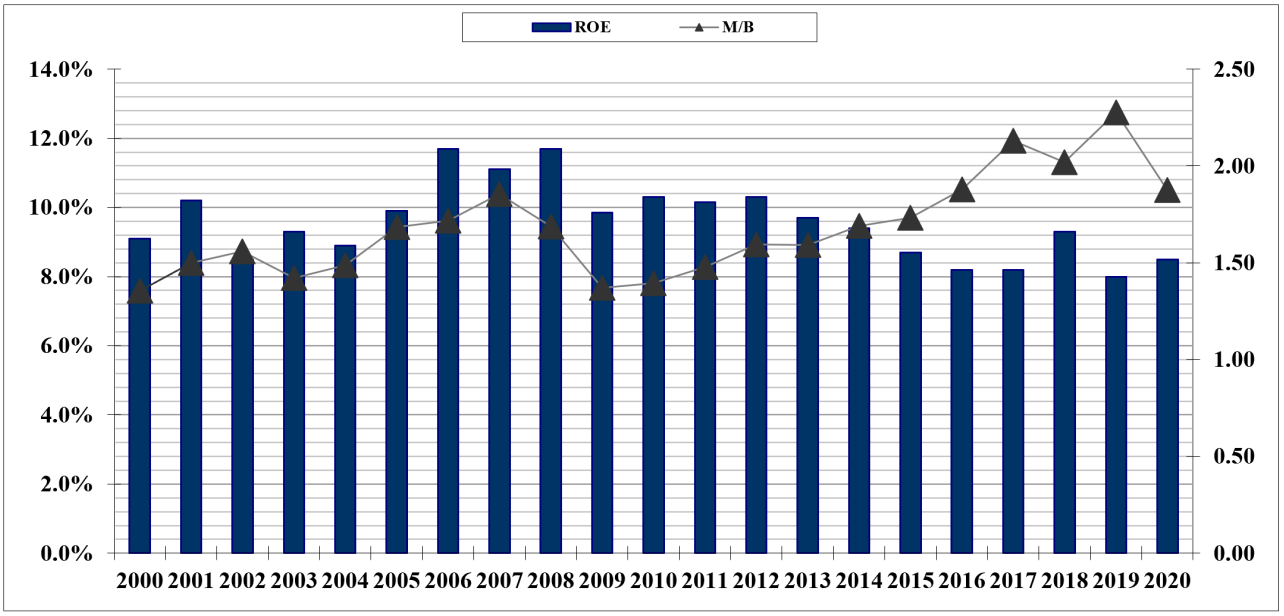
Gas Company Average Dividend Yield



Data Source: ***Value Line Investment Survey.***

Exhibit JRW-2

Gas Company Average Return on Equity and Market-to-Book Ratios



Data Source: ***Value Line Investment Survey.***

Exhibit JRW-3
Black Hills Energy

Gas Proxy Group

Company	Operating Revenue ($mil)	Percent Gas Revenue	Percent Elec Revenue	Net Plant ($mil)	Market Cap ($mil)	S&P Issuer Credit Rating	Moody's Issuer Credit Rating	Pre-Tax Interest Coverage	Primary Service Area	Common Equity Ratio	Return on Equity	Market to Book Ratio
Atmos Energy Company (NYSE-ATO)	2860.1	95%	0%	13582.5	11753.6	A-	NR	10.88	TX,LA,MS,CO,KS,KY	60.0%	9.59	1.73
Chesapeake Utilities (NYSE-CPK)	488.2	45%	16%	1612.4	1971.3	NR	NR	5.16	DE,MD,FL	57.8%	11.20	2.83
New Jersey Resources Corp. (NYSE-NJR)	1792.9	27%	0%	4114.8	3871.2	NR	NR	3.13	NJ	44.3%	11.30	2.10
Nisource Inc (NYSE-NI)	4681.7	68%	33%	16659.4	8566.1	BBB+	Baa2	2.67	IN,OH,PA,KY,VA,MD,MA	34.8%	-1.46	1.76
Northwest Natural Holdings (NYSE-NWN)	773.7	97%	0%	2732.2	1582.7	A+	NR	3.04	OR,WA	43.3%	8.01	1.78
ONE Gas, Inc.(NYSE-OGS)	1530.3	100%	0%	4904.3	3918.8	BBB+	A2	4.77	OK,KS,TX	52.7%	9.00	1.75
South Jersey Industries, Inc. (NYSE-SJI)	1541.4	55%	5%	4466.2	2677.6	BBB	NR	2.37	NJ	32.9%	10.20	1.61
Southwest Gas Company (NYSE-SWX)	3298.9	46%	0%	6869.5	3964.6	BBB+	Baa2	3.58	AZ,NV,CA	48.5%	8.97	1.48
Spire (NYSE-SR)	1801.1	95%	0%	5177.5	3664.1	A-	Baa2	3.51	MO	40.8%	4.08	1.61
Mean	$2,085.4	70%	6%	$6,679.9	$4,663.3	A /BBB+	Baa1	4.34		46.1%	7.88	1.85
Median	$1,792.9	68%	0%	$4,904.3	$3,871.2	A-/BBB+	Baa1	3.51		44.3%	9.00	1.75

Data Source: S&P Capital IQ, 2020 Fiscal Year-end data.

Exhibit JRW-3

Black Hills Energy
***Value Line* Risk Metrics**

Gas Proxy Group

Company	Beta	Financial Strength	Safety	Earnings Predictability	Stock Price Stability
Atmos Energy Company (NYSE-ATO)	0.80	A+	1	100	95
Chesapeake Utilities (NYSE-CPK)	0.80	A	2	95	85
New Jersey Resources Corp. (NYSE-NJR)	1.00	A+	2	55	80
Nisource Inc (NYSE-NI)	0.85	B+	2	45	95
Northwest Natural Gas Co. (NYSE-NWN)	0.85	A	1	5	85
ONE Gas, Inc. (NYSE-OGS)	0.90	A	2	100	95
South Jersey Industries, Inc. (NYSE-SJI)	1.05	A	3	65	60
Southwest Gas Company (NYSE-SWX)	0.95	A	3	95	80
Spire (NYSE-SR)	0.85	B++	2	50	90
Mean	0.89	A	2.0	68	85

Data Source: *Value Line Investment Survey* , 2021.

Value Line Risk Metrics

Beta

A relative measure of the historical sensitivity of a stock's price to overall fluctuations in the New York Stock Exchange Composite Index. A beta of 1.50 indicates a stock tends to rise (or fall) 50% more than the New York Stock Exchange Composite Index. The ''coefficient'' is derived from a regression analysis of the relationship between weekly percentage changes in the price of a stock and weekly percentage changes in the NYSE Index over a period of five years. In the case of shorter price histories, a smaller time period is used, but two years is the minimum. Betas are adjusted for their long-term tendency to converge toward 1.00.

Financial Strength

A relative measure of the companies reviewed by *Value Line* . The relative ratings range from A++ (strongest) down to C (weakest).

Safety Rank

A measurement of potential risk associated with individual common stocks. The Safety Rank is computed by averaging two other *Value Line* indexes the Price Stability Index and the Financial strength Rating. Safety Ranks range from 1 (Highest) to 5 (Lowest). Conservative investors should try to limit their purchases to equities ranked 1 (Highest) and 2 (Above Average) for Safety. .

Earnings Predictability

A measure of the reliability of an earnings forecast. Earnings Predictability is based upon the stability of year-to-year comparisons, with recent years being weighted more heavily than earlier ones. The most reliable forecasts tend to be those with the highest rating (100); the least reliable, the lowest (5). The earnings stability is derived from the standard deviation of percentage changes in quarterly earnings over an eight-year period. Special adjustments are made for comparisons around zero and from plus to minus.

Stock Price Stability

A measure of the stability of a stock's price. It includes sensitivity to the market (see Beta as well as the stock's inherent volatility. *Value Line's* Stability ratings range from 1 (highest) to 5 (lowest).

Source: *Value Line Investment Analyzer* .

Exhibit JRW-4

Black Hills Energy
Capital Structure Ratios and Debt Cost Rate

Panel A - Black HillsProposed Capital Structure and Debt Cost Rates

Capital Source	Capitalization Ratios	Cost Rate
Long-Term Debt	49.66%	3.91%
Common Equity	50.34%	
Total Capital	100.00%	

Panel B - Proxy Group Average Quarterly Capital Structure Ratios Including Short-Term Debt

	Average
Short-Term Debt	11.9%
Long-Term Debt	43.3%
Preferred Stock	0.6%
Common Equity	44.2%
Total Capital	100.0%

Panel B - Proxy Group Average Quarterly Capital Structure Ratios Excluding Short-Term Debt

	Average
Long-Term Debt	48.5%
Preferred Stock	0.7%
Common Equity	50.8%
Total Capital	100.0%

Data Source: S&P Capital IQ.

Panel C - BKH Average Quarterly Capital Structure Ratios Including Short-Term Debt

	Average
Short-Term Debt	5.11%
Long-Term Debt	54.26%
Common Equity	40.63%
Total Capital	100.00%

Panel C - BKH Average Quarterly Capital Structure Ratios Excluding Short-Term Debt

	Average
Long-Term Debt	57.17%
Common Equity	42.83%
Total Capital	100.00%

Data Source: S&P Capital IQ.

Panel D - CURB Recommended Capital Structure Ratios Excluding Short-Term Debt

		Rate
Long-Term Debt	50.00%	3.91%
Common Equity	50.00%	
Total Capital	100.00%	

Exhibit JRW-4

Black Hills Energy
Average Quarterly Proxy Group Capital Structure Ratios - 2019-21

	ATO	CPK	NJR	NI	NWN	OGS	SJI	SWX	SR	Average
Short-Term Debt	1.5%	34.2%	7.4%	7.4%	10.4%	9.8%	20.1%	3.8%	12.5%	11.9%
Long-Term Debt	43.0%	27.0%	45.8%	45.8%	52.4%	37.4%	47.4%	47.8%	43.1%	43.3%
Preferred Stock	0.0%	0.0%	0.0%	0.0%	5.7%	0.0%	0.0%	0.0%	0.0%	0.6%
Common Equity	55.5%	38.9%	46.8%	46.8%	31.5%	52.9%	32.5%	48.4%	44.4%	44.2%
Total Capital	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

	ATO	CPK	NJR	NI	NWN	OGS	SJI	SWX	SR	Average
Long-Term Debt	43.7%	36.0%	49.4%	49.4%	58.4%	41.4%	59.2%	49.7%	49.2%	48.5%
Preferred Stock	0.0%	0.0%	0.0%	0.0%	6.3%	0.0%	0.0%	0.0%	0.0%	0.7%
Common Equity	56.3%	64.0%	50.6%	50.6%	35.2%	58.6%	40.8%	50.3%	50.8%	50.8%
Total Capital	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Data Source: S&P Capital IQ.

Exhibit JRW-4

Black Hills Energy
BKH Capital Structure Ratios

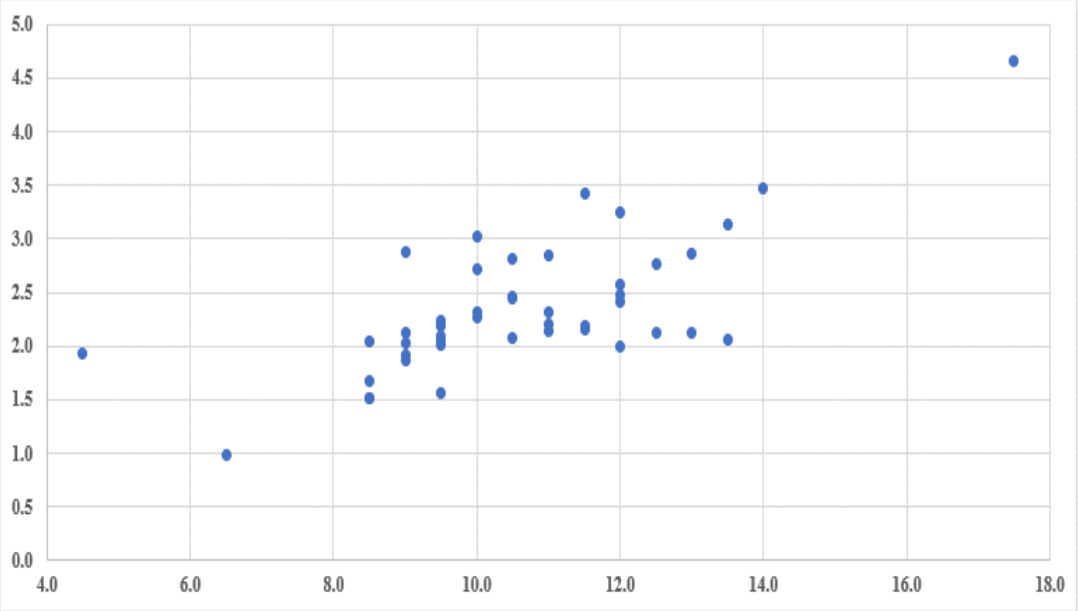
	2019 FQ1	2019 FQ2	2019 FQ3	2019 FQ4	2020 FQ1	2020 FQ2	2020 FQ3	2020 FQ4	2021 FQ1	2021 FQ2	Average
Short-Term Debt	3.17%	2.00%	5.31%	6.08%	5.43%	0.07%	1.53%	3.84%	11.79%	11.91%	5.11%
Long-Term Debt	54.67%	55.73%	53.72%	53.63%	52.41%	58.39%	57.44%	55.74%	50.59%	50.24%	54.26%
Common Equity	42.16%	42.27%	40.98%	40.29%	42.16%	41.54%	41.03%	40.42%	37.62%	37.85%	40.63%
Total Capital	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

	2019 FQ1	2019 FQ2	2019 FQ3	2019 FQ4	2020 FQ1	2020 FQ2	2020 FQ3	2020 FQ4	2021 FQ1	2021 FQ2	Average
Long-Term Debt	56.46%	56.87%	56.73%	57.10%	55.42%	58.43%	58.33%	57.96%	57.35%	57.04%	57.17%
Common Equity	43.54%	43.13%	43.27%	42.90%	44.58%	41.57%	41.67%	42.04%	42.65%	42.96%	42.83%
Total Capital	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Data Source: S&P Capital IQ.

Exhibit JRW-5
Electric Utilities and Gas Distribution Companies

Market-to-Book



Expected Return on Equity
R-Square = .50, N=43

Exhibit JRW-6
Industry Average Betas*
Value Line Investment Survey* Betas*
28-Jan-21

Rank	Industry	Beta	Rank	Industry	Beta	Rank	Industry	Beta
1	Oilfield Svcs/Equip.	1.49	34	Bank (Midwest)	1.20	67	Investment Co.	1.01
2	Homebuilding	1.47	35	Restaurant	1.19	68	Med Supp Non-Invasive	1.00
3	Insurance (Life)	1.47	36	Machinery	1.19	69	Environmental	1.00
4	Petroleum (Integrated)	1.42	37	Electrical Equipment	1.18	70	Telecom. Equipment	1.00
5	Hotel/Gaming	1.42	38	Bank	1.18	71	Investment Co.(Foreign)	1.00
6	Petroleum (Producing)	1.41	39	Medical Services	1.17	72	E-Commerce	0.99
7	Apparel	1.39	40	Electronics	1.17	73	Retail Store	0.98
8	Air Transport	1.37	41	Maritime	1.17	74	Cable TV	0.96
9	Shoe	1.37	42	Heavy Truck & Equip	1.15	75	Drug	0.96
10	Retail (Hardlines)	1.36	43	Toiletries/Cosmetics	1.15	76	Telecom. Services	0.95
11	Building Materials	1.33	44	R.E.I.T.	1.15	77	Healthcare Information	0.94
12	Office Equip/Supplies	1.33	45	Automotive	1.15	78	Computer Software	0.94
13	Aerospace/Defense	1.31	46	Reinsurance	1.14	79	Tobacco	0.94
14	Metals & Mining (Div.)	1.30	47	Publishing	1.11	80	Trucking	0.94
15	Metal Fabricating	1.30	48	Computers/Peripherals	1.10	81	Telecom. Utility	0.93
16	Pipeline MLPs	1.30	49	Semiconductor Equip	1.10	82	Electric Utility (West)	0.90
17	Auto Parts	1.29	50	Industrial Services	1.09	83	Foreign Electronics	0.90
18	Steel	1.28	51	Precision Instrument	1.09	84	Biotechnology	0.90
19	Retail Automotive	1.27	52	Packaging & Container	1.09	85	Beverage	0.89
20	Oil/Gas Distribution	1.26	53	Railroad	1.08	86	Electric Utility (East)	0.89
21	Paper/Forest Products	1.25	54	Power	1.07	87	Natural Gas Utility	0.89
22	Furn/Home Furnishings	1.25	55	Wireless Networking	1.07	88	Electric Util. (Central)	0.89
23	Public/Private Equity	1.24	56	Med Supp Invasive	1.06	89	Household Products	0.81
24	Natural Gas (Div.)	1.24	57	Retail Building Supply	1.06	90	Retail/Wholesale Food	0.81
25	Advertising	1.23	58	Educational Services	1.06	91	Water Utility	0.79
26	Financial Svcs. (Div.)	1.22	59	Semiconductor	1.06	92	Entertainment Tech	0.79
27	Recreation	1.21	60	Internet	1.05	93	Food Processing	0.77
28	Engineering & Const	1.21	61	Insurance (Prop/Cas.)	1.05	94	Precious Metals	0.68
29	Retail (Softlines)	1.21	62	Human Resources	1.04			
30	Chemical (Specialty)	1.21	63	Information Services	1.03			
31	Chemical (Diversified)	1.21	64	Entertainment	1.03			
32	Diversified Co.	1.20	65	Thrift	1.02			
33	Chemical (Basic)	1.20	66	IT Services	1.01		Mean	1.12

* Industry averages for 94 industries using *Value Line*'s database of 1,704 companies - Updated 1-28-21.

** *Value Line* computes betas using monthly returns regressed against the New York Stock Exchange Index for five years. These betas are then adjusted as follows: *VL* Beta = [{(2/3) * Regressed Beta} + {(1/3) * (1.0)}] to account to tendency for Betas to regress toward average of 1.0. See M. Blume, "On the Assessment of Risk," *Journal of Finance*, March 1971.

Exhibit JRW-6
DCF Model

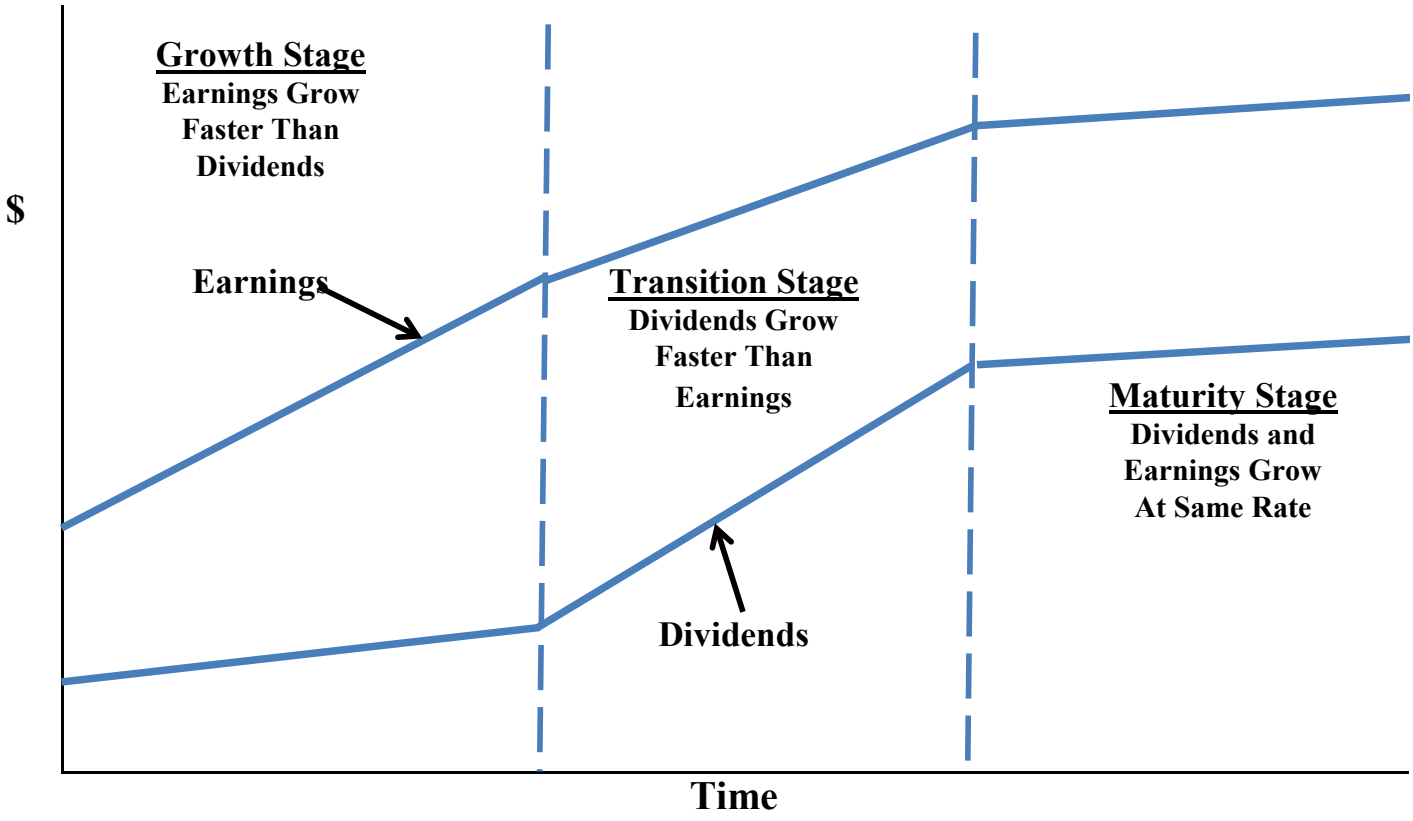


Exhibit JRW-7

Black Hills Energy
Discounted Cash Flow Analysis

Gas Proxy Group

Dividend Yield*	**3.40%**
Adjustment Factor	**1.02625**
Adjusted Dividend Yield	**3.49%**
Growth Rate**	**5.25%**
Equity Cost Rate	**8.75%**

*** Page 2 of Exhibit JRW-7**

**** Based on data provided on pages 3, 4, 5, and 6 of Exhibit JRW-7**

Exhibit JRW-7

Black Hills Energy
Monthly Dividend Yields

Gas Proxy Group

Company	Annual Dividend	Dividend Yield 30 Day	Dividend Yield 90 Day	Dividend Yield 180 Day
Atmos Energy Corporation (NYSE-AWR)	2.50	2.5%	2.5%	2.6%
Chesapeake Utilities Corp. (NYSE-CPK)	1.76	1.4%	1.5%	1.5%
New Jersey Resources Corp. (NYSE-NJR)	0.88	3.5%	3.5%	3.6%
NiSource Inc. (NYSE-NI)	1.33	3.4%	3.2%	3.4%
Northwest Natural Gas Co. (NYSE-NWN)	1.92	3.6%	3.6%	3.8%
One Gas, Inc. (NYSE-OGS)	2.32	3.1%	3.1%	3.1%
South Jersey Industries, Inc. (NYSE-SJI)	1.21	4.8%	4.7%	4.9%
Southwest Gas Corporation (NYSE-SWX)	2.38	3.4%	3.5%	3.6%
Spire (NYSE-SR)	2.60	3.6%	3.6%	3.7%
Mean		3.3%	3.2%	3.4%
Median		3.4%	3.5%	3.6%

Data Source: S&P Cap IQ, August, 2021.

Exhibit JRW-7

Black Hills Energy
DCF Equity Cost Growth Rate Measures
***Value Line* Historic Growth Rates**

Gas Proxy Group

Company	*Value Line* Historical Growth					
	Past 10 Years			Past 5 Years		
	Earnings	Dividends	Book Value	Earnings	Dividends	Book Value
Atmos Energy Company (NYSE-ATO)	8.0	5.0	7.5	9.0	7.5	10.0
Chesapeake Utilities (NYSE-CPK)	9.5	6.5	9.5	9.0	6.5	11.0
New Jersey Resources Corp. (NYSE-NJR)	6.0	7.0	7.5	5.5	6.5	8.5
Nisource Inc (NYSE-NI)	2.0	-1.5	-3.0	-0.5	-3.0	-5.0
Northwest Natural Gas Co. (NYSE-NWN)	-1.5	1.5	1.0	1.5	1.5	0.5
ONE Gas, Inc. (NYSE-OGS)*				10.0	14.5	3.0
South Jersey Industries, Inc. (NYSE-SJI)	1.5	6.5	5.5	-1.5	4.0	2.5
Southwest Gas Company (NYSE-SWX)	7.5	8.5	6.0	5.5	8.0	7.0
Spire (NYSE-SR)	1.5	4.5	7.0	4.5	6.0	5.5
Mean	4.3	4.8	5.1	4.8	5.7	4.8
Median	4.0	5.8	6.5	5.5	6.5	5.5
	Average of Median Figures =			5.6		

Data Source: *Value Line Investment Survey.*

Exhibit JRW-7

Black Hills Energy
DCF Equity Cost Growth Rate Measures
***Value Line* Projected Growth Rates**

Gas Proxy Group

Company	*Value Line* Projected Growth Est'd. '18-'20 to '24-'26			*Value Line* Sustainable Growth		
	Earnings	Dividends	Book Value	Return on Equity	Retention Rate	Internal Growth
Atmos Energy Company (NYSE-ATO)	7.0	7.5	10.5	7.5%	49.0%	3.7%
Chesapeake Utilities (NYSE-CPK)	8.5	8.0	6.5	12.0%	60.0%	7.2%
New Jersey Resources Corp. (NYSE-NJR)	2.0	5.5	6.0	10.5%	36.0%	3.8%
Nisource Inc (NYSE-NI)	9.5	4.5	4.5	11.5%	50.0%	5.8%
Northwest Natural Gas Co. (NYSE-NWN)	5.5	0.5	8.5	7.0%	37.0%	2.6%
ONE Gas, Inc. (NYSE-OGS)	6.5	7.0	10.5	6.5%	41.0%	2.7%
South Jersey Industries, Inc. (NYSE-SJI)	11.5	4.5	5.0	13.0%	44.0%	5.7%
Southwest Gas Company (NYSE-SWX)	8.0	4.5	7.0	9.0%	54.0%	4.9%
Spire (NYSE-SR)	10.0	4.5	7.5	7.5%	38.0%	2.9%
Mean	7.6	5.2	7.3	9.4%	45.4%	4.3%
Median	8.0	4.5	7.0	9.0%	44.0%	3.8%
Average of Median Figures =		6.5			Median =	3.8%

* 'Est'd. '18-'20 to '24-'26' is the estimated growth rate from the base period 2018 to 2020 until the future period 2024 to 2026.

Data Source: *Value Line Investment Survey.*

Exhibit JRW-7

Black Hills Energy
DCF Equity Cost Growth Rate Measures
Analysts Projected EPS Growth Rate Estimates

Gas Proxy Group

Company	Yahoo	Zacks	S&P Cap IQ	Mean
Atmos Energy Company (NYSE-ATO)	7.7%	7.4%	7.4%	7.5%
Chesapeake Utilities (NYSE-CPK)	4.7%	na	2.0%	3.4%
New Jersey Resources Corp. (NYSE-NJR)	6.0%	7.1%	7.1%	6.7%
Nisource Inc (NYSE-NI)	3.5%	6.2%	4.0%	4.6%
Northwest Natural Gas Co. (NYSE-NWN)	5.5%	4.9%	4.9%	5.1%
ONE Gas, Inc. (NYSE-OGS)	5.0%	5.0%	5.0%	5.0%
South Jersey Industries, Inc. (NYSE-SJI)	4.8%	5.4%	5.0%	5.1%
Southwest Gas Company (NYSE-SWX)	4.0%	5.5%	6.0%	5.2%
Spire (NYSE-SR)	7.3%	5.5%	5.1%	6.0%
Mean	5.4%	5.9%	5.2%	5.4%
Median	5.0%	5.5%	5.0%	5.1%

Data Sources: www.zacks.com, http://quote.yahoo.com, S&P Cap IQ, August, 2021.

Exhibit JRW-7

Black Hills Energy
DCF Growth Rate Indicators

Gas Proxy Group

Growth Rate Indicator	Gas Proxy Group
Historic *Value Line* Growth in EPS, DPS, and BVPS	5.6%
Projected *Value Line* Growth in EPS, DPS, and BVPS	6.5%
Sustainable Growth ROE * Retention Rate	3.8%
Projected EPS Growth from Yahoo, Zacks, and Reuters - Median	5.4%/5.1%

Exhibit JRW-8

Black Hills Energy
Capital Asset Pricing Model

Gas Proxy Group

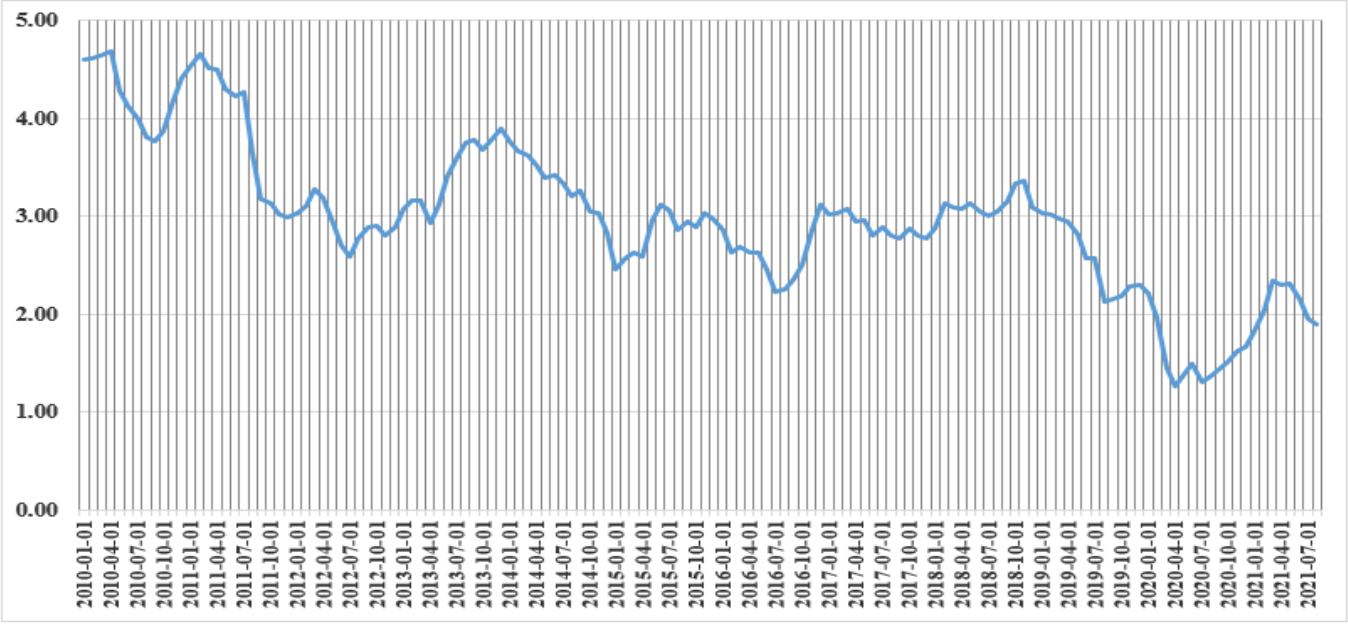
Risk-Free Interest Rate	**2.50%**
Beta*	**0.85**
Ex Ante Equity Risk Premium**	**6.00%**
CAPM Cost of Equity	**7.6%**

* See page 3 of Exhibit JRW-8

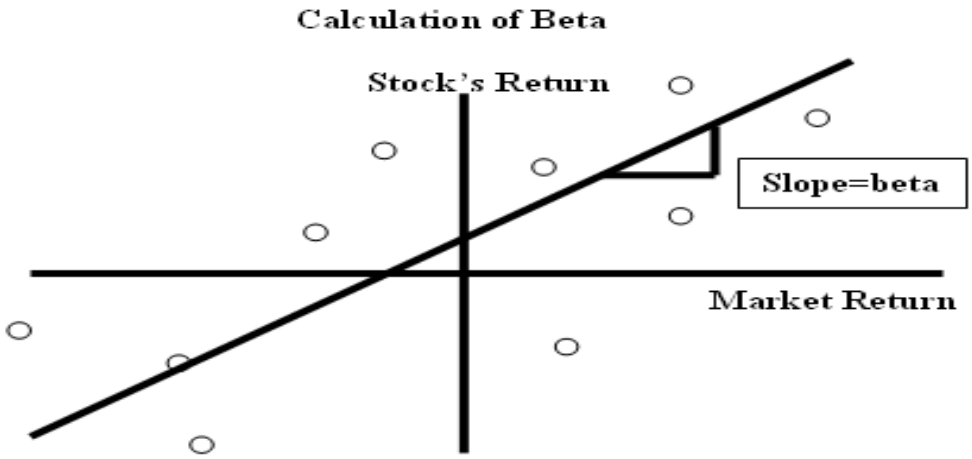
** See pages 5 and 6 of Exhibit JRW-8

Exhibit JRW-8

Thirty-Year U.S. Treasury Yields
2010-2021



Source: Federal Reserve Bank of St. Louis, FRED Database.



Gas Proxy Group

Atmos Energy Company (NYSE-ATO)	**0.80**
Chesapeake Utilities (NYSE-CPK)	**0.80**
New Jersey Resources Corp. (NYSE-NJR)	**1.00**
Nisource Inc (NYSE-NI)	**0.85**
Northwest Natural Gas Co. (NYSE-NWN)	**0.85**
ONE Gas, Inc. (NYSE-OGS)	**0.90**
South Jersey Industries, Inc. (NYSE-SJI)	**1.05**
Southwest Gas Company (NYSE-SWX)	**0.95**
Spire (NYSE-SR)	**0.85**
Mean	**0.89**
Median	**0.85**

Data Source: *Value Line Investment Survey*, 2021.

Exhibit JRW-8
Risk Premium Approaches

	Historical Ex Post Returns	**Surveys**	**Expected Return Models and Market Data**
Means of Assessing The Market Risk Premium	Historical Average Stock Minus Bond Returns	Surveys of CFOs, Financial Forecasters, Companies, Analysts on Expected Returns and Market Risk Premiums	Use Market Prices and Market Fundamentals (such as Growth Rates) to Compute Expected Returns and Market Risk Premiums
Problems/Debated Issues	Time Variation in Required Returns, Measurement and Time Period Issues, and Biases such as Market and Company Survivorship Bias	Questions Regarding Survey Histories, Responses, and Representativeness Surveys may be Subject to Biases, such as Extrapolation	Assumptions Regarding Expectations, Especially Growth

Source: Adapted from Antti Ilmanen, Expected Returns on Stocks and Bonds," *Journal of Portfolio Management*, (Winter 2003).

Exhibit JRW-8

Capital Asset Pricing Model
Market Risk Premium

Category	Study Authors	Publication Date	Time Period Of Study	Methodology	Return Measure	Range Low	Range High	Midpoint of Range	Mean	Median
Historical Risk Premium										
	Ibbotson	2016	1928-2015	Historical Stock Returns - Bond Returns	Arithmetic				6.00%	
					Geometric				4.40%	
	Damodaran	2021	1928-2020	Historical Stock Returns - Bond Returns	Arithmetic				6.44%	
					Geometric				4.83%	
	Dimson, Marsh, Staunton Credit Suisse Report	2019	1900-2018	Historical Stock Returns - Bond Returns	Arithmetic				5.50%	
					Geometric					
	Bate	2008	1900-2007	Historical Stock Returns - Bond Returns	Geometric				4.50%	
	Shiller	2006	1926-2005	Historical Stock Returns - Bond Returns	Arithmetic				7.00%	
					Geometric				5.50%	
	Siegel	2005	1926-2005	Historical Stock Returns - Bond Returns	Arithmetic				6.10%	
					Geometric				4.60%	
	Dimson, Marsh, and Staunton	2006	1900-2005	Historical Stock Returns - Bond Returns	Arithmetic				5.50%	
	Goyal & Welch	2006	1872-2004	Historical Stock Returns - Bond Returns					4.77%	
	Median									5.50%
Ex Ante Models (Puzzle Research)										
	Claus Thomas	2001	1985-1998	Abnormal Earnings Model					3.00%	
	Arnott and Bernstein	2002	1810-2001	Fundamentals - Div Yld + Growth					2.40%	
	Constantinides	2002	1872-2000	Historical Returns & Fundamentals - P/D & P/E					6.90%	
	Cornell	1999	1926-1997	Historical Returns & Fundamental GDP/Earnings		3.50%	5.50%	4.50%	4.50%	
	Easton, Taylor, et al	2002	1981-1998	Residual Income Model					5.30%	
	Fama French	2002	1951-2000	Fundamental DCF with EPS and DPS Growth		2.55%	4.32%		3.44%	
	Harris & Marston	2001	1982-1998	Fundamental DCF with Analysts' EPS Growth					7.14%	
	McKinsey	2002	1962-2002	Fundamental (P/E, D/P, & Earnings Growth)		3.50%	4.00%		3.75%	
	Siegel	2005	1802-2001	Historical Earnings Yield					2.50%	
	Grabowski	2006	1926-2005	Historical and Projected		3.50%	6.00%	4.75%	4.75%	
	Maheu & McCurdy	2006	1885-2003	Historical Excess Returns, Structural Breaks,		4.02%	5.10%	4.56%	4.56%	
	Bostock	2004	1960-2002	Bond Yields, Credit Risk, and Income Volatility		3.90%	1.30%	2.60%	2.60%	
	Bakshi & Chen	2005	1982-1998	Fundamentals - Interest Rates					7.31%	
	Donaldson, Kamstra, & Kramer	2006	1952-2004	Fundamental, Dividend yld., Returns,, & Volatility		3.00%	4.00%	3.50%	3.50%	
	Campbell	2008	1982-2007	Historical & Projections (D/P & Earnings Growth)		4.10%	5.40%		4.75%	
	Best & Byrne	2001	Projection	Fundamentals - Div Yld + Growth					2.00%	
	Fernandez	2007	Projection	Required Equity Risk Premium					4.00%	
	DeLong & Magin	2008	Projection	Earnings Yield - TIPS					3.22%	
	Siegel - Rethink ERP	2011	Projection	Real Stock Returns and Components					5.50%	
	Duff & Phelps	2020	Projection	Normalized with 3.5% Long-Term Treasury Yield					6.00%	
	Mschchowski - VL - 2014	2014	Projection	Fundamentals - Expected Return Minus 10-Year Treasury Rate					5.50%	
	American Appraisal Quarterly ERP	2015	Projection	Fundamental Economic and Market Factors					6.00%	
	Market Risk Premia	2021	Projection	Fundamental Economic and Market Factors					3.42%	
	KPMG	2021	Projection	Fundamental Economic and Market Factors					6.25%	
	Damodaran -3-21	2021	Projection	Fundamentals - Implied from FCF to Equity Model (Trailing 12 month, with adjusted payout)					4.63%	
	Social Security									
	Office of Chief Actuary		1900-1995							
	John Campbell	2001	1860-2000	Historical & Projections (D/P & Earnings Growth)	Arithmetic	3.00%	4.00%	3.50%	3.50%	
			Projected for 75 Years		Geometric	1.50%	2.50%	2.00%	2.00%	
	Peter Diamond	2001	Projected for 75 Years	Fundamentals (D/P, GDP Growth)		3.00%	4.80%	3.90%	3.90%	
	John Shoven	2001	Projected for 75 Years	Fundamentals (D/P, P/E, GDP Growth)		3.00%	3.50%	3.25%	3.25%	
	Median									4.00%
Surveys										
	New York Fed	2015	Five-Year	Survey of Wall Street Firms					5.70%	
	Survey of Financial Forecasters	2020	10-Year Projection	About 20 Financial Forecastsers					3.36%	
	Duke - CFO Magazine Survey	2020	10-Year Projection	Approximately 200 CFOs					4.05%	
	Welch - Academics	2008	30-Year Projection	Random Academics		5.00%	5.74%	5.37%	5.37%	
	Fernandez - Academics, Analysts, and Companie	2020	Long-Term	Survey of Academics, Analysts, and Companies					5.60%	
	Median									5.37%
Building Block										
	Ibbotson and Chen	2015	Projection	Historical Supply Model (D/P & Earnings Growth)	Arithmetic			6.22%	5.21%	
					Geometric			4.20%		
	Chen - Rethink ERP	2010	20-Year Projection	Combination Supply Model (Historic and Projection)	Geometric				4.00%	
	Ilmanen - Rethink ERP	2010	Projection	Current Supply Model (D/P & Earnings Growth)	Geometric				3.00%	
	Grinold, Kroner, Siegel - Rethink ERP	2011	Projection	Current Supply Model (D/P & Earnings Growth)	Arithmetic			4.63%	4.12%	
					Geometric			3.60%		
	Median									4.06%
Mean										**4.73%**
Median										**4.83%**

Exhibit JRW-8

Capital Asset Pricing Model
Market Risk Premium

Summary of 2010-20 Equity Risk Premium Studies

Category	Study Authors	Publication Date	Time Period Of Study	Methodology	Return Measure	Range Low	Range High	Midpoint of Range	Mean	Average
Historical Risk Premium										
	Ibbotson	2016	1928-2015	Historical Stock Returns - Bond Returns	Arithmetic				6.00%	
					Geometric				4.40%	
	Damodaran	2021	1928-2020	Historical Stock Returns - Bond Returns	Arithmetic				6.44%	
					Geometric				4.83%	
	Dimson, Marsh, Staunton _Credit Suisse Report	2019	1900-2018	Historical Stock Returns - Bond Returns	Arithmetic				5.50%	
					Geometric					
	Median									5.43%
Ex Ante Models (Puzzle Research)										
	Siegel - Rethink ERP	2011	Projection	Real Stock Returns and Components					5.50%	
	Duff & Phelps	2020	Projection	Normalized with 3.5% Long-Term Treasury Yield					6.00%	
	Mschchowski - VL - 2014	2014	Projection	Fundamentals - Expected Return Minus 10-Year Treasury Rate					5.50%	
	American Appraisal Quarterly ERP	2015	Projection	Fundamental Economic and Market Factors					6.00%	
	Market Risk Premia	2021	Projection	Fundamental Economic and Market Factors					3.42%	
	KPMG	2021	Projection	Fundamental Economic and Market Factors					6.25%	
	Damodaran -3-21	2021	Projection	Fundamentals - Implied from FCF to Equity Model (Trailing 12 month, with adjusted payout)					4.63%	
	Median									5.50%
Surveys										
	New York Fed	2015	Five-Year	Survey of Wall Street Firms					5.70%	
	Survey of Financial Forecasters	2020	10-Year Projection	About 20 Financial Forecastsers					3.36%	
	Duke - CFO Magazine Survey	2020	10-Year Projection	Approximately 200 CFOs					4.05%	
	Fernandez - Academics, Analysts, and Companies	2020	Long-Term	Survey of Academics, Analysts, and Companies					5.60%	
	Median									4.83%
Building Block										
	Ibbotson and Chen	2015	Projection	Historical Supply Model (D/P & Earnings Growth)	Arithmetic			6.22%	5.21%	
					Geometric			4.20%		
	Chen - Rethink ERP	2010	20-Year Projection	Combination Supply Model (Historic and Projection)	Geometric				4.00%	
	Ilmanen - Rethink ERP	2010	Projection	Current Supply Model (D/P & Earnings Growth)	Geometric				3.00%	
	Grinold, Kroner, Siegel - Rethink ERP	2011	Projection	Current Supply Model (D/P & Earnings Growth)	Arithmetic			4.63%	4.12%	
					Geometric			3.60%		
	Median									4.06%
Mean										**4.95%**
Median										**5.13%**

Duff & Phelps Risk-Free Interest Rates and Equity Risk Premium Estimates

DUFF & PHELPS

December 9, 2020

For additional information, please visit https://www.duffandphelps.com/insights/publications/cost-of-capital

Table: Equity Risk Premium & Risk-free Rates

Duff & Phelps Recommended U.S. Equity Risk Premium (ERP) and Corresponding Risk-free Rates (R_f): January 2008–Present

Date	Risk-free Rate (R_f)	R_f (%)	Duff & Phelps Recommended ERP (%)	What Changed
Current Guidance:				
December 9, 2020 – UNTIL FURTHER NOTICE	Normalized 20-year U.S. Treasury yield	2.50	5.50	ERP
June 30, 2020 – December 8, 2020	Normalized 20-year U.S. Treasury yield	2.50	6.00	Rf
March 25, 2020 – June 29, 2020	Normalized 20-year U.S. Treasury yield	3.00	6.00	ERP
December 19, 2019 – March 24, 2020	Normalized 20-year U.S. Treasury yield	3.00	5.00	ERP
September 30, 2019 – December 18, 2019	Normalized 20-year U.S. Treasury yield	3.00	5.50	R_f
December 31, 2018 – September 29, 2019	Normalized 20-year U.S. Treasury yield	3.50	5.50	ERP
September 5, 2017 – December 30, 2018	Normalized 20-year U.S. Treasury yield	3.50	5.00	ERP
November 15, 2016 – September 4, 2017	Normalized 20-year U.S. Treasury yield	3.50	5.50	R_f
January 31, 2016 – November 14, 2016	Normalized 20-year U.S. Treasury yield	4.00	5.50	ERP
December 31, 2015	Normalized 20-year U.S. Treasury yield	4.00	5.00	
December 31, 2014	Normalized 20-year U.S. Treasury yield	4.00	5.00	
December 31, 2013	Normalized 20-year U.S. Treasury yield	4.00	5.00	
February 28, 2013 – January 30, 2016	Normalized 20-year U.S. Treasury yield	4.00	5.00	ERP
December 31, 2012	Normalized 20-year U.S. Treasury yield	4.00	5.50	
January 15, 2012 – February 27, 2013	Normalized 20-year U.S. Treasury yield	4.00	5.50	ERP
December 31, 2011	Normalized 20-year U.S. Treasury yield	4.00	6.00	
September 30, 2011 – January 14, 2012	Normalized 20-year U.S. Treasury yield	4.00	6.00	ERP
July 1 2011 – September 29, 2011	Normalized 20-year U.S. Treasury yield	4.00	5.50	R_f
June 1, 2011 – June 30, 2011	Spot 20-year U.S. Treasury yield	Spot	5.50	R_f
May 1, 2011 – May 31, 2011	Normalized 20-year U.S. Treasury yield	4.00	5.50	R_f
December 31, 2010	Spot 20-year U.S. Treasury yield	Spot	5.50	
December 1, 2010 – April 30, 2011	Spot 20-year U.S. Treasury yield	Spot	5.50	R_f
June 1, 2010 – November 30, 2010	Normalized 20-year U.S. Treasury yield	4.00	5.50	R_f
December 31, 2009	Spot 20-year U.S. Treasury yield	Spot	5.50	
December 1, 2009 – May 31, 2010	Spot 20-year U.S. Treasury yield	Spot	5.50	ERP
June 1, 2009 – November 30, 2009	Spot 20-year U.S. Treasury yield	Spot	6.00	R_f
December 31, 2008	Normalized 20-year U.S. Treasury yield	4.50	6.00	
November 1, 2008 – May 31, 2009	Normalized 20-year U.S. Treasury yield	4.50	6.00	R_f
October 27, 2008 – October 31, 2008	Spot 20-year U.S. Treasury yield	Spot	6.00	ERP
January 1, 2008 – October 26, 2008	Spot 20-year U.S. Treasury yield	Spot	5.00	Initialized

"Normalized" in this context means that in months where the risk-free rate is deemed to be abnormally low, a proxy for a longer-term sustainable risk-free rate is used.

To learn more about cost of capital issues, and to ensure that you are using the most recent Duff & Phelps Recommended ERP, visit www.duffandphelps.com/insights/publications/cost-of-capital.
This and other related resources can also be found in the online Cost of Capital Navigator platform. To learn more about the Cost of Capital Navigator and other Duff & Phelps valuation and industry data products, visit www.DPCostofCapital.com.

Source: https://www.duffandphelps.com/-/media/assets/pdfs/publications/articles/dp-erp-rf-table-2020.pdf?

Capital Source	Capitalization Ratios	Cost Rate	Weighted Cost Rate
Long-Term Debt	49.66%	3.91%	1.94%
Common Equity	50.34%	10.15%	5.11%
Total Capital	100.00%		7.05%

Docket No. 21-BHCG-418-RTS
Exhibit JRW-9
Black Hills Energy ROE Results
Page 2 of 2

SUMMARY OF MCKENZIE'S ROEs

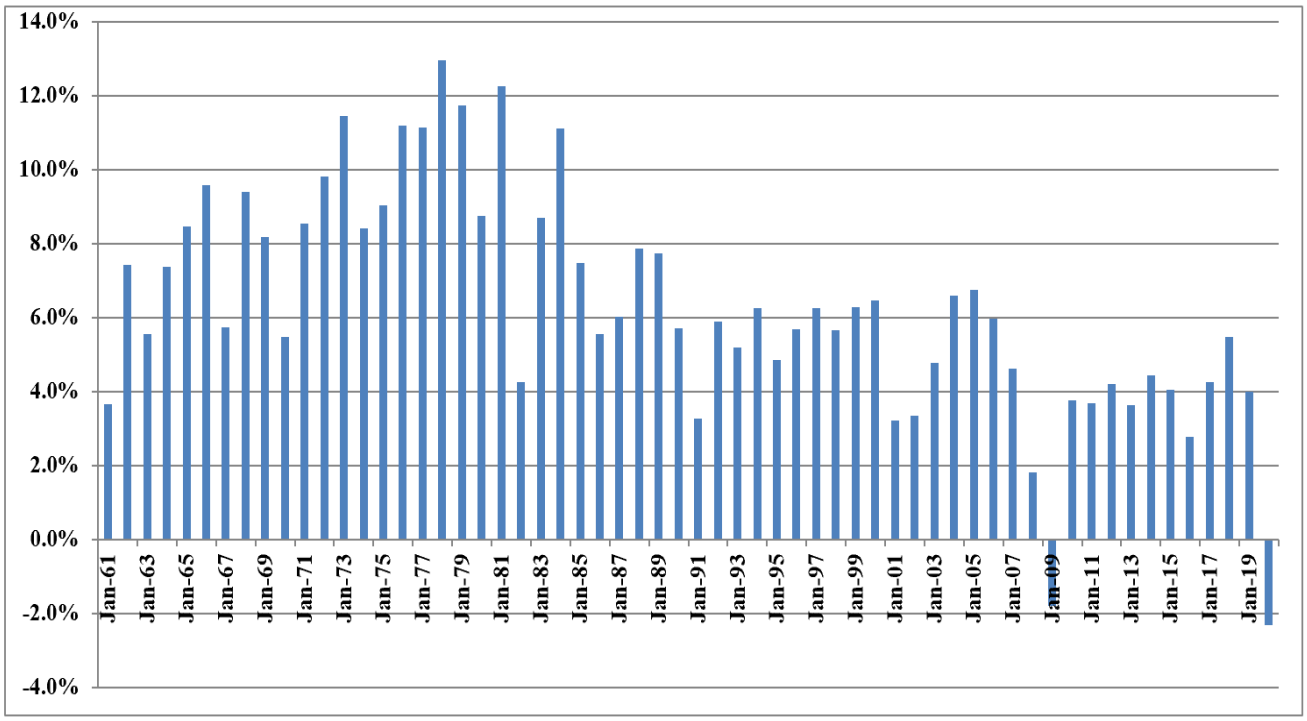
Method		Average		Midpoint
DCF				
	Value Line	10.6%		10.4%
	IBES	8.4%		9.8%
	Zacks	9.1%		10.1%
	Internal br + sv	10.4%		8.8%
CAPM				
	Current Bond Yield	11.6%		11.8%
	Projected Bond Yield	11.8%		11.9%
Empirical CAPM				
	Current Bond Yield	11.9%		12.0%
	Projected Bond Yield	12.0%		12.1%
Utility Risk Premium				
	Current Bond Yield		9.2%	
	Projected Bond Yields		9.5%	
Expected Earnings		9.8%	--	9.9%
ROE Recommendation				
	Cost of Equity Range	9.5%	--	10.8%
	ROE Recommendation		10.15%	

Growth Rates
GDP, S&P 500 Price, EPS, and DPS

		GDP	S&P 500	S&P 500 EPS	S&P 500 DPS	
	1960	542.382	58.11	3.10	1.98	
1	1961	562.210	71.55	3.37	2.04	
2	1962	603.921	63.1	3.67	2.15	
3	1963	637.451	75.02	4.13	2.35	
4	1964	684.460	84.75	4.76	2.58	
5	1965	742.289	92.43	5.30	2.83	
6	1966	813.414	80.33	5.41	2.88	
7	1967	859.958	96.47	5.46	2.98	
8	1968	940.651	103.86	5.72	3.04	
9	1969	1017.615	92.06	6.10	3.24	
10	1970	1073.303	92.15	5.51	3.19	
11	1971	1164.850	102.09	5.57	3.16	
12	1972	1279.110	118.05	6.17	3.19	
13	1973	1425.376	97.55	7.96	3.61	
14	1974	1545.243	68.56	9.35	3.72	
15	1975	1684.904	90.19	7.71	3.73	
16	1976	1873.412	107.46	9.75	4.22	
17	1977	2081.826	95.1	10.87	4.86	
18	1978	2351.599	96.11	11.64	5.18	
19	1979	2627.334	107.94	14.55	5.97	
20	1980	2857.307	135.76	14.99	6.44	
21	1981	3207.042	122.55	15.18	6.83	
22	1982	3343.789	140.64	13.82	6.93	
23	1983	3634.038	164.93	13.29	7.12	
24	1984	4037.613	167.24	16.84	7.83	
25	1985	4338.979	211.28	15.68	8.20	
26	1986	4579.631	242.17	14.43	8.19	
27	1987	4855.215	247.08	16.04	9.17	
28	1988	5236.438	277.72	24.12	10.22	
29	1989	5641.580	353.4	24.32	11.73	
30	1990	5963.144	330.22	22.65	12.35	
31	1991	6158.129	417.09	19.30	12.97	
32	1992	6520.327	435.71	20.87	12.64	
33	1993	6858.559	466.45	26.90	12.69	
34	1994	7287.236	459.27	31.75	13.36	
35	1995	7639.749	615.93	37.70	14.17	
36	1996	8073.122	740.74	40.63	14.89	
37	1997	8577.552	970.43	44.09	15.52	
38	1998	9062.817	1229.23	44.27	16.20	
39	1999	9630.663	1469.25	51.68	16.71	
40	2000	10252.347	1320.28	56.13	16.27	
41	2001	10581.822	1148.09	38.85	15.74	
42	2002	10936.418	879.82	46.04	16.08	
43	2003	11458.246	1111.91	54.69	17.88	
44	2004	12213.730	1211.92	67.68	19.407	
45	2005	13036.637	1248.29	76.45	22.38	
46	2006	13814.609	1418.3	87.72	25.05	
47	2007	14451.860	1468.36	82.54	27.73	
48	2008	14712.845	903.25	65.39	28.05	
49	2009	14448.932	1115.10	59.65	22.31	
50	2010	14992.052	1257.64	83.66	23.12	
51	2011	15542.582	1257.60	97.05	26.02	
52	2012	16197.007	1426.19	102.47	30.44	
53	2013	16784.851	1848.36	107.45	36.28	
54	2014	17527.258	2058.90	113.01	39.44	
55	2015	18238.301	2043.94	106.32	43.16	
56	2016	18745.075	2238.83	108.86	45.03	
57	2017	19542.980	2673.61	124.94	49.73	
58	2018	20611.861	2506.85	148.34	53.61	Average
	2019	21433.226	3230.78	162.35	58.80	
	2020	20934.850	3756.07	138.12	56.70	
	Growth Rates	**6.28**	**7.20**	**6.53**	**5.75**	**6.44**

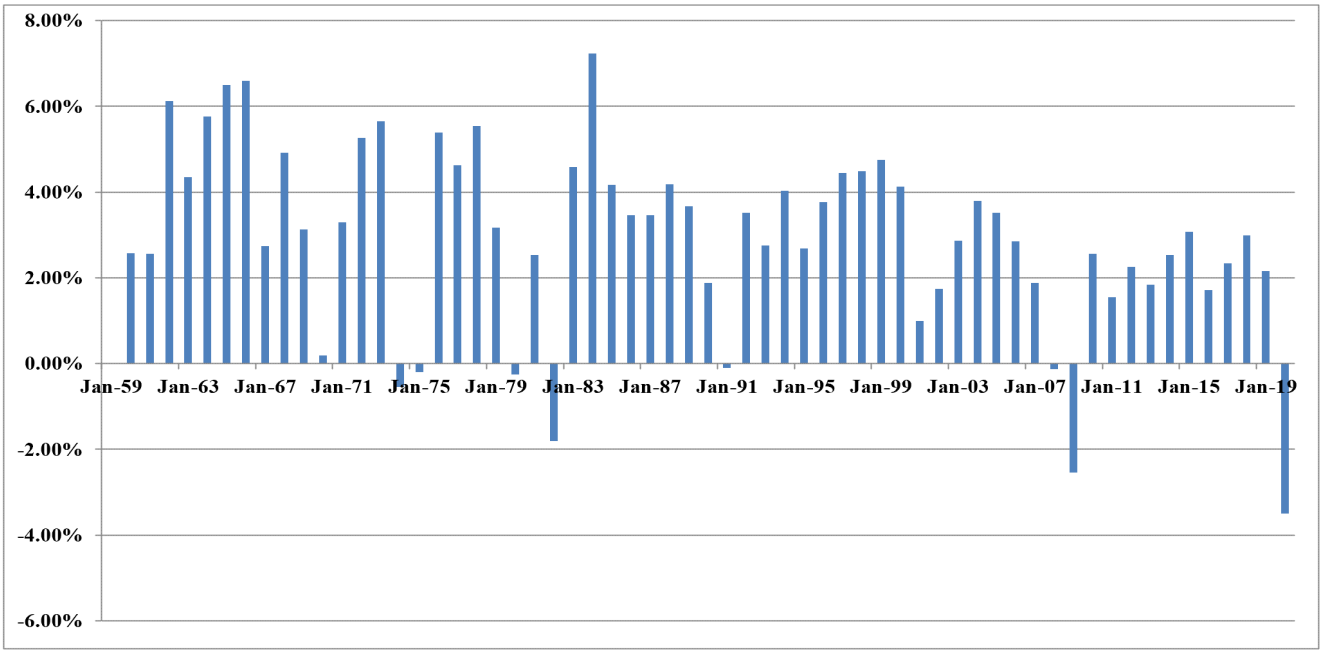
Data Sources: GDPA -http://research.stlouisfed.org/fred2/series/GDPA/downloaddata

Nominal GDP Growth Rates
Annual Growth Rates - 1961-2020



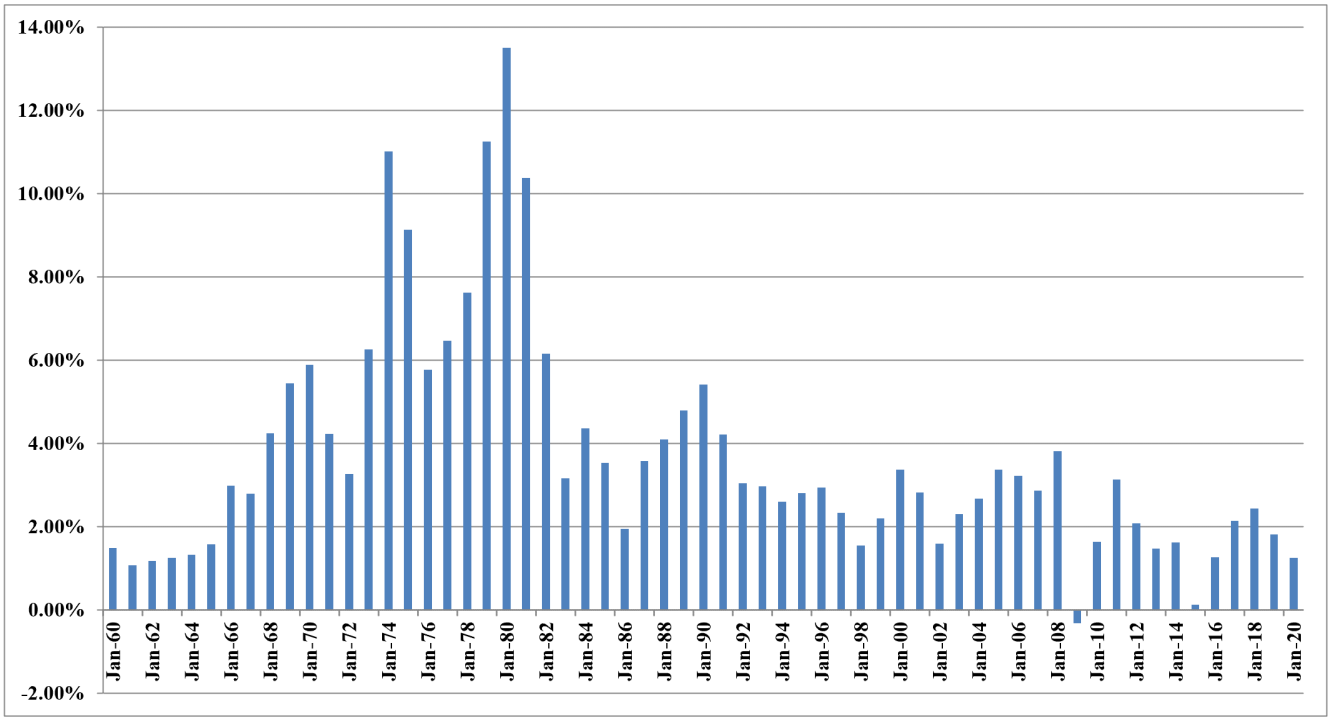
Data Sources: GDPA -https://fred.stlouisfed.org/series/GDPA

Annual Real GDP Growth Rates
1961-2020



Data Sources: GDPC1 - https://fred.stlouisfed.org/series/GDPCA

Annual Inflation Rates
1961-2020



Data Sources: CPIAUCSL - https://fred.stlouisfed.org/series/CPIAUCSL

Panel A
Historic GDP Growth Rates

10-Year Average		**3.40%**
20-Year Average		**3.63%**
30-Year Average		**4.27%**
40-Year Average		**5.10%**
50-Year Average		**6.12%**

Calculated using GDP data on Page 1 of Exhibit JRW-10

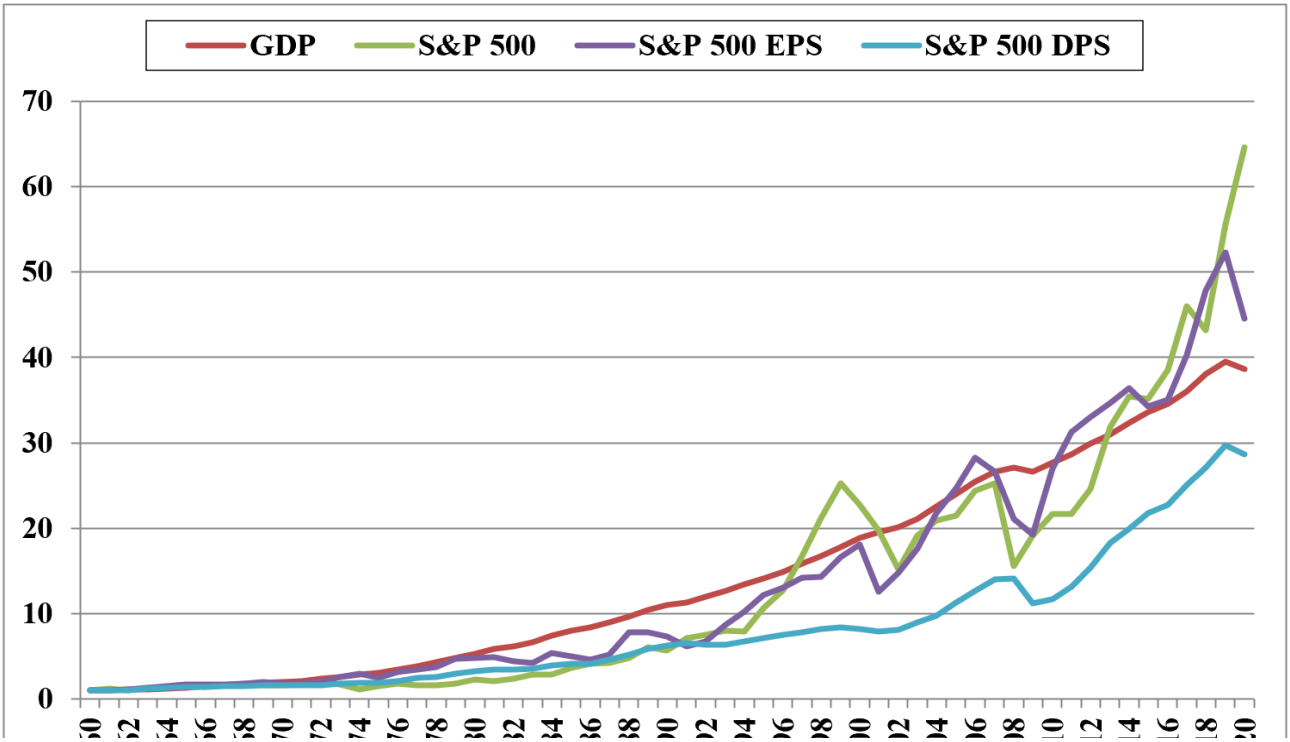
Panel B
Projected GDP Growth Rates

	Time Frame	Projected Nominal GDP Growth Rate
Congressional Budget Office	**2019-29**	**3.8%**
Survey of Financial Forecasters	**Ten Year**	**4.3%**
Social Security Administration	**2020-2095**	**4.1%**
Energy Information Administration	**2019-2050**	**4.2%**

Sources:

Congressional Budget Office,The *2020 Long-Term Budget Outlook* , June 25, 2020.
U.S. Energy Information Administration, *Annual Energy Outlook 2020* , Table: Macroeconomic Indicators,
Social Security Administration, 2020 Annual Report of the Board of Trustees of the Old-Age,
Survivors, and Disability Insurance (OASDI) Program, Table VI.G4, p. 211(July 15, 2020),
The 4.1% growth rate is the growth in projected GDP from $22,341 trillion in 2020 to $450,425 trillion in 2095.
https://www.philadelphiafed.org/research-and-data/real-time-center/survey-of-professional-forecasters/

Long-Term Growth of GDP, S&P 500, S&P 500 EPS, and S&P 500 DPS



CERTIFICATE OF SERVICE

21-BHCG-418-RTS

I, the undersigned, hereby certify that a true and correct copy of the above and foregoing document was served by electronic service on this 10th day of September, 2021, to the following:

JAMES G. FLAHERTY, ATTORNEY
ANDERSON & BYRD, L.L.P.
216 S HICKORY
PO BOX 17
OTTAWA, KS 66067
jflaherty@andersonbyrd.com

ANN STICHLER, Snr. Analyst-Reg. & Finance
BLACK HILLS/KANSAS GAS UTILITY
COMPANY LLC D/B/A Black Hills Energy
2287 COLLEGE ROAD
COUNCIL BLUFFS, IA 51503
ann.stichler@blackhillscorp.com

ROB DANIEL, MANAGER REGULATORY & FINANCE
BLACK HILLS/KANSAS GAS UTILITY
COMPANY, LLC D/B/A BLACK HILLS ENERGY
655 EAST MILLSAP DRIVE
FAYETTEVILLE, AR 72703
Rob.Daniel@blackhillscorp.com

DOUGLAS LAW, ASSOCIATE GENERAL COUNSEL
BLACK HILLS/KANSAS GAS UTILITY
COMPANY, LLC D/B/A BLACK HILLS ENERGY
1731 WINDHOEK DRIVE
LINCOLN NE 68512
douglas.law@blackhillscorp.com

TOM STEVENS, DIRECTOR REGULATORY & FINANCE
BLACK HILLS/KANSAS GAS UTILITY
COMPANY, LLC D/B/A BLACK HILLS ENERGY
655 EAST MILLSAP DRIVE
FAYETTEVILLE, AR 72703
TOM.STEVENS@BLACKHILLSCORP.COM

MONTGOMERY ESCUE, CONSULTANT
FREEDOM PIPELINE, LLC
PO BOX 622377
OVIEDO, FL 63762
montgomery@escue.com

KIRK HEGER
FREEDOM PIPELINE, LLC
1901 UNIVERSITY DRIVE
LAWRENCE, KS 66044
kirkheger@gmail.com

COLE BAILEY, LITIGATION COUNSEL
KANSAS CORPORATION COMMISSION
1500 SW ARROWHEAD RD
TOPEKA, KS 66604
c.bailey@kcc.ks.gov

DAVID COHEN, ASSISTANT GENERAL COUNSEL
KANSAS CORPORATION COMMISSION
1500 SW ARROWHEAD RD
TOPEKA, KS 66604
d.cohen@kcc.ks.gov

CARLY MASENTHIN, LITIGATION COUNSEL
KANSAS CORPORATION COMMISSION
1500 SW ARROWHEAD RD
TOPEKA, KS 66604
c.masenthin@kcc.ks.gov

GLENDA CAFER, ATTORNEY
MORRIS LAING EVANS BROCK & KENNEDY
800 SW JACKSON
SUITE 1310
TOPEKA, KS 66612-1216
GCAFER@MORRISLAING.COM

RICHARD L. HANSON
RICHARD L. HANSON
16171 ROAD I
LIBERAL, KS 67901
rlhanson@wbsnet.org

Della Smith
Senior Administrative Specialist