BEFORE THE NORTH CAROLINA UTILITIES COMMISSION
DOCKET NO. G-9 SUB 743

In the Matter of	)	
	)	**DIRECT TESTIMONY OF**
Application of Piedmont Natural Gas Company,	)	**J. RANDALL WOOLRIDGE, PH.D.**
Inc. For Adjustment of Rates and Charges	)	**EXPERT WITNESS FOR**
Applicable to Electric Service in North Carolina	)	**THE ATTORNEY GENERAL'S**
	)	**OFFICE**

EXPERT WITNESS FOR

NORTH CAROLINA ATTORNEY GENERAL'S OFFICE

DOCKET NO. G-9 SUB 743

JULY 19, 2018

Piedmont Natural Gas Company, Inc.
Docket No. G-9, Sub 743

Direct Testimony of
Dr. J. Randall Woolridge

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TESTIMONY OF J. RANDALL WOOLRIDGE, PH.D.

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 the 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

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A: I have been asked by the North Carolina Attorney General's Office (AGO") to provide an overall fair rate of return or cost of capital recommendation for Piedmont Natural Gas Company, Inc. ("Piedmont" or "Company").[1]

Q. PLEASE SUMMARIZE YOUR RECOMMENDATIONS AND THE MAIN ISSUES THAT YOU WILL ADDRESS IN YOUR TESTIMONY.

[1] In my testimony, I use the terms 'rate of return' and 'cost of capital' interchangeably. This is because the required rate of return of investors on a company's capital is the cost of capital.

1. My capital structure recommendation: Piedmont witness Sullivan has proposed a capital structure consisting of 0.82% short-term debt, 47.18% long-term debt, and 52.00% common equity. That is a higher common equity ratio than other gas distribution companies in the proxy group. I recommend adjusting Piedmont's proposed capital structure to use a common equity ratio of 50 percent, as that is more in line with the capital structures of the utilities in the proxy group as well as Piedmont's parent, Duke Energy. See Part V.

2. My ROE recommendation: I recommend authorizing a 9.0% rate of return on common equity (ROE). My analyses indicate that an ROE of between 7.60% and 8.70% is appropriate. My recommendation is 30 basis points higher than the range to reflect a small increase in risk associated with my adjustment of the proposed equity capital structure. See Part II.B.

3. My recommendation for the overall rate of return: These recommendations produce an overall rate of return for debt and equity capital of 6.76%. See Part II.B.

4. My alternative recommendation: I also provide an alternative recommendation which would apply if Piedmont's proposed 52% common equity capital structure is allowed. In that case, I recommend that the rate of return on equity be fixed at 8.70%, resulting in an overall rate of return of 6.69%. See Part II.B.

5. My cost of equity studies: I performed two studies using the same proxy group of natural gas utilities as was used by Piedmont's witness Hevert. I used a traditional constant-growth discounted cash flow (DCF) model, which estimates the cost of equity by summing the stock's dividend yield and the investors' expected long-

run growth rate for dividends per share. For the growth rate, I gave the most weight to analysts' projected earnings-per-share growth rates, but also considered multiple other growth rate measures. I also used the Capital Asset Pricing Model (CAPM). That approach requires an estimate of the risk-free interest rate, the "beta" (reflecting the risk particular to the particular companies used as comparable investments), and the market or equity risk premium (market risk premium). My estimate of the market risk premium is 5.50%, which factors in multiple approaches to estimating the market premium and uses results of many academic studies that are used by leading investment banks and consulting firms, and are consistent with estimates of surveys, forecasters, analysts, and corporate CFOs. See Part VI.

6. Factors that support the reasonableness of my recommendation:

   a. Interest rates and capital costs remain at historically low levels despite forecasts for many years of higher interest rates.

   b. The natural gas utility industry is a low-risk industry as measured by *Value Line* betas.

   c. The S&P and Moody's ratings of A- and A3 show that Piedmont's investment risk is in line with the risk profile of the proxy group.

   d. The authorized rates of return on common equity for natural gas utilities have declined over the years reflecting the lower interest rates and capital costs. See Part VI.C.

7. Piedmont's rate of return analyses: Piedmont's witness Mr. Hevert recommends a much higher rate of return on common equity of 10.75% due to multiple errors

that skew his analyses in an upward direction. The high ROE combined with Piedmont's proposed 52.0% common equity capital structure produce a 7.68% overall rate of return proposal.

8. <u>The most significant errors that contribute to the unreasonableness of Mr. Hevert's analyses and recommendations:</u>

a. Mr. Hevert assumes, without support, that interest rates and the cost of capital will increase. Yet, long-term interest rates and capital costs have not increased in any meaningful way even with the Federal Reserve's actions and the increase in short-term rates. As was explained in a 2015 Moody's article, the persistently low interest rates and the comprehensive suite of cost recovery mechanisms that are allowed for regulated gas and electric utilities ensure a low business risk profile and, as such, reductions in the rates of return authorized by regulators have not impaired their credit profiles or deterred them from raising record amounts of capital. [2] See Part VI C.

b. Mr. Hevert's Discounted Cash Flow analyses rely exclusively on overly optimistic and upwardly biased earnings per share (EPS) growth rate forecasts, without consideration of other measures of growth. For example, his growth factor relies on estimates for growth in future earnings per share for nine comparable natural gas utilities, including an estimate that the long-term rate of growth for one company is 25.5%, based on a *Value Line*

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

prediction for that growth rate during the next five years.[3] The 25.5% growth prediction follows periods when the company experienced annual rates of growth in earnings of *negative* 11.5% in the past ten years, and *negative* 22.0% in the past five years (i.e., it predicts a turn-around).[4] Obviously, 25.5% is not a realistic estimate of long term growth, and its impact distorts Mr. Hevert's estimate of the growth factor. Yet, that is not the only high growth estimate skewing Mr. Hevert's analyses. See Part VII.A.

c. Mr. Hevert's Capital Asset Pricing Model erroneously uses a too-high risk-free interest rate combined with an exaggerated range of equity market risk premiums. His range of market risk premiums of 10.65% to 13.77% reflect unrealistic assumptions about future long-term economic earnings growth and stock returns, assumptions that are out of line with the lower expected growth expected for our gross domestic product ("GDP"). To illustrate, consider how the expected earnings growth compares over time to the expected growth in GDP. If we use a 13.1% growth rate in earnings to predict what aggregate net income will be for S&P 500 companies in the year 2050, and compare that value to the value of nominal GDP in the United States, which is predicted to grow at a rate of 4.23%, then by 2050 the aggregate net income for the S&P 500 companies would make up 92% of our gross domestic product. Today, by comparison, net income makes up under 7% of our gross domestic product. Warren Buffet has observed that "you have to be wildly optimistic to believe

[3] See Table 8, shown on page 72.

[4] See Table 9 shown on page73.

that corporate profits as a percent of GDP can, for any sustained period, hold much above 6%." [5] More details about errors in Mr. Hevert's CAPM results are discussed in Part VII.B.

d. Mr. Hevert's Alternative Risk Premium Model relies on inflated risk-free interest rates for his base yield and adds a risk premium that is factored using *authorized* rates of return (i.e., returns estimated by regulators in place of market-based data). As such, the risk premium is a gauge of regulatory commission behavior, not current investor requirements. See Part VII.C.

e. Mr. Hevert's Expected Earnings Approach compares earnings using the book value of equity rather than current stock values. This ignores capital market data about changes in investor rate of return requirements. As a result, the approach is circular, measuring estimates of the rate of return on equity based largely on regulatory determinations, rather than basing the estimates on current market data. See Part VII.D.

f. Mr. Hevert also suggests two other reasons for his high ROE recommendation, namely the riskiness of Piedmont relative to the proxy group, and the need to make an adjustment for "flotation costs," but those reasons lack merit as is discussed in Part VII.E.

g. With respect to economic conditions in North Carolina and in Piedmont's service territory, I conclude that the higher level of natural gas residential rates in North Carolina, coupled with a lower level of household income in

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

the state and a higher level of unemployment in Piedmont's service territory suggest that affordability can be an issue for an essential utility service such as natural gas. See Part VIII.

h. Finally, Piedmont's overall rate of return request has a significant impact on its overall requested increase in revenues. Piedmont proposes to increase its overall annual operating revenues by $253,435,633, due in part to its proposal to increase its common equity ratio to 52.0% and increase its ROE to 10.60%. See Exhibit JRW-13, page 1 (which reflects Piedmont's Exhibit _(PKP-7 page 2)). On page 2 of Exhibit JRW-13, Piedmont's revenues increase proposal is shown again modified only to show the impact of my recommendation to reduce the common equity ratio to 50.0% and authorize an ROE of 9.0%. Without any other changes to Piedmont's proposal, the overall revenue increase would be reduced by $58 million per year to $195,468,893. The rate of return in Piedmont's proposal is not necessary to attract investors and is not just and reasonable. See Part VIII.

Q. HOW IS THE REST OF YOUR TESTIMONY ORGANIZED?

A. First, I provide a brief overview of what comprises a utility's rate of return and provide tables that present my recommendations. Second, I discuss the current capital market environment. Third, I select a proxy group of gas distribution companies for estimating the market cost of equity for Piedmont. Fourth, I present my recommendations for the Company's capital structure and debt cost rates. Fifth, I provide an overview of the concept of the cost of equity capital and then estimate

the equity cost rate for Piedmont. Sixth, I critique the Company's rate of return analysis and testimony. Finally, I assess North Carolina's economic conditions and examine the impact of the Company's rate of return proposal on its overall revenue increase request. I have attached one appendix.

II. INTRODUCTION

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, otherwise known as 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 establishing an appropriate level of profitability for regulated public utilities in two cases: (1) *Bluefield*[6] and (2) *Hope*.[7] 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, 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 the economic models and formulas in cost of capital testimony (including those presented later in my testimony) is to estimate, using the 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.

[6] *Bluefield Water Works and Improvement Co. v. Public Service Commission of West Virginia*, 262 U.S. 679, 43 S. Ct. 675, 67 L. Ed. 1176 (1923) ("Bluefield").

[7] *Federal Power Commission v. Hope Natural Gas Co.*, 320 U.S. 591, 64 S. Ct. 281, 88 L. Ed. 333 (1944) ("Hope").

B. Table of Recommendations

Q. PLEASE PROVIDE YOUR RECOMMENDATIONS REGARDING THE APPROPRIATE MARKET-BASED RATE OF RETURN FOR PIEDMONT.

A. My rate of return recommendation is provided in Exhibit JRW-1. Panel A in Exhibit JRW-1 shows my primary recommendation, which adjusts Piedmont's proposed equity capital structure to 50% and establishes a 9.00% rate of return on equity:

Table 1
Primary Rate of Return Recommendation

Capital Source	Capitalization Ratios*	Cost Rate	Weighted Cost Rate
Short-Term Debt	**0.85%**	**2.82%**	**0.02%**
Long-Term Debt	**49.15%**	**4.55%**	**2.24%**
Common Equity	**50.00%**	**9.00%**	**4.50%**
Total Capitalization	**100.00%**		**6.76%**

Q. PLEASE PROVIDE YOUR ALTERNATIVE RATE OF RETURN RECOMMENDATION FOR PIEDMONT.

A. My alternative rate of return recommendation is summarized in Table 2 and Panel B of Exhibit JRW-1.

Table 2
AG's Alternative Rate of Return Recommendation

Capital Source	Capitalization Ratios*	Cost Rate	Weighted Cost Rate
Short-Term Debt	**0.82%**	**2.82%**	**0.02%**
Long-Term Debt	**47.18%**	**4.55%**	**2.15%**
Common Equity	**52.00%**	**8.70%**	**4.52%**
Total Capitalization	**100.00%**		**6.69%**

III. CURRENT CAPITAL MARKET CONDITIONS AND AUTHORIZED ROES

Q. IS IT APPROPRIATE TO SET THE AUTHORIZED RATE OF RETURN BASED ON CURRENT INDICATORS OF MARKET-COST RATES, OR SHOULD THE COMMISSION ADJUST THE RATE BASED ON MR. HEVERT'S FORECASTS OF HIGHER INTEREST RATES AND CAPITAL COSTS?

A. I suggest that the Commission set an equity cost rate based on current indicators of market-cost rates and not speculate on the future direction of interest rates.

Economists have been predicting that interest rates would be going up for a decade, and they consistently have been wrong. For example, after the announcement of the end of the Quantitative Easing III ("QE III") program in 2014, all the economists in Bloomberg's interest rate survey forecasted interest rates would increase in 2014, and 100% of the economists were wrong. According to the *Market Watch* article:[8]

> The survey of economists' yield projections is generally skewed toward rising rates — only a few times since early 2009 have a majority of respondents to the Bloomberg survey thought rates would fall. But the unanimity of the rising rate forecasts in the spring was a stark reminder of how one-sided market views can become. It also teaches us that economists

[8] Ben Eisen, "Yes, 100% of economists were dead wrong about yields, *Market Watch*," October 22, 2014. Perhaps reflecting this fact, *Bloomberg* reported that the Federal Reserve Bank of New York has stopped using the interest rate estimates of professional forecasters in the Bank's interest rate model due to the unreliability of those interest rate forecasts. See Susanne Walker and Liz Capo McCormick, "Unstoppable $100 Trillion Bond Market Renders Models Useless," *Bloomberg.com* (June 2, 2014). http://www.bloomberg.com/news/2014-06-01/the-unstoppable-100-trillion-bond-market-renders-models-useless.html.

can be universally wrong.

Two other financial publications produced studies on how economists consistently predict higher interest rates, and yet they too, have been wrong. The first publication, entitled "How Interest Rates Keep Making People on Wall Street Look Like Fools," evaluated economists' forecasts for the yield on 10-year Treasury bonds at the beginning of the year for the last ten years.[9] The results demonstrated that economists consistently predict that interest rates will go higher, and interest rates have not fulfilled those predictions.

The second study tracked economists' forecasts for the yield on 10-year Treasury bonds on an ongoing basis from 2010 until 2015.[10] The study, entitled "Interest Rate Forecasters are Shockingly Wrong Almost All of the Time," indicates that economists are continually forecasting that interest rates are going up, yet they do not. Indeed, as Bloomberg has reported, economists' continued failure in forecasting increasing interest rates has caused the Federal Reserve Bank of New York to stop using the interest-rate estimates of professional forecasters in the Bank's interest-rate model due to the unreliability of those interest-rate forecasts.[11]

Obviously, investors are aware of the consistently wrong forecasts of higher interest rates, and therefore place little weight on such forecasts. If investors were

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[9] Joe Weisenthal, "How Interest Rates Keep Making People on Wall Street Look Like Fools," Bloomberg.com, March 16, 2015. http://www.bloomberg.com/news/articles/2015-03-16/how-interest-rates-keep-making-people-on-wall-street-look-like-fools.

[10] Akin Oyedele, "Interest Rate Forecasters are Shockingly Wrong Almost All of the Time," *Business Insider*, July 18, 2015. http://www.businessinsider.com/interest-rate-forecasts-are-wrong-most-of-the-time-2015-7.

[11] "*Market Watch*," October 22, 2014.

expecting interest rates to suddenly increase, thereby producing higher yields and negative returns, they would not be buying long-term Treasury bonds or utility stocks at their current yields. For example, consider a utility that pays a dividend of $2.00 with a stock price of $50.00. That produces a current dividend yield of 4.0%. If the stock price goes up to $80, that would produce a dividend yield of 2.5%, a reduction in the yield. If, on the other hand, investors were to require an increase in the dividend yield due to forecasts of higher interest rates as Mr. Hevert suggests, then the price of the utility stock would decline. In the example above where the dividend amount is $2.00, and higher return requirements led the dividend yield to increase from 4.0% to 5.0% in the next year, the stock price would have to decline from $50 to $40, which would be a -20% return on the stock. Obviously, investors would not buy the utility stock with an expected return of -20% due to higher dividend yield requirements.

In sum, the Commission should set the equity cost rate based on current indicators of market-cost rates without speculating about the future direction of interest rates. I am not aware of any study of changes in interest rates that suggests one forecasting service is consistently better than others or that interest-rate forecasts are consistently better than just assuming the current interest rate will be the rate in the future. As discussed above, investors would not be buying long-term Treasury bonds or utility stocks at their current yields if they expected interest rates to suddenly increase, thereby producing higher dividend yields and negative stock returns.

Q. HAVE THE FEDERAL RESERVE'S DECISIONS TO RAISE THE FEDERAL FUNDS RATE IN RECENT YEARS RESULTED IN

INCREASES IN LONG TERM INTEREST RATES AND CAPITAL COSTS?

A. No. Long term interest rates have not increased even as the Federal Reserve has increased its target rate for federal funds.

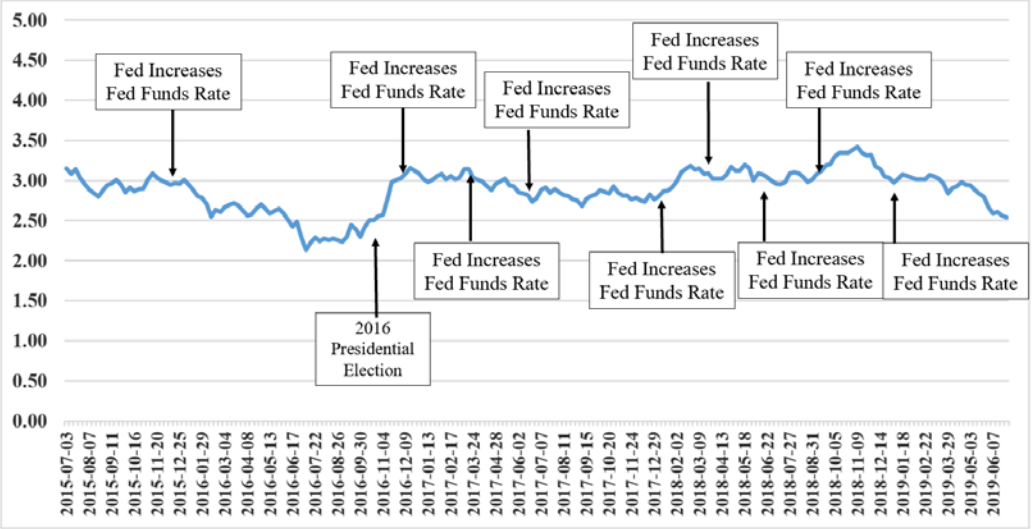
On December 16, 2015, the Federal Reserve increased its target rate for federal funds from 0.25 to 0.50 percent.[12] This increase came after the rate was kept in the 0.00 to 0.25 percent range for over five years in order to spur economic growth in the wake of the financial crisis associated with the Great Recession. As the economy has improved, with lower unemployment, and steady but slow GDP growth, the Federal Reserve has increased the target federal funds rate on eight additional occasions: December 2016; March, June, December of 2017; and March, June, September, and December of 2018.

Figure 1, below, shows the yield on 30-year Treasury bonds over the period of 2015-2019. I have highlighted the dates in which the Federal Reserve increased the federal funds rate. The 30-year Treasury yield hit its lowest point in the 2015 – 2016 timeframe in the summer of 2016 and subsequently increased with improvements in the economy. Then came November 8, 2016, and financial markets moved significantly in the wake of the results in the U.S. presidential election. The stock market gained more than 10% and the 30-year Treasury yield increased about 50 basis points to 3.2% by year-end 2016. However, over the past three years, even as the Federal Reserve has increased the federal funds rate, the

[12] The federal funds rate is set by the Federal Reserve and is the borrowing rate applicable to the most creditworthy financial institutions when they borrow and lend funds overnight to each other.

yield on thirty-year bonds has remained in the 2.5% to 3.3% range.

Figure 1
Thirty-Year Treasury Yield and Federal Reserve Fed Funds Rate Increases
2015-2019



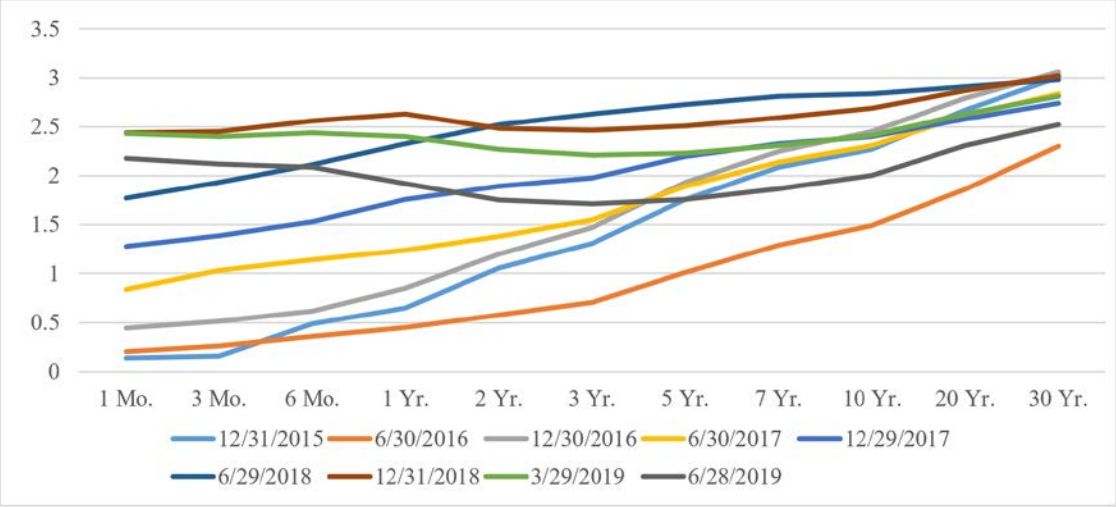
Q. WHY HAVE LONG-TERM TREASURY YIELDS REMAINED IN THE 3.0% RANGE DESPITE THE FEDERAL RESERVE INCREASING SHORT-TERM RATES?

A. Whereas the Federal Reserve can directly affect short-term rates by adjustments to the federal funds rate, long-term rates are primarily driven by expected economic growth and inflation.[13] The relationship between short- and long-term rates is normally evaluated using the yield curve. The yield curve depicts the relationship between the yield-to-maturity and the time-to-maturity for U.S. Treasury bills, notes, and bonds. Figure 2, below, shows the yield curve on a semi-

[13] Whereas economic growth picked up in 2018, partly in response to the personal and corporate tax cuts, projected real GDP growth for 2019 and beyond remains in the 2.0% to 2.5% range. In addition, inflation remains low and is also in the 2.0% to 2.5% range.

annual basis since the Federal Reserve started increasing the federal funds rate at the end of 2015. It shows that, except for mid-year 2016, when interest rates dipped to very low levels, the 30-year Treasury yield has remained in the 2.8%-3.3% range despite the fact that short-term rates have increased from near 0.0% to about 2.50%. As such, long-term interest rates and capital costs have not increased in any meaningful way even with the Federal Reserve's actions and the increase in short-term rates.

Figure 2
Semi-Annual Yield Curves
2015-2019



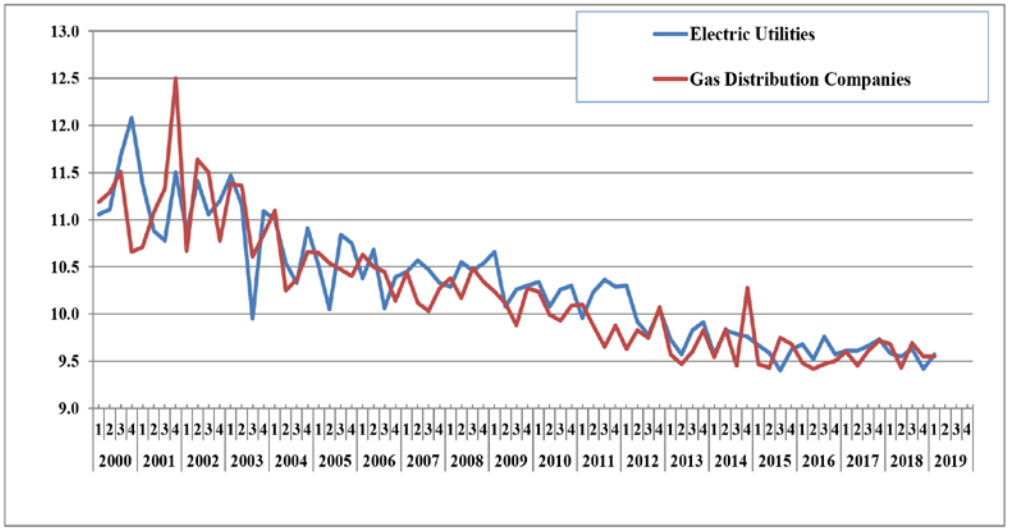
Date Source: https://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=yieldYear&year=2019.

Q. PLEASE DISCUSS THE TREND IN AUTHORIZED RETURN ON EQUITY FOR ELECTRIC AND GAS COMPANIES.

A. Over the past five years, with the historically low interest rates and capital costs, authorized ROEs for electric utility and gas distribution companies have slowly

declined to reflect the low capital cost environment. In Figure 3, below, I have graphed the quarterly authorized ROEs for electric and gas companies from 2000 to 2018. There is a clear downward trend in the data. On an annual basis, these authorized ROEs for gas distribution companies have largely 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, and 9.55% in the first quarter of 2019. The authorized ROEs for electric utilities have declined from an average of 10.01% in 2012, 9.8% in 2013, 9.76% in 2014, 9.58% in 2015, 9.60%, and 9.68% in 2017, 9.56% in 2018, and 9.57% in the first quarter of 2019, according to Regulatory Research Associates.[14]

Figure 3
Authorized ROEs for Electric Utility and Gas Distribution Companies
2000-2019



[14] *Regulatory Focus*, Regulatory Research Associates, 2019.

IV. PROXY GROUP SELECTION

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

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

Q. PLEASE DESCRIBE YOUR PROXY GROUP OF GAS DISTRIBUTION COMPANIES.

A. This Gas Proxy Group consists of eight natural gas distribution companies. The companies include Atmos Energy, Chesapeake Utilities, Inc. New Jersey Resources, Northwest Natural Gas Company, One Gas, Inc., South Jersey Industries, Southwest Gas, and Spire, Inc. This is the same group used by Mr. Hevert.

Summary financial statistics for the Gas Proxy Group are listed on page 1 of Exhibit JRW-2. The median operating revenues and net plant among members of the Gas Proxy Group are $1,640.2 million and $3,182.7 million, respectively. On average, the group receives 69% of revenues from regulated gas operations, has an "A-" average issuer credit rating from S&P, a median common equity ratio of 47.1%, and a median earned return on common equity of 9.7%.

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

A. I believe that bond ratings provide a good assessment of the investment risk of a company. The S&P and Moody's issuer credit ratings for Piedmont are A- and A3, respectively. These are in line with those of the companies in the gas proxy group. As such, I believe that the investment risk of Piedmont is similar to the average of the 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-2, I show the riskiness of the Gas Proxy Group using five different risk measures from *Value Line*. These measures include Beta, Financial Strength, Safety, Earnings Predictability, and Stock Price Stability.[15] The comparisons of the risk measures include Beta (0.68), Financial Strength (A), Safety (1.8), Earnings Predictability (71), and Stock Price Stability (88). In my opinion, these risk measures indicate that the group's investment risk is relatively low.

[15] These metrics are defined on page 3 of Exhibit JRW-2.

V. CAPITAL STRUCTURE RATIOS AND DEBT COST RATES

Q. PLEASE DESCRIBE PIEDMONT'S PROPOSED CAPITAL STRUCTURE AND SENIOR CAPITAL COST RATES.

A. Piedmont has proposed a capital structure consisting of 0.82% short-term debt, 47.18% long-term debt, and 52.00% common equity. Piedmont has proposed short-term and long-term debt cost rates of 2.82% and 4.55%.

Q. HOW DO PIEDMONT'S PROPOSED CAPITAL STRUCTURE RATIOS COMPARE TO THE AVERAGE CAPITALIZATION RATIOS FOR COMPANIES IN THE GAS PROXY GROUP?

A. Piedmont's proposed capital structure ratios include a common equity ratio of 52.00%. As shown in Panel B of Exhibit JRW-3, the average quarterly common equity ratio for the Gas Proxy Group in fiscal year 2018 was 46.75%. As such, Piedmont is proposing a capital structure that includes much more common equity in financing its gas operations than the average of the proxy group.

Q. HOW DO PIEDMONT'S PROPOSED CAPITAL STRUCTURE RATIOS COMPARE TO ITS RECENT CAPITALIZATION RATIOS AS WELL AS TO THOSE OF ITS PARENT, DUKE ENERGY CORPORATION?

A. Panel C of Exhibit JRW-3 provides Piedmont's average quarterly capitalization ratio over the 2018-19 time period. The quarterly data are provided on page 2 of Exhibit JRW-3. The company's average capitalization ratios over the 2018-19 time period

have been 9.6% short-term debt, 43.3% long-term debt, and 48.10% common equity. Panel C of Exhibit JRW-3 also provides Duke Energy Corporation's average quarterly capitalization ratio over the 2018-19 time period. Duke's average capitalization ratios over the 2018-19 time period have been 6.3% short-term debt, 50.6% long-term debt, and 42.9% common equity.

As a result, the Company's proposed capital structure includes a higher common equity ratio (52.00%) than it has had in recent years and is much higher than common equity ratio of its parent, Duke Energy Corporation.

Q. PLEASE DISCUSS THE ISSUE OF PUBLIC UTILITY HOLDING COMPANIES SUCH AS DUKE ENERGY USING DEBT TO FINANCE THE EQUITY IN SUBSIDIARIES SUCH AS THE COMPANY.

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: [16]

> US 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.

This financial strategy has traditionally been known as double leverage. Moody's defined double leverage in the following way:[17]

> Double leverage is a financial strategy whereby the parent raises debt but downstreams the proceeds to its operating subsidiary, likely in the form of

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

[17] *Ibid.* p. 5.

> 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.

Moody's goes on to discuss the potential risk to utilities of the strategy, and specifically notes that regulators could take it into consideration in setting authorized ROEs.[18]

> **"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.

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 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.

[18] *Ibid.* p. 1.

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. WHY IS THIS RELATIONSHIP IMPORTANT TO THE UTILITY'S CUSTOMERS?

A. 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. Again, equity capital is more expensive than debt. Not only does equity command a higher cost rate, it also adds more to the income tax burden that ratepayers are required to pay through rates. As the equity ratio increases, the utility's revenue requirements increase 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. HOW HAVE UTILITIES TYPICALLY STRUCK THIS BALANCE?

A. 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 PIEDMONT HAS PROPOSED AN EQUITY RATIO THAT IS HIGHER THAN (1) THE AVERAGE COMMON EQUITY RATIO OF MR. HEVERT'S PROXY GROUP, (2) THE AVERAGE AUTHORIZED COMMON EQUITY RATIO FOR US GAS COMPANIES, AND (3) ITS OWN COMMON EQUITY RATIO AS WELL AS THE COMMON EQUITY RATIO OF ITS PARENT COMPANY, 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 cannot expect to "have it both ways." Specifically, a utility cannot 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. GIVEN THIS DISCUSSION, PLEASE DISCUSS YOUR PRIMARY CAPITAL STRUCTURE RECOMMENDATION FOR PIEDMONT?

A. My primary capital structure recommendation is presented in Panel C of Exhibit JRW-3. As previously noted, Piedmont's proposed capital structure consists of more common equity and less financial risk than any of the other proxy gas companies. Therefore, in my primary rate of return recommendation, I am proposing a capital structure that includes a common equity ratio of 50.0%. This capital structure includes a common equity ratio that is about half way between Piedmont's proposed capital structure of 52.0% and the average common equity ratio of the proxy group of 46.75%. As shown in Table 3 and Panel C of Exhibit JRW-3, in this capital structure, I have grossed up the percentage amounts of short-

term and long-term debt and preferred stock so that they collectively total 50.0% and reduced the amount of common equity from 52.0% to 50.0%.

Table 3
Primary Capital Structure Recommendation

	Piedmont Proposed	Adjustment	AG Proposed	Cost
Short-Term Debt	**0.82%**	**1.041667**	**0.85%**	**2.82%**
Long-Term Debt	**47.18%**	**1.041667**	**49.15%**	**4.55%**
Common Equity	**52.00%**	**0.961538**	**50.00%**	
Total Capital	**100.00%**		**100.00%**	

Q. WHAT IS THE CAPITAL STRUCTURE IN YOUR ALTERNATIVE RATE OF RETURN RECOMMENDATION?

A. In my alternative rate of return recommendation, I am using Piedmont' proposed capital structure which consists of **0**.82% short-term debt, 47.18% long-term debt, and 52.00% common equity. I am also using Piedmont's proposed short-term and long-term debt cost rates of 2.82% and 4.55%.

Table 4
Alternative Capital Structure Recommendation

	Percent of Total	Cost
Short-Term Debt	**0.82%**	**2.82%**
Long-Term Debt	**47.18%**	**4.55%**
Common Equity	**52.00%**	
Total Capital	**100.00%**	

Q. DO YOU BELIEVE THAT YOUR PROPOSED 50% EQUITY CAPITAL STRUCTURE IS FAIR TO PIEDMONT?

A. Yes, for two reasons: (1) It includes a common equity ratio that is higher than the average common equity ratio for the Gas Proxy Group in 2018 and therefore affords Piedmont with more common equity and less financial risk than other gas distribution companies: and (2) according to Regulatory Research Associates, the average authorized common equity ratio for gas-distribution companies in calendar year 2018 was 50.09%.[19]

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, many 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

[19] *Regulatory Focus*, Regulatory Research Associates, (2019).

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 firm 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 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. [20]

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

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.

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 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*[21]

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-

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

book ratio data. The results are presented in Exhibit JRW-4. The average R-square is 0.50.[22] 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 earnings ROEs above the cost of equity capital for many years.

Q. WHAT ECONOMIC FACTORS HAVE AFFECTED THE COST OF EQUITY CAPITAL FOR PUBLIC UTILITIES?

A. Exhibit JRW-5 provides indicators of public utility equity cost rates over the past decade.

Page 1 shows the yields on long-term A-rated public utility bonds. These yields decreased from 2000 until 2003, and then hovered in the 5.50%-6.50% range from mid-2003 until mid-2008. These yields peaked in November 2008 at 7.75% during the Great Recession. These yields have generally declined since then, dropping below 4.0% on four occasions - in mid-2013, in the first quarter of 2015, in the summer of 2016, and in late 2017. These yields increased in 2018 but have fallen back to 4.0% in 2019.

Page 2 of Exhibit JRW-5 provides the dividend yields for the companies in the Gas Proxy Group over the past seventeen years. The dividend yields for the gas group declined from 5.8% to 3.1% between the years 2000 to 2007 due to

[22] 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.

higher gas company stock prices, increased to about 4.0% in 2009 during the financial crisis, and have declined steadily since that time due to higher utility stock valuations. The average dividend yield was 2.70% in 2017 and 2018.

Average earned returns on common equity and market-to-book ratios for gas utilities are on page 3 of Exhibit JRW-5. For the gas group, earned returns on common equity have been in the range of 9.0% to 12.0% over these years. Over the past decade, the earned ROEs have declined from the 12.0% range to about 9.0%. The average market-to-book ratios for this group, which were about 1.25X in 2000 have increased to over 2.00X in 2017 and 2018. This means that, for at least the last decade, returns on common equity have been greater than the cost of capital, or more than necessary to meet investors' required returns. This also means that customers have been paying more than necessary to support an appropriate profit level for regulated utilities.

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.

Exhibit JRW-6 provides an assessment of investment risk for 97 industries as measured by beta, which according to modern capital market theory, is the only relevant measure of investment risk. Beta 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 whose price movement is 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. According to the *Value Line Investment Survey*, the average betas for electric, gas, and water utility

companies are 0.60, 0.67, and 0.70, respectively.[23] 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.

[23] The beta for the *Value Line* Electric Utilities is the simple average of *Value Line*'s Electric East (0.55), Central (0.63), and West (0.62) group betas.

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. 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 DO YOU PLAN TO ESTIMATE THE COST OF EQUITY CAPITAL FOR PIEDMONT?

A. I rely primarily on the discounted cash flow ("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 a capital asset pricing model ("CAPM") study; 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.

B. Discounted Cash Flow Analysis

Q. PLEASE DESCRIBE IN SIMPLE TERMS HOW A DISCOUNTED CASH FLOW ANALYSIS IS CALCULATED.

A. Simply put, a constant growth DCF measures the cost of common equity based on the sum of the dividend yield plus the expected rate of growth of dividends for comparable companies.

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 that earnings that are not paid out in the form of dividends are reinvested in the firm so as 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:

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

where P is the current stock price, D_n is the dividend in year 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-7, Page 1 of 2. This model presumes that a company's dividend payout initially progresses 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 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 attractive ROEs. At that time, its earnings growth rate, payout ratio, and ROE stabilize for the remainder of its life. The constant-growth DCF model is appropriate when a firm is in the maturity stage of the life cycle.

In using this 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. 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 D_1 represents the expected dividend over the coming year 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 VERSION OF THE DCF MODEL APPROPRIATE FOR PUBLIC UTILITIES?

A. Yes. The economics of the public utility business indicate that the industry is in the maturity 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 appropriate DCF valuation procedure for companies in the maturity 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 precisely measured 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 30-day, 90-day, and 180-day average stock prices. These dividend yields are provided in page 2 of Exhibit JRW-8. For the Gas Proxy Group, the median dividend yields using the 30-day, 90-day, and 180-day average stock prices range from 2.4% to 2.6%. I am using the 2.60% 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 to the dividend yield over the coming period. 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.[24]

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 that is computed based upon 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?

A. I adjust the dividend yield by one-half (1/2) of the expected growth so as to reflect growth over the coming year. The DCF equity cost rate ("K") is computed as:

$$K = [(D/P) * (1 + 0.5g)] + g$$

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'

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

expectation 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 GROUP?

A. I have analyzed a number of measures of growth for companies in the proxy Group. 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, Reuters, and Zacks. These services solicit three-to-five-year earnings growth rate projections from securities analysts and compile and publish the means and medians of these forecasts. Finally, I 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 INTERNAL GROWTH.

A. Historical growth rates per share for earnings, dividends, and book values (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). However, 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.

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-term 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' forecasts for earnings per share for companies are collected and published by a number of different investment information services, including Institutional Brokers Estimate System ("I/B/E/S"), Bloomberg, FactSet, 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, and Zacks 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, and First Call are fee-based services. These services usually provide detailed reports and other data in addition to analysts' EPS forecasts. Thompson Reuters and Zacks do 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. The Reuters website (www.reuters.com) also publishes EPS forecasts from Thompson Reuters, but with more detail. 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. PLEASE PROVIDE AN EXAMPLE OF THESE EPS FORECASTS.

A. The following example provides the earnings per share forecasts compiled by Reuters for Atmos Energy Corp. (stock symbol "ATO"). The figures are provided on page 2 of Exhibit JRW-7. Line one shows one analysts' EPS estimate for the quarter ending June 30, 2019. The mean, high, and low estimates are $0.72, $0.87, and $0.66, respectively. The second line shows seven analysts' quarterly EPS estimates for the quarter ending September 30, 2019 with mean, high, and low estimates of 0.50, $0.65, and $0.45. Line 3 shows the results for fiscal year ending

September 30, 2019: $4.33 (mean), $4.39 (high), and $4.27 (low). The fourth line shows seven analysts' quarterly EPS estimates for the fiscal year ending September 30, 2020: $4.59 (mean), $4.66 (high), and $4.45 (low). The quarterly and annual EPS forecasts in lines one through four are expressed in dollars and cents. As in the Atmos case shown in Exhibit JRW-7, it is common for more analysts to provide estimates of annual EPS as opposed to quarterly EPS. The bottom line shows the projected long-term EPS growth rate, which is expressed as a percentage. For Atmos, two analysts have provided a long-term EPS growth rate forecast, with mean, high, and low growth rates of 6.45%, 6.90%, and 6.00%, respectively.

Q. WHICH OF THESE EPS FORECASTS IS USED IN DEVELOPING A DCF GROWTH RATE?

A. The Discounted Cash Flow growth rate is the long-term projected growth rate per share in earnings, dividends, and book values. Therefore, in developing an equity cost rate using the DCF model, the projected long-term growth rate is the projection used in the DCF model.

Q. WHY DO YOU NOT RELY EXCLUSIVELY ON THE EPS FORECASTS OF WALL STREET ANALYSTS IN ARRIVING AT A DCF GROWTH RATE FOR THE PROXY GROUP?

A. There are several issues with using the earnings per share 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, dividends 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 2011 study by Lacina, Lee, and Xu 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.[25] Employing data over a 20-year period, these authors demonstrate that using the most recent year's EPS figure to forecast EPS in the next 3-5 years proved to be just as accurate as using the EPS estimates from analysts' long-term earnings growth rate forecasts. In the authors' opinion, these study 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 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.[26] Hence, using these

[25] 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.

[26] 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).

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.[27]

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 stock prices therefore reflect the upward bias. In other words, given the research on analysts' EPS growth rate forecasts, I believe that investors know that analysts' EPS growth rate forecasts are biased and take this into account when pricing stocks

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. The dividend yield takes into account the impact of investor expectations based on changes in stock prices, but the expected growth rate used in the DCF should also be adjusted downward from the projected EPS growth rate to remove the upward bias by reviewing other measures of growth.

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

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

A. Page 3 of Exhibit JRW-8 provides the 5- and 10-year historical growth rates per share for earnings, dividends, and book values for the companies in the proxy group, as published in the *Value Line Investment Survey*. The median historical growth measures per share for earnings, dividends and book values for the Gas Proxy Group, as provided in Panel A, range from 5.0% to 7.5%, with an average of the medians of 6.2%.

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

A. *Value Line's* projections of per share growth in earnings, dividends, and book values for the companies in the proxy Group are shown on page 4 of Exhibit JRW-8. As stated above, due to the presence of outliers, the medians are used in the analysis. For the Gas Proxy Group, as shown in Panel A of page 4 of Exhibit JRW-8, the medians range from 4.5% to 8.5%, with an average of the medians of 6.3%.

Also provided on page 4 of Exhibit JRW-8 are the prospective sustainable growth rates for the companies in the proxy group as measured by *Value Line*'s average projected return on shareholders' equity and retention rates. As noted above, sustainable 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 5.0%.

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

A. Yahoo, Zacks, and Reuters collect, summarize, and publish Wall Street analysts' three-to-five year earnings per share 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-8. I have reported both the mean and median growth rates for the group. Since 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 three-to-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/median of analysts' projected EPS growth rates for the gas group 5.6% and 6.2%, respectively.[28]

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

A. Page 6 of Exhibit JRW-8 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 6.2%. The average of the projected per share growth rates in earnings, dividends, and book values from *Value Line* is 6.3%, and *Value Line*'s projected sustainable growth rate is 5.0%. The projected earnings per share

[28] Given the variation in the measures of central tendency of analysts' projected EPS growth rates for the proxy group, I have considered both the means and medians figures in the growth rate analysis.

growth rates of Wall Street analysts for the Gas Proxy Group are 5.6% and 6.2% as measured by the mean and median growth rates. The overall range for the projected growth rate indicators (ignoring historical growth) is 5.0% to 6.3%. Giving primary weight to the projected EPS growth rate of Wall Street analysts, I believe that the appropriate growth rate for the Gas Proxy Group is 6.00%. This is at the high end of the range of projected growth rates.

Q. BASED ON THE ABOVE ANALYSIS, WHAT ARE YOUR INDICATED COMMON EQUITY COST RATES FROM THE DCF MODEL FOR THE PROXY GROUP?

A. My DCF-derived equity cost rates for the gas group is summarized on page 1 of Exhibit JRW-8 and in Table 5 below.

Table 5
DCF-derived Equity Cost Rate/ROE

	Dividend Yield	1 + ½ Growth Adjustment	DCF Growth Rate	Equity Cost Rate
Gas Proxy Group	**2.60%**	**1.0300**	**6.00%**	**8.700%**

The calculation for the Gas Proxy Group is the 2.60% dividend yield, times the one and one-half growth adjustment of 1.030, and a DCF growth rate of 6.00%, which results in an equity cost rate of 8.70%.

B. Capital Asset Pricing Model

Q. PLEASE DESCRIBE IN SIMPLE TERMS HOW A CAPITAL ASSET PRICING MODEL ESTIMATES THE COST OF EQUITY CAPITAL

A. Simply put, a Capital Asset Pricing Model estimates the cost of common equity based on the sum of the risk-free bond rate plus the risk premium associated with comparable investments. And the risk premium is measured using an estimate of the risk premium for the overall market (such as the S&P 500), adjusted to reflect the relative risk of comparable investments.

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 equal to:

$$K = (R_f) + ß * [E(R_m) - (R_f)]$$

Where:

- *K* represents the estimated rate of return on the stock;
- $E(R_m)$ represents the expected 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 premiumthe excess 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 more difficult to measure, as 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-9.

A. Exhibit JRW-9 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-9, the yield on 30-year U.S. Treasury bonds has been in the 2.5% to 4.0% range over the 2013–2019 time period. The current 30-year Treasury yield is in the lower end of this range. Given the recent range of yields, I use the higher end 4.0% as the risk-free rate, or R_f, in my CAPM.

Q. DOES YOUR 4.0% RISK-FREE INTEREST RATE TAKE INTO CONSIDERATION FORECASTS OF HIGHER INTEREST RATES?

A. No, it does not. As I stated before, forecasts of higher interest rates have been notoriously wrong for a decade. My 4.0% 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 rate. As discussed below, my market risk premium is based on the results of many studies and surveys that have been published over time. My risk-free interest rate of 4.0% reflects the 30-year Treasury yield over a period of time since the market risk premiums found in the studies and surveys have been measured and published over the years. Therefore, my risk-free interest rate of 4.0% 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 overall 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 whose price movement is 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.

As shown on page 3 of Exhibit JRW-9, the slope of the regression line is the stock's beta. 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 beta and greater-than-average market risk. A less steep line indicates a lower beta 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 the time period over which beta is measured, and any adjustments that are made to reflect the fact that betas tend to regress to 1.0 over time. In estimating an equity cost rate for the proxy group, I am using the betas for the companies as provided in the *Value Line Investment Survey*. As shown on page 3 of Exhibit JRW-9, the median beta for the companies in the Gas Proxy Group is 0.65.

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)). It reflects 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 is discussed below, there are different ways to measure expected market returns, and studies have come up with significantly different magnitudes for expected market returns. As Merton Miller, the 1990 Nobel Prize winner in economics indicated, the expected market return is very difficult to measure and is one of the great mysteries in finance.[29]

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

A. Page 4 of Exhibit JRW-9 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

[29] Merton Miller, "The History of Finance: An Eyewitness Account," *Journal of Applied Corporate Finance*, 2000, P. 3.

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 as discussed later in my testimony. 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.[30]

In addition, there are a number of surveys of financial professionals regarding the market risk premium. There have also been several published surveys of academics on the equity risk premium. *CFO Magazine* conducts a

[30] Rajnish Mehra & Edward C. Prescott, "The Equity Premium: A Puzzle," *Journal of Monetary Economics*, 145 (1985).

quarterly survey of Chief Financial Officers, which includes questions regarding their views on the current expected returns on stocks and bonds. Usually, over 200 CFOs participate in the survey.[31] Another survey is found in questions regarding expected stock and bond returns that are included in the Federal Reserve Bank of Philadelphia's annual survey of financial forecasters, which is published as the *Survey of Professional Forecasters*.[32] This survey of professional economists has been published for almost fifty years. In addition, Pablo Fernandez conducts annual surveys of financial analysts and companies regarding the equity risk premiums they use in their investment and financial decision-making.[33]

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

A. Derrig and Orr (2003), Fernandez (2007), and Song (2007) completed the most comprehensive review of the research on the market risk premium.[34] Derrig and Orr's study evaluated the various approaches to estimating market risk premiums, as well as the issues with the alternative approaches and summarized the findings

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31 *See* DUKE/CFO Magazine Global Business Outlook Survey, www.cfosurvey.org.

32 Federal Reserve Bank of Philadelphia, *Survey of Professional Forecasters* (March 2019). 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.

33 Pablo Fernandez, Vitaly Pershin and Isabel Fernandez Acín, "Market Risk Premium and Risk-Free Rate used for 59 countries in 2019: a survey." *IESE Business School*, April 2019.

34 *See* Richard Derrig & Elisha Orr, "Equity Risk Premium: Expectations Great and Small," Working Paper (version 3.0), Automobile Insurers Bureau of Massachusetts, (August 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).

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 provides an annotated bibliography and highlights the alternative approaches to estimating the market risk premium.

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

A. Page 5 of Exhibit JRW-9 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 thirty studies, and the median market risk premium is 4.83%.

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

A. The studies cited on page 5 of Exhibit JRW-9 include every study and survey I could identify that was published over the past fifteen years 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 fifty years of data) and so were not estimating an 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-9 on page 6 of Exhibit JRW-9; however, I have eliminated all studies dated before January 2, 2010. The median for this subset of studies is 4.87%.

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 pages 5 and 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 6.26% 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, indicates market risk premiums in the range of 4.49% to 6.00%.

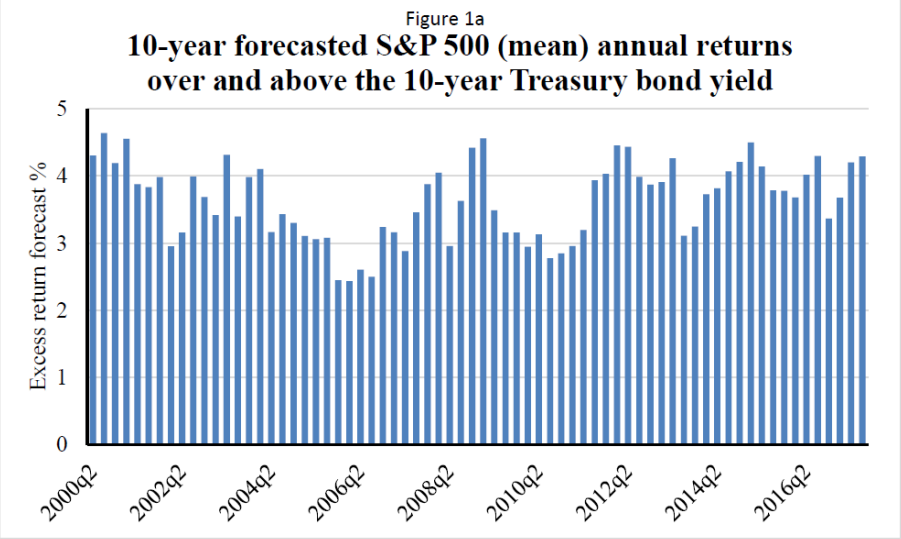
Surveys – Market risk premiums developed from surveys of analysts, companies, financial professionals, and academics find lower market risk premiums, with a range from 1.85% to 5.7%.

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.

CFO Magazine conducts a quarterly survey of Chief Financial Officers, which includes questions regarding their views on the current expected returns on stocks and bonds. Usually, over 200 CFOs participate in the survey.[35] In the December 2018 CFO survey conducted by *CFO Magazine* and Duke University, which included approximately 200 responses, the expected 10-year market risk premium was 3.15%.[36] Figure 4, below, shows the market risk premium associated with the CFO Survey, which has been in the 4.0% range in recent years.

Figure 4
Market Risk Premium
CFO Survey



[35] *See* DUKE/CFO Magazine Global Business Outlook Survey, https://www.cfosurvey.org/past-results-2018.html, (December 2018). https://www.cfosurvey.org/wp-content/uploads/2018/12/Q4-18-US-Toplines.pdf.

[36] https://www.cfosurvey.org/wp-content/uploads/2018/12/Q4-18-US-Toplines.pdf, P. 45.

Source: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3151162&download=yes

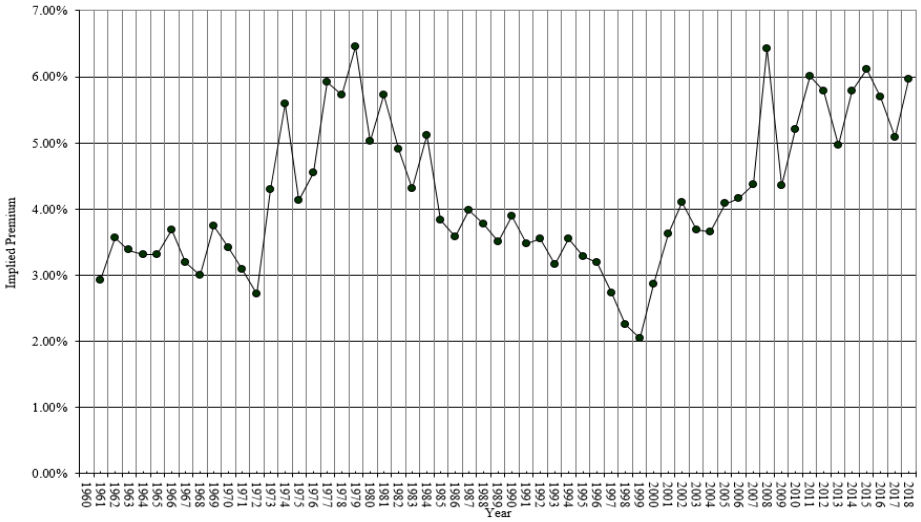
Pablo Fernandez conducts annual surveys of financial analysts and companies regarding the equity risk premiums they use in their investment and financial decision-making.[37] His survey results are included on pages 5 and 6 of Exhibit JRW-9. The results of his 2019 survey of academics, financial analysts, and companies, which included 4,000 responses, indicated a median market risk premium employed by U.S. analysts and companies of 5.6%.[38] His estimated market risk premium for the U.S. has been in the 5.00%-5.50% range in recent years.

Professor Aswath Damodaran of NYU, a leading expert on valuation and the market risk premium provides a monthly updated market risk premium which is based on projected S&P 500 earnings per share and stock price level, and long-term interest rates. His estimated market risk premium is shown graphically in Figure 5, below, for the past twenty years, has primarily been in the range of 5.0% to 6.0% since 2010.

[37] Pablo Fernandez, Vitaly Pershin and Isabel Fernandez Acín, "Market Risk Premium and Risk-Free Rate used for 59 countries in 2019: a survey," *IESE Business School*, (Apr. 2019), available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3358901.

[38] *Ibid.* p. 3.

Figure 5
Damodaran Market Risk Premium



Source: http://pages.stern.nyu.edu/~adamodar/

Duff & Phelps, an investment advisory firm, provides recommendations for the risk-free interest rate and market risk premiums to be used in calculating the cost of capital data. Their recommendations over the 2008-2019 time periods are shown on page 7 of Exhibit JRW-9. Duff & Phelps' recommended market risk premium has been in the 5.0% to 6.0% over the past decade. Most recently, on December 31 of 2018, Duff & Phelps increased its recommended market risk premium on January 31, 2016 from 5.00% to 5.50%.[39]

KPMG is one of the largest public accounting firms in the world. Their recommended market risk premium over the 2013-2019 time period is shown in Panel A of page 8 of Exhibit JRW-9. KPMG's recommended market risk premium

[39] https://www.duffandphelps.com/insights/publications/cost-of-capital/recommended-us-equity-risk-premium-and-corresponding-risk-free-rates.

has been in the 5.50% to 6.50% range over this time period. Since the third quarter of 2018, KPMG has recommended a market risk premium of 5.50%.[40]

Finally, the website *market-risk-premia.com* provides risk-free interest rates, implied market risk premiums, and overall cost of capital for thirty-six countries around the world. These parameters for the U.S. over the 2002-2019 time period are shown in Panel B of page 8 of Exhibit JRW-9. As of May 31, 2019, market-risk-premia.com estimated an implied cost of capital for the U.S. of 6.40% consisting of a risk-free rate of 2.14% and an implied market risk premium of 4.26%.[41]

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

A. The studies on page 6 of Exhibit JRW-9, 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 5.50%, which is in the upper end of the range, as the market risk premium. I gave most weight to the market risk premium estimates of the CFO Survey, Duff & Phelps, the 2019 Dimson, Marsh, Staunton - Credit Suisse Report, 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.

[40] https://assets.kpmg/content/dam/kpmg/nl/pdf/2019/advisory/equity-market-research-summary.pdf

[41] Source: http://www.market-risk-premia.com/us.html.

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

A. The results of my CAPM study for the proxy group are summarized on page 1 of Exhibit JRW-9 and in Table 6 below.

Table 6
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	**4.0%**	**0.65**	**5.5%**	**7.6%**

For the Gas Proxy Group, the risk-free rate of 4.0% plus the product of the beta of 0.65 times the equity risk premium of 5.5% results in a 7.6% equity cost rate.

C. 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 8.70% and 7.60%, respectively.

Table 7
ROEs Derived from DCF and CAPM Models

	DCF	CAPM
Gas Proxy Group	**8.70%**	**7.60%**

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

A. I conclude that the appropriate equity cost rate for companies in the Gas Proxy Group is in the 7.60% to 8.70% range. However, since I rely primarily on the DCF model, I am using the upper end of the range as the equity cost rate for the group.

Q. ARE YOU RECOMMENDING AN EQUITY COST RATE IN THIS RANGE FOR PIEDMONT?

A. No, not as a primary ROE recommendation. While I believe that this range accurately reflects current capital market data, I recognize that the adjustment to the equity ratio that I have recommended in the capital structure, if adopted by the Commission, increases the risk for stockholders somewhat. Therefore, I am recommending 9.0% as a primary ROE for Piedmont.

Q. ARE YOU ALSO PROVIDING AN ALTERNATIVE ROE RECOMMENDATION FOR PIEDMONT?

A. Yes. My alternative recommendation would apply if Piedmont's proposed 52.0% common equity capital structure is allowed. As indicated above, I believe that my equity cost rate range, 7.60% to 8.70%, accurately reflects current capital market

data. Capital costs in the U.S. remain low, with low inflation and interest rates and very modest economic growth. To reflect these low capital costs, my alternative ROE recommendation is 8.70%, which is at the high end of my equity cost rate range.

Q. PLEASE INDICATE WHY YOUR EQUITY COST RATE RECOMMENDATIONS ARE APPROPRIATE FOR THE GAS DISTRIBUTION OPERATIONS OF THE COMPANY.

A. There are a number of reasons why equity cost rates of 9.0%/8.70% are appropriate and fair for the Company in this case:

1. The S&P and Moody's issuer credit ratings for Piedmont are A- and A3, respectively. These are in line with those of the companies in the gas proxy group. As such, the investment risk of Piedmont is similar to the average of the proxy group.

2. As shown in Exhibits JRW-5, capital costs for utilities, as indicated by long-term utility bond yields, are still at historically low levels. In addition, given low inflationary expectations and slow global economic growth, interest rates are likely to remain at low levels for some time;

3. As shown in Exhibit JRW-6, the gas distribution industry is among the lowest risk industries in the U.S. as measured by beta. Most notably, the betas for gas companies have been declining in recent years, which indicates the risk of the industry has declined. Overall, the cost of equity capital for this industry is the lowest in the U.S., according to the CAPM;

4. I have recommended an equity cost rate of the high end of the range of my ROE outcomes; and

5. The authorized ROEs for gas distribution companies have largely 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, and 9.55% in the first quarter of 2019.[42] In my opinion, authorized ROEs have lagged behind capital market cost rates, or in other words, authorized ROEs have been slow to reflect low capital market cost rates. However, the trend has been towards lower ROEs and the norm now is below 10%. Hence, I believe that my recommended ROE reflects our present historically low capital cost rates, and these low capital cost rates are finally being recognized as the norm by state utility regulatory commissions.

Q. DO YOU BELIEVE THAT YOUR 9.0%/8.70% ROE RECOMMENDATIONS MEET *HOPE* AND *BLUEFIELD* STANDARDS?

A. Yes, I do. As previously noted, according to the *Hope* and *Bluefield* decisions, returns on capital should be: (1) comparable to returns investors expect to earn on other investments of similar risk; (2) sufficient to assure confidence in the company's financial integrity; and (3) adequate to maintain and support the company's credit and to attract capital. As shown in Exhibit JRW-6, gas distribution companies have been earning in the 8.0% to 9.0% range in recent

[42] *Regulatory Focus*, Regulatory Research Associates, 2019.

years. While my recommendation is below the average authorized ROEs for gas distribution companies, it reflects the downward trend in authorized and earned ROEs of gas distribution companies.

Q. PLEASE ALSO DISCUSS YOUR RECOMMENDATION IN LIGHT OF A MOODY'S PUBLICATION ON ROEs AND CREDIT QUALITY.

A. Moody's published an article on utility ROEs and credit quality in 2015. In the article, Moody's recognizes that authorized ROEs for electric and gas companies are declining due to lower interest rates. The article explains:

> 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.[43]

Moody's indicates that with the lower authorized ROEs, electric and gas companies are earning ROEs of 9.0% to 10.0%, yet this is not impairing their credit profiles and is not deterring them from raising record amounts of capital. With respect to authorized ROEs, Moody's recognizes that utilities and regulatory commissions are having trouble justifying higher ROEs in the face of lower

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

interest rates and cost recovery mechanisms.

> 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 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.[44]

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

Q. ARE UTILITIES ABLE TO ATTRACT CAPITAL WITH THE LOWER ROEs?

A. Moody's also highlights in the article that utilities are raising about $50 billion a year in debt capital, despite the lower ROEs. Furthermore, as indicated in Exhibit JRW-5, page 3, the companies in the Gas Proxy Group have been earning ROEs of about 9.0% in recent years. As shown on page 1 of Exhibit JRW-2, the market to book ratio of utilities in the Gas Proxy Group is still well above 2.0 indicating that their stock is still in great demand.

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

VI. CRITIQUE OF PIEDMONT'S RATE OF RETURN TESTIMONY

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

A. Piedmont has proposed a capital structure consisting of 0.82% short-term debt, 47.18% long-term debt, and 52.00% common equity. Piedmont has proposed short-term and long-term debt cost rates of 2.82% and 4.55%. Mr. Robert Hevert has recommended a common equity cost rate, or ROE, of 10.60% for Piedmont. The Company's overall rate of return recommendation is 7.68%. This is summarized in Exhibit JRW-10.

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

A. Mr. Hevert has developed a proxy group of gas distribution companies and employed Discounted Cash Flow, Capital Asset Price Model, Bond Yield Risk Premium, and Expected Earnings equity cost rate approaches. Mr. Hevert's equity cost rate estimates for Piedmont are summarized on page 1 Exhibit JRW-11. Based on these figures, he concludes that the appropriate equity cost rate is 10.60% for Piedmont.

A. DCF Approach

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

A. On pages 59-66 of his testimony and in Exhibit Nos. RBH-1 – RBH-2, Mr. Hevert develops an equity cost rate by applying the DCF model to the companies in his

proxy group. Mr. Hevert's DCF results are summarized in Panel A of Exhibit JRW-11. He uses a constant-growth DCF model. Mr. Hevert uses three dividend yield measures (30, 90, and 180) and has relied on the forecasted EPS growth rates of Zacks, First Call, and *Value Line* as well as retention growth. He reports median and median high results. His DCF results are summarized in Panel A of page 1 of Exhibit JRW-11 and his median results range from 9.60% to 9.65%.

Q. WHAT ARE THE ERRORS IN MR. HEVERT'S DCF ANALYSES?

A. The primary issues in Mr. Hevert's DCF analyses are: (1) he relies on the overly optimistic and upwardly biased three-to-five year earnings per share growth rate forecasts of Wall Street analysts and *Value Line*, and (2) he has combined abnormally high *Value Line* projected earnings per share, computed from a three-year base period, with three-to-five-year projected growth rates of First Call and Zack's.

1. Analysts' EPS Growth Rates

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

A. In his constant-growth DCF model, Mr. Hevert's DCF growth rate is the average of the earnings per share growth rate forecasts of: (1) Wall Street analysts as compiled by First Call, Zacks; and (2) *Value Line*.

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

A. It is highly unlikely that investors today would rely exclusively on the earnings per share growth rate forecasts of Wall Street analysts and ignore other growth rate measures in arriving at their expected growth rates for equity investments. The appropriate growth rate in the DCF model is the dividend growth rate, not the earnings growth rate. [45] Hence, consideration must be given to other indicators of growth, including historical prospective dividend growth, internal growth, as well as projected earnings growth. Also, analysts' long-term earnings growth rate forecasts have been found to be no more accurate at forecasting future earnings than naïve random walk forecasts of future earnings, according to a study by Lacina, Lee, and Xu (2011).[46] And finally, and most significantly, it is well-known that the long-term earnings per share growth rate forecasts of Wall Street securities analysts are overly optimistic and upwardly biased.[47] Hence, using these growth rates as a DCF constant growth rate produces an overstated equity cost rate. A study by Easton and Sommers (2007) found that optimism in analysts'

[45] See my discussion of the point that the DCF model considers growth in dividends, not earnings in Part VI.B.

[46] 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.

[47] See footnote 26 and 27 of this testimony.

earnings growth rate forecasts leads to an upward bias in estimates of the cost of equity capital of almost 3.0 percentage points.[48]

2. *Value Line* Projected EPS Growth Rates

Q. PLEASE DISCUSS MR. HEVERT'S DCF GROWTH RATE.

A. Table 8 and page 2 of Exhibit JRW-11 shows Mr. Hevert's DCF growth rates from Zacks, First Call, and *Value Line*. The Zacks and First Call growth rates are the average of analysts' three-to-five year projected growth rates compiled by First Call and Zack's. *Value Line* uses a different approach in estimating projected growth. *Value Line* projects growth from a three-year base period – 2015-2017 – to a projected three-year period for the period - 2022-2024. 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. With the exception of one proxy company, the *Value* Line projected growth rates are larger than the First Call and Zack's growth rates, and especially so for Northwest Natural Gas ("NWN") and ONE Gas, Inc. ("OGS").

[48] 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.

Table 8
Mr. Hevert's DCF Growth Rates

Gas Proxy Group	Zacks Earnings Growth	First Call Earnings Growth	Value Line Earnings Growth
Atmos Energy Corporation	6.50%	6.40%	7.50%
Chesapeake Utilities Corporation	6.00%	6.00%	9.00%
New Jersey Resources Corporation	7.00%	6.00%	2.50%
Northwest Natural Gas Company	4.30%	4.00%	25.50%
ONE Gas, Inc.	5.90%	5.00%	9.00%
South Jersey Industries, Inc.	9.50%	9.50%	9.50%
Southwest Gas Corporation	5.00%	6.20%	8.50%
Spire Inc.	3.90%	2.42%	5.50%
Proxy Group Mean	6.01%	5.69%	9.63%

To see why these growth rates are inflated, I show additional information about the *Value Line* projected earnings per share growth rate of 25.5% for Northwest Natural Gas Company (NWN) in Table 9. Panel A shows that *Value Line* had a 25.5% growth rate from the three-year base period – 2015-2017 – to a projected three-year period 2022-2024. Panel B of Table 9 shows that NWN's base period includes 2015, 2016, and 2017 earnings per share figures of $1.96, $2.12, and -$1.94. NWN's abnormally low 2017 earnings per share figure results in a *Value Line* earnings per share base three-year period average figure of $0.71. From these data, *Value* Line projected earnings per share growth rate of 25.5%. (*Value Line* averages growth rates to the nearest one-half percent.) This 25.5% EPS growth rate projection comes after NWN's EPS declined -22.0% and -11.5% over the previous five and ten years.

Table 9
NWN's *Value Line* Projected EPS Growth Rate
Panel A

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '15-'17 to '22-'24
Revenues	-3.5%	-3.0%	*1.5%*
"Cash Flow"	-3.0%	-6.5%	*8.5%*
Earnings	-11.5%	-22.0%	*25.5%*
Dividends	3.0%	1.5%	*2.5%*
Book Value	2.5%	1.0%	*.5%*

Panel B

Northwest Natural Gas Company	**2015**	**2016**	**2017**	**2018**	**2019**	**2022-24**
Earnings Per Share	$ 1.96	$ 2.12	$ (1.94)	$ 2.20	$ 2.45	$ 3.50
3-Year Base & Projected Periods		**2015-17**				**2022-24**
Base and Projected EPS Figures		$ 0.71				$ 3.50
Base Period to Projected Period Growth Rate				25.5%		

* Source: Exhibit JRW-11, page 2.

Q. PLEASE SUMMARIZE THE IMPACT OF COMBINING THE DIFFERENT PROJECTED EPS GROWTH RATES ON MR. HEVERT'S DCF RESULTS.

A. The impact of combining the earnings per share growth rates from Zacks, First Call, and *Value Line* is highly significant for three reasons: (1) This approach greatly inflates Mr. Hevert's DCF results. (2) In the case of Northwest Natural Gas, the *Value Line* growth rate of 25.5% is grossly in excess of the First Call and Zack's projected growth rates of 4.30% and 4.00%. (3) It must be remembered that DCF growth rate is a long-term (infinite) growth rate. In summary, the idea of a regulated gas utility growing its EPS at a 25.5% rate forever is totally unrealistic.[49]

[49] I have used *Value Line*'s projected growth rates for EPS, DPS, and BVPS. However, due to the

B. CAPM Approach

Q. PLEASE DISCUSS MR. HEVERT'S CAPM.

A. On pages 66-71 of his testimony and in Exhibit Nos. RBH-3 – RBH-5, Mr. Hevert develops an equity cost rate by applying the Capital Asset Pricing Model to the companies in his proxy group. The CAPM approach requires an estimate of the risk-free interest rate, beta, and the equity risk premium. Mr. Hevert uses three different measures of the 30-Year Treasury bond yield - a current yield of 3.04%, a near-term projected yield of 3.25%, and a long-term projected yield of 4.05%; (b) two different Betas (an average Bloomberg Beta of 0.584 and an average *Value Line* Beta of 0.688), and (c) two market risk premium measures - a Bloomberg, DCF-derived market risk premium of 10.65% and *Value Line* derived market risk premium of 13.77%. Based on these figures, he finds a CAPM equity cost rate range from 9.26% to 13.52%. Mr. Hevert's CAPM results are summarized in Panel B of page 1 of Exhibit JRW-11.

Q. WHAT ARE THE ERRORS IN MR. HEVERT'S CAPM ANALYSES?

A. There are two issues with Mr. Hevert' CAPM analyses: (1) he has used current, near-term projected, and long-term projected Treasury yields yield that are abnormally high relative to current yields; and (2) Mr. Hevert's market risk

different periods of growth that are measured by *Value Li*ne compared to First Call and Zack's I have analyzed the *Value Line* data separately from the other growth rate data, and I have used the medians of the growth rates for the proxy group to minimize the impact of outliers such as those discussed above.

premiums of 10.65% and 13.77% include highly unrealistic assumptions regarding future economic and earnings growth and stock returns.

1. Current and Projected Risk-Free Interest Rates

Q. PLEASE DISCUSS THE RISK-FREE RATE OF INTEREST IN MR. HEVERT'S CAPM.

A. Mr. Hevert has used three different measures of the 30-Year Treasury bond yield - a current yield of 3.04%, a near-term projected yield of 3.25%, and a long-term projected yield of 4.05%. The current 30-Year Treasury rate is about 2.55%. Mr. Hevert's figures are between 50 and 150 basis points above this current yield. These yields are excessive for two reasons. First, as discussed previously, economists are always predicting that interest rates are going up, and yet they are almost always wrong. Obviously, investors are well aware of the consistently wrong forecasts of higher interest rates, and therefore place little weight on such forecasts. Second, investors would not be buying long-term Treasury bonds at their current yields if they expected interest rates to suddenly increase. If long-term interest rates do increase and the yields on long-term Treasury bonds go up, the prices of these bonds investors bought at today's yields go down, producing a negative return.

2. Market Risk Premiums

Q. PLEASE ASSESS MR. HEVERT'S MARKET RISK PREMIUMS DERIVED FROM APPLYING THE DCF MODEL TO THE S&P 500 AND *VALUE LINE INVESTMENT SURVEY.*

A. Mr. Hevert computes market risk premiums of 10.65% and 13.77% by: (1) calculating an expected market return by applying the DCF model to the S&P 500; and then (2) subtracting the current 30-year Treasury bond yield of 3.04% from his estimate of the expected market return. Mr. Hevert also uses (1) a dividend yield of 2.21% and an expected DCF growth rate of 11.47% for Bloomberg and (2) a dividend yield of 2.08% and an expected DCF growth rate of 14.73% for *Value Line.* The resulting expected annual S&P 500 stock market returns using this approach are 13.68% (using Bloomberg three-to-five-year EPS growth rate estimates) and 16.81% (using *Value Line* three- to five-year EPS growth rate estimates). These results are not realistic in today's market.

Q. ARE MR. HEVERT'S MARKET RISK PREMIUMS OF 10.65% AND 13.77% REFLECTIVE OF THE MARKET RISK PREMIUMS FOUND IN STUDIES AND SURVEYS OF THE MARKET RISK PREMIUM?

A. No. Although there are many studies and surveys that estimate the market risk premium, Mr. Hevert fashions his own estimate. He has labeled his market risk premiums by reference to "Bloomberg" and "*Value Line,*" but his approach does not rely on market risk premium studies performed by Bloomberg or *Value Line.*

Instead, Mr. Hevert created the studies and labels one Bloomberg because it uses a beta and an EPS growth rate calculated by Bloomberg, and likewise the one labeled *Value Line* uses a beta and an EPS growth rate calculated by *Value Line*.

In fact, Mr. Hevert's market risk premiums are well in excess of the market risk premiums: (1) that are discovered in studies of the market risk premium by leading academic scholars; (2) those produced by analyses of historic stock and bond returns; and (3) those found in surveys of financial professionals. Page 5 of Exhibit JRW-9 provides the results of over thirty market risk premium studies from the past fifteen years. Historic stock and bond returns suggest an market risk premium in the 4.5% to 7.0% range, depending on whether one uses arithmetic or geometric mean returns. There have been many studies using expected return (also called *ex ante*) models, and their market risk premium results vary from as low as 2.0% to as high as 7.31%. Finally, the market risk premiums developed from surveys of analysts, companies, financial professionals, and academics suggest lower market risk premiums, in a range of from 1.91% to 5.70%. The bottom line is that there is no support in historic return data, surveys, academic studies, or in reports for investment firms for using a market risk premium as high as those used by Mr. Hevert.

Q. PLEASE ONCE AGAIN ADDRESS THE ISSUES WITH ANALYSTS' EPS GROWTH RATE FORECASTS.

A. The key point is that Mr. Hevert's CAPM market risk premium methodology is based entirely on the concept that analyst projections of companies' three-to-five

EPS growth rates reflect investors' expected *long-term* EPS growth for those companies. However, this seems highly unrealistic given the research on these projections. The short answer is that analysts' three-to-five-year EPS growth rate forecasts are inaccurate, overly optimistic and upwardly biased, and they inflate the indicated market risk premium and cost of equity. 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.[50] Moreover, a 2011 study showed that analysts' forecasts of EPS growth over the next three-to-five years earnings are no more accurate than their forecasts of the next single year's EPS growth.[51] 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.[52]

Q. **HAVE CHANGES IN REGULATIONS IMPACTING WALL STREET ANALYSTS AND THEIR RESEARCH IMPACTED THE UPWARD BIAS**

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

[51] 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.

[52] 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).

IN THEIR THREE-TO-FIVE YEAR EPS GROWTH RATE FORECASTS?

A. No. A number of the studies I have cited here 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 study entitled "Equity Analysts: Still Too Bullish," which involved a study of the accuracy on analysts long-term EPS growth rate forecasts. The authors conclude that after a decade of stricter regulation, analysts' long-term earnings forecasts continue to be excessively optimistic. They made the following observation:[53]

> 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.

This is the same observation made in a *Bloomberg Businessweek* article.[54]

The author concluded:

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[53] Marc H. Goedhart, Rishi Raj, and Abhishek Saxena, "Equity Analysts, Still Too Bullish," *McKinsey on Finance*, pp. 14-17, (Spring 2010) (emphasis added).

[54] Roben Farzad, "For Analysts, Things Are Always Looking Up," *Bloomberg Businessweek* (June 10, 2010).

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

Q. IS THERE OTHER EVIDENCE THAT INDICATES THAT MR. HEVERT'S MARKET RISK PREMIUMS COMPUTED USING S&P 500 EARNINGS PER SHARE GROWTH RATES ARE EXCESSIVE?

A. Beyond my previous discussion of the upwardly biased nature of analysts' projected earnings per share growth rates, the fact is that long-term growth rates of 13.77% and 14.73% based on earnings projections are inconsistent with both historic and projected economic and earnings growth in the U.S for several reasons: (1) Long-term earnings per share and economic growth is about one-half of Mr. Hevert's projected earnings per share growth rates of 13.77% and 14.73%. (2) As discussed below, long-term earnings per share and gross domestic product ("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.

<u>Long-Term Historic EPS and GDP Growth has been in the 6%-7% Range</u>

I performed a study of the growth in nominal GDP, S&P 500 stock price appreciation, and S&P 500 per share growth in earnings and dividends since 1960. The results are provided on page 1 of Exhibit JRW-12, and a summary is shown in the Table 10, below.

Table 10
GDP, S&P 500 Stock Price, EPS, and DPS Growth
1960-Present

Nominal GDP	**6.46**
S&P 500 Stock Price	**6.71**
S&P 500 EPS	**6.89**
S&P 500 DPS	**5.85**
Average	**6.48**

The results show that the historical long-run growth rates for Gross Domestic Product, S&P earnings per share, and S&P dividends per share are in the 6% to 7% range. By comparison, Mr. Hevert's long-run growth rate projections of 13.77% and 14.73% are at best overstated. These estimates suggest that companies in the U.S. would be expected to: (1) increase their growth rate of earnings per shares by 100% in the future and (2) maintain that growth indefinitely in an economy that is expected to grow at about one-third of his projected growth rates.

There is a Direct Link Between Long-Term Earnings Per Share and GDP Growth

The results in Exhibit JRW-12 and Table 10 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. He concludes with the following observations:[55]

> 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-12 shows annual real GDP growth rate over the 1961 to 2018 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-12 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 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.

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

The graphs on pages 2, 3, and 4 of Exhibit JRW-12 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 11, below, provides the compounded GDP growth rates for 10-, 20-, 30-, 40- and 50-years. Whereas the 50-year compounded GDP growth rate is 6.36%, 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 3.0% to 5.0% is more appropriate today for the U.S. economy.

Table 11
Historical Nominal GDP Growth Rates

10-Year Average		**3.37%**
20-Year Average		**4.17%**
30-Year Average		**4.65%**
40-Year Average		**5.56%**
50-Year Average		**6.36%**

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-12. The mean 10-year nominal GDP growth forecast (as of March 2019) by economists in the recent *Survey of Financial Forecasters* is 4.27%.[56] The Energy

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

Information Administration ("EIA"), in its projections used in preparing *Annual Energy Outlook*, forecasts long-term GDP growth of 4.3% for the period 2017-2050.[57] The Congressional Budget Office, in its forecasts for the period 2018 to 2048, projects a nominal GDP growth rate of 4.0%.[58] Finally, the Social Security Administration, in its Annual OASDI Report, provides a projection of nominal GDP from 2018-2095.[59] The Social Security Administration's projected growth GDP growth rate over this period is 4.4%. Overall, these forecasts suggest long-term GDP growth rate in the 4.0% to 4.4% range. The trends and projections indicating slower GDP growth make Mr. Hevert's market risk premiums computed using analysts projected EPS growth rates look even more unrealistic. Simply stated, Mr. Hevert's projected EPS growth rates of 13.77% and 14.73% are almost three times 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: (a) the number of workers in the economy (employment); and (2) the productivity of those workers (usually defined as output

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[57] U.S. Energy Information Administration, *Annual Energy Outlook 2018*, Table: Macroeconomic Indicators, *https://www.eia.gov/outlooks/aeo/data/browser/#/?id=18-AEO2018&sourcekey=0*.

[58] Congressional Budget Office, The *2018 Long-Term Budget Outlook*, June 1, 2018. https://www.cbo.gov/system/files?file=2018-06/53919-2018ltbo.pdf

[59] Social Security Administration, *2018 Annual Report of the Board of Trustees of the Old-Age, Survivors, and Disability Insurance (OASDI) Program*, Table VI.G4, p. 211(June 15, 2018), https://www.ssa.gov/oact/tr/2018/lr6g4.html. The 4.4% represents the compounded growth rate in projected GDP from $20,307 trillion in 2018 to $548,108 trillion in 2095.

per hour).[60] According to McKinsey, real GDP growth over the past 50 years was driven by population and productivity growth which grew at compound annual rates of 1.7% and 1.8%.

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. PLEASE PROVIDE MORE INSIGHTS INTO THE RELATIONSHIP BETWEEN S&P 500 EPS AND GDP GROWTH.

A. Figure 6 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.[61] Volatility aside, however, it is clear that over the medium to long run, S&P 500 EPS growth does not outpace GDP growth.

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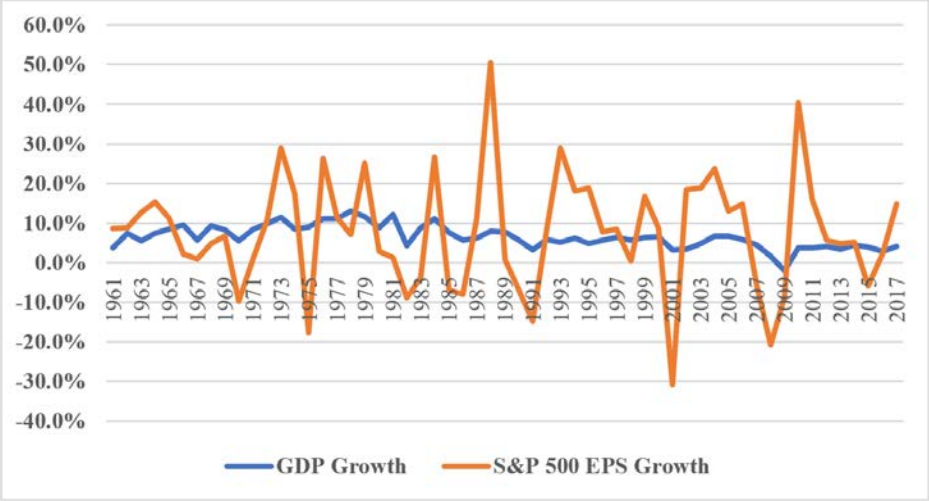
[60] McKinsey & Co., "Can Long-Term Growth be Saved?" McKinsey Global Institute, January 2015.

[61] 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 6
Average Annual Growth Rates
GDP and S&P 500 EPS
1960-2018



Data Sources: 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 – Milton Friedman, the noted economist, 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."[62] Friedman also noted that profits must move back down to their traditional share of GDP. In Table 12, below, I show that

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

currently the aggregate net income levels for the S&P 500 companies, using 2018 figures, represents 6.73% of nominal GDP.

Table 12
S&P 500 Aggregate Net Income as a Percent of GDP

Aggregate Net Income for S&P 500 Companies ($B)	**$1,406,400.00**
2018 Nominal U.S. GDP ($B)	**$20,891,000.00**
Net Income/GDP (%)	**6.73%**

Data Sources: 2018 Net Income for S&P 500 companies – *Value Line* (March 12, 2019).
2018 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 rates for the S&P 500 companies have 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.[63] These

[63] See the following studies: Burt White and Jeff Buchbinder, "The S&P and GDP are not the Same Thing," LPL Financial, 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, April 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/ .

differences include: (a) corporate profits are about 2/3 manufacturing driven, while GDP is 2/3 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.

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 EVIDENCE ON HOW UNREALISTIC THE S&P 500 EPS GROWTH RATES ARE THAT MR. HEVERT USES TO COMPUTE HIS MARKET RISK PREMIUMS.

A. Beyond my previous discussion, I have performed the following analysis of S&P 500 EPS and GDP growth in Table 13, below, to show how improbable it is that Mr. Hevert's growth rate estimates reflect long term growth rates. Specifically, I started with the 2018 aggregate net income for the S&P 500 companies and 2018 nominal GDP for the U.S. As shown in Table 12, the aggregate profit for the S&P

500 companies represented 6.73% of nominal GDP in 2018. In Table 13, I then 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 the average of Mr. Hevert's Bloomberg and *Value Line* growth rates, 11.47% and 14.73%, which is 13.10%. As a growth rate for nominal GDP, I used the average of the long-term projected GDP growth rates from Congressional Budget Office, Social Security Administration, and Energy Information Administration (4.0%, 4.4%, and 4.3%), which is 4.23%. The projected 2050 level for the aggregate net income level for the S&P 500 companies is $72.4 trillion. However, over the same period GDP only grows to $78.7 trillion. As such, if the aggregate net income for the S&P 500 grows in accordance with the growth rates used by Mr. Hevert, and if nominal GDP grows at rates projected by major government agencies, the net income of the S&P 500 companies will grow from 6.73% of GDP in 2018 to 91.9% of GDP in 2050. Obviously, it is implausible for the net income of the S&P 500 to become such a large component of GDP.

Table 13
Projected S&P 500 Earnings and Nominal GDP
2018-2050
S&P 500 Aggregate Net Income as a Percent of GDP

Using Mr. Hevert's Growth Rate Estimate

	2018 Value	Growth Rate	No. of Years	2050 Value
Aggregate Net Income for S&P 500 Companies	**1,406,400.0**	**13.10%**	**32**	**72,364,670.4**
2018 Nominal U.S. GDP	**20,891,000.0**	**4.23%**	**32**	**78,735,624.7**
Net Income/GDP (%)	**6.73%**			**91.9%**

Data Sources: 2018 Aggregate Net Income for S&P 500 companies – *Value Line* (March 12, 2019).
2018 Nominal GDP – Moody's - https://www.economy.com/united-states/nominal-gross-domestic-product.
S&P 500 EPS Growth Rate - Average of Hevert's Bloomberg and *Value Line* growth rates - 11.47% and 14.73%;
Nominal GDP Growth Rate – The average of the long-term projected GDP growth rates from CBO, SSA, and EIA (4.0%, 4.4%, and 4.3%).

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 have 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, he made the following observation: [64]

> 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

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

> 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%. One thing keeping the percentage down will be competition, which is alive and well. In addition, there's a public-policy point: If corporate investors, in aggregate, are going to eat an ever-growing portion of the American economic pie, some other group will have to settle for a smaller portion. That would justifiably raise political problems--and in my view a major reslicing of the pie just isn't going to happen.

In sum, Mr. Hevert's long-term S&P 500 EPS growth rates of 11.47% and 14.73% are grossly overstated and are not credible. 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."[65]

Q. PLEASE PROVIDE ADDITIONAL INSIGHTS INTO THE CAPM RESULTS FROM USING *VALUE LINE* DATA.

A. There are several additional issues with the CAPM-*Value Line* results. Simply put, Mr. Hevert's 16.81% expected stock market return shown in Exhibit RBH-3,

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

p. 14 is outrageous.[66] The compounded annual return in the U.S. stock market is about 10% (9.49% according to Damodaran between 1928-2018).[67] Mr. Hevert's *Value Line* CAPM results assume that return on the U.S. stock market will be more than 50% higher in the future than it has been in the past. The extremely high expected stock market return, and the resulting market risk premium and equity cost rate results, are directly related to the 14.73% expected earnings per share growth rate. There are a number of fallacies with this growth rate. First, the expected growth rate is not from today going forward, but instead it is computed from a three-year base period in the past (2015-2017) to a projected three-year period in the future (2022-2024). The problem here is that it incorporates historic growth in the base period, which can inflate projected growth for the future if the base period includes poor earnings. This issue was previously discussed as it related to the use of *Value Line* EPS growth rates in the DCF model. Second, and most significantly, a projected growth rate of 14.73% does not reflect economic reality. As noted above, it assumes that S&P 500 companies can grow their earnings in the future at a rate that is triple the expected GDP growth rate.

C. Bond Yield Risk Premium ("BYRP") Approach

Q. PLEASE DISCUSS MR. HEVERT'S BYRP APPROACH.

[66] The 16.81% stock return is the presumed annual S&P 500 stock market return (forever!) computed using *Value Line* data. It is the sum of a dividend yield of 2.08% and a long-term EPS growth rate of 14.73% for *Value Line.*

[67] http://pages.stern.nyu.edu/~adamodar/

A. On pages 72-75 of his testimony and in Exhibit No. RBH-6, Mr. Hevert develops an equity cost rate using his Bond Yield Risk Premium approach. Mr. Hevert develops an equity cost rate by: (1) regressing the authorized returns on equity for gas distribution companies from the January 1, 1980to January 18, 2019, time period on the thirty-year Treasury Yield; and (2) adding the risk premium established in step (1) to three different thirty-year Treasury yields: (a) current yield of 3.04%, a near-term projected yield of 3.25%, and a long-term projected yield of 4.05% Mr. Hevert's risk premium results are provided in Exhibit JRW-11. He reports Bond Yield Risk Premium equity cost rates ranging from 9.89% to 10.11%.

Q. WHAT ARE THE ERRORS IN MR. HEVERT'S ANALYSIS?

A. There are errors in both the risk-free rate and the risk premium components.

1. Current and Projected Risk-Free Interest Rates

Q. PLEASE DISCUSS THE RISK-FREE RATE OF INTEREST IN MR. HEVERT's BYRP APPROACH.

A. As with his CAPM approach, Mr. Hevert has used three different measures of the 30-Year Treasury bond yield - a current yield of 3.04%, a near-term projected yield of 3.25%, and a long-term projected yield of 4.05%. As previously discussed, the current 30-Year Treasury rate is 2.55% and so Mr. Hevert's current, near-term projected, and long-term projected yield are unrealistic.

2. Risk Premium

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

A. There are several problems with this approach. First, his Bond Yield Risk Premium methodology produces an inflated measure of the risk premium because the approach uses historic authorized ROEs and Treasury yields, and the resulting risk premium is applied to projected Treasury Yields. Since Treasury yields are always forecasted to increase, the resulting risk premium would be smaller if done correctly, which would be to use projected Treasury yields in the analysis rather than historic Treasury yields.

In addition, Mr. Hevert's Risk Premium approach is a gauge of *commission* behavior and 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. Hevert'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 especially be true when the authorized ROE data includes the results of rate cases that are settled and not fully litigated.

Finally, Mr. Hevert's methodology produces an inflated required rate of return since utilities have been selling at market-to-book ratios in excess of 1.0 for many years. As was explained earlier in Part VI.A, a market-to-book ratio above 1.0 indicates a company's ROE is above its equity cost rate. Therefore, a risk premium based on authorized returns can be expected to produce an inflated equity cost rate.

D. Expected Earnings Approach

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

A. On pages 75-76 of his testimony and in Exhibit RBH-7, Mr. Hevert develops an equity cost rate using his Expected Earnings approach. Mr. Hevert's approach involves using *Value Line*'s projected ROE for the years 2021-23/2022-24 for his proxy group and then adjusting this ROE to account for the fact the *Value Line* uses year-end equity in computing ROE. Mr. Hevert's Expected Earnings results are summarized in Panel D of page 1 of Exhibit JRW-11. He reports an Expected Earnings result of 10.73%.

Q. PLEASE ADDRESS THE ISSUES WITH MR. HEVERT'S EXPECTED 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 an ROE for Piedmont. These issues include:

The Expected Earnings Approach Does Not Measure the Market Cost of Equity Capital – First and foremost, this is an accounting-based methodology that does not measure investor return requirements. As indicated by Professor Roger Morin, a long-time rate of return witness for utility companies, "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 capital.

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

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

requirements. Investors 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 ROEs ratios for the proxy companies 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 Piedmont's 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 transmission with formula rates. These include earnings from unregulated businesses such as gas marketing operations, wholesale gas sales, gas storage, construction services, and other energy services.

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

A. In short, Mr. Hevert's Expected Earnings approach does not measure the market cost of equity capital, is independent of most cost of capital indicators and, as

[69] *Id.*

shown above, has a number of other empirical issues. Therefore, the Commission should ignore this approach in determining the appropriate ROE for Piedmont.

E. Other Issues

1. Piedmont's Capital Expenditures

Q. PLEASE ADDRESS MR. HEVERT'S CONSIDERATION OF THE COMPANY'S CAPITAL EXPENDITURES.

A. Mr. Hevert also considers the magnitude of Piedmont's capital expenditures in arriving at his 10.60% ROE recommendation. Capital expenditures are a risk factor considered as part of the credit-rating process used by major rating agencies. In addition, as I noted above, Piedmont's S&P and Moody's credit ratings of A- and A3 suggest that the Company's investment risk is in line with other gas companies.

2. Flotation Costs

Q. PLEASE DISCUSS MR. HEVERT'S ADJUSTMENT FOR FLOTATION COSTS.

A. Mr. Hevert argues that a flotation cost adjustment is appropriate for Piedmont and he has considered flotation costs in arriving at his 10.60% ROE recommendation.

First and foremost, Mr. Hevert has not identified any flotation cost for Piedmont. Therefore, he is asking for higher revenues in the form of a higher ROE for expenses that he has not identified.

Second, it is commonly argued that a flotation cost adjustment (such as that used by the Company) is necessary to prevent the dilution of the existing shareholders. This is incorrect for several reasons:

(1) If an equity flotation cost adjustment is similar to a debt flotation cost adjustment, the fact that the market-to-book ratios for gas distribution companies are over 1.95X actually suggests that there should be a flotation cost reduction (and not an increase) to the equity cost rate. This is because when (a) a bond is issued at a price in excess of face or book value, and (b) the difference between market price and the book value is greater than the flotation or issuance costs, the cost of that debt is lower than the coupon rate of the debt. The amount by which market values of gas distribution companies are in excess of book values is much greater than flotation costs. Hence, if common stock flotation costs were exactly like bond flotation costs, and one was making an explicit flotation cost adjustment to the cost of common equity, the adjustment would be downward;

(2) If a flotation cost adjustment is needed to prevent dilution of existing stockholders' investment, then the reduction of the book value of stockholder investment associated with flotation costs can occur only when a company's stock is selling at a market price at/or below its book value. As noted above, gas distribution companies are selling at market prices

well in excess of book value. Hence, when new shares are sold, existing shareholders realize an increase in the book value per share of their investment, not a decrease;

(3) Flotation costs consist primarily of the underwriting spread or fee and not out-of-pocket expenses. On a per-share basis, the underwriting spread is the difference between the price the investment banker receives from investors and the price the investment banker pays to the company. Therefore, these are not expenses that must be recovered through the regulatory process. Furthermore, the underwriting spread is known to the investors who are buying the new issue of stock, and who are well aware of the difference between the price they are paying to buy the stock and the price that the Company is receiving. The offering price they pay is what matters when investors decide to buy a stock based on its expected return and risk prospects. Therefore, the company is not entitled to an adjustment to the allowed return to account for those costs; and

(4) Flotation costs, in the form of the underwriting spread, are a form of a transaction cost in the market. They represent the difference between the price paid by investors and the amount received by the issuing company. Whereas the Company believes that it should be compensated for these transaction costs, it has not accounted for other market transaction costs in determining its cost of equity. Most notably, brokerage fees that investors pay when they buy shares in the open market are another market transaction cost. Brokerage fees increase the effective stock price paid by

investors to buy shares. If the Company had included these brokerage fees or transaction costs in its DCF analysis, the higher effective stock prices paid for stocks would lead to lower dividend yields and equity cost rates. This would result in a downward adjustment to their DCF equity cost rate.

VIII. NORTH CAROLINA ECONOMIC CONDITIONS AND PIEDMONT'S RATE OF RETURN AND REVENUE RECOMMENDATIONS

Q. PLEASE DISCUSS MR. HEVERT'S CONSIDERATION OF ECONOMIC CONDITIONS IN NORTH CAROLINA.

A. Mr. Hevert has acknowledged that the North Carolina Commission must balance the interests of investors and customers in setting the ROE. In addition, Mr. Hevert notes that the Commission's task is to set rates as low as possible consistent with the dictates of the United States and North Carolina Constitutions.[70] On this issue, the ROE should be the minimum amount needed to meet the *Hope* and *Bluefield* standards. Finally, Mr. Hevert also highlights that the North Carolina Supreme Court also has indicated that in retail utility service rate cases the Commission must make findings of fact regarding the impact of changing economic conditions on customers when determining the proper ROE for a public utility.[71]

[70] State of North Carolina Utilities Commission, Docket No. E-7, Sub 1026, Order Granting General Rate Increase, Sept. 24, 2013 at 24; see also DEC Remand Order at 40 ("the Commission in every case seeks to comply with the North Carolina Supreme Court's mandate that the Commission establish rates as low as possible within Constitutional limits.").

[71] *State of North Carolina ex rel. Utilities Commission v. Cooper*, 758 S.E.2d 635, 642 (2014) ("Cooper II").

With respect to this latter mandate, Mr. Hevert evaluates a number of factors such as employment and income levels and, based on his review of the data, comes to the following conclusion: Piedmont's proposed ROE of 10.60 percent is fair and reasonable to Piedmont, its shareholders, and its customers in light of the effect of those changing economic conditions.[72]

Q. DO YOU AGREE WITH MR. HEVERT'S ASSESSMENT OF ECONOMIC CONDITIONS IN NORTH CAROLINA?

A. As highlighted by the correlations between U.S. and North Carolina economic data, I agree with Mr. Hevert that economic conditions have improved with the overall economy over the past decade.

Q. DO YOU AGREE WITH MR. HEVERT'S CONCLUSION THAT THE IMPROVEMENT IN ECONOMIC CONDITIONS IN NORTH CAROLINA AND THE COMPANY'S SERVICE TERRITORY JUSTIFY THE COMPANY'S PROPOSED RATE OF RETURN INCLUDING A 10.60% ROE?

A. No. Whereas economic conditions have improved in North Carolina, it does not necessarily justify such a high rate of return and ROE. I have three observations on Mr. Hevert' assessment of the economic conditions in North Carolina and Piedmont's service territory.

[72] Hevert Testimony, pp. 43-4.

1. Whereas North Carolina's unemployment rate has fallen by one-third since its peak in the 2009-2010 period and is equal to the national average of 3.70%, the unemployment rate in Piedmont's service territory is seventy basis point higher at 4.40%;

2. As Mr. Hevert notes, North Carolina's median household income has grown at a somewhat slower pace than the national average, and is more than 10% below the U.S. norm; and

3. North Carolina's natural gas residential rates are more than 15% higher than national average gas rates.

Q. WHAT IS YOUR CONCLUSION REGARDING THE ECONOMIC CONDITIONS IN NORTH CAROLINA AND THE COMPANY'S SERVICE TERRITORY?

A. The higher level of natural gas residential rates in North Carolina, coupled with lower level of household income in the state and the higher level of unemployment in Piedmont's service territory suggest that affordability can be an issue for an essential utility service such as natural gas. And Piedmont's overall rate of return request has a significant impact on its overall requested increase in revenues.

Q. HOW MUCH OF AN IMPACT DOES THE COMPANY'S RATE OF RETURN REQUEST HAVE ON THE COMPANY'S OVERALL INCREASE IN REVENUES.

A. Page 1 of Exhibit JRW-13 provides a summary of Piedmont's overall rate of return

and revenue. This comes from Piedmont's revenue requirement exhibits (Exhibits_ (PKP)-1 through (PKP)-8. Page 2 of Exhibit_ (PKP)-7 provide the revenue requirements and capital costs. Page 1 of Exhibit JRW-13 is the Company's position and shows the Company's overall annual operating revenue increase of $253,435,633 with Piedmont's proposed 52.0% common equity ratio and 10.60% ROE. Page 2 of Exhibit JRW-13 provides Piedmont's revenues increase but substitutes the 50%/50% debt-equity capital structure and 9.00% ROE that I have recommended. Without any other changes to Piedmont's proposal, my rate of return recommendations reduce the overall revenue increase by $58 million per year to $195,468,893. As I discussed earlier in my testimony, a 50%50% debt-equity capital structure and a 9.00% ROE is more than adequate to meet *Hope* and *Bluefield* standards with respect to comparable returns, financial integrity and ability to attract capital.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

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 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 twenty-five 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.

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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

Piedmont Natural Gas Company, Inc.
Recommended Cost of Capital

Panel A - Primary Cost of Capital Recommendation

Capital Source	Capitalization Ratios*	Cost Rate	Weighted Cost Rate
Short-Term Debt	0.85%	2.82%	0.02%
Long-Term Debt	49.15%	4.55%	2.24%
Common Equity	50.00%	9.00%	4.50%
Total Capitalization	100.00%		6.76%

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

Panel B - Alternative Cost of Capital Recommendation

Capital Source	Capitalization Ratios*	Cost Rate	Weighted Cost Rate
Short-Term Debt	0.82%	2.82%	0.02%
Long-Term Debt	47.18%	4.55%	2.15%
Common Equity	52.00%	8.70%	4.52%
Total Capitalization	100.00%		6.69%

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

Exhibit JRW-2

Piedmont Natural Gas Company, Inc.

Gas Proxy Group

Company	Operating Revenue ($mil)	Percent Elec Revenue	Percent Gas Revenue	Net Plant ($mil)	Market Cap ($mil)	S&P 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)	$2,759.7	0%	96%	$9,259.2	$9.0	A	6.03	Ten States	52.6%	10.8%	2.32
Chesapeake Utilities (NYSE-CPK)	$617.58	4%	43%	$1,126.03	$1.2	NR	6.73	DE,MD,FL	51.5%	12.5%	2.54
New Jersey Resources Corp. (NYSE-NJR)	$2,268.6	0%	31%	$2,609.7	$3.0	A	4.04	NJ	46.4%	11.0%	2.96
Northwest Natural Gas Co. (NYSE-NWN)	$762.2	0%	96%	$2,255.0	$1.7	BBB+	(1.24)	OR,WA	47.1%	-7.0%	2.26
ONE Gas, Inc.(NYSE-OGS)	$1,539.6	0%	100%	$4,007.6	$3.8	A	6.56	OK,KS,TX	55.8%	8.5%	1.94
South Jersey Industries, Inc. (NYSE-SJI)	$1,243.1	0%	41%	$2,700.2	$2.5	BBB	0.37	NJ	43.7%	-0.3%	2.06
Southwest Gas Corporation (NYSE-SWX)	$2,548.8	0%	51%	$4,523.7	$3.9	BBB+	4.32	AZ,NV,CA	47.1%	11.2%	2.14
Spire (NYSE-SR)	$1,740.7	0%	95%	$3,665.2	$3.2	A-	3.68	MO	43.6%	8.6%	1.61
Mean	$1,685.0	1%	69%	$3,768.3	$3.54	A-	3.81		48.5%	6.9%	2.23
Median	$1,640.2	0%	73%	$3,182.7	$3.10	A-	4.18		47.1%	9.7%	2.20

Data Source: Company 2018 SEC 10-K filings; *Value Line Investment Survey* , 2019.

Exhibit JRW-2

Piedmont Natural Gas Company, Inc.
***Value Line* Risk Metrics**

Gas Proxy Group

Company	Beta	Financial Strength	Safety	Earnings Predictability	Stock Price Stability
Atmos Energy Company (NYSE-ATO)	0.65	A+	1	100	100
Chesapeake Utilities (NYSE-CPK)	0.65	B++	2	90	75
New Jersey Resources Corp. (NYSE-NJR)	0.70	A+	1	50	80
Northwest Natural Gas Co. (NYSE-NWN)	0.60	A	1	10	95
ONE Gas, Inc. (NYSE-OGS)	0.65	A	2	95	100
South Jersey Industries, Inc. (NYSE-SJI)	0.80	A	2	65	80
Southwest Gas Corporation (NYSE-SWX)	0.70	B++	3	90	80
Spire (NYSE-SR)	0.65	B++	2	70	95
Mean	0.68	A	1.8	71	88

Data Source: *Value Line Investment Survey* , 2018.

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 that 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-3

Piedmont Natural Gas Company, Inc.
Capital Structure Ratios and Debt Cost Rates

Panel A - Piedmont's Proposed Capital Structure and Debt Cost Rates

	Percent of Total	Cost
Short-Term Debt	0.82%	2.82%
Long-Term Debt	47.18%	4.55%
Common Equity	52.00%	
Total Capital	100.00%	

Panel B - Proxy Group Average Capital Structure Ratios

	Q4 2018	Q3 2018	Q2 2018	Q1 2018	Mean
Short-Term Debt	13.03%	18.06%	15.28%	10.11%	14.12%
Long-Term Debt	40.87%	37.60%	37.90%	40.17%	39.14%
Preferred Stock	0.00%	0.00%	0.00%	0.00%	0.00%
Common Equity	46.10%	44.34%	46.82%	49.72%	46.75%
Total Capital	100.00%	100.00%	100.00%	100.00%	100.00%

Panel C - Average Quarterly Capitalization Ratios (2018-19)
Piedmont Natural Gas Company, Inc.

Common Stockholders' Equity	48.1%
Preferred Stock	0.0%
Long Term Debt (excludes Current Maturities)	42.3%
Total Short Term Debt	9.6%
Total	100.0%

Duke Energy Corporation

Common Stockholders' Equity	42.9%
Preferred Stock	0.2%
Long Term Debt (excludes Current Maturities)	50.6%
Current Maturities of Long Term Debt	0.0%
Total Short Term Debt	6.3%
Total	100.0%

Source: Company Response to AG-2-20.

Panel D- AG's Capital Structure Ratios and Debt Cost Rates

	Piedmont Proposed	Adjustment	AG Proposed	Cost
Short-Term Debt	0.82%	1.041667	0.85%	2.82%
Long-Term Debt	47.18%	1.041667	49.15%	4.55%
Common Equity	52.00%	0.961538	50.00%	
Total Capital	100.00%		100.00%	

Exhibit JRW-3

Piedmont Natural Gas Company, Inc.
Quarterly Capital Structure Ratios

Panel A - Average Quarterly Capitalization Ratios (2018-19)
Piedmont Natural Gas Company, Inc.

Common Stockholders' Equity	48.1%
Preferred Stock	0.0%
Long Term Debt (excludes Current Maturi	42.3%
Total Short Term Debt	9.6%
Total	100.0%

Duke Energy Corporation

Common Stockholders' Equity	42.9%
Preferred Stock	0.2%
Long Term Debt (excludes Current Maturi	50.6%
Current Maturities of Long Term Debt	
Total Short Term Debt	6.3%
Total	100.0%

Panel B - Quarterly Capitalization Ratios (2016-19)

Piedmont Natural Gas Capitalization Structure including Short-term Debt (GAAP view)

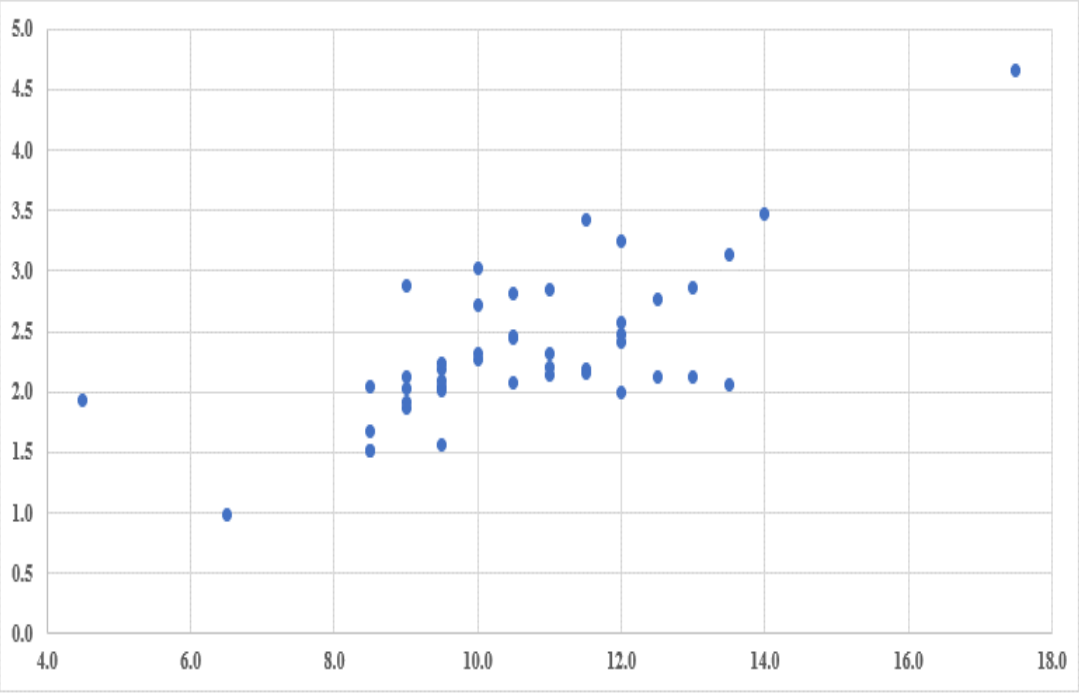
	3/31/2019		12/31/2018		9/30/2018		6/30/2018		3/31/2018		12/31/2017		9/30/2017		6/30/2017		3/31/2017		12/31/2016	
Common Stockholders' Equit	$ 2,213	48.6%	$ 2,091	47.2%	$ 2,043	48.9%	$ 2,064	50.3%	$ 1,772	45.3%	$ 1,662	40.9%	$ 1,599	40.8%	$ 1,610	43.2%	$ 1,767	45.9%	$ 1,672	47.9%
Preferred Stock	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	$ -	0.0%	$ -	0.0%	$ -	0.0%	$ -	0.0%
Long Term Debt (excludes Cu	1,788	39.3%	1,788	40.4%	1,788	42.8%	1,787	43.6%	1,787	45.6%	1,787	44.0%	$ 2,036	52.0%	$ 1,911	51.3%	$ 1,786	46.4%	$ 1,786	51.1%
Notes Payable and Commerc	201		198		-		-		107		364		$ 284		$ 167		$ 261		$ -	
Current Maturities of Long Te	350		350		350		250		250		250		$ -		$ 35		$ 35		$ 35	
Total Short	551	12.1%	548	12.4%	350	8.4%	250	6.1%	357	9.1%	614	4.1%	$ 284	7.2%	$ 202	5.4%	$ 296	7.7%	$ 35	1.0%
Total	$ 4,552	100%	$ 4,427	100%	$ 4,181	100%	$ 4,101	100%	$ 3,916	100%	$ 4,063	89%	$ 3,919	100%	$ 3,723	100%	$ 3,849	100%	$ 3,493	100%

Duke Energy Corporation Capitalization Structure including Short-term Debt (GAAP view)

	3/31/2019		12/31/2018		9/30/2018		6/30/2018		3/31/2018		12/31/2017		9/30/2017		6/30/2017		3/31/2017		12/31/2016	
Common Stockholders' Equity (1)	$ 44,056	42.3%	$ 43,817	43.1%	$42,995	43.1%	$42,507	43.1%	$41,792	42.8%	$41,739	43.4%	$41,631	43.8%	$41,294	43.8%	$41,179	43.9%	$41,033	44.9%
Preferred Stock	974	0.9%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	$ -	0.0%	$ -	0.0%	$ -	0.0%	$ -	0.0%
Long Term Debt	53,681	51.5%	51,123	50.2%	50,507	50.6%	49,863	50.6%	49,030	50.2%	49,035	51.0%	$48,929	51.5%	$46,043	48.8%	$47,021	50.2%	$45,576	49.9%
Notes Payable and Commercial Paper	3,029		3,410		2,891		3,329		2,969		2,163		$ 1,899		$ 3,488		$ 3,558		$ 2,487	
Current Maturities of Long Term Debt	2,501		3,406		3,455		2,852		3,951		3,244		$ 2,485		$ 3,472		$ 1,977		$ 2,319	
Total Short Term Debt	5,530	5.3%	6,816	6.7%	6,346	6.4%	6,181	6.3%	6,920	7.1%	5,407	5.6%	$ 4,384	4.6%	$ 6,960	7.4%	$ 5,535	5.9%	$ 4,806	5.3%
Total	$ 104,241	100%	$101,756	100%	$99,848	100%	$98,551	100%	$97,742	100%	$96,181	100%	$94,944	100%	$94,297	100%	$93,735	100%	$91,415	100%

Exhibit JRW-4
Electric Utilities and Gas Distribution Companies

Market-to-Book



R-Square = .50, N=43

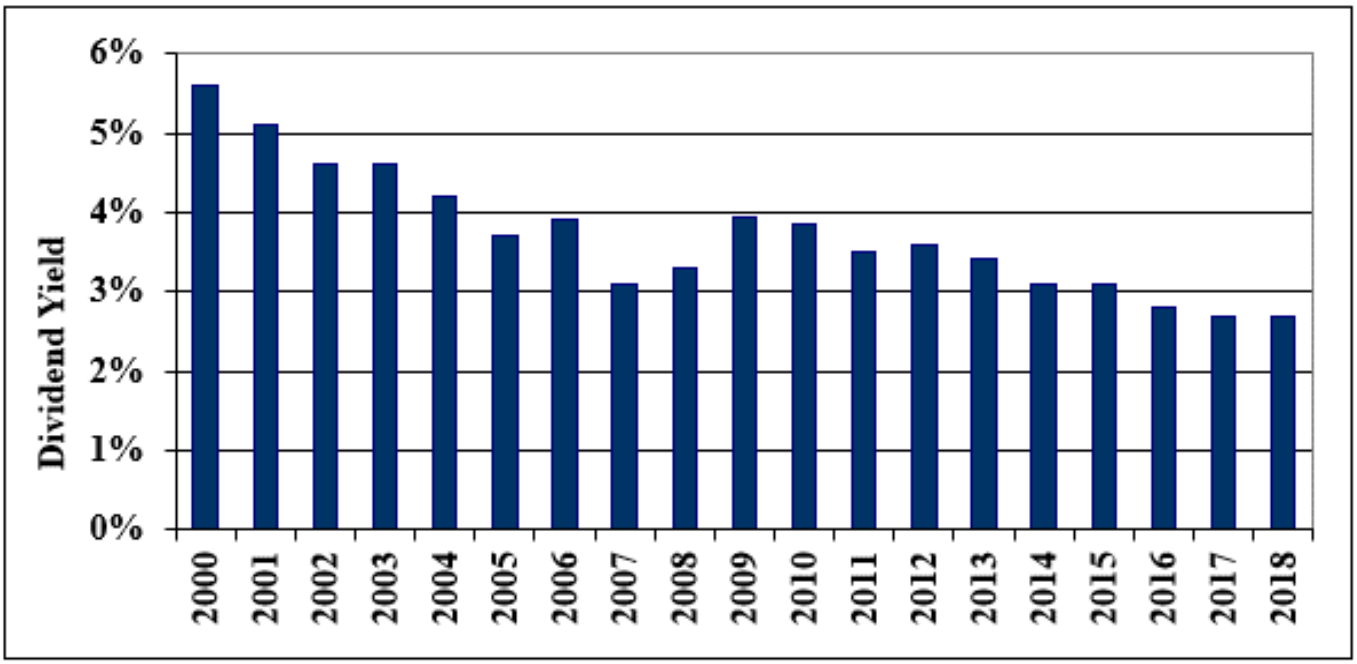
Source: *Value Line Investment Survey* , 2019.

Exhibit JRW-5
Long-Term 'A' Rated Public Utility Bonds

Data Source: Mergent Bond Record

Exhibit JRW-5

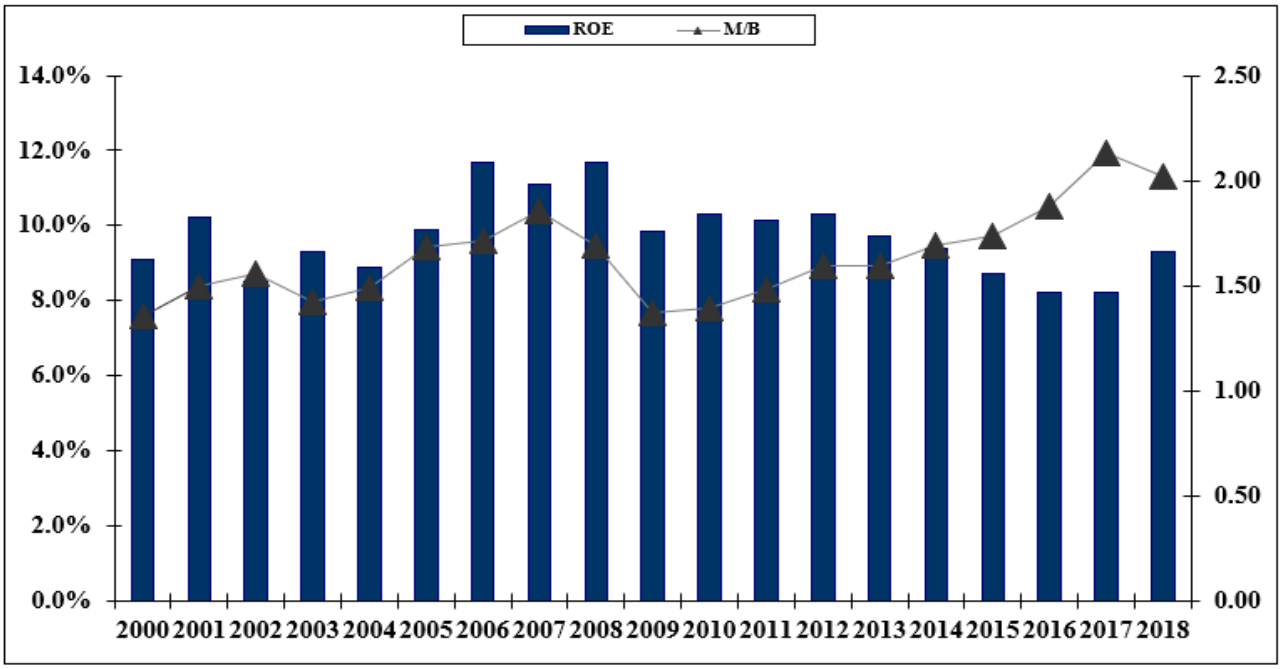
Gas Distribution Company Average Dividend Yield



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

Exhibit JRW-5

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



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

Exhibit JRW-6

Industry Average Betas*
Value Line Investment Survey* Betas*
22-Jan-19

Rank	Industry	Beta	Rank	Industry	Beta	Rank	Industry	Beta
1	Petroleum (Producing)	1.71	34	Telecom. Equipment	1.15	67	Medical Services	1.01
2	Metals & Mining (Div.)	1.64	35	Internet	1.15	68	Recreation	1.01
3	Natural Gas (Div.)	1.63	36	Financial Svcs. (Div.)	1.15	69	IT Services	1.01
4	Oilfield Svcs/Equip.	1.61	37	Retail (Hardlines)	1.14	70	Med Supp Non-Invasive	0.99
5	Maritime	1.51	38	Semiconductor Equip	1.14	71	Telecom. Services	0.99
6	Steel	1.49	39	Entertainment Tech	1.13	72	Retail Store	0.98
7	Oil/Gas Distribution	1.40	40	Publishing	1.13	73	Pharmacy Services	0.98
8	Metal Fabricating	1.37	41	Computer Software	1.13	74	Information Services	0.97
9	Chemical (Specialty)	1.34	42	Paper/Forest Products	1.13	75	Investment Co.(Foreign)	0.96
10	Chemical (Diversified)	1.33	43	Precision Instrument	1.12	76	Healthcare Information	0.96
11	Pipeline MLPs	1.33	44	Public/Private Equity	1.12	77	Funeral Services	0.95
12	Heavy Truck & Equip	1.31	45	Retail Automotive	1.12	78	Med Supp Invasive	0.95
13	Chemical (Basic)	1.30	46	Power	1.12	79	Reinsurance	0.92
14	Building Materials	1.30	47	Wireless Networking	1.12	80	Environmental	0.91
15	Petroleum (Integrated)	1.30	48	Retail Building Supply	1.11	81	Cable TV	0.90
16	Homebuilding	1.28	49	Bank (Midwest)	1.11	82	Insurance (Prop/Cas.)	0.90
17	Railroad	1.27	50	Packaging & Container	1.11	83	Thrift	0.89
18	Auto Parts	1.27	51	Furn/Home Furnishings	1.11	84	Restaurant	0.88
19	Biotechnology	1.27	52	Human Resources	1.10	85	Tobacco	0.88
20	Engineering & Const	1.25	53	Drug	1.10	86	Household Products	0.86
21	Office Equip/Supplies	1.24	54	Advertising	1.10	87	Investment Co.	0.85
22	Hotel/Gaming	1.24	55	Shoe	1.09	88	Beverage	0.83
23	Automotive	1.24	56	Bank	1.09	89	Food Processing	0.82
24	Insurance (Life)	1.24	57	Newspaper	1.08	90	R.E.I.T.	0.82
25	Semiconductor	1.21	58	Toiletries/Cosmetics	1.08	91	Precious Metals	0.82
26	Machinery	1.20	59	Entertainment	1.07	92	Retail/Wholesale Food	0.80
27	Air Transport	1.20	60	Telecom. Utility	1.07	93	Water Utility	0.70
28	Electrical Equipment	1.20	61	Foreign Electronics	1.07	94	Natural Gas Utility	0.67
29	Electronics	1.20	62	Aerospace/Defense	1.05	95	Electric Util. (Central)	0.63
30	Trucking	1.19	63	Industrial Services	1.05	96	Electric Utility (West)	0.62
31	E-Commerce	1.18	64	Apparel	1.05	97	Electric Utility (East)	0.55
32	Computers/Peripherals	1.16	65	Educational Services	1.03			
33	Diversified Co.	1.16	66	Retail (Softlines)	1.02		Mean	1.10

* Industry averages for 97 industries using *Value Line* 's database of 1,710 companies.

** *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-7
DCF Model

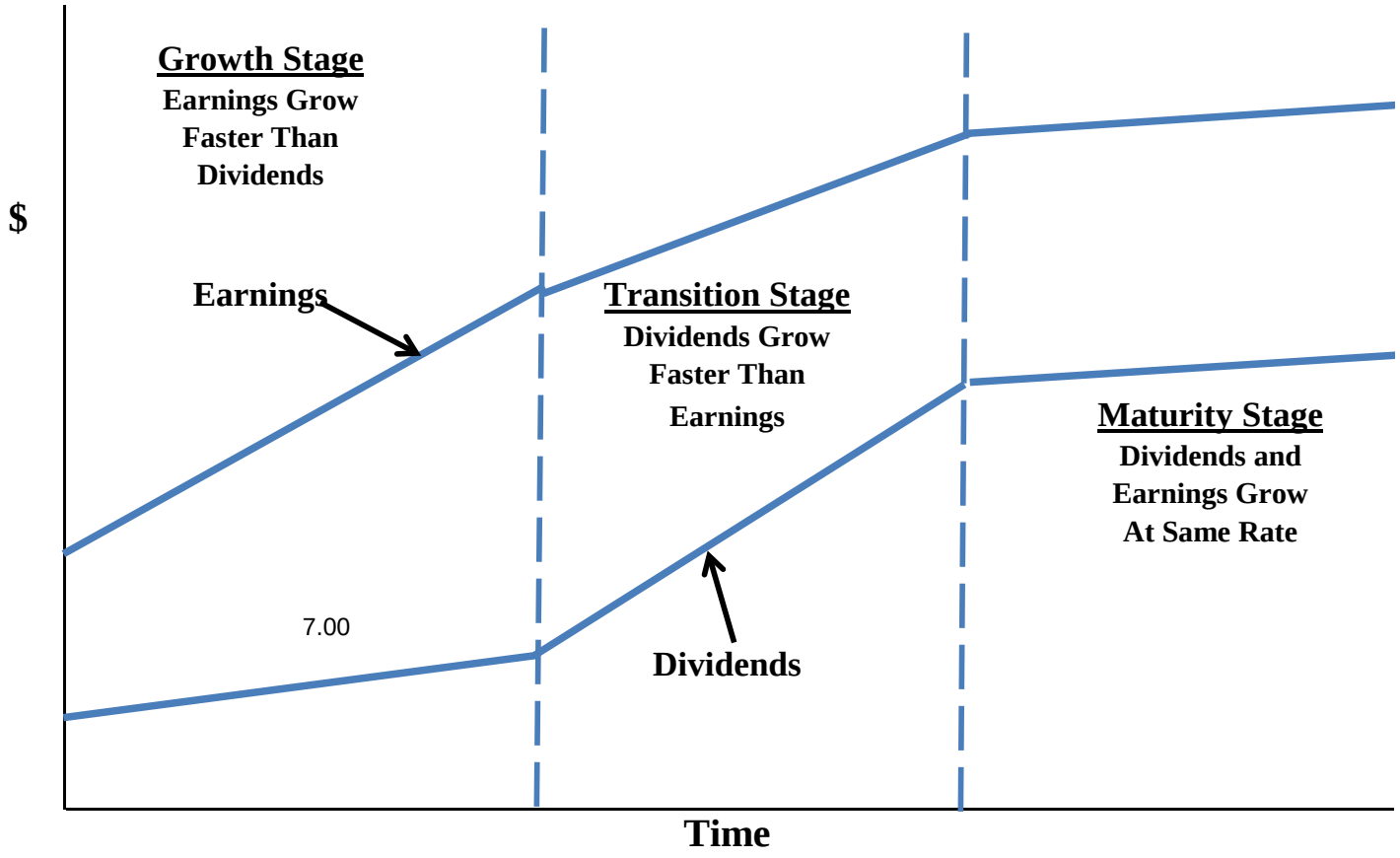


Exhibit JRW-7

DCF Model
Consensus Earnings Estimates
Atmos Energy Corporatrion (ATO)
www.reuters.com
June, 2019

Date	# of Estimates	Mean	High	Low
Quarter Ending Jun-19	6	$0.72	$0.87	$0.66
Quarter Ending Sep-19	6	$0.50	$0.65	$0.45
Year Ending Sep-19	7	$4.33	$4.39	$4.27
Year Ending Sep-20	9	$4.59	$4.66	$4.45
LT Growth Rate (%)	2	6.45%	6.90%	6.00%

Exhibit JRW-8

Piedmont Natural Gas Company, Inc.
Discounted Cash Flow Analysis

Gas Proxy Group

Dividend Yield*	**2.60%**
Adjustment Factor	**1.03**
Adjusted Dividend Yield	**2.68%**
Growth Rate**	**6.00%**
Equity Cost Rate	**8.70%**

*** Page 2 of Exhibit JRW-8**

**** Based on data provided on pages 3, 4, 5, and 6 of Exhibit JRW-8**

Exhibit JRW-8

Piedmont Natural Gas Company, Inc.
Monthly Dividend Yields

Gas Proxy Group

Company	Annual Dividend	Dividend Yield 30 Day	Dividend Yield 90 Day	Dividend Yield 180 Day
Atmos Energy Company (NYSE-ATO)	$2.10	2.0%	2.1%	2.1%
Chesapeake Utilities (NYSE-CPK)	$1.62	1.7%	1.8%	1.8%
New Jersey Resources Corp. (NYSE-NJR)	$1.17	2.4%	2.4%	2.4%
Northwest Natural Gas Co. (NYSE-NWN)	$1.90	2.8%	2.8%	2.9%
One Gas, Inc. (NYSE-OGS)	$2.00	2.2%	2.3%	2.4%
South Jersey Industries, Inc. (NYSE-SJI)	$1.15	3.5%	3.6%	3.7%
Southwest Gas Corporation (NYSE-SWX)	$2.18	2.5%	2.6%	2.7%
Spire (NYSE-SR)	$2.37	2.8%	2.9%	3.0%
Mean		2.5%	2.5%	2.6%
Median		2.4%	2.5%	2.5%

Data Sources: http://quote.yahoo.com, June, 2019.

Exhibit JRW-8

Piedmont Natural Gas Company, Inc.
DCF Equity Cost Growth Rate Measures
***Value Line* Historic Growth Rates**

Gas Proxy Group

Company	*Value Line* Historic Growth					
	Past 10 Years			Past 5 Years		
	Earnings	Dividends	Book Value	Earnings	Dividends	Book Value
Atmos Energy Company (NYSE-ATO)	6.5	3.5	5.5	10.0	5.5	7.0
Chesapeake Utilities (NYSE-CPK)	9.0	5.0	10.0	8.0	6.0	10.5
New Jersey Resources Corp. (NYSE-NJR)	7.0	7.5	7.0	5.5	6.5	8.0
Northwest Natural Gas Co. (NYSE-NWN)	-10.5	2.5	2.0	-18.0	1.0	
ONE Gas, Inc. (NYSE-OGS)						
South Jersey Industries, Inc. (NYSE-SJI)	1.5	8.0	6.5	-2.5	6.0	6.0
Southwest Gas Corporation (NYSE-SWX)	7.0	8.5	5.5	4.5	10.5	6.0
Spire (NYSE-SR)	4.0	4.0	7.5	7.5	5.0	8.0
Mean	3.5	5.6	6.3	2.1	5.8	7.6
Median	6.5	5.0	6.5	5.5	6.0	7.5
	Average of Median Figures =			6.2		

Data Source: *Value Line Investment Survey.*

Exhibit JRW-8

Piedmont Natural Gas Company, Inc.
DCF Equity Cost Growth Rate Measures
***Value Line* Projected Growth Rates**

Gas Proxy Group

Company	*Value Line* Projected Growth Est'd. '16-'18 to '22-'24			*Value Line* Sustainable Growth		
	Earnings	Dividends	Book Value	Return on Equity	Retention Rate	Internal Growth
Atmos Energy Company (NYSE-ATO)	7.5	7.0	7.0	10.0%	52.0%	5.2%
Chesapeake Utilities (NYSE-CPK)	9.0	9.0	9.0	10.0%	57.0%	5.7%
New Jersey Resources Corp. (NYSE-NJR)	3.5	4.0	7.0	11.5%	47.0%	5.4%
Northwest Natural Gas Co. (NYSE-NWN)	27.0	2.5	1.0	12.0%	37.0%	4.4%
ONE Gas, Inc. (NYSE-OGS)	8.0	8.5	4.5	10.0%	44.0%	4.4%
South Jersey Industries, Inc. (NYSE-SJI)	10.5	4.0	4.5	12.0%	40.0%	4.8%
Southwest Gas Corporation (NYSE-SWX)	9.0	5.0	7.5	9.5%	55.0%	5.2%
Spire (NYSE-SR)	5.5	4.0	4.0	4.5%	47.0%	2.1%
Mean	10.0	5.5	5.6	9.9%	47.4%	4.7%
Median	8.5	4.5	5.8	10.0%	47.0%	5.0%
Average of Median Figures =		6.3			Median =	5.0%

*** 'Est'd. '16-'18 to '22-'24' is the estimated growth rate from the base period 2016 to 2018 until the future period 2021 to 2023.**

Data Source: *Value Line Investment Survey*.

Exhibit JRW-8

Piedmont Natural Gas Company, Inc.
DCF Equity Cost Growth Rate Measures
Analysts Projected EPS Growth Rate Estimates

Gas Proxy Group

Company	Yahoo	Reuters	Zacks	Mean
Atmos Energy Company (NYSE-ATO)	6.5%	6.5%	6.5%	6.5%
Chesapeake Utilities (NYSE-CPK)	6.0%	7.2%	7.0%	6.7%
New Jersey Resources Corp. (NYSE-NJR)	6.0%	6.0%	7.0%	6.3%
Northwest Natural Gas Co. (NYSE-NWN)	4.0%	4.0%	4.5%	4.2%
ONE Gas, Inc. (NYSE-OGS)	5.0%	5.0%	5.9%	5.3%
South Jersey Industries, Inc. (NYSE-SJI)	5.9%	5.9%	7.2%	6.3%
Southwest Gas Corporation (NYSE-SWX)	6.1%	6.1%	6.2%	6.1%
Spire (NYSE-SR)	2.8%	2.8%	4.9%	3.5%
Mean	5.3%	5.4%	6.1%	5.6%
Median	6.0%	6.0%	6.3%	6.2%

Data Sources: www.reuters.com, www.zacks.com, http://quote.yahoo.com, June, 2019.

Exhibit JRW-8

Piedmont Natural Gas Company, Inc.
DCF Growth Rate Indicators

Gas Proxy Group

Growth Rate Indicator	Gas Proxy Group
Historic *Value Line* Growth in EPS, DPS, and BVPS	6.2%
Projected *Value Line* Growth in EPS, DPS, and BVPS	6.3%
Sustainable Growth ROE * Retention Rate	5.0%
Projected EPS Growth from Yahoo, Zacks, and Reuters - Mean/Median	5.6%/6.2%

Exhibit JRW-9

Piedmont Natural Gas Company, Inc.
Capital Asset Pricing Model

Gas Proxy Group

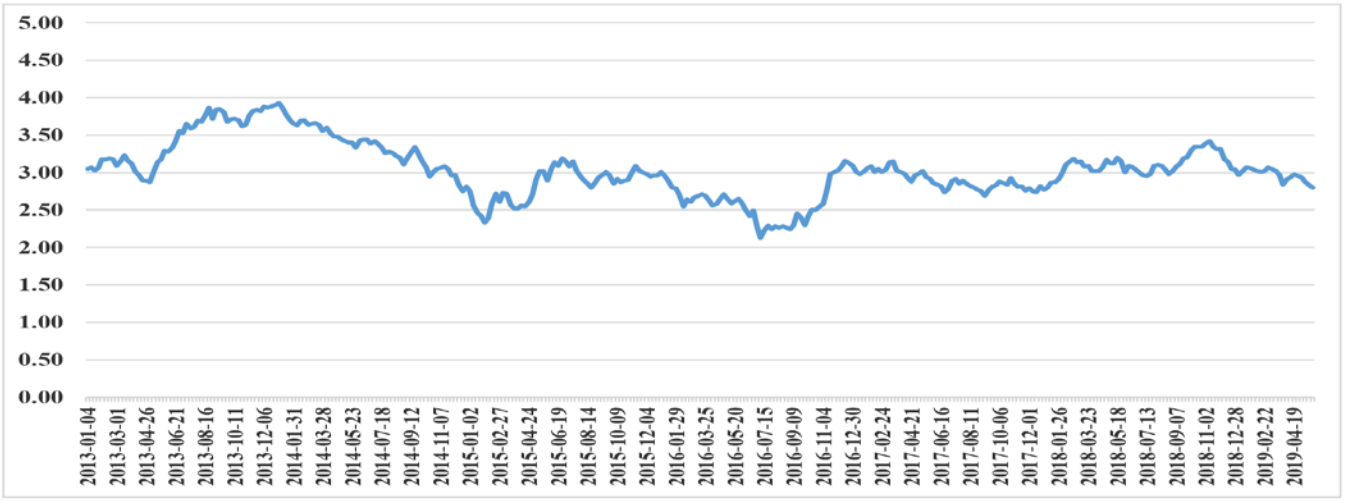
Risk-Free Interest Rate	**4.00%**
Beta*	**0.65**
Ex Ante Equity Risk Premium**	**5.50%**
CAPM Cost of Equity	**7.6%**

* See page 3 of Exhibit JRW-9

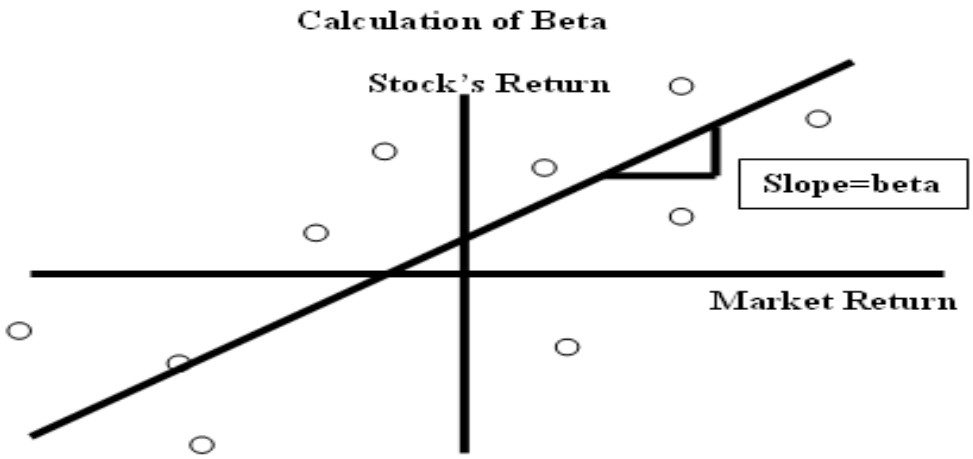
** See pages 5 and 6 of Exhibit JRW-9

Exhibit JRW-9

Thirty-Year U.S. Treasury Yields
2013-2019



Source: Federal Reserve Bank of St. Louis, FRED Database: https://fred.stlouisfed.org/series/DGS30



Gas Proxy Group

Company	Beta
Atmos Energy Company (NYSE-ATO)	**0.65**
Chesapeake Utilities (NYSE-CPK)	**0.65**
New Jersey Resources Corp. (NYSE-NJR)	**0.70**
Northwest Natural Gas Co. (NYSE-NWN)	**0.60**
ONE Gas, Inc. (NYSE-OGS)	**0.65**
South Jersey Industries, Inc. (NYSE-SJI)	**0.80**
Southwest Gas Corporation (NYSE-SWX)	**0.70**
Spire (NYSE-SR)	**0.65**
Mean	**0.68**
Median	**0.65**

Data Source: *Value Line Investment Survey* , 2019.

Exhibit JRW-9
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-9

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	2019	1928-2018	Historical Stock Returns - Bond Returns	Arithmetic				6.26%	
					Geometric				4.66%	
	Dimson, Marsh, Staunton _Credit Suisse Repo	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	Geometric				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	2019	Projection	Normalized with 3.5% Long-Term Treasury Yield					5.50%	
	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	2019	Projection	Fundamental Economic and Market Factors					4.29%	
	KPMG	2019	Projection	Fundamental Economic and Market Factors					5.50%	
	Damodaran - 3-1-19	2019	Projection	Fundamentals - Implied from FCF to Equity Model (Trailing 12 month, with adjusted payout)					4.98%	
	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									4.29%
Surveys										
	New York Fed	2015	Five-Year	Survey of Wall Street Firms					5.70%	
	Survey of Financial Forecasters	2019	10-Year Projection	About 20 Financial Forecastsers					1.85%	
	Duke - CFO Magazine Survey	2019	10-Year Projection	Approximately 200 CFOs					3.15%	
	Welch - Academics	2008	30-Year Projection	Random Academics		5.00%	5.74%	5.37%	5.37%	
	Fernandez - Academics, Analysts, and Compan	2019	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										**4.80%**
Median										**4.83%**

Exhibit JRW-9

Capital Asset Pricing Model
Market Risk Premium

Summary of 2010-19 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	2019	1928-2018	Historical Stock Returns - Bond Returns	Arithmetic				6.26%	
					Geometric				4.66%	
	Dimson, Marsh, Staunton _Credit Suisse Report	2019	1900-2018	Historical Stock Returns - Bond Returns	Arithmetic				5.50%	
					Geometric					
	Median									5.36%
Ex Ante Models (Puzzle Research)										
	Siegel - Rethink ERP	2011	Projection	Real Stock Returns and Components					5.50%	
	Duff & Phelps	2019	Projection	Normalized with 3.5% Long-Term Treasury Yield					5.50%	
	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	2019	Projection	Fundamental Economic and Market Factors					4.29%	
	KPMG	2019	Projection	Fundamental Economic and Market Factors					5.50%	
	Damodaran - 3-1-19	2019	Projection	Fundamentals - Implied from FCF to Equity Model (Trailing 12 month, with adjusted payout)					4.98%	
	Median									5.50%
Surveys										
	New York Fed	2015	Five-Year	Survey of Wall Street Firms					5.70%	
	Survey of Financial Forecasters	2019	10-Year Projection	About 20 Financial Forecastsers					1.85%	
	Duke - CFO Magazine Survey	2019	10-Year Projection	Approximately 200 CFOs					3.15%	
	Fernandez - Academics, Analysts, and Companies	2019	Long-Term	Survey of Academics, Analysts, and Companies					5.60%	
	Median									4.38%
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										**4.82%**

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

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

For additional information, please visit
www.duffandphelps.com/CostofCapital

Date	Risk-free Rate (R_f)	R_f (%)	Duff & Phelps Recommended ERP (%)	What Changed
Current Guidance: December 31, 2018 – UNTIL FURTHER NOTICE	**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.

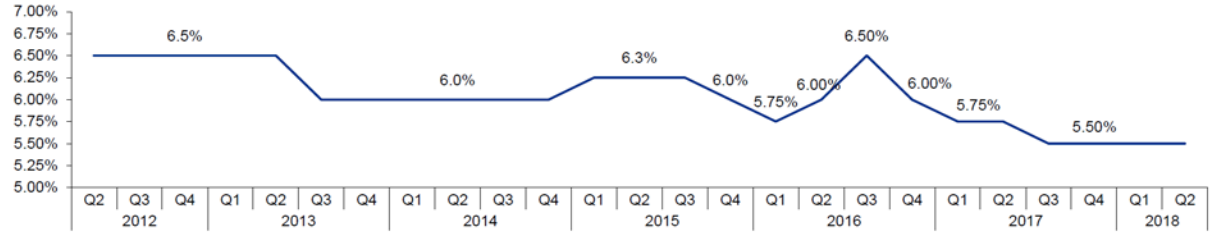
Source: https://www.duffandphelps.com/-/media/assets/pdfs/publications/valuation/coc/erp-risk-free-rates-jan-2008-present.ashx?la=en

Panel A
KPMG Equity Risk Premium Recommendation

Appendix

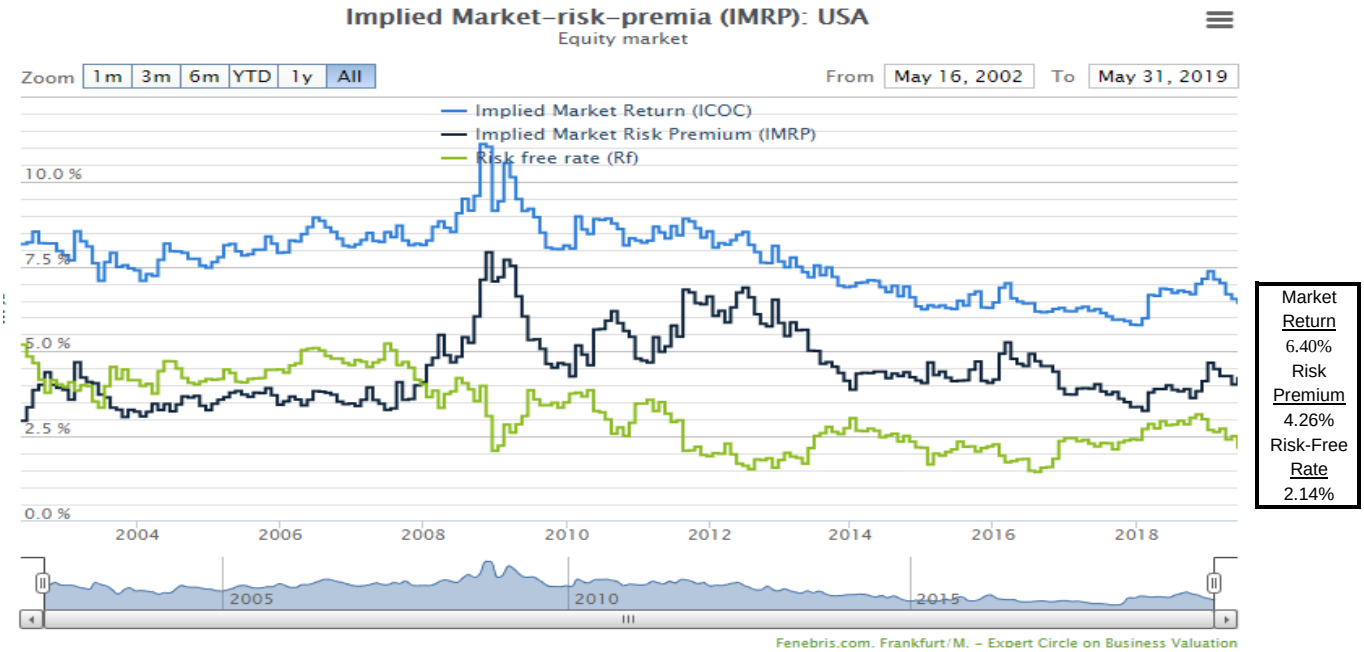
Historic MRP estimates

Please find an overview of the historic MRP estimates by KPMG in the graph below.



Source: https://assets.kpmg/content/dam/kpmg/nl/pdf/2019/advisory/equity-market-research-summary.pdf

Panel B
Market-Risk-Premia.com Implied Market Risk Premium
31-May-19



Market Return	6.40%
Risk Premium	4.26%
Risk-Free Rate	2.14%

Source: http://www.market-risk-premia.com/us.html

Exhibit JRW-10

Piedmont Natural Gas Company, Inc.
Company's Proposed Cost of Capital

	Percent of Total	Cost	Weighted Cost Rate
Short-Term Debt	0.82%	2.82%	0.02%
Long-Term Debt	47.18%	4.55%	2.15%
Common Equity	52.00%	10.60%	5.51%
Total Capital	100.00%		7.68%

Panel A - Discounted Cash Flow Results

	Median	Median High
30-Day Average	9.60%	11.94%
90-Day Average	9.63%	11.97%
180-Day Average	9.65%	12.03%

Panel B - CAPM Results

	Bloomberg Derived Market Risk Premium	Value Line Derived Market Risk Premium
Average Bloomberg Beta Coefficient		
Current 30-Year Treasury (3.04%)	9.26%	11.08%
Near Term Projected 30-Year Treasury (3.25%)	9.47%	11.30%
Long Term Projected 30-Year Treasury (4.05%)	10.27%	12.10%
Average Value Line Beta Coefficient		
Current 30-Year Treasury (3.04%)	10.36%	12.50%
Near Term Projected 30-Year Treasury (3.25%)	10.57%	12.72%
Long Term Projected 30-Year Treasury (4.05%)	11.37%	13.52%

Panel C - Bond Yield Risk Premium Results

Treasury Yield	*Return on Equity*
Current 30-Year Treasury (3.04%)	9.89%
Near Term Projected 30-Year Treasury (3.25%)	9.92%
Long Term Projected 30-Year Treasury (4.05%)	10.11%

Panel D - Expected Earnings Approach

	Return on Equity
Low	9.58%
Average	10.73%
High	12.13%

Panel A
***Value Line* Projected EPS Growth Rates**

Gas Proxy Group	Zacks Earnings Growth	First Call Earnings Growth	Value Line Earnings Growth
Atmos Energy Corporation	6.50%	6.40%	7.50%
Chesapeake Utilities Corporation	6.00%	6.00%	9.00%
New Jersey Resources Corporation	7.00%	6.00%	2.50%
Northwest Natural Gas Company	4.30%	4.00%	25.50%
ONE Gas, Inc.	5.90%	5.00%	9.00%
South Jersey Industries, Inc.	9.50%	9.50%	9.50%
Southwest Gas Corporation	5.00%	6.20%	8.50%
Spire Inc.	3.90%	2.42%	5.50%
Proxy Group Mean	6.01%	5.69%	9.63%
Proxy Group Median	5.95%	6.00%	8.75%

Panel B
***NWN's Value Line* Projected EPS Growth Rate**

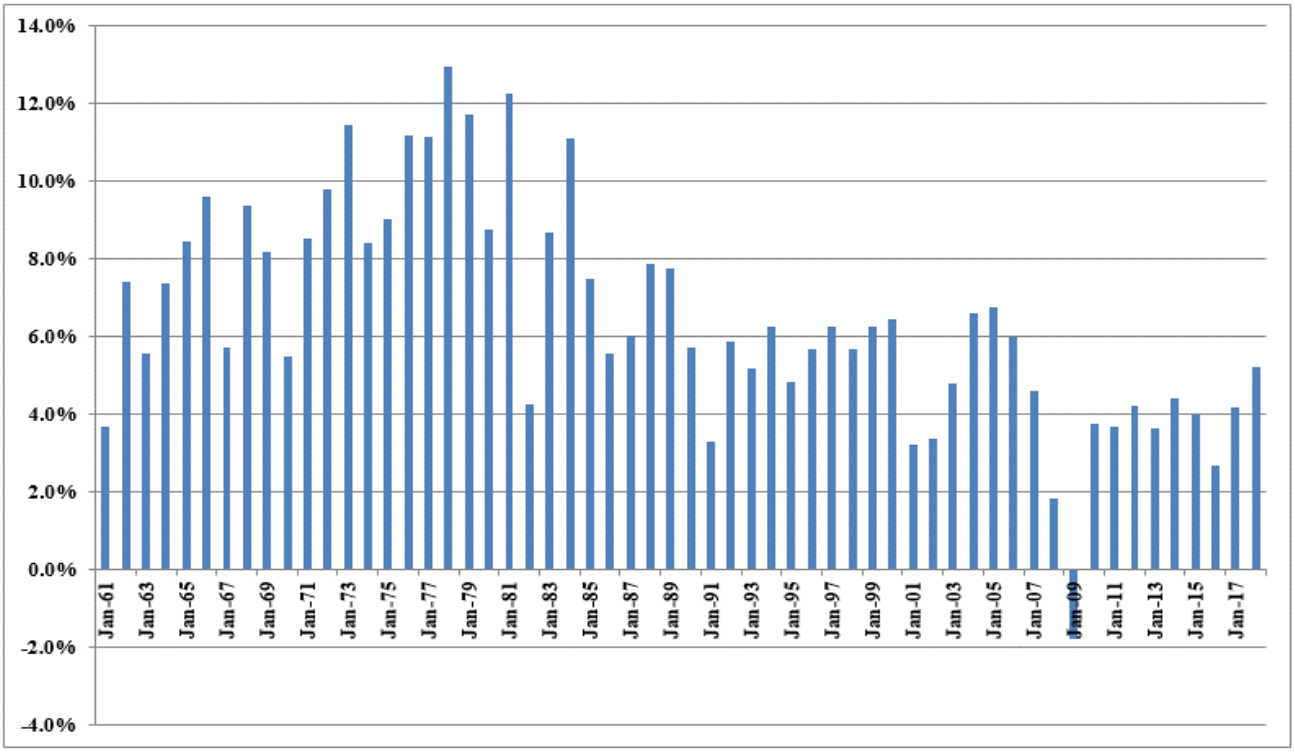
ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '15-'17 to '22-'24
Revenues	-3.5%	-3.0%	*1.5%*
"Cash Flow"	-3.0%	-6.5%	*8.5%*
Earnings	-11.5%	-22.0%	*25.5%*
Dividends	3.0%	1.5%	*2.5%*
Book Value	2.5%	1.0%	*.5%*

Northwest Natural Gas Company	**2015**	**2016**	**2017**	**2018**	**2019**	**2022-24**
Earnings Per Share	$ 1.96	$ 2.12	$ (1.94)	$ 2.20	$ 2.45	$ 3.50
Three-Year Base and Projected Periods		2015-17				2022-24
Base and Projected EPS Figures		$ 0.71				$ 3.50
Base Period to Projected Period Growth Rate				25.5%		

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

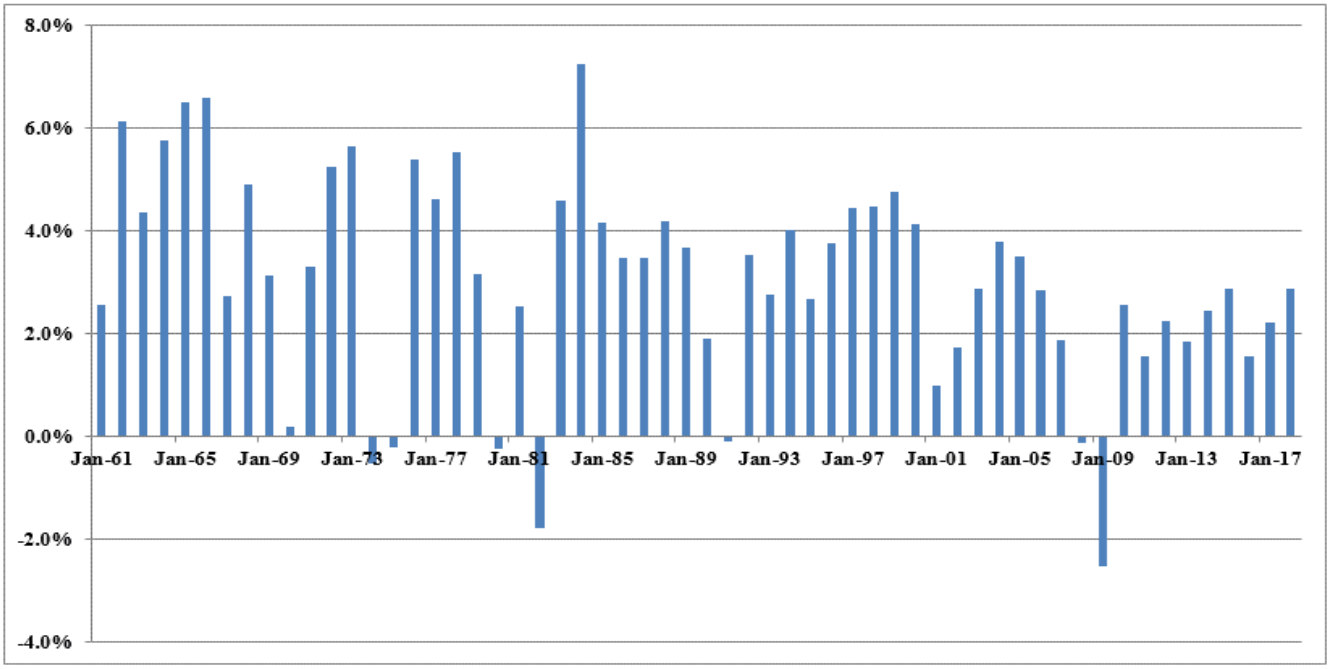
	GDP	S&P 500	S&P 500 EPS	S&P 500 DPS	
1960	542.38	58.11	3.10	1.98	
1961	562.21	71.55	3.37	2.04	
1962	603.92	63.10	3.67	2.15	
1963	637.45	75.02	4.13	2.35	
1964	684.46	84.75	4.76	2.58	
1965	742.29	92.43	5.30	2.83	
1966	813.41	80.33	5.41	2.88	
1967	859.96	96.47	5.46	2.98	
1968	940.65	103.86	5.72	3.04	
1969	1017.62	92.06	6.10	3.24	
1970	1073.30	92.15	5.51	3.19	
1971	1164.85	102.09	5.57	3.16	
1972	1279.11	118.05	6.17	3.19	
1973	1425.38	97.55	7.96	3.61	
1974	1545.24	68.56	9.35	3.72	
1975	1684.90	90.19	7.71	3.73	
1976	1873.41	107.46	9.75	4.22	
1977	2081.83	95.10	10.87	4.86	
1978	2351.60	96.11	11.64	5.18	
1979	2627.33	107.94	14.55	5.97	
1980	2857.31	135.76	14.99	6.44	
1981	3207.04	122.55	15.18	6.83	
1982	3343.79	140.64	13.82	6.93	
1983	3634.04	164.93	13.29	7.12	
1984	4037.61	167.24	16.84	7.83	
1985	4338.98	211.28	15.68	8.20	
1986	4579.63	242.17	14.43	8.19	
1987	4855.22	247.08	16.04	9.17	
1988	5236.44	277.72	24.12	10.22	
1989	5641.58	353.40	24.32	11.73	
1990	5963.14	330.22	22.65	12.35	
1991	6158.13	417.09	19.30	12.97	
1992	6520.33	435.71	20.87	12.64	
1993	6858.56	466.45	26.90	12.69	
1994	7287.24	459.27	31.75	13.36	
1995	7639.75	615.93	37.70	14.17	
1996	8073.12	740.74	40.63	14.89	
1997	8577.55	970.43	44.09	15.52	
1998	9062.82	1229.23	44.27	16.20	
1999	9630.66	1469.25	51.68	16.71	
2000	10252.35	1320.28	56.13	16.27	
2001	10581.82	1148.09	38.85	15.74	
2002	10936.42	879.82	46.04	16.08	
2003	11458.25	1111.91	54.69	17.88	
2004	12213.73	1211.92	67.68	19.41	
2005	13036.64	1248.29	76.45	22.38	
2006	13814.61	1418.30	87.72	25.05	
2007	14451.86	1468.36	82.54	27.73	
2008	14712.85	903.25	65.39	28.05	
2009	14448.93	1115.10	59.65	22.31	
2010	14992.05	1257.64	83.66	23.12	
2011	15542.58	1257.60	97.05	26.02	
2012	16197.01	1426.19	102.47	30.44	
2013	16784.85	1848.36	107.45	36.28	
2014	17521.75	2058.90	113.01	39.44	
2015	18219.30	2043.94	106.32	43.16	
2016	18707.19	2238.83	108.86	45.03	
2017	19485.39	2673.61	124.94	49.73	
2018	20500.64	2506.85	148.34	53.61	Average

Nominal GDP Growth Rates
Annual Growth Rates - 1961-2018



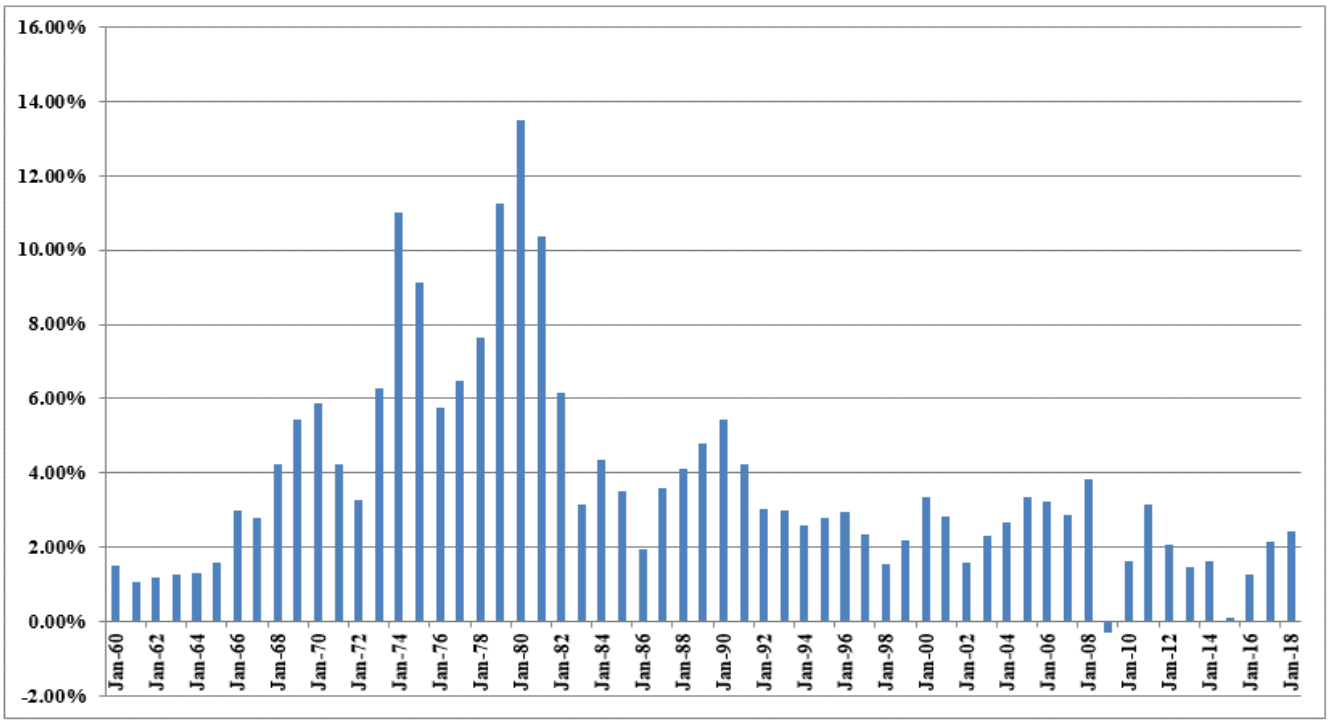
Data Sources: GDPA -https://fred.stlouisfed.org/series/GDPA

Annual Real GDP Growth Rates
1961-2018



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

Annual Inflation Rates
1961-2018



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

Panel A
Historic GDP Growth Rates

10-Year Average		**3.37%**
20-Year Average		**4.17%**
30-Year Average		**4.65%**
40-Year Average		**5.56%**
50-Year Average		**6.36%**

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	**2018-2048**	**4.0%**
Survey of Financial Forecasters	**Ten Year**	**4.3%**
Social Security Administration	**2018-2095**	**4.4%**
Energy Information Administration	**2017-2050**	**4.3%**

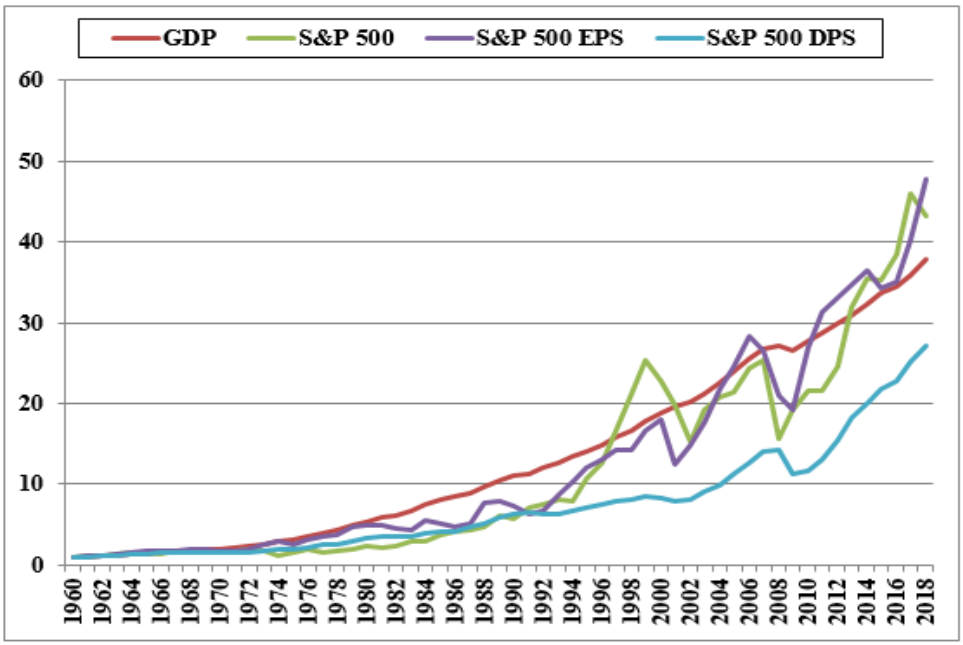
Sources:

Congressional Budget Office,The *2018 Long-Term Budget Outlook* , June 1, 2018.
https://www.cbo.gov/system/files?file=2018-06/53919-2018ltbo.pdf

U.S. Energy Information Administration, *Annual Energy Outlook 2018* , Table: Macroeconomic Indicators, *https://www.eia.gov/outlooks/aeo/data/browser/#/?id=18-AEO2018&sourcekey=0.*

Social Security Administration, 2018 Annual Report of the Board of Trustees of the Old-Age, Survivors, and Disability Insurance (OASDI) Program, Table VI.G4, p. 211(June 15, 2018), https://www.ssa.gov/oact/tr/2018/lr6g4.html. The 4.4% represents the compounded growth rate in projected GDP from $20,307 trillion in 2018 to $548,108 trillion in 2095.

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



	GDP	S&P 500	S&P 500 EPS	S&P 500 DPS
Growth Rates	6.47	6.95	6.70	5.82

Piedmont Natural Gas Company, Inc.
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	Test Period			After Accounting and Pro Forma Adjustments				
	Per Books @ 12/31/2018	Per Books Ratio	Cost Net Investment	Pro Forma Ratio	Cost Net Investment	Embedded Cost	Weighted Cost	Net Operating Income
Long-Term Debt	1,783,237,924	45.56%	1,416,243,157	47.18%	1,556,492,778	4.55%	2.15%	70,820,421
Short-Term Debt Prox	39,714,182	1.01%	31,540,905	0.82%	27,112,267	2.82%	0.02%	764,566
Common Equity	2,091,229,831	53.43%	1,660,849,569	52.00%	1,715,572,132	5.36%	2.79%	91,974,506
Total	$ 3,914,181,937	100.00%	$ 3,108,633,631	100.00%	$ 3,299,177,177		4.96%	$ 163,559,493

After Adjustments for Proposed Rates

	Cost Net Investment	Embedded Cost	Weighted Cost	Net Operating Income
Long-Term Debt	1,556,492,778	4.55%	2.15%	70,820,421
Short-Term Debt Proxy	27,112,267	2.82%	0.02%	764,566
Common Equity	1,715,572,132	10.60%	5.51%	181,850,646
Total	$ 3,299,177,177		7.68%	$ 253,435,633

After Adjustments for Proposed Rates

	Retention Factor	(Pre-Tax ROR) Gross Rev. Factor	Tax Factor	Net of Tax Weighted Cost
Long-Term Debt	0.9878745	2.18%	0.7609103	1.64%
Short-Term Debt Proxy	0.9878745	0.02%	0.7609103	0.02%
Common Equity	0.7609103	7.24%	1.0000000	5.51%
Total		9.44%		7.16%

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	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
	Test Period			After Accounting and Pro Forma Adjustments				
	Per Books @ 12/31/2018	Per Books Ratio	Cost Net Investment	Pro Forma Ratio	Cost Net Investment	Embedded Cost	Weighted Cost	Net Operating Income
Long-Term Debt	1,783,237,924	45.56%	1,416,243,157	0.85%	28,180,472	4.55%	0.04%	1,282,211
Short-Term Debt Prc	39,714,182	1.01%	31,540,905	49.15%	1,621,408,117	2.82%	1.39%	45,723,709
Common Equity	2,091,229,831	53.43%	1,660,849,569	50.00%	1,649,588,589	6.72%	3.36%	110,906,532
Total	$ 3,914,181,937	100.00%	$ 3,108,633,631	100.00%	$ 3,299,177,178		4.79%	$ 157,912,452

	After Adjustments for Proposed Rates			
	Cost Net Investment	Embedded Cost	Weighted Cost	Net Operating Income
Long-Term Debt	28,180,472	4.55%	0.04%	1,282,211
Short-Term Debt Proxy	1,621,408,117	2.82%	1.39%	45,723,709
Common Equity	1,649,588,589	9.00%	4.50%	148,462,973
Total	$ 3,299,177,178		5.92%	$ 195,468,893

	After Adjustments for Proposed Rates			
	Retention Factor	(Pre-Tax ROR) Gross Rev. Factor	Tax Factor	Net of Tax Weighted Cost
Long-Term Debt	0.9878745	0.04%	0.7609103	0.03%
Short-Term Debt Proxy	0.9878745	1.41%	0.7609103	1.06%
Common Equity	0.7609103	5.91%	1.0000000	4.50%
Total		7.36%		5.59%