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I. STATEMENT OF QUALIFICATIONS

Q. PLEASE STATE YOUR NAME, TITLE AND BUSINESS ADDRESS.

A. My name is Aaron L. Rothschild. My title is President and my business address is 15 Lake Road, Ridgefield, CT.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am President of Rothschild Financial Consulting.

Q. PLEASE STATE YOUR EDUCATIONAL ACHIEVEMENTS AND PROFESSIONAL DESIGNATIONS?

A. I have a B.A. (1994) degree from Clark University in mathematics and an M.B.A. (1996) from Vanderbilt University.

Q. PLEASE DESCRIBE YOUR BUSINESS EXPERIENCE.

A. I provided financial analysis in the telecom industry in the United States and Asia Pacific from 1996 to 2001, investment banking consulting in New York, complex systems science research regarding the power sector at an independent research institute and I have prepared rate of return testimonies since 2002. My business experience includes providing expert witness services to the California Public Advocates Office to evaluate the financial health, basic operation, wildfire cost recovery and organizational culture/governance of gas and electric utilities (I.15-08-019), including evaluating Pacific Gas and Electric bankruptcy restructuring plans . See Exhibit ALR-1 for my resume.

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Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THIS COMMISSION, OR OTHER STATE COMMISSIONS? IF SO, WHICH COMMISSIONS?

A. I have testified in over 50 cost of capital proceedings before the following state commissions: California, Colorado, Connecticut, Delaware, Florida, New Jersey, Maryland, North Dakota, Pennsylvania and Vermont. See Exhibit ALR-1 for the list of dockets for each of my testimonies.

Q. ON WHOSE BEHALF ARE YOU PROVIDING THIS TESTIMONY?

A. South Carolina Department of Consumer Affairs.

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

A. The purpose of my testimony is to provide my recommendations to the Public Service Commission of South Carolina ("Commission") regarding the appropriate cost of equity, capital structure and overall cost of capital for Blue Granite Water Company ("BGWC").

II. SUMMARY OF CONCLUSIONS

Q. PLEASE SUMMARIZE YOUR TESTIMONY.

A. I recommend the following for BGWC for its wastewater operations:

- An overall cost of capital of 7.27%
- A cost of equity of 8.65%
- A capital structure containing 52.91% common equity and 47.09% debt
- A debt cost rate of 5.73%

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TABLE 1: ALR RECOMMENDATION - BLUE GRANITE WATER COMPANY
Overall Cost of Capital

	Capital Structure Ratios	Cost Rate	Weighted Cost Rate
Long-Term Debt	47.09%	5.73%	2.70%
Common Equity	52.91%	8.65%	4.58%
	100.0%		7.27%

Exhibit ALR 1B

Q. PLEASE COMPARE YOUR COST OF CAPITAL RECOMMENDATIONS TO BGWC'S REQUESTED COST OF CAPITAL?

A. The primary reasons Mr. D'Ascendis and I recommend a different cost of equity for BGWC is because he includes a group of 14 "non-price regulated" companies in his analysis. I do not include these 14 companies in my cost of equity calculations because my analysis (See Section IV) reveals they are not comparable in total risk to water utilities, as Mr. D'Ascendis claims. In particular, these non-price regulated companies are not comparable to the water utilities we use in our cost of equity calculations[1]. In fact, my analysis shows that the non-price regulated companies are significantly riskier than the 6 water utilities.

Mr. D'Ascendis' cost of equity recommendation would be 9.8%-10.3%[2], if based on the 6 water companies exclusively.

[1] I use 5 of the 6 water companies used by Mr. D'Ascendis.
[2] D'Ascendis Corrected Direct Testimony, page 4, Table 2. 9.8% = average of 9.03%, 10.39% and 9.91%. 10.3% = 9.8% + 0.5% "Business Risk Adjustment".

As shown in Table 2 below, Mr. D'Ascendis and I recommend the same cost of debt (5.73%) and the same capital structure (common equity 52.91% and 47.09% debt). Our cost of equity recommendations are different, however. My 8.65% cost of equity recommendation results in a 7.27% overall rate of return. Mr. D'Ascendis' 10.2%-10.7% cost of equity recommendation results in an overall rate of return of 8.10%-8.36%.

Table 2: RECOMMENDATION COMPARISON - ROTHSCHILD AND D'ASCENDIS

	Cost of Equity	Cost of Debt	Common Equity %	Debt %	Rate of Return
Rothschild	8.65%	5.73%	52.91%	47.09%	7.27%
D'Ascendis	10.2% - 10.7%	5.73%	52.91%	47.09%	8.10%-8.36%

As shown in Table 3 below, if my 8.65% cost of equity is used to set rates for BGWC the rate of return portion of the revenue requirement will be about $6.7 million. On the other hand, if Mr. D'Ascendis' 10.2% to 10.7% cost of equity recommendation is used to set rates the annual revenue requirement will be between about $7.6 million and $7.9 million. If Mr. D'Ascendis' rate of return recommendations are adopted instead of mine consumers will pay between $0.84 million and $1.1 million more per year.

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TABLE 3: ANNUAL REVENUE IMPACT COMPARISON - - ROTHSCHILD AND D'ASENDIS

		Rate of Return Portion of Rev Requirement		Difference D'Ascendis - Rothschild
Rothschild	$	6,766,646		
D'Ascendis				
10.2% cost of equity	$	7,611,424	**$**	**844,779**
10.7% cost of equity	$	7,883,771	**$**	**1,117,125**

Inputs:

Based on following imputs: Rate Base (Proposed)*	$	76,180,847
Federal income tax rate		21.0%
State income tax rate		5.0%

*Application of Blue Granite Water Company for Approval to Adjust Its Rate Schedules and Increase Rates Schedule C, page 1 of 7

Q. PLEASE SUMMARIZE HOW YOU DETERMINED YOUR 8.65% COST OF EQUITY RECOMMENDATION.

A. To arrive at my recommendations, I applied the following three models to a proxy group of 6 publicly traded water companies ("Water Proxy Group"):

- Constant Growth Discounted Cash Flow Model ("DCF")
- Non-Constant Growth DCF Model
- Capital Asset Pricing Model ("CAPM")

My constant growth DCF model is used by major financial institutions. J.P. Morgan Chase uses the sustainable growth form of the DCF method, as I do, in its 2019 Long-Term Capital Market Assumptions publication[3]. *Principles of Corporate Finance*, a leading financial textbook used in business schools around the world, recommends using the very

[3] 23rd Annual Edition, Long-Term Capital Market Assumptions - Time-tested projections to build stronger portfolios, pp. 62-63.

same method I use to calculate the cost of equity for regulated energy utility companies[4]. My CAPM is based on methodologies used by Value Line, the Chicago Board of Options Exchange (CBOE) and published in peer-reviewed academic journals (e.g. The Review of Financial Studies).

I have determined that the cost of equity for the average company in the Water Proxy Group is 8.75%[5]. I recommend a 8.65%[6] cost of equity for BGWC because it has less financial risk than the companies in my Water Group because it has more equity in its capital structure. This 8.75% result is above the average of the high-end results of my three cost of equity models). As shown in Table 4 below, the high-end results of my three cost of equity models range between 6.96% and 9.68%, averaging 8.75%. The low-end results of my three cost of equity models range between 5.72% and 8.34%, averaging 7.46%.

[4] Brealey, Myers, and Allen (2017), Principles of Corporate Finance, 12th Edition, McGraw-Hill Irwin, New York, page 86-87
[5] Exhibit ALR 2.
[6] Ibid.

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TABLE 4: Cost of Equity Model Results

	Low	High
DCF - CONSTANT GROWTH	**8.34%**	**8.76%**
DCF - NON-CONSTANT GROWTH	**5.72%**	**6.96%**
CAPM		
Risk Free Rate - 3-Month T Bill	**7.76%**	**9.59%**
Risk Free Rate - 30-yr T Bond	**8.02%**	**9.68%**
Range	**7.46%**	**8.75%**

Source: Schedule ALR 2

My 8.75% cost of equity recommendation (8.65% after financial risk adjustment) is equal to the average of my high-end results (8.75%) primarily because this Commission expressed concern in BGWC's 2017 rate case (Docket No. 2017-292-WS) regarding its size. In Order No. 2018-345(A), this Commission stated "…there is no dispute that [BGWC] is significantly smaller than its proxy group counterparts, and, therefore, it may present a higher risk."[7]

Q. PLEASE PROVIDE A SUMMARY OF HOW MR. D'ASCENDIS' TESTIMONY COMPARES TO YOUR TESTIMONY, MAJOR FINANCIAL INSTITUTIONS AND RECENT DECISIONS IN WATER UTILITY RATE CASES YOU HAVE BEEN INVOLVED IN.

A. My direct testimony explains that Mr. D'Ascendis' 10.20 – 10.70% recommendation is above (1) return expectations indicated by market data (e.g. stocks, bonds, options), (2)

[7] Page 14.

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return expectations published by major financial institutions, and (3) allowed returns in water utility rate cases in which I have filed testimonies.

The following two components of our analyses led to our different cost of equity recommendations:

1. Mr. D'Ascendis cost of equity recommendation (10.20% – 10.70%) is based, in part, on the results of applying his cost of equity models to non-utility companies (14 Non-Price Regulated Companies). Both of us applied our cost of equity models to 6 water utilities. My 8.65% recommendation is based only on 6 water utility companies, however.
2. Mr. D'Ascendis concludes that investors expect stock returns over bonds (risk premium) will be 10.03%. I calculated a risk premium of 9%.

Mr. D'Ascendis claims that his Non-Price Regulated Proxy Group is comparable to the 6 water utility companies (Utility Proxy Group). They are not. Therefore, his cost of equity results based on applying his cost of equity models to this group of non-utilities should be removed from consideration. In BGWC's last rate case (Docket No. 2017-292-WS) this Commission found that "Mr. D'Ascendis' non-price regulated proxy group more accurately reflects the total risk faced by price regulated utilities and [BGWC]."[8] I was not involved in those proceedings and I do not have an opinion on this Commission's decision at that time. In this proceeding Mr. D'Ascendis' Non-Price Regulated Proxy Group consists of a different group[9] of companies. Additionally, market conditions likely have changed, at least to some degree, since 2017. As

[8] Docket No. 2017-292-WS – Order No. 2018-235(A), May 30, 2018, page 14.
[9] Some of the companies are the same in both proxy groups.

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discussed below (Section VI.), current stock and option price data indicate that the companies in Mr. D'Ascendis' Non-Price Regulated Proxy Group are significantly riskier.

As shown in Table 5 below, Mr. D'Ascendis' 10.20% to 10.70% cost of equity recommendation is considerably higher than return expectations (5.25-8.75%)[10] published by major banks and brokerage houses.

TABLE 5: COST OF EQUITY COMPARISON

	Nominal	
BGWC Witness Recommendation (December 2019)	**10.20 - 10.70%**	[1]
Charles Schwab - Long-term Market Returns (March 2018)		
U.S. Large Capitalization Stocks	6.50%	[2]
U.S. Small Capitalization Stocks	7.20%	[2]
J.P. Morgan Asset Management - Equity Long-Term Returns (2019)		
U.S Large Cap	5.25%	[3]
Selected Emerging Market	8.00 - 8.75%	[3]

Sources:
[1] Mr. D'Ascendis' Direct Testimony, page 4
[2] Charles Schwab - Why Market Returns May Be Lower in the Future, March 6, 2018.
[3] J.P. Morgan Asset Management - Long-Term Capital Market Assumptions, 2019 Annual Edition, page 65.

The return expectations published by Charles Schwab and J.P. Morgan are based on their own financial models. I provide the data shown in Table 5 to show that major financial institutions are telling their clients to expect lower returns on their investments than the cost of equity proposed by Mr. D'Ascendis. Charles Schwab and J.P. Morgan's published return expectations are for the overall stock market. Mr. D'Ascendis' cost of equity recommendation is for a regulated utility company. It is unlikely that investors would expect to earn a higher return on equity for a cost of service regulated utility company than the overall stock market.

[10] Includes expected returns from selected emerging markets (8.00-8.75%).

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Mr. D'Ascendis' 10.20% to 10.70% is not consistent with allowed returns in recent proceedings I have testified in. In 2018 I testified on behalf of the Office of Consumer Advocate (ORA)[11] in California's Water Cost of Capital Proceeding. On March 22, 2018 the California Public Utilities Commission authorized a return on equity (ROE) of between 8.90% and 9.20% for the following California Class A water utilities (Decision 18-03-035):

- 9:20% - California Water Service Company (A17-04-001, 17-04-001);
- 9.20% - California American Water Company (A17-04-001, 17-04-002);
- 8.90% - Golden State Water Company (A17-04-001, 17-04-003);
- 8.90% - San Jose Water Company (A17-04-001, 17-04-006).[12]

III. CAPITAL STRUCTURE, COST OF DEBT AND OVERALL RATE OF RETURN

Q. WHAT CAPITAL STRUCTURE DO YOU RECOMMEND AND WHY?

A. I recommend using BGWC's requested capital structure consisting of 52.91% equity and 47.09% debt because it is consistent with capital structure ratios used by other regulated water companies.

[11] Renamed the "Public Advocates Office" in 2019.
[12] CPUC Press release, CPUC SETS COST OF CAPITAL FOR LARGE WATER COMPANIES, March 22, 2018.

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IV. COST OF EQUITY IN TODAY'S FINANCIAL MARKET

Q. HOW DOES YOUR COST OF EQUITY RECOMMENDATION RELATE TO THE CURRENT FINANCIAL MARKET?

A. The United States' economy has been experiencing high stock prices, low unemployment, reasonable global growth, low bond yields, and low inflation expectations. According to a recent J.P. Morgan Asset Management report, "[t]his S&P bull market is the longest on record, with trough-to-peak gains almost twice the bull market average of the last 50 years…"[13] These favorable economic conditions have led to high market-to-book ratios for utility stocks which indicates the cost of equity for utility companies is decreasing. Rates should be set in this proceeding based on the current low cost of capital environment and re-evaluated should conditions change in the future. Since the beginning of 2018, national trade policy has added some risks to companies with exposure to international markets. However, regulated water companies have limited exposure to the adverse effects of a possible trade war. In fact, regulated water companies present an opportunity for investors looking for a way to shed trade policy risk.

The current capital markets indicate that an 8.65% return on equity for investing in a regulated utility company is sufficient to raise capital. Interest rates remain low by historical standards (see Chart 5 on page 20) and yield spreads are low (see Chart 6 on page 21). Lower than average yield spreads indicate a cost of equity lower than the historical average. It is important to consider the results of my cost of equity models (e.g. DCF and

[13] J.P. Morgan Asset Management – Long-Term Capital Market Assumptions, 2019 Annual Edition, page 6-.

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CAPM) in the context of current financial market conditions as follows:

1. **Stocks are expensive.** As the S&P 500, Dow Jones Industrial Average and other stock indices increase, investors are paying more for the same earnings, including for utility stocks, than the average of the past 10 years,[14] indicating that the cost of equity is lower than the historical average.
2. **Interest rates are low.** Interest rates are near historical lows (see Chart 3) and the Federal Reserve cut interest rates on July 31, 2019. The market expected this rate cut. In fact, investors expect there is a chance of another rate cut in 2020. Futures market data indicates that market prices reflect investor expectations regarding Federal Reserve policy and, therefore, there is no need to use Blue Chip interest rate forecasts as a proxy for the risk-free rate in a CAPM as BGWC witness has done.
3. **Credit spreads are low.** The spread between the yield investors demand to purchase U.S. Corporate Bonds and U.S. Treasury bonds (see Chart 6) remains at near all-time lows since the last financial crisis of 2008/2009. Low credit spreads support a cost of equity as low, or lower, than at any other time since the financial crisis.
4. **Volatility expectations**. As of December 31, 2019, the Market Volatility Index("VIX") is at relatively low levels. The VIX is a market indicator that allows us to see what investors expect volatility to be in the future.

[14] As of December 31, 2019 the S&P 500 has a Price-to-earnings ratio (over 24) nearly twice the average (15.70) since 1880.

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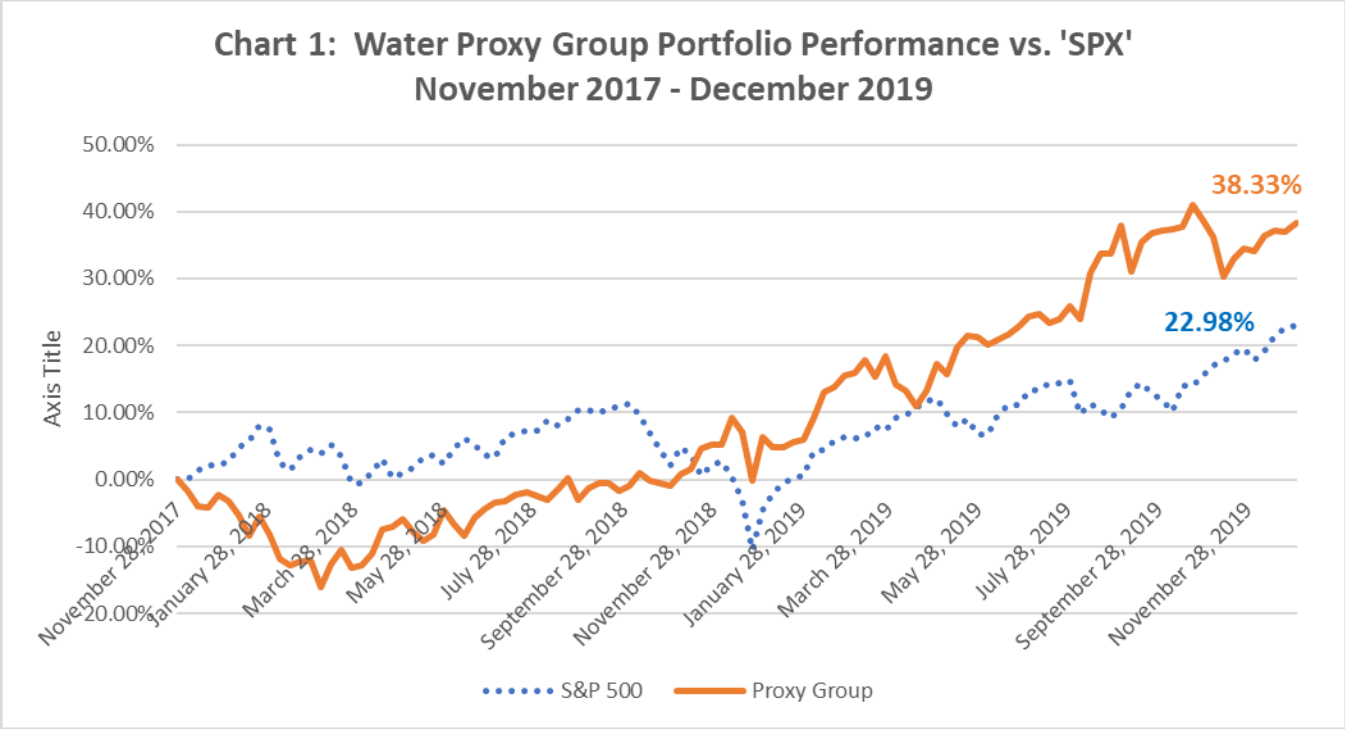
As explained below, these factors indicate the cost of equity remains at historically low levels.

A. Stocks Price Trends

Q. WHAT, IF ANYTHING, DOES THE STOCK MARKET DATA INDICATE WITH REGARD TO THE COST OF EQUITY?

A. As stock prices have increased significantly in recent years, the price-to-earnings ratios have increased as well. This indicates that the cost of equity may be decreasing along with the higher stock prices. As shown in Chart 1 below, stock prices for the S&P 500 and the Water Proxy Group have increased significantly in the past four plus years since BGWC filed their last rate case in 2017. The Water Proxy Group has increased by 38.33% while the S&P 500 has increased by 22.98%.



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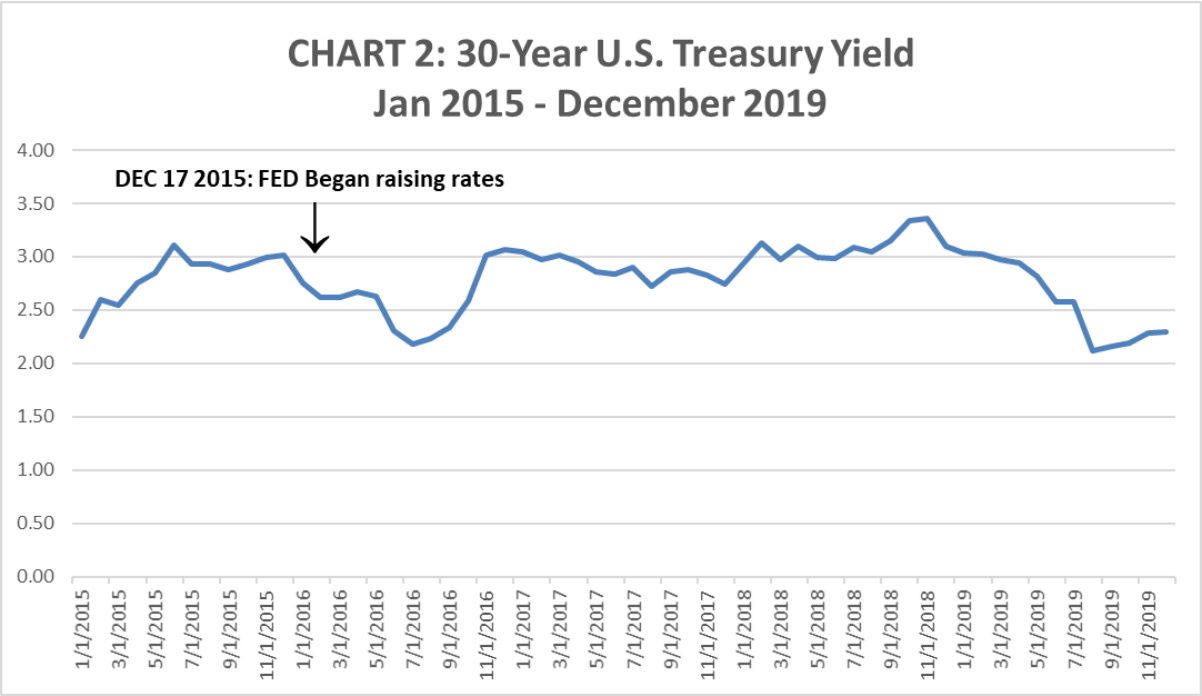
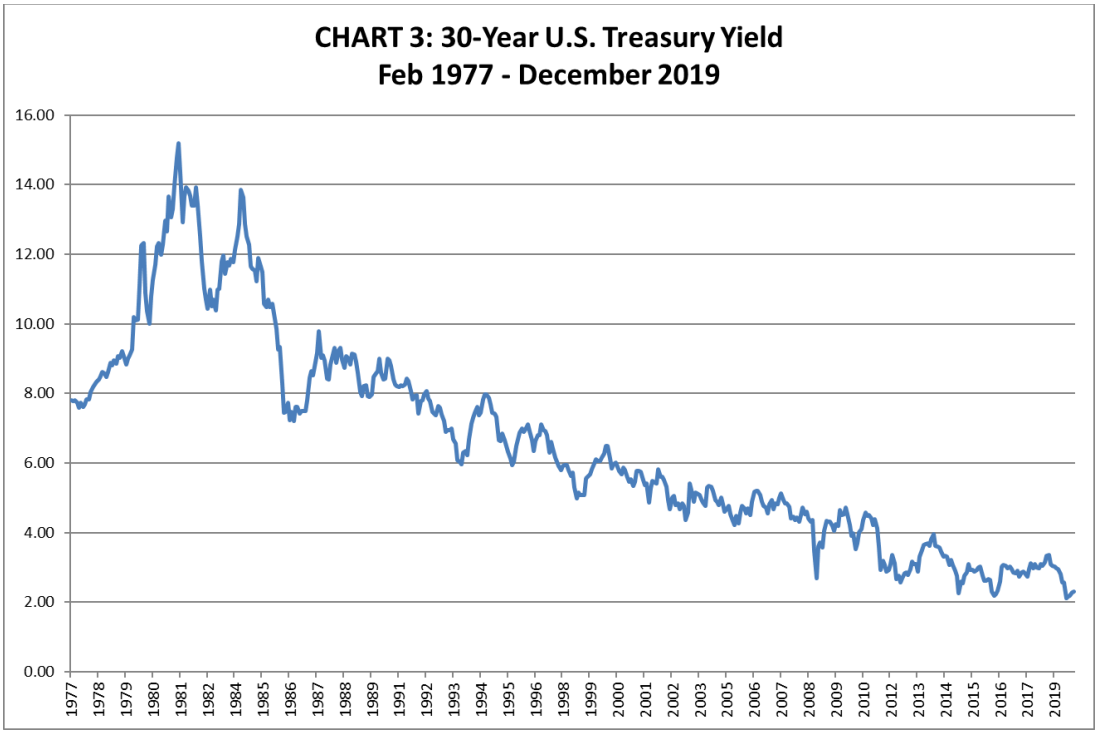
B. Interest Rates

Q. DO INVESTORS EXPECT LONG TERM U.S. GOVERNMENT BOND YIELDS TO STAY AT THESE LOW LEVELS?

A. Yes. Despite raising the federal funds rate nine times since 2015, yields on long-term U.S. government bonds (2.39% as of December 31, 2019) have not increased since the Federal Reserve began raising rates in December 2015. See Chart 2 below.



As shown in Chart 3 below, yields on 30-year U.S. Treasuries remain low by historical measures:



Q. CAN YOU PLEASE PUT THE CURRENT INTEREST RATE ON 30-YEAR U.S. TREASURY BONDS INTO HISTORICAL PERSPECTIVE?

A. Chart 3 above shows that the yield on 30-year U.S. Treasury bonds has been in a long-term downward trend since the very early 1980's when the annual yield peaked just below 14%. As of December 31, 2019, the yield on 30-year Treasury bonds remains at the historically low yield of 2.39% that has persisted since the middle of 2015.

Q. PLEASE COMMENT ON HOW RECENT ACTION TAKEN BY THE FEDERAL RESERVE TO RAISE THE FEDERAL FUNDS RATE RELATES TO THE BOND YIELDS SHOWN IN CHARTS 4 AND 5?

A. The yields on 30-year U.S. Treasury bonds are market-based and therefore reflect investors' expectations. Since bond prices and yields are inversely related, an investor who expected long-term interest rates to increase soon would not purchase 30-year U.S.

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Treasuries because they would lose money. In a liquid market like those for 30-year U.S. Treasury bonds, the yield reflects interest rate expectations of the marketplace. The current yield on 30-year U.S. Treasury bonds is based upon a market with investors who are aware of the comments by the Federal Reserve. In March 2019, the Board of Governors of the Federal Reserve voted to maintain the target federal funds rate at 2.25 - 2.50%. The Committee stated the following:

> In light of global economic and financial developments and muted inflation pressures, the Committee will be patient…[15]

Recent Fed-funds futures indicated that investors believed the Federal Reserve may cut rates in 2020.

It is important to recognize that current long-term interest rates represent a direct observation of investor expectations and there is no need to use "expert" forecasts such as Blue Chip to determine the appropriate risk-free rate to use in a CAPM analysis or any other cost of equity calculations.

Q. DO YOU KNOW WHAT INTEREST RATES WILL BE IN THE FUTURE?

A. No. As noted above, Jerome Powell, the Federal Reserve Board Chair, has said "we will be patient," regarding changing the federal fund rate, but, he explained, that the Federal Reserve is "always prepared to shift the stance of policy."[16] He emphasized the uncertainty surrounding forecasting the economy and the financial markets in a 2018 speech, stating:

> You could imagine narratives in which that [forecast] would make sense, but honestly, I wouldn't put too much on that.[17]

[15] Federal Reserve Press Release, May 1, 2019.
[16] "Powell says Fed 'will be patient' with monetary policy as it watches how economy performs", CNBC, January 4, 2019.
[17] "Fed Raises Rates and Signals Faster Pace in Coming Years" The Wall Street Journal March 21, 2018.

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Many economists and forecasters will continue to be quoted in the press prognosticating on possible developments that are truly unpredictable. The Nobel Laureate Economist Daniel Kahneman stated the following regarding forecasting:

> It is wise to take admissions of uncertainty seriously, but declarations of high confidence mainly tell you that an individual has constructed a coherent story in his mind, not necessarily that the story is true.[18]

Kahneman also found that the trading industry is based on an "illusion of skill."[19]

BGWC's actual cost of capital is based on the current capital markets. More fundamental to economic regulation, a market-based cost of equity is consistent with ratemaking principles.[20]

Q. ARE YOU AWARE OF STUDIES THAT HAVE SHOWN THE CHALLENGES OF FORECASTING FINANCIAL MARKETS?

A. Yes. A Duke University study demonstrated that U.S. financial executives were over-confident in their ability to predict financial markets. The Chief Financial Officers (CFOs) in the study estimated the returns of Standard and Poor's Index over the following year. The 80% confidence interval provided by the CFOs contained only 33% of the realized returns.[21] The correlation between their estimates and the true value of returns was slightly less than zero.

An additional study conducted by McKinsey and Company to determine the accuracy of analysts' earnings forecasts found that the analysts were overly optimistic,

[18] Daniel Kahneman, *Thinking Fast and Slow* (New York: Farrar, Straus and Giroux, 2011): 212.
[19] Id.
[20] The U.S. Supreme Court in the *Hope* and *Bluefield* cases, established that the cost of equity should support a utility's credit, enable raising money, assure financial soundness and "be commensurate with returns on investments in other enterprises having corresponding risks."
[21] Itzhak Ben-David, John R. Graham, Campbell R. Harvey, *Managerial Miscalibration*, July 2010, page 30.

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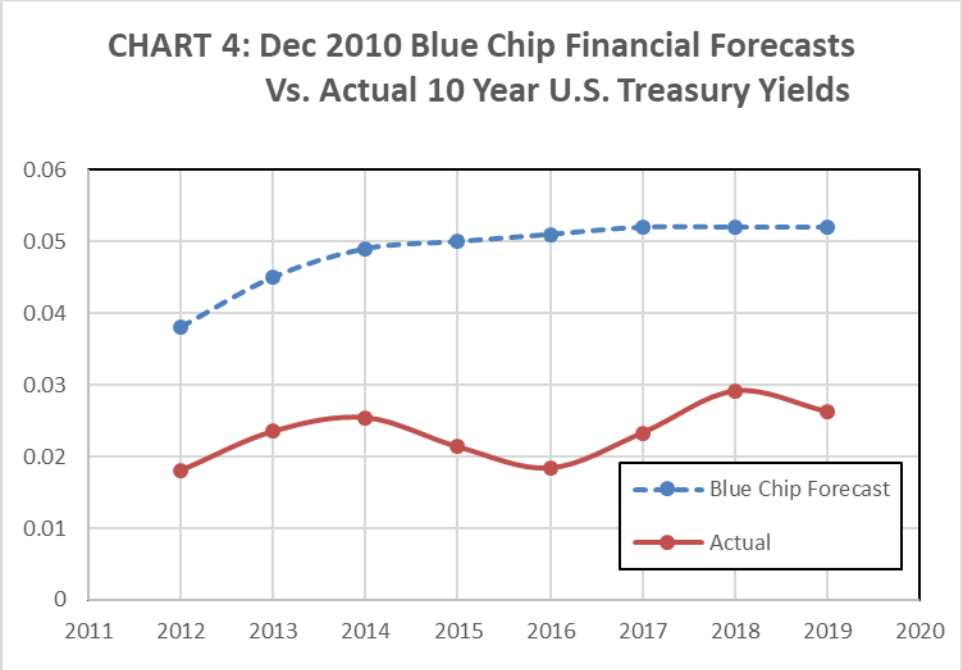
slow to revise their forecasts, and prone to making increasingly inaccurate forecasts during economic downturns. Moreover, as indicated by P/E (price/earnings) ratios, the investors' expectations were more conservative.[22]

Q. HAVE THE BLUE CHIP INTEREST-RATE FORECASTS BEEN ACCURATE?

A. No. As Chart 4 below shows, Blue Chip Financial forecasted in 2012 that 10-Year U.S. Treasury bonds would be over 5% by 2018, when they are actually under 3%.



The time covered in Chart 4 was chosen to provide a concrete example. Blue Chip's interest rate forecasts have been persistently inaccurate for decades. A recent paper published by the Congressional Budget Office determined Blue Chip consensus forecasts

[22] Marc H. Goedhart, Rishi Raj and Abhishek Saxena, *Equity Analysts: Still too bullish*, Spring 2010, page 14.

exhibited "significant positive bias" between 1984 and 2012 and "have become more biased and less accurate over time."[23]

C. Low Credit Spreads

Q. WHAT DO LOW U.S. TREASURY YIELDS MEAN FOR THE COST OF EQUITY?

A. Historical market data indicates that a low interest rate environment, like we have now, indicates a low cost of equity. Chart 5 below shows that as interest rates decrease, the yield credit spread between Baa rated corporate bonds and U.S Treasury bonds, which is a proxy for the cost of equity, has remained relativity stable (except for the great recession). This chart indicates that the cost of equity decreases as interest rates decrease because the extra yield investors demand to purchase Baa, Corporate bonds, and equities, is over a lower "risk free"[24] rate of return.

[23] Did Treasury Debt Markets Anticipate the Persistent Decline in Long-Term Interest Rates?, Congressional Budget Office, Edward N. Gamber, page 2. This paper can be found at: https://www.cbo.gov/system/files/115th-congress-2017-2018/workingpaper/53153-interestrateswp.pdf

[24] The return on investments with no chance of loss. For example, short-term U.S. Government bonds virtually risk-free rate because the U.S. Government can print money to avoid default.

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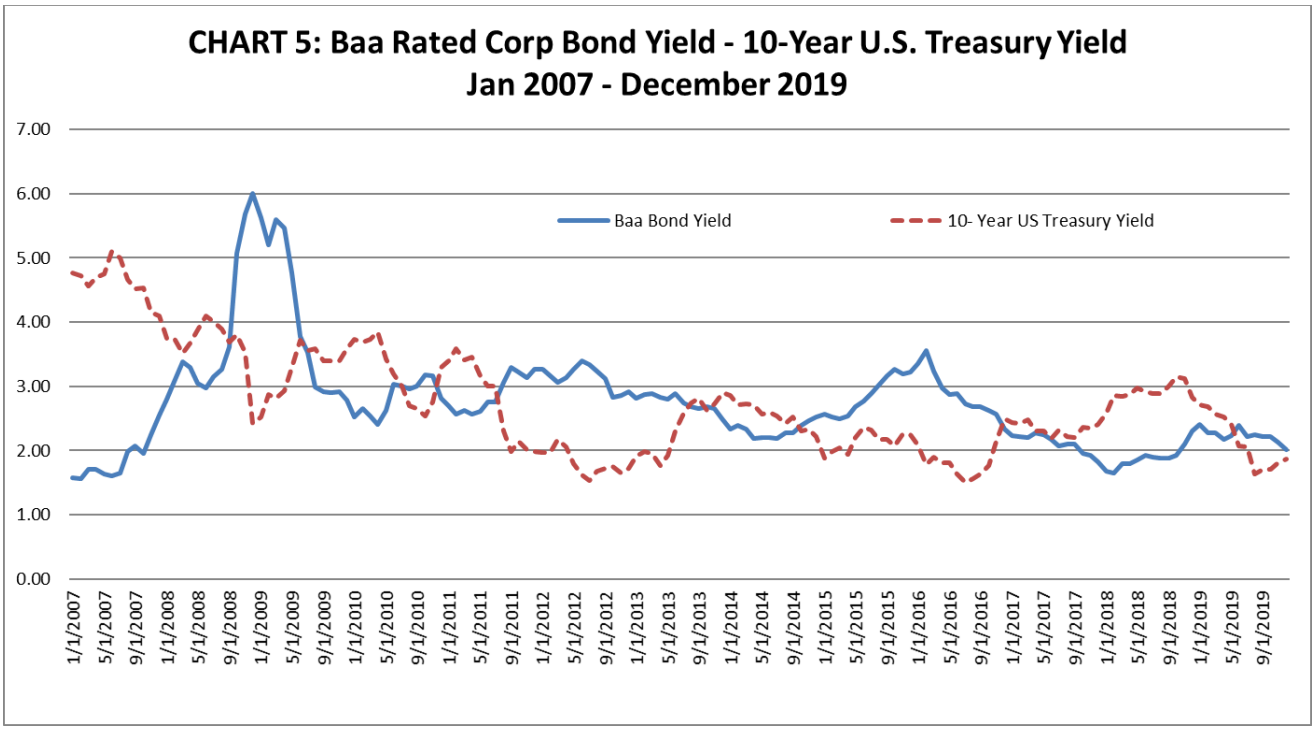

D. Volatility Expectations

Q. WHAT IS YOUR BASIS FOR CLAIMING THAT INVESTORS VIEW THE MARKETS AS LESS RISKY?

A. The Market Volatility Index ("VIX") is a market indicator that allows us to see what investors expect volatility to be in the future. Volatility, uncertainty, and risk are synonymous. Therefore, the VIX index can be a valuable tool to determine investors' assessment of the riskiness of financial markets. This is a more direct route than trying to monitor world events, analysts' forecasts and surveys. This direct route has not only proven to be more accurate than forecasts and interpretations, but is also aligned with the principle that the cost of capital is a market-based concept.

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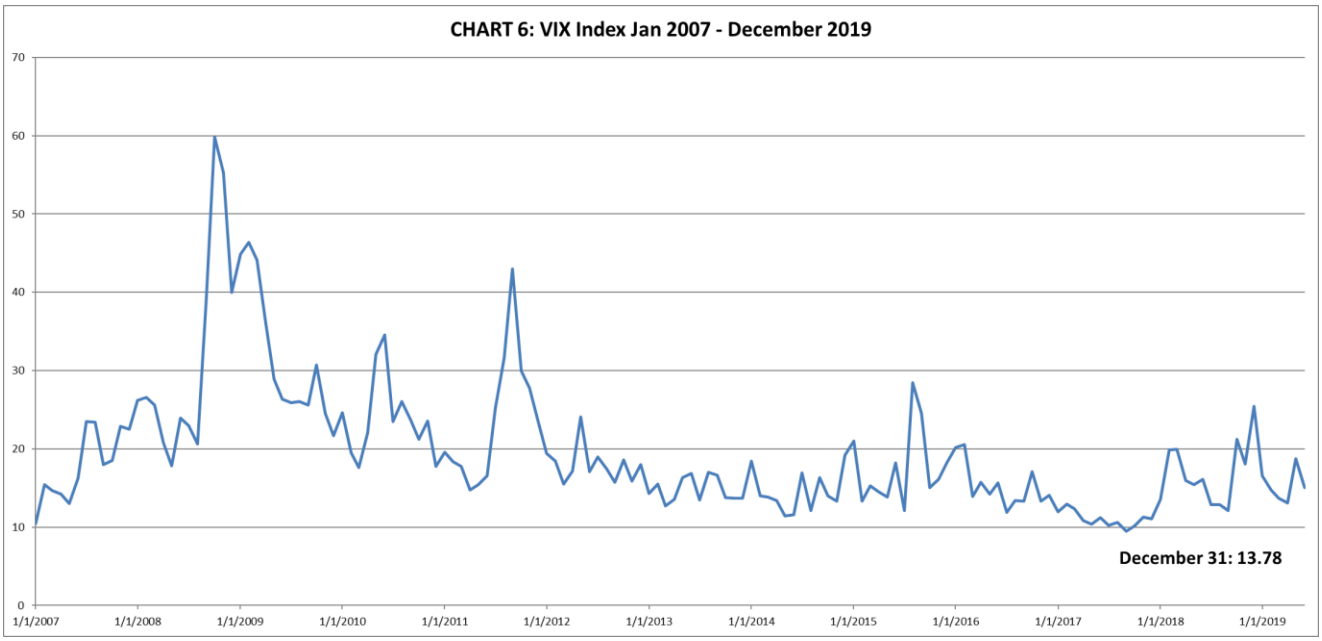
Q. PLEASE EXPLAIN FURTHER WHAT THE VIX INDEX IS AND HOW IT IS ESTABLISHED.

A. The Chicago Board Options Exchange ("CBOE") VIX is based on options on the S&P 500 Index and reflects the market consensus expected volatility in the S&P 500 over the next 30 days on an annual basis. It is sometimes known as the "fear index."

Q. WHAT IS THE MARKET PRICE OF THE VIX CURRENTLY AND HOW DOES THIS COMPARE TO PRICES DURING THE GREAT RECESSION?

A. As of December 31, 2019, the VIX Index was trading at 13.78, indicating that investors expect an annualized change of 13.78% over the next 30 days. At the height of the financial crisis in 2008, the VIX Index was trading at over 80, indicating that investors expected an annualized change of over 80% over the same 30-day period. As can readily be seen in the chart below, the VIX Index is significantly lower than it was during the financial crisis and is nearing pre-crisis levels.



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V. COST OF EQUITY CALCULATION

A. Overview

Q. PLEASE PROVIDE YOUR DEFINITION OF THE COST OF CAPITAL.

A. The cost of capital is the return investors require to provide capital to BGWC based on current capital markets. My cost of equity ("COE") recommendation is my opinion of the return investors require to provide equity capital to BGWC based on current capital markets. My recommendation is consistent with the following legal standards set by the United States Supreme Court set for a fair rate of return:

> The return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks.[25]

And

> …sufficient to…support its credit and…rase the money necessary for the proper discharge of its public duties.[26]

Because the cost of equity is not a published figure like a bond yield, some interpretation is required to determine the appropriate market price. My cost of equity recommendation is based on my computation of what the market indicates investors require (return on investment) to provide capital to companies with comparable risk to BGWC.

As explained below, I use current market prices (e.g. stocks, bonds, options), which measures investors' expectations directly, instead of relying solely on historical data and analyst forecasts.

[25] Federal Power Commission v. Hope Natural Gas Company (1944) 320 U.S. 591, 603.
[26] Bluefield Water Works & Improvement Company v. Public Service. Commission of the State of Virginia (1923) 262 U.S. 679, 692-693.

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A cost of equity based on market prices (market-based) is superior to a cost of equity based on historical data (non-market-based) for two reasons:

- The cost of equity that BGWC has to pay investors is based on capital markets. Interest rates remain at historical low levels after a persistent downtrend since the early 1980s (see Chart 3 above). It is possible interest rates will increase, but if the marketplace expected interest rates to change, then that would already be part of current prices.
- Capital markets are unpredictable. Regarding capital markets' unpredictability, investment guru Warren Buffet recently gave the following advice to investors:

> "They should not listen to a lot of the jabbering about what the market is going to do tomorrow, or next week or next month because nobody knows."[27]

Research, which I will present later in my testimony, supports Mr. Buffet's advice to investors and my opinion that the cost of equity should be based on current capital markets. Current capital markets are our best source of investors' expectations regarding future capital markets.

Current market prices of stocks and bonds reflect investors' forecasts for long-term interest rates and capital markets in general. If, indeed, investors in aggregate should be expecting an increase in interest rates, adding a separate factor for this on top of what is already indicated in market prices would amount to a double-count.

[27] PBS News Hour, June 26, 2017, Part 1 – America should stand for more than just wealth, says Warren Buffett.

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Q. WHICH COMPANIES DID YOU INCLUDE IN YOUR COMPARABLE GROUP OF UTILITY COMPANIES TO DETERMINE YOUR COST OF EQUITY RECOMMENDATION?

A. I included the following 6 utility companies, referred to as the Water Proxy Group: (1) American States Water, (2) American Water Works, (3) Aqua America, (4) California Water Service Group, (5) Middlesex Water Company, and (6) York Water. Mr. D'Ascendis Utility Proxy Group includes 5 of the 6 water companies in my Water Proxy Group.

Q. HOW DID YOU ARRIVE AT YOUR COST OF EQUITY RECOMMENDATIONS?

A. I used both a constant growth and non-constant growth Discounted Cash Flow ("DCF") method. My constant growth DCF method determines growth based on the sustainable retention procedure. My non-constant growth method is based on estimated dividend growth for the next 5-years and capital gains. Additionally, I used a Capital Asset Pricing Model ("CAPM") based on current market data. Later in my testimony, I explain the theory behind both the DCF and CAPM methods.

B. Discounted Cash Flow

Q. HOW DID YOU ARRIVE AT YOUR DCF-BASED COST OF EQUITY RECOMMENDATION?

A. I used the constant growth form of the Discounted Cash Flow ("DCF") method that determines growth based on the sustainable retention growth procedure and a non-constant DCF method. My constant growth form DCF analysis indicates a cost of equity range of

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between 8.34% and 8.76% for the Water Proxy Group.[28] The results of my non-constant DCF method indicates a cost of equity of between 5.72% and 6.96% for the Water Proxy Group.[29] Based on these results from my constant growth and non-constant growth DCF methods, I concluded that an 8.75% cost of equity for the Water Proxy Group is conservatively high. I recommend an 8.65% cost of equity for BGWC because, based on its requested capital structure, it has slightly less financial risk than my Water Proxy Group.

Q. WHAT IS THE DISCOUNTED CASH FLOW METHOD?

A. The DCF method, is an approach to determining the cost of equity. The method recognizes that investors purchase common stock to receive future cash payments. These payments come from: (a) current and future dividends, and (b) proceeds from selling stock. A rational investor will buy stock to receive dividends and to ultimately sell the stock to another investor at a gain. The price the new owner is willing to pay for stock is related to that buyer's expectation of future flow of dividends and the future expected selling price. The value of the stock is the discounted value of all future dividends until the stock is sold plus the value of proceeds from the sale of the stock.

Q. HAVE INVESTORS ALWAYS USED THE DCF METHOD?

A. While investors who buy stock have always done so for future cash flow, the DCF approach first appeared in the 1937 Harvard Ph.D. thesis of John Burr Williams titled *The Theory of Investment Value*. Author Peter L. Bernstein once stated, Williams' model for valuing a security calls for the investor to make a long-run projection of a company's future dividend

[28] See Exhibit ALR 2.
[29] See Exhibit ALR 4.

payments…"[30] The Williams DCF model separately discounts each and every future expected cash flow. Dividends and proceeds from the sale of stock are the expected cash flows. Its accuracy is therefore unaffected by non-constant growth rates. Myron Gordon and Eli Shapiro who helped to make this method widely used, referred to Williams' work in their paper published in 1956 "Equipment Analysis: The Required Rate of Profit."

C. Constant Growth Form of the DCF Model

Q. YOU STATE YOU USED THE CONSTANT GROWTH FORM OF THE DCF MODEL. WHAT IS THE CONSTANT GROWTH FORM OF THE DCF MODEL?

A. The constant growth form of the DCF model is a form of the DCF method that can be used in determining the cost of equity when investors can reasonably expect that the growth of retained earnings and dividends will be constant.

Retained earnings are funds that a company keeps in its treasury, so that it is available for future needs, such as operating expenses, capital expenditures, debt payments, and new investments. These retained earnings show investors whether the company is growing which, in turn, is a measure of the future indicator of dividends and the value of a company's stock.

Q. DESCRIBE HOW THE CONSTANT GROWTH MODEL WORKS.

A. The constant growth model is described by this equation k= D/P + g, where: [31]

k= cost of equity;
D=Dividend; and
P=Market price of stock at time of the analysis.

and where:

g=the growth rate, where g= br + sv;

[30] P. BERNSTEIN, *Capital Ideas: The Improbable Origins of Modern Wall Street* (The Free Press, © 1992).

[31] M. GORDON, *Cost of Capital to a Public Utility*, at 32-33 (MSU Public Utility Studies 1974).

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b=the earnings retention rate;
r=return on common equity investment (referred to below as "book equity");
v=the fraction of funds raised by the sale of stock that increases the book value of the existing shareholders' common equity; and
s=the rate of continuous new stock financing.
The constant growth model is therefore correctly recognized to be:
$k=D/P + (br +sv)$

The cost of equity demanded by investors is the sum of two factors. The first factor is the dividend yield. The second factor is growth (dividends and stock price). The logical relationship among these factors is as follows: the dividend yield is calculated based on current dividend payments while growth indicates what dividends and stock price will be in the future.

Q. WHAT OTHER FACTORS IMPACT HOW ONE USES THE CONSTANT GROWTH FORM OF THE DCF MODEL?

A. Sufficient care must be taken to be sure that the growth rate "g" is representative of the constant sustainable growth. To obtain an accurate constant growth DCF result, the mathematical relationship between earnings, dividends, book value and stock price must be respected.

Suppose one is faced with a situation where Value Line forecasts of growth are being used as a source for inputs and Value Line projects different growth rates for earnings per share and dividends per share. Under such conditions, the earnings per share growth rate does not provide a reasonable proxy for earnings per share growth, and dividends per share and stock price growth as well. Consider the following:

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1. It is the lower dividend growth rate that makes it possible for more earnings to be retained, which in turn makes the earnings per share growth rate higher than it would be if dividends had in fact been modeled by Value Line to keep pace with earnings per share growth.

2. A dividend growth rate that is lower than both the earnings per share growth rate and the stock price growth rate means that the dividend yield will be going down. However, the constant growth form of the DCF model has no mechanism to account for the lower dividend yield investors would get if the Value Line projections were correct.

Using an earnings per share growth rate in the constant growth form of the DCF model will therefore result in an overstatement of the cost of equity whenever the earnings per share growth rate that has been modeled is derived along with an expectation of a lower dividend growth rate. This is because, under these conditions, the dividend yield portion of the constant growth form of the equation will be overstated.

The basic difference between the use of an analysts' earnings per share growth rate in the constant growth DCF formula and using the "br" (**b** (the earnings retention rate) X **r** (rate of return on common equity investment)) approach is that the "br" form, if properly applied, eliminates the mathematical error caused by an inconsistency between the expectations for earnings per share growth and dividends per share growth. Because it eliminates that error, the results of a properly applied "br" approach will be superior to the answer obtained from other approaches to the constant growth form of the DCF model. This is not to say that even a properly applied "br" approach will be perfect. The self-correcting nature of a properly applied "br" to forecasted differences in earnings per share

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and dividends per share growth rates helps mitigate the resultant error, but should not be viewed as the perfect way to quantify the impact of expected non-constant growth rates.

Q. ARE YOU AWARE OF CLAIMS ALLEGING THAT THE "BR" APPROACH TO THE CONSTANT GROWTH DCF MODEL IS FLAWED BECAUSE IT RELIES ON THE VALUE OF THE FUTURE EXPECTED RETURN ON BOOK EQUITY "R" TO ESTIMATE WHAT THE EARNED RETURN ON EQUITY SHOULD BE?

A. Yes. One common criticism is that it is not reasonable for the DCF to indicate a cost of equity (market return) that is different (lower or higher) than the expected return on book equity (accounting). There are multiple reasons why this concern is unfounded:

1. The constant growth form of the equation using "br" is:

$$k = D/P + (br + sv).$$

In this equation, k is the variable for the cost of equity, and r is the future expected return on equity. The cost of equity, "k," is not the same variable as the future expected earned return on equity, "r." In fact, there often is a large difference between the two.

2. The correct value to use for "r" is the return on book equity expected by investors as of the time the stock price and dividend data is used to quantify the D/P term in the equation. Therefore, even if future events occur that may change what investors expect for "r", the computation of the cost of equity "k" remains correct as of the time the computation was made.

3. The ability of a commission's ROE decision to influence future cash flow expectations is not unique to the retention growth DCF approach. The five-year

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analysts' earnings per share growth rate is a computation that is directly influenced by what earnings per share will be in five years. Allowed ROE's impact earning – higher allowed returns lead to higher earnings growth because the higher allowed returns the more earnings that is available for reinvestment.

Q. CAN CHANGES IN THE ACTUAL EARNED RETURNS IMPACT GROWTH ABOVE AND BEYOND WHATEVER GROWTH RESULTS FROM EARNINGS RETENTION?

A. Yes, but large short-term changes in earnings per share caused by a perceived change in the future expected earned returns are unsustainable. The new perceived earned return on book equity should be part of the computation, but the one-time growth spurt to get there is no more indicative of the sustainable growth required in the constant growth DCF formula than the temporary negative growth that occurs when a company has a bad year.

Q. HOW HAVE YOU IMPLEMENTED THE CONSTANT GROWTH FORM OF THE DCF MODEL IN THIS CASE?

A. I have applied the constant growth form of the DCF model by staying true to the mathematically derived "k=D/P + (br + sv)" form of the DCF model. I have also taken care to fully allocate all future expected earnings to either future cash flow in the form of dividends ("D") or to retained earnings (the retention rate, "b"). This extra accuracy is obtained only when the retention rate "b" is derived from the values used for "D" and "r," rather than independently.

Q. PLEASE EXPLAIN HOW YOU OBTAINED THE VALUES TO INPUT INTO THE CONSTANT GROWTH FORM OF THE DCF METHOD.

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A. The DCF model generally calls for the use of the dividend expected over the next year. A reasonable way to estimate next year's dividend rate is to increase the quarterly dividend rate by ½ of the current actual quarterly dividend rate. This is a good approximation of the rate that would be obtained if the full prior year's dividend were escalated by the entire growth rate.[32]

I obtained the stock price—"P"—used in my DCF analysis from the closing prices of the stocks on December 31, 2019. I also obtained an average stock price for the 12 months ending December 31, 2019 by averaging the high and low stock prices for the year.

I based the value of the future expected return on equity— "r" —on the average return on book equity expected by Value Line, adjusted in consideration of recent returns. I also made a computation that was based on a review of both the earned return on equity consistent with analysts' consensus earnings growth rate expectations and on the actual earned returns on equity. For a stable industry such as utility companies, investors will typically look at actual earned returns on equity as one meaningful input into what can be expected for future earned returns on book equity. See Exhibit ALR 4, page 1.

This return on book equity expectation used in the DCF method to compute growth must *not* be confused with the cost of equity. Since the stock prices for the comparative

[32] For example, assume a company paid a dividend of $0.50 in the first quarter a year ago, and has a dividend growth rate of 4 % per year. This dividend growth rate equals (1.04)^4-1=0.00985 % per quarter. Thus, the dividend is $0.5049 in the second quarter, $0.5099 in the third quarter, and $0.5149 in the fourth quarter. If that 4 % per annum growth continues into the following year, then the dividend would be $0.5199 in the 1st quarter, $0.5251 in the 2nd quarter, $0.5303 in the 3rd quarter, and $0.5355 in the 4th quarter. Thus, the total dividends for the following year equal $2.111 (0.5199 + 0.5251 + 0.5303 + 0.5355). I computed the dividend yield by taking the current quarter (the $0.5149 in the 4th quarter in this example), and multiplying it by 4 to get an annual rate of $2.06. I then escalated this $2.06 by ½ the 4 % growth rate, which means it is increased by 2 %. $2.06 x 1.02= $2.101, which is within one cent of the $2.111 obtained in the example.

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companies are considerably higher than their book value, the return investors expect to receive on their market price investment is considerably less than whatever is the anticipated return on book value. If the market price is low relative to book value, the cost of equity will be higher than the future expected return on book equity, and if the market price is high, then the return on book equity will be less than the cost of equity.

In addition to growing through the retention of earnings, utility companies also grow by selling new common stock. Selling new common stock increases a company's growth. I quantified this growth caused by the sale of new common stock by multiplying the amount that the actual market-to-book ratio exceeds 1.0, by the compound annual growth rate of stock that Value Line forecasts. The results of that computation are shown on line 4 of Exhibits ALR 4, page 1.

Pure financial theory prefers concentrating on the results from the most current price because investors cannot purchase stock at historical prices. There is a legitimate concern, however, about the potential distortion of using just a single price. I present both so this Commission can use the approach it deems more appropriate. As shown in Exhibit ALR 2, my DCF method, applied to the Water Proxy Group, the DCF result based on the year-end stock price and the DCF result based on average prices for the year ending December 31, 2019 is 8.76%. As of December 31, 2019, the result is 8.34%. Exhibit ALR 4, page 1, shows more of the specifics of how I implemented the constant growth form of the DCF model for the Water Proxy Group.

Q. PLEASE EXPLAIN HOW YOU DETERMINED WHAT VALUE TO USE FOR "R" WHEN COMPUTING GROWTH IN YOUR CONSTANT GROWTH FORM OF THE DCF MODEL.

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A. The inputs I considered are shown in Footnote [C] of Exhibit ALR 4, page 1A and B. The value of "r" that is appropriate to use in the DCF formula is the value anticipated by investors to be maintained on average in the future. This schedule shows that the average future return on equity forecast by Value Line for the Water Proxy Group for 2019-2022-2024 is 13.00%. The same footnote also shows that the future expected return on equity derived from the Zacks consensus forecast is 10.93%, and that the actual returns on equity earned on average by the Water Proxy Group were 10.57% in 2016, 10.59% in 2017 and 10.50% in 2018. Based on the combination of the forecast return on equity derived from the Zacks consensus, the recent historical actual earned returns and Value Line's forecast, I made the DCF growth computation using a 11.85%[33] value of "r" for the year-end stock price data, I used an "r" of 11.20%.

Q. WHAT COST OF EQUITY IS INDICATED BY THE CONSTANT GROWTH FORM OF THE DCF METHOD THAT YOU RELY ON FOR YOUR RECOMMENDATION?

A. The result of my DCF analysis using the Constant Growth form of the DCF indicates a cost of equity range of between 8.34% and 8.76% for the Water Proxy Group.[34] Since these DCF findings use analysts' forecasts to derive sustainable growth (in part) and on analysts' forecasts of dividend growth and book value growth in the non-constant form of the DCF method, the results should be considered as conservatively high. This is because, as

[33] I used 11.85% and 11.20% in consideration of historical returns, allowed returns and Value Line projected returns for the Water Proxy Group.
[34] Exhibit ALR -2.

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previously mentioned above, analysts' forecasts of such growth have been notoriously overstated.

My results are not as influenced by over-optimistic analysts' forecasts as would have been the case had I merely used analysts' five-year earnings growth rate forecasts as a proxy for long-term growth. This is because the DCF methods I use compute sustainable growth rates rather than growth rates that can exaggerate the growth rate due to assuming that a relatively short-term forecast (five-years) will remain indefinitely.

D. Non-Constant Growth Form of the DCF Model

Q. PLEASE EXPLAIN HOW YOU IMPLEMENTED THE NON-CONSTANT GROWTH FORM OF THE DCF MODEL.

A. The non-constant growth form of the DCF model determines the return on investment expected by investors based on an estimate of each separate annual cash flow the investor expects to receive. For the purpose of this computation, I've incorporated Value Line's detailed annual forecasts to arrive at the specific non-constant growth expectations that an investor who trusts Value Line would expect. This implementation is shown on Exhibit ALR 4, page 2-3. In the first stage cash flow entry is the cash outflow an investor would experience when buying a share of stock at the market price. The subsequent years of cash flow are equal to the dividends per share that Value Line forecasts. For the intermediate years of the forecast period in which Value Line does not provide a specific dividend, the annual dividends were obtained by estimating that dividend growth would persist at a compound annual rate. The cash flow at the end of the forecast period consists of both the last year's dividend forecast by Value Line and the proceeds from the sale of the stock. The stock price used to determine the proceeds from selling the stock was obtained by

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estimating that the stock price would grow at the same rate at which Value Line forecasts book value to grow.

Q. WHY DID YOU USE BOOK VALUE GROWTH TO PROVIDE THE ESTIMATE OF THE FUTURE STOCK PRICE?

A. For any given earned return on book equity, earnings are directly proportional to the book value. Furthermore, book value growth is the net result after the company produces earnings, pays a dividend and also, perhaps, either sells new common stock at market price or repurchases its own common stock at market price.

Once these cash flows are entered into an Excel spreadsheet, the compound annual return an investor would achieve as a result of making this investment was obtained by using the Internal Rate of Return (IRR) function built into the spreadsheet. As shown on Exhibit ALR 4, pages 2-3, this multi-stage DCF model produced an average indicated cost of equity of 5.72% based on the year-end stock price and 6.96% based on average prices for the year ending December 31, 2019 for the Water Proxy Group.

Q. YOUR NON-CONSTANT GROWTH DCF MODEL USES ANNUAL EXPECTED CASH FLOWS. SINCE DIVIDENDS ARE PAID QUARTERLY RATHER THAN ANNUALLY, HOW DOES THIS SIMPLIFICATION IMPACT YOUR RESULTS?

A. I used the annual model because it is easier to input the data and for observers to visualize what is happening. By modeling cash flows to be annual rather than when they actually are expected to occur causes a small overstatement of the cost of equity.

Q. WHY IS IT A SMALL OVERSTATEMENT IF YOU HAVE MODELED DIVIDENDS TO BE RECEIVED SOME MONTHS AFTER INVESTORS ACTUALLY EXPECT TO RECEIVE THEM?

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A. The process of changing from an annual model to a quarterly model would require two changes, not just one. A quarterly model would show dividends being paid sooner and would also show earnings being available sooner. A company that receives its earnings sooner, rather than at the end of the year, has the opportunity to compound them. Since revenues, and therefore earnings, are essentially received every day, a company that is supposed to earn an annual rate of 9.00% on equity would have to earn only 8.62% if the return were compounded daily.[35] This reduction from 9.00% to 8.62% would then be partially offset by the impact of the quarterly dividend payment to bring the result of switching from the simplifying annual model closer to, but still a bit below 9.00%.

Q. BY USING CASH FLOW EXPECTATIONS AS THE VALUATION PARAMETER, DOES THE NON-CONSTANT DCF MODEL STILL RELY ON EARNINGS?

A. Yes. It relies on an expectation of future cash flows. Future cash flows come from dividends during the time the stock is owned and capital gains from the sale of the stock once it is sold. Since earnings impact both dividends and stock price, the non-constant DCF model still relies on earnings.

Every dollar of earnings is used for the benefit of stockholders, either in the form of a dividend payment or earnings reinvested for future growth in earnings and/or dividends. Earnings paid out as a dividend have a different value to investors than earnings retained in the business. Recognizing this difference and properly considering it in the quantification process is a major strength of the DCF model, and is why the non-constant

[35] (1+.0862/365)^365=1.09=9.00 %.

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DCF model as I have set forth is an improvement over either the P/E ratio or D/P methods.

Q. WHY IS THERE A DIFFERENCE TO INVESTORS IN THE VALUE OF EARNINGS PAID OUT AS A DIVIDEND COMPARED TO THE VALUE OF EARNINGS RETAINED IN THE BUSINESS?

A. The return on earnings retained in the business depends upon the opportunities available to that company. If a regulated utility reinvests earnings in needed used and useful utility assets, then those reinvested earnings have the potential to earn at whatever return is consistent with ratemaking procedures allowed and the skill of management in prudently operating the system.

When an investor receives a dividend, he can either reinvest it in the same or another company or use it for other things, such as paying down debt or paying living expenses. Although an investor could theoretically use the proceeds from any dividend payments to simply buy more stock in the same company, when an investor increases his investment in a company by purchasing more stock, the transaction occurs at market price. However, when the same investor sees his investment in a company increase because earnings are retained rather than paid as a dividend, the reinvestment occurs at book value. Stated within the context of the DCF terminology: earnings retained in the business earn at the future expected return on book equity "r," and dividends used to purchase new stock earn at the rate "k." When the market price exceeds book value (that is, the market-to-book ratio exceeds 1.0), retained earnings are worth more than earnings paid out as a dividend because "r" will be higher than "k." Conversely, when the market price is below

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book value, "k" will be higher than "r," meaning that earnings paid out as a dividend earn a higher rate than retained earnings.

Q. IF RETAINED EARNINGS WERE MORE VALUABLE WHEN THE MARKET-TO-BOOK RATIO IS ABOVE 1.0, WHY WOULD A COMPANY WITH A MARKET-TO-BOOK RATIO ABOVE 1.0 PAY A DIVIDEND RATHER THAN RETAIN ALL OF THE EARNINGS?

A. Retained earnings are more valuable than dividends only if there are sufficient opportunities to profitably reinvest those earnings. Regulated utility companies are allowed to earn the cost of capital only on assets that are used and useful in providing utility service. Investing in assets that are not needed may not produce any return at all. For unregulated companies, opportunities to reinvest funds are limited by the demands of the business. For example, how many new computer chips can Intel profitably develop at the same time?

Q. UNDER THE NON-CONSTANT DCF MODEL, IS IT NECESSARY FOR EARNINGS AND DIVIDENDS TO GROW AT A CONSTANT RATE FOR THE MODEL TO BE ABLE TO ACCURATELY DETERMINE THE COST OF EQUITY?

A. No. Because the non-constant form of the DCF model separately discounts each and every future expected cash flow, it does *not* rely on any assumptions of constant growth. The dividend yield can be different from period to period, and growth can bounce around in any imaginable pattern without harming the accuracy of the answer obtained from quantifying those expectations. When the non-constant DCF model is correctly used, the answer obtained is as accurate as the estimates of future cash flow.

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Q. WHAT COST OF EQUITY DOES YOUR NON-CONSTANT GROWTH DCF METHOD INDICATE?

A. My non-constant growth DCF method indicates a cost of equity of between 5.72% and 6.96%.[36]

E. Capital Asset Pricing Model

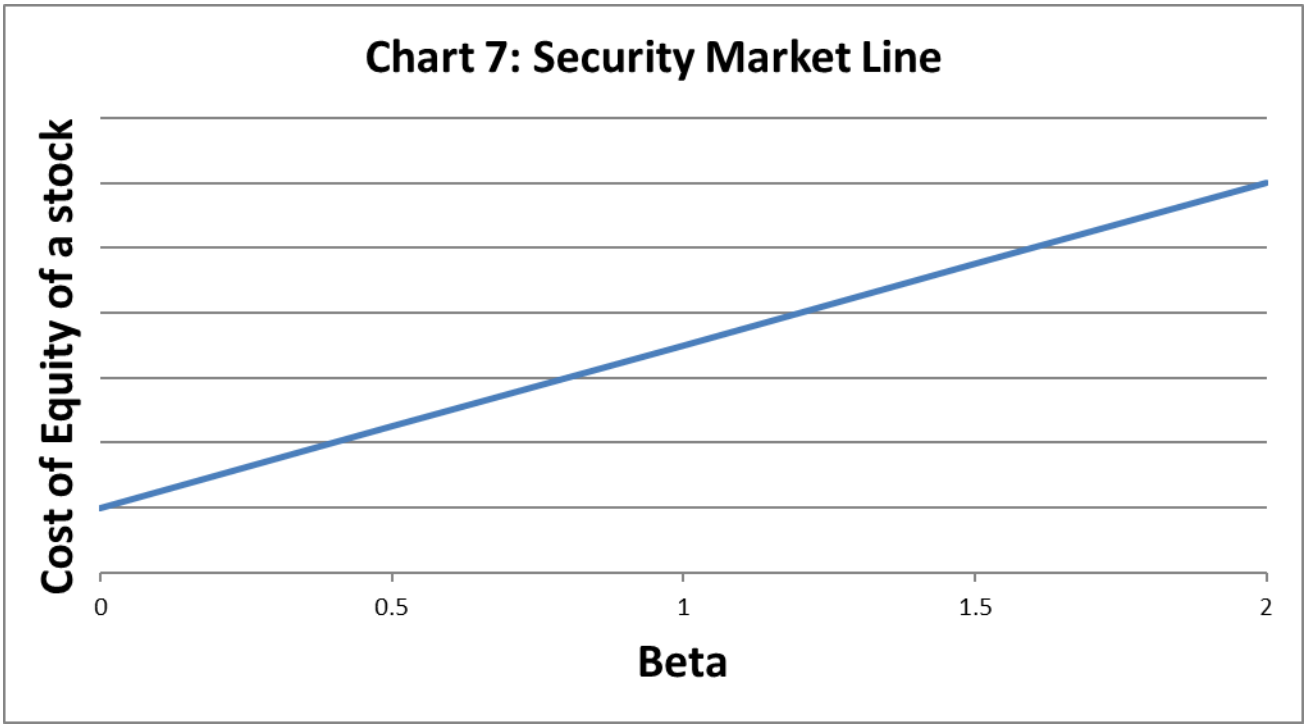
Q. PLEASE DESCRIBE THE CAPM.

A. CAPM stands for "Capital Asset Pricing Model." The CAPM relates return to risk; specifically, it relates the expected return on an investment in a security to the risk of investing in that security. The riskier the investment, the greater the expected return (*i.e.*, the cost of equity) investors require to make for that investment.

Investors in a firm's equity face two types of risks: (1) firm-specific risk and (2) market risk (financial analysts refer to this market risk as systematic risk). Firm-specific risk refers to risks unique to the firm such as management performance and losing market share to a new competitor. Investors can reduce firm-specific risk by purchasing stocks as part of a diverse portfolio of companies, if they construct the portfolio to cause the firm-specific risk of individual companies to balance out. Market-related risk refers to potential impacts from the overall market such as a recession or interest rate changes. This risk cannot be removed by diversification, so the investor must bear it no matter what. Because the investor has no option but to bear market risk, the investor's cost of equity will reflect that risk. The CAPM predicts that for a given equity security, the cost of equity has a positive linear relationship to how sensitive the stock's returns are to

[36] Exhibit ALR- 4, pages 2-3.

movements in the overall market (e.g., S&P 500). A security's market sensitivity is measured by its **Beta.**[37] As shown in Chart 7 below, the higher the beta of a stock, the higher the company's cost of equity—the return required by the investor to invest in the stock.



Here is the standard CAPM formula:

$$K = Rf + \beta i * (Rm - Rf)$$

Where:
K is the cost of equity;
Rf is the risk-free interest rate;
Rm is the expected return on the overall market (e.g., S&P 500);
[Rm – Rf] is the premium investors expect to earn above the risk-free rate for investing in the overall market ("equity risk premium" or "market risk premium"); and
βí (Beta) is a measure of non-diversifiable, or systematic, risk.

[37] The covariation of the return on an individual security with the return on the market portfolio.

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Q. PLEASE EXPLAIN HOW YOU IMPLEMENTED THE CAPM.

A. First, I determined appropriate values or ranges for each of the three model inputs: (a) Risk Free Rate, (b) Beta, and (c) Equity Risk Premium. Second, I used the equation above to calculate the cost of equity implied by the model. Below I will explain how I calculated the three model inputs and summarize the CAPM cost of equity numbers resulting from those inputs. Table 6 below shows my CAPM results.

1a. Risk Free Rate

I chose to use a risk-free rate of 1.55 %[38] based on short-term U.S. Treasury bills (3-months) and long-term U.S. Treasury bonds of 2.39% (30-years) as of December 31, 2019. U.S. government bonds are reasonable to use as a risk free rate because they have a negligible risk of default. The value of Short-term U.S. Treasury bills has a relevantly low exposure to swings in the overall market. The value of long-term U.S. Treasury bonds are relatively more exposed to the market and therefore must be used with caution. I considered using a risk-free rate based on subtracting the historical spread between long-term and short-term U.S. Treasury bills from current long-term yields, as recommended by some financial textbooks.[39] I did not use this method because, in the current capital markets, this method results in an unreasonably low risk-free rate (under 1%).

[38] Exhibit ALR 5, page 4.
[39] Brealey, Myers, and Allen (2017), Principles of Corporate Finance, 12th Edition, McGraw-Hill Irwin, New York, page 228

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1b. Beta

Since the cost of equity should be based on investor expectations, I chose to use two betas that are based on forward-looking investor expectations of non-diversifiable risk.

Most published betas are based on historical return data. For example, Value Line publishes a 5-year historical beta for each of the companies it covers. However, it is also possible to calculate betas based on investors' expectations of the probability distribution of future returns. This probability distribution of future returns expected by investors can be calculated based on the market prices of stock options.

A stock option is the right to buy or sell a stock at a specific price for a specified amount of time. A call option is the right to buy a stock at a specified exercise or strike price on or before a maturity date. A put option is the right to sell a stock at a specified exercise or strike price on or before a maturity date. For example, a call option to purchase Apple Computer stock for $230 on January 17, 2020 allows the owner the option (not the obligation) to buy Apple stock for $230 on that date. At the end of July 2019, Apple stock was trading at about $215 per share. Why would anyone pay for the right to buy a stock higher than the current price? Investors purchasing call options think there is a chance Apple stock will be trading higher than $230 on January 17, 2020 and the option will give the investor the right to buy Apple stock for $230 and profit by selling it at the market price on that date if it is higher.

The market prices of put options and call options provide information regarding the probability distribution of future stock prices expected by investors. Using established techniques, I am able to use price data for stock options of my Proxy Group

companies and the S&P 500 Index to determine investors' return expectations, including the relationship (covariance) between the return expectations for individual Proxy Group companies and those for the overall market (S&P 500). This covariance between the expected returns for my Proxy Group and for the S&P 500 indicates what investors expect betas will be in the future. I refer to betas based on option price calculations as "option-implied betas."

Traditionally, the betas used in CAPM calculations are calculated from historical returns. This approach has strengths and weaknesses. An alternative way to calculate betas is to incorporate investors' return expectations by calculating option-implied betas as explained in the previous paragraph. As discussed below, I have chosen to use both historical and option-implied betas in my CAPM analysis. I chose to use option-implied betas in my CAPM analysis because, among other reasons, studies have found that betas calculated based on investor expectations (option-implied) provide information regarding future perceived risks and expectations.[40] As shown in Chart 8 below, stock option prices indicate that investors likely expect higher betas for the Proxy Group in the future.

[40] Bo-Young Chang & Peter Christoffersen & Kris Jacobs & Gregory Vainberg. (2011) Option-Implied Measures of Equity Risk, *Review of Finance* 16: 385-428.

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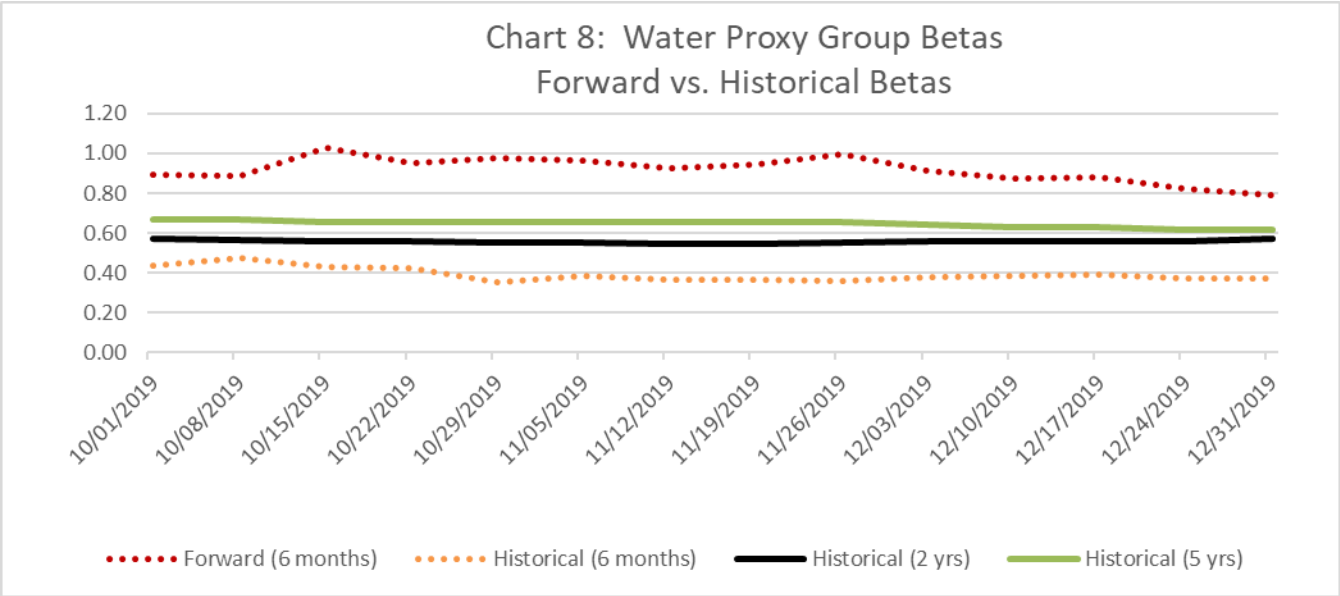

See Exhibit ALR 5, page 2 for data used in creating the chart above.

I used the following two betas in my CAPM analysis:

1. **Hybrid Beta:** 50% Option-Implied Beta (6 months) + 25% Historical Beta (6 months) + 15% Historical Beta (2 years) + 10% Historical Beta (5 years).
2. **Forward Beta:** 100% Option-Implied Beta (6 months).

Historical Beta Calculations

I calculate historical betas following the methodology used by Value Line. Specifically, I use the following guidelines:

1. Returns for each security are regressed against returns for the overall market in the following form:

   $Ln (p^{I}_{t} / p^{I}_{t-1}) = a_{I} + B_{I} * Ln (p^{m}_{t} / p^{m}_{t-1})$

   Where:

   - p^{I}_{t} is the price of the security I at time t

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- p^{I}_{t-1} is the price of the security I one week before time t
- p^{m}_{t} and p^{m}_{t-1} are the corresponding values of the market index
- B_{I} is the regression estimate of Beta for the security against the market index

2. The natural log of the price ratio is used as an approximation of each return and no adjustment is made for dividends paid during the week.
3. Weekly returns are calculated weekly on Tuesdays to minimize the effect of holidays as much as possible.
4. Betas calculated using the regression method above are adjusted as per Blume (1971) using the following formula:

   Adjusted $B_{I} = 0.35 + 0.67 * \text{Calculated } B_{I}$

The only significant difference between my beta calculations and Value Line's calculations is that, whereas Value Line uses the NYSE Composite Index as the market index, I use the S&P 500 Index. S&P 500 Index has a much larger number of options traded, making the calculation of option-implied betas more reliable, and I wanted to make my historical betas as comparable as possible to my option-implied betas. Value Line only calculates betas every three months and always uses a five year period for the return regression in their company reports[41], whereas I use the same consistent methodology to calculate betas every week during the most recent three complete months (October through December 2019) and calculate historical betas for periods of 6 months, two years, and five years, as shown in Chart 8 above.

[41] The offer betas calculated over different time periods on their website, including 3-years and 10-years.

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Option-Implied Beta Calculations

Calculating option-implied betas of a company requires (1) obtaining stock option data for that company and a market index, (2) filtering the stock option data, (3) calculating the option-implied volatility for the company and for the index, (4) calculating the option-implied skewness for the company and for the index, and (5) calculating option-implied betas for the company based on implied volatility and skewness for the company and for the index. There are various ways one could choose to perform the steps above, but I chose to filter stock option data and calculate option-implied volatility[42] and skewness[43] following exactly the same methodology used by the Chicago Board of Options Exchange (CBOE) in the calculation of their widely-used VIX (or Volatility Index) and SKEW Index, respectively.

I start my process with publicly available trading information for all the options for a given security (company or index) for a complete trading day. I then filter the option data as described by the CBOE , using the following guidelines:

1. Use the mid-quote or mark (average of bid and ask) as the option price.
2. Use only out-of-the-money call and put options.
    a. Determine the "moneyness" threshold where absolute difference between call and put prices is smallest (using CBOE "Forward Index Price" formula).

[42] CBOE Volatility Index White Paper, 2018. Cover page says "proprietary information." The author has had access to this document in the public domain for at least 3 years.
[43] The CBOE SKEW Index, 2010. Cover page says "proprietary information." The author has had access to this document in the public domain for at least 3 years.

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b. Include "at-the-money" call and put options and use average of call and put prices as price for "blended" option.

3. Exclude all zero bids.
4. Exclude remaining (more out-of-the-money) options when two sequential zero bids are found.

I then apply the series of formulas clearly described in both of the CBOE's white papers to the remaining options to calculate Option-Implied Volatility and Option-Implied Skewness. In the words of the CBOE, each of its two indices is "an amalgam of the information reflected in the prices of all of the selected options." To be clear, Implied Volatility is not exactly the same as the VIX Index and Implied Skewness is not exactly the same as the SKEW Index, but both indices are directly based on their corresponding statistical value.

Option-Implied Volatility reflects investors' expectations regarding future stock price movements. Option-Implied Skewness reflects investors' expectations regarding how implied volatility changes for strike prices that are closer and further to the current value of the underlying stock price.

The CBOE calculates Times to Expiration by the minute—as do I. The Time to Expiration of traded options cannot be changed and varies from day to day. For the sake of consistency, the CBOE calculates the VIX and SKEW indices on a "30-day" basis by interpolating for two sets of options with Times to Expiration closest to the 30-day mark. I prefer to focus on as long of a time horizon as possible for forecasting purposes. Option Times to Expiration vary significantly for various stocks, but can relatively consistently

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be found to go out to 6 months (180 days) for utility companies. Therefore, for the sake of consistency, I have chosen to interpolate to calculate 6-month volatility and skewness where possible. Occasionally, Times to Expiration for a given stock do not go out to 180 days. If the greatest Time to Expiration available is 171 days (95%) or greater, I use the volatility and skewness for that group of options as a proxy for the 180-day volatility and skewness, respectively.

Finally, once I have calculated the option-implied volatility and skewness for each company and index using the methodology described above, I calculate option-implied betas using the following formula developed by Christoffersen and Chang (2011): [44]

$$\beta_i = \left(\frac{SKEW_i}{SKEW_m}\right)^{1/3} \left(\frac{VAR_i}{VAR_m}\right)^{1/2}$$

Where:

β_i: $option - implied\ beta\ of\ security\ (e.g. stock, fund)$;
$SKEW_i$: $skewness\ of\ security$;
$SKEW_m$: $skewness\ of\ overall\ market\ (S\&P\ 500)$;
VAR_i: $variance\ of\ company$;
VAR_m: $variance\ of\ overall\ market\ (S\&P\ 500)$.

1c. Equity Risk Premium

My equity risk premium is the expected return on the S&P 500 minus the risk-free rate as described above. I calculated an expected return on the S&P 500 by using stock options traded on this index. The implied volatility for options with an expiration period of one year was approximately 0.1838.[45] This implied volatility indicates that the market

[44] Bo-Young Chang & Peter Christoffersen & Kris Jacobs & Gregory Vainberg. (2011) Option-Implied Measures of Equity Risk, *Review of Finance* 16: 385-428.
[45] Exhibit ALR 5, page 3.

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expects the standard deviation of future annual price movements of the S&P 500 to be 18.38%. Based on these market expectations, I considered the following growth rate in the DCF analysis I used to calculate the equity risk premium component of my CAPM:

Base S&P 500 growth of 8.74%

i. The market expects a 68.3% probability of growth equal to or less than this level. The market expects less than a 32% probability of higher growth.

2. Results

Table 6 below shows a summary of my CAPM results:

TABLE 6: CAPITAL ASSET PRICING MODEL (CAPM) - INDICATED COST OF EQUITY

CAPITAL ASSET PRICING MODEL (CAPM) - INDICATED COST OF EQUITY
(Assuming S&P Growth at 68.3% of Option-Implied Normal Distribution)
Water Proxy Group

	3-Month Treasury Bill		30-Year Treasury Bond	
	Hybrid Beta	Forward Beta	Hybrid Beta	Forward Beta
Risk Free Ra	1.55%	1.55%	2.39%	2.39%
Beta	0.69	0.89	0.69	0.89
Risk Premiu	9.00%	9.00%	8.16%	8.16%
CAPM	7.76%	9.59%	8.02%	9.68%

Source: Schedule ALR 5, page 1.

VI. ADDITIONAL COMMENTS ON MR. D'ASCENDIS' TESTIMONY

Q. PLEASE SUMMARIZE THE TESTIMONY OF MR. D'ASCENDIS.

A. Mr. D'Ascendis has recommended that the Company be allowed a return on equity of within a range of 10.20% and 10.70% and an overall cost of capital within a range of 8.10%

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to 8.36%.[46] He arrived at his recommendation based upon his own versions of the Discounted Cash Flow ("DCF") Model, Risk Premium approach ("RPM") and Capital Asset Pricing Model ("CAPM"). Mr. D'Ascendis testified that, "the use of multiple generally accepted common equity cost rate models…adds reliability and accuracy when arriving at a recommended common equity cost rate."[47] Mr. D'Ascendis applies his three cost of equity methods to a group of 6 water utility companies, 5 of which are in my Water Proxy Group. Mr. D'Ascendis refers to this group as the Utility Proxy Group.[48] He also applies his cost of equity models to a group of non-price regulated companies ("Non-Price Regulated Proxy Group").[49] His cost of equity recommendation (10.20%-10.70%) includes an upward adjustment of 0.50% to account for his claim that BGWC has greater business risk than the companies in his Utility Proxy Group.[50]

Mr. D'Ascendis concluded that current regulatory environment in South Carolina BGWC's smaller size, in relation to his Utility Proxy Group, is the cause of the greater business risk that justifies his 0.50% upward adjustment to his cost of equity recommendation.[51]

Below are the results of Mr. D'Ascendis' three cost of equity methods.

[46] D'Ascendis Corrected Direct Testimony, page 2, lines 6-13.
[47] Ibid. page 5, lines 13-17.
[48] Ibid. page 3, lines 7-11.
[49] Ibid, page 3, lines 11-13.
[50] Ibid. page 4, lines 17-22.
[51] Ibid. page 36, lines 3-8.

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TABLE 7: D'ASCENDIS COST OF EQUITY RESUTLS		
METHOD	UTILITY PROXY GROUP	NON-PRICE REGULATED PROXY GROUP
DCF	9.03%	12.14%
RPM	10.39%	11.60%
CAPM	9.91%	10.84%

Q. WHAT IS YOUR OVERALL REACTION TO MR. D'ASCENDIS' TESTIMONY?

A. Mr. D'Ascendis' final recommended range of range of common equity cost rates of 10.20%-10.70%[52] overstates the cost of equity. The primary reasons Mr. D'Ascendis and I recommend a different cost of equity for BGWC is because he includes a group of 14 "non-price regulated" companies in his analysis. I do not. He claims these 14 companies are comparable in total risk to water utilities. As discussed below, I determined these 14 companies are riskier than water utilities companies. Therefore, the authorized Return on Equity (ROE) should not be based on the cost of equity of these companies.

Mr. D'Ascendis' cost of equity recommendation would be 9.8%-10.3%[53], if based on his proxy group of 6 water companies (Utility Proxy Group) exclusively.

<u>Non-Price Regulated Proxy Group</u>

Q. SHOULD THE COST OF EQUITY FOR BGWC BE BASED UPON MR. D'ASCENDIS' "NON-PRICE REGULATED PROXY GROUP"?

[52] Ibid, page 4, Table 2.
[53] Ibid. page 4, Table 2. 9.8% = average of 9.03%, 10.39% and 9.91%. 10.3% = 9.8% + 0.5% "Business Risk Adjustment".

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A. No. Mr. D'Ascendis' Non-Price Regulated Proxy Group of 14 companies should not be used because the companies in this group are not comparable in risk to BGWC. As a regulated utility, BGWC has accepted an obligation to serve within its certificated service territory in exchange for the opportunity to recover its costs and earn a return on its investments. Non-price regulated companies have a different business model and are exposed to different risks. Non-price regulated companies face the risk that their customers will no longer purchase their product if they raise prices to cover increasing costs. BGWC, on the other hand, can file for a rate increase to address increasing costs.

The companies in Mr. D'Ascendis' Non-Price Regulated Proxy Group are exposed to tariff related expenses, emerging market economies (e.g. Mexico, Brazil), risks related to recent acquisitions, among many other risks that BGWC is not exposed to. For example, one of his non-price regulated companies, AutoZone, explains in their annual report that their business may be materially adversely affected by the following: (1) political unrest in other countries, (2) the number of older vehicles in service, (3) rising energy prices, (4) the economy, (5) weather, (6) advances in automotive technology, and (7) the number of miles people drive their cars annually, (8) among other risks. Regulated water utilities, including BGWC, are not impacted by many of these factors at all, or to a significantly lower degree because BFWC does not have international operations and if their earnings decline they are impacted for a limited period of time because they can apply for a rate increase. None of the companies in Mr. D'Ascendis' Non-Price Regulated Proxy Group can file for a rate case if political unrest in Brazil, for example, harms earnings.

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Q: DO YOU AGREE WITH MR. D'ASCENDIS' METHODOLOGY FOR SELECTING A PROXY GROUP COMPARABLE IN TOTAL RISK TO THE UTILITY PROXY GROUP?

A. No. I found several problems with Mr. D'Ascendis' approach, which I believe results in a proxy group with a significantly different level of total risk than that of the Utility Proxy Group. The most significant problems I see with Mr. D'Ascendis' selection methodology are the following:

1. Despite my best efforts including speaking directly with Value Line, I was unable to reproduce Mr. D'Ascendis' calculations of the "Residual Standard Error of the Regression" and the "Standard Deviation of Beta" for each reported company in his Schedule DWD-6, Pages 2 and 3. If this data was not obtained directly from Value Line, as implied by the cited sources in his schedule, Mr. D'Ascendis should provide more details on the methodology of his calculations.

2. Independently from the definition and the calculations involved, the third criterium (p. 33, lines 5 and 6) establishes a range of "comparable betas" that is far too wide. As Schedule DWD-6, Page 2 makes clear, the "Beta Range" used by Mr. D'Ascendis is between 0.26 and 0.70. It would be impossible to argue that two companies with betas at opposite ends of this range have comparable risk profiles. A company with a beta of 0.70 is theoretically 30% less volatile than the market as a whole, while a company with a beta of 0.26 is theoretically 74% less volatile. Furthermore, the range

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is so wide that there are 263 companies that fit the first three criteria laid out by Mr. D'Ascendis.

3. It is not clear exactly how Mr. D'Ascendis reduces the number of companies from 263 to 14, but what is clear is that 12 out of the 14 companies in the final selection have betas (both adjusted and unadjusted) above the average beta for the Utility Proxy Group. The two that have betas below the average have betas very close to the average. The result is that the average beta for the Non-Price Regulated Companies is 0.12 higher than the average beta for the Utility Proxy Group, implying a significant difference in the risk profile of the two groups. An impartial methodology applied on such a large sample group should result in a comparable group with an average beta closer to the average of the Utility Proxy Group.

Q. MR. D'ASCENDIS STATES THAT COMPANIES THAT HAVE SIMILAR BETA COEFFICIENTS HAVE SIMILAR TOTAL INVESTMENT RISKS. DO THE COMPANIES IN MR. D'ASCENDIS' NON-PRICE REGULATED PROXY GROUP HAVE SIMILAR BETA COEFFICIENTS TO THE WATER UTILITIES IN HIS UTILITY PROXY GROUP?

A. No. While similar beta coefficients do indeed indicate similar total investment risks, as shown in Chart 9 below, the historical betas of the companies in Mr. D'Ascendis' Non-Price Regulated Proxy Group are over twice that of the water companies in his Utility Proxy Group. Since the end of June 2019, the betas for the water utilities average about 0.4 when calculated based on 6-month return data (i.e., considering returns since January

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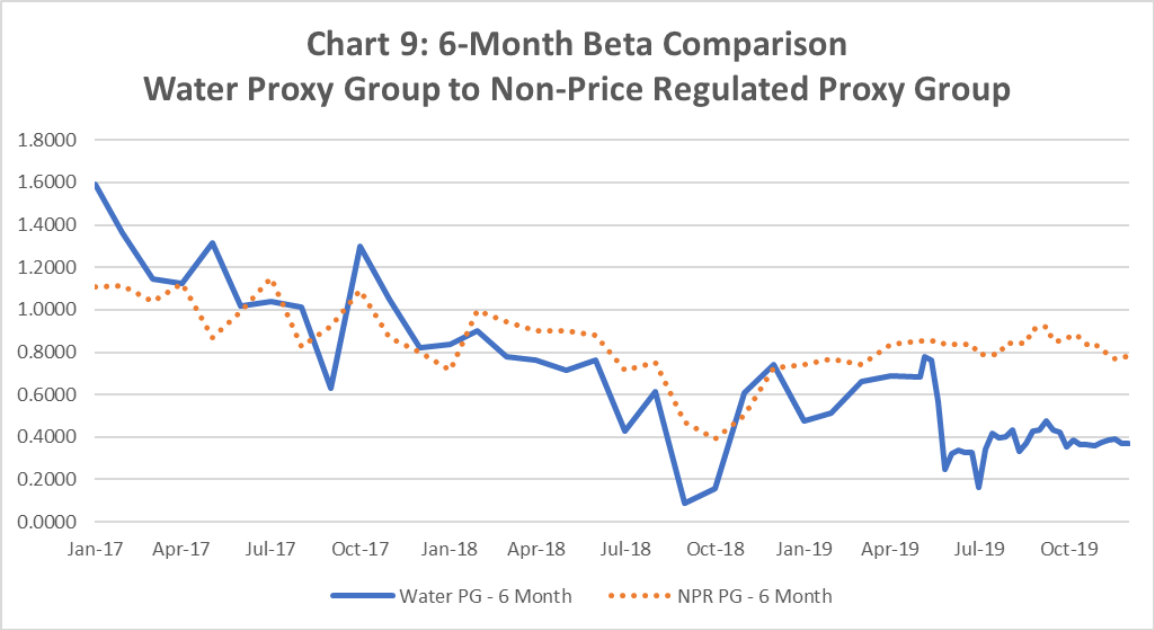
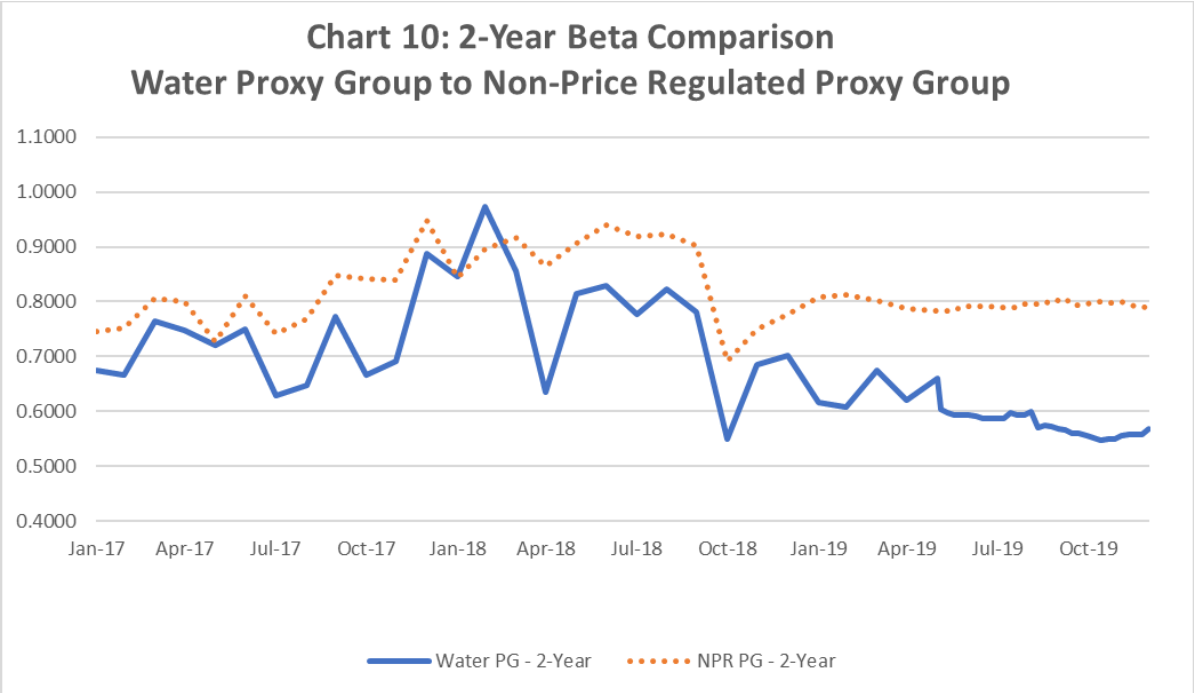
2019 for the June 2019 beta calculations). Over the same time period, the betas for the companies in Mr. D'Ascendis' Non-Price Regulated Proxy Group average over 0.8.



Beta coefficients calculated based on returns over relatively short time periods (e.g., 6 months) can be more indicative of the current risk of companies because it measures recent market activity. If companies have become more or less risky than they were many years ago, betas calculated over shorter time periods will be a better gauge of current risk since they are based only on recent data. That said, betas calculated based on returns over longer periods of time are also worth considering in case recent market developments are temporary. To that end, I compared the beta coefficients of Mr. D'Ascendis' Non-Price Regulated Proxy Group to the water utilities group based on returns over longer periods of time to determine if they indicate a more sustainable relationship. As shown in Chart 10 below, the beta coefficients calculated based on 2-year returns has been about 30% higher for the Non-Price Regulated Proxy Group since the beginning of 2019.



Even beta coefficients calculated based on 5-year returns indicate that betas for the companies in his Non-Price Regulated Proxy Group are currently about 20% higher, as shown in Chart 11 below. The 5-year betas for the two groups overlapped for a brief period in late 2017 to early 2018, but as Chart 11 clearly shows, that was an exception and the Non-Price Regulated Proxy Group has shown considerably higher betas throughout the 3 years of betas analyzed, with the gap only getting larger in the last 6 months.

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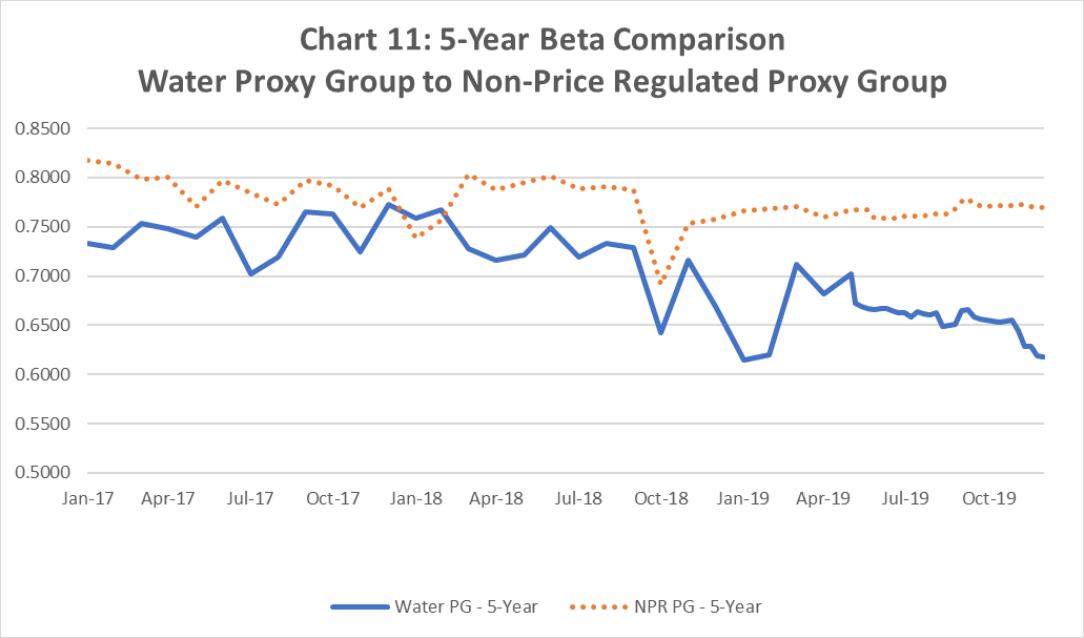
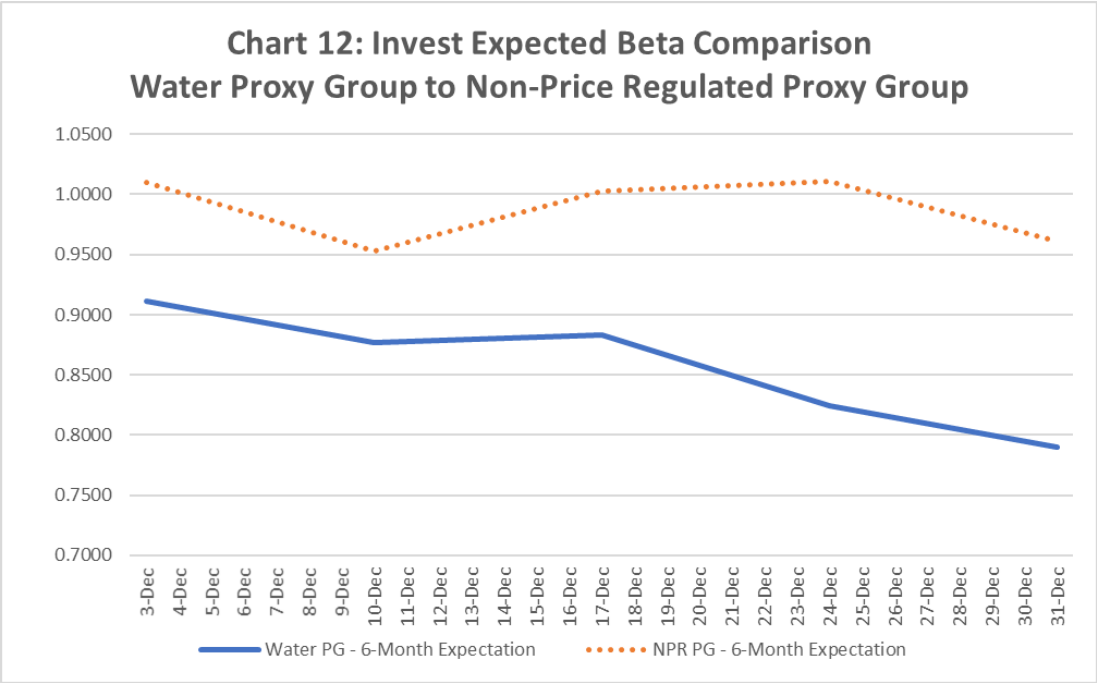


Charts 9-11cm show betas calculated based on historical returns. Investors may or may not expect the future to be like the past. As explained above, the authorized ROE for BGWC should be based on investor expectations. Historical data is relevant only to the degree it represents investors' current expectations. In addition to historical betas, I also calculated "forward-looking" betas based on current market prices of stock options[54] (put and call options traded on the 14 companies in Mr. D'Ascendis' Non-Price Regulated Proxy Group) in order to determine the level of risk expected by investors for both proxy groups in the future. As shown in Chart 12 below, throughout December 2019 investors expected (6-months forward) the beta of Mr. D'Ascendis' Non-Price Regulated Proxy Group to remain about 20% higher than the utilities group in the future

[54] See Section V. E for a definition of stock options.



The results of my analysis presented above indicate that Mr. D'Ascendis' Non-Price Regulated Proxy Group has and is expected by investors to continue to have significantly higher risk than water utilities, based on his own criteria (beta coefficients), and therefore should not be used to determine the appropriate authorized ROE for BGWC in this proceeding.

Q. IS MR. D'ASCENDIS' DCF RESULT OF 9.03% AN APPROPRIATE COST OF EQUITY FOR BGWC?

A. No. Mr. D'Ascendis' 9.03% DCF result, as applied to his proxy group of 6 water utility companies, is relatively close to the market based cost of equity because his DCF analysis relies on a 7.00%[55] growth component. Below I will explain why the analyst five-year EPS

[55] Ibid. Schedule DWD-1, page 1 of 7. 7.00% = average of Five Year Growth in EPS shown in column "[6]".

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growth rate forecasts used by Mr. D'Ascendis' are usually not consistent with sustainable growth rates and lead to above market cost of equity results most of the time. Currently his growth rates are reasonable and therefore his 9.03% DCF result is on the high side of reasonable for setting rates in this proceeding.

DCF Method

Q. WHAT FORM OF THE DCF MODEL DOES MR. D'ASCENDIS USE?

A. He uses the single stage (or constant growth) form of the DCF model.[56]

Q. DOES MR. D'ASCENDIS PROPERLY APPLY THE SIMPLIFIED OR CONSTANT DCF METHOD?

A. No. Mr. D'Ascendis adds a growth component to a divided yield even though his growth analysis relies completely on analyst five-year EPS per share growth forecasts.[57] It is only a DCF method if the dividend yield is computed properly, and the growth rate used is derived from a careful study of what future sustainable growth in cash flow is anticipated by investors. In BGWC's 2017 rate case (Docket No. 2017-292-WS) this Commission concluded "Mr. D'Ascendis' use of analysts' estimates for his DCF analysis is supported by consensus…"[58] Respectfully, I believe this Commission's level of support for Mr. D'Ascendis' DCF method may have been too generous. As discussed above (Section II), major financial institutions (J.P. Morgan Chase) do not use a growth rate based on analyst 5-year EPS growth rates as Mr. D'Ascendis has done.

[56] Ibid, page 14, lines 11-12.
[57] Ibid. page 15, lines 17-18.
[58] Page 14.

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Q. HOW DID MR. D'ASCENDIS CALCULATE HIS GROWTH RATE FOR HIS DCF METHOD?

A. On page 15, lines 12-14 of Mr. D'Ascendis' testimony he says that he uses analysts' five-year EPS forecast as the growth component of his DCF analysis because "investors are likely to rely on…Value Line, Reuters, Zacks, and Yahoo Finance" and "Investors realize that analysts have significant insight..."

Below are the five-year projected earnings per share rates by the four investment research firms he chose:

Value Line:	8.50%
Reuters:	10.60%
Zacks:	8.70%
Yahoo Finance:	5.93%[59]

Q. IS MR. D'ASCENDIS' METHODOLOGY TO DETERMINE THE GROWTH RATE TO USE IN HIS DCF MODEL APPROPRIATE?

A. No. As stated above, Mr. D'Ascendis uses analyst five-year earnings per share growth without attempting to reconcile the retention rate used for computing growth with the retention rate he used to compute the dividend yield. This is analogous to failing to reconcile the money you are taking out of your checking account with your future balance, i.e. the basic balancing of a checkbook.

[59] Ibid. Schedule DWD-3, page 1 of 7.

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Q. CAN YOU PLEASE SUMMARIZE WHY A FUTURE ORIENTED "B X R" METHOD IS SUPERIOR TO A FIVE-YEAR EARNINGS PER SHARE GROWTH RATE FORECAST IN PROVIDING A LONG-TERM SUSTAINABLE GROWTH RATE?

A. Yes. The primary cause of sustainable earnings growth is the retention of earnings. A company is able to create higher future earnings by retaining a portion of the prior year's earnings in the business and purchasing new business assets with those retained earnings. There are many factors that can cause short-term swings in earnings growth rates, but long-term sustainable growth is caused by retaining earnings and reinvesting those earnings. Factors that cause short-term swings include anything that causes a company to earn a return on book equity at a rate different from the long-term sustainable rate. Assume, for example, that a particular utility company is regulated so that it is provided with a reasonable opportunity to earn 9.0% on its equity. Should the company experience an event such as the loss of several key customers, or unfavorable weather conditions, which cause it to earn only 6.0% on equity in a given year, the drop of 9% earned return on equity to a 6% earned return on equity would be concurrent with a very large drop in earnings per share. In fact, if a company did not issue any new shares of stock during the year, a drop from a 9% earned return on book equity to a 6% earned return on book equity would result in a 33.3% decline in earnings per share over the period.[60] However, such a drop in earnings would not be any indication of what is a long-term sustainable earnings per share growth

[60] By definition, earned return on equity is earnings divided by book value. Therefore, whatever level of earnings is required to produce earnings of 6% of book would have to be 33.3% lower than the level of earnings required to produce a return on book equity of 9%.

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rate. If the drop were caused by weather conditions, the drop in earnings would be immediately offset once normal weather conditions return. If the drop were from the loss of some key customers, the company would replace the lost earnings by filing for a rate increase to bring revenues up to the level required for the company to have a reasonable opportunity to recover its cost of equity.

For the above reasons, changes in earnings per share growth rates that are caused by non-recurring changes in the earned return on book equity are inconsistent with long-term sustainable growth, but changes in earnings per share because of the reinvestment of additional assets is a cause of sustainable earnings growth. The "b x r" term in the DCF equation computes sustainable growth because it measures only the growth which a company can expect to achieve when its earned return on book equity "r" remains in equilibrium. If analysts have sufficient data to be able to forecast varying values of "r" in future years, then a complex, or multi-stage DCF method must be used to accurately quantify the effect. Averaging growth rates over sub-periods, such as averaging growth over the first five years with a growth rate expected over the subsequent period, will not provide an appropriate representation of the cash flows expected by investors in the future and, therefore, will not provide an acceptable method of quantifying the cost of equity using the DCF method. The choices are either a constant growth DCF, in which one "b x r" derived growth rate should be used, or a complex DCF method in which the cash flow anticipated in each future year is separately estimated. Mr. D'Ascendis has done neither.

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Q. WHY ARE ANALYSTS' FIVE-YEAR CONSENSUS GROWTH RATES NOT INDICATIVE OF LONG-TERM SUSTAINABLE GROWTH RATES?

A. Analysts' five-year earnings per share growth rates are earnings per share growth rates that measure earnings growth from the most currently completed fiscal year to projected earnings five years into the future. These growth rates are not indicative of future sustainable growth rates, in part, because the sources of cash flow to an investor are dividends and stock price appreciation. While both stock price and dividends are impacted in the long-run by the level of earnings a company is capable of achieving, earnings growth over a period as short as five years is rarely in synchronization with the cash flow growth from increases in dividends and stock prices. For example, if a company experiences a year in which investors perceive that earnings temporarily dipped below normal trend levels, stock prices generally do not decline at the same percentage that earnings decline, and dividends are usually not cut just because of a temporary decline in a company's earnings. Unless both the stock price and dividends mirror every down swing in earnings, they cannot be expected to recover at the same growth rate that earnings recover. Therefore, growth rates such as five-year projected growth in earnings per share are not indicative of long-term sustainable growth rates in cash flow. As a result, they are inapplicable for direct use in the simplified DCF method.

Q. IS THE USE OF FIVE-YEAR EARNINGS PER SHARE GROWTH RATES IN THE DCF MODEL ALSO IMPROPER?

A. Yes. A raw, unadjusted, five-year earnings per share growth rate is usually a poor proxy for either short-term or long-term cash flow that an investor expects to receive. When implementing the DCF method, the time value of money is considered by equating the

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current stock price of a company to present value of the future cash flows that an investor expects to receive over the entire time that he or she owns the stock. The discount rate required to make the future cash flow stream, on a net present value basis, equal to the current stock price is the cost of equity. The only two sources of cash flow to an investor are dividends and the net proceeds from the sale of stock at whatever time in the future the investor finally sells. Therefore, the DCF method is discounting future cash follows that investors expect to receive from dividends and from the eventual sale of the stock. Five-year earnings growth rate forecasts are especially poor indicators of cash flow growth even over the five years being measured by the five-year earnings per share growth rate number.

Q. WHY IS A FIVE-YEAR EARNINGS PER SHARE GROWTH RATE A POOR INDICATOR OF THE FIVE-YEAR CASH FLOW EXPECTATION FROM DIVIDENDS?

A. The board of directors' changes dividend rates based upon long-term earnings expectations combined with the capital needs of a company. Most companies do not cut the dividend simply because a company has a year in which earnings were below sustainable trends, and similarly they do not increase dividends simply because earnings for one year happened to be above long-term sustainable trends. Therefore, over any given five-year period, earnings growth is frequently very different from dividend growth. In order for earnings growth to equal dividend growth, at a minimum, earnings per share in the first year of the five-year earnings growth rate period would have to be exactly on the long-term earnings trend line expected by investors. Since earnings in most years are above or below the trend line, the earnings per share growth rate over most five-year periods is different from what is expected for dividend growth.

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Q. WHY IS THE FIVE-YEAR EARNINGS PER SHARE GROWTH RATE A POOR INDICATION OF FUTURE STOCK PRICE GROWTH?

A. If a company happens to experience a year in which earnings decline below what investors believe are consistent with the long-term trend, then the stock price does not drop as much as earnings drop. Similarly, if a company happens to experience a year in which earnings are higher than the investor-perceived long-term sustainable trend, then the stock price will not increase as much as earnings. In other words, the P/E ratio of a company will increase after a year in which investors believe earnings are below sustainable levels, and the P/E ratio will decline in a year in which investors believe earnings are higher than expected. Since it is stock price that is one of the important cash flow sources to an investor, a five-year earnings growth rate is a poor indicator of cash flow both because it is a poor indicator of stock price growth over the five years being examined and is equally a poor predictor of dividend growth over the same period.

Q. ARE YOU SAYING THAT ANALYSTS' CONSENSUS EARNINGS PER SHARE GROWTH RATES ARE USELESS AS AN AID TO PROJECTING THE FUTURE?

A. No. Analysts' EPS growth rates are, however, very dangerous if used in a simplified DCF without proper interpretation. While they are not useful if used in their "raw" form, they can be useful in computing estimates of what earned return on equity investors expect will be sustained in the future, and as such, are useful in developing long-term sustainable growth rates.

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Risk Premium Method

Q. PLEASE EXPLAIN MR. D'ASCENDIS' VERSION OF THE RISK PREMIUM METHODS, AS PRESENTED IN HIS DIRECT TESTIMONY.

A. Mr. D'Ascendis applies the following two risk premium methods: Predictive Risk Premium Model (PRPM) and "total market approach."[61] His PRPM is based on research showing that the level of volatility in equity prices and returns can be used to predict future levels of risk premiums.[62] The model inputs include historical returns of the common equity of the companies in his "Utility Proxy Group" minus the historical monthly yield on long-term U.S. Treasury securities through July 2019.[63] Statistical software was used to determine the projected equity risk premium for each of the water companies in Mr. D'Ascendis' Utility Proxy Group, which range between 10.21% for California Water Service Group to 12.64% for York Water.[64] The risk-free rate component of 2.91% is based on the consensus forecast derived from Blue Chip Financial Forecasts.[65] Adding the predicted risk premium to the risk free rate for each of the 6 companies in his proxy group results in a PRPM based 10.97% cost of equity.[66]

Mr. D'Ascendis' total market approach RPM adds a prospective public utility bond yield to an equity risk premium.[67] The equity risk premium is based on beta-adjusted total

[61]Ibid. page 16, lines 1-12.
[62] Ibid. lines 5-12.
[63] Ibid. page 17, lines 17-19.
[64] Ibid. Schedule DWD-4, page 2 of 12.
[65] Ibid. Schedule DWD-5, page 2 of 2, note 2.
[66] Ibid. Schedule DWD-4, page 2 of 12.
[67] Ibid. page 18, lines 14-16.

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market equity risk premium and an equity risk premium based upon S&P Utilities Index.[68] He determines the prospective bond yield based on the consensus forecasts of about 50 economists of Aaa rated corporate bonds (3.90%) and then increases this result by 0.37% to be equivalent to A2 rated public utility bonds (4.27%).[69] He adds an additional 0.08% to the prospective bond yield to get a 4.35% "expected bond yield for his Utility Proxy Group"[70] because his Utility Proxy Group has a lower A2/A3 bond rating.[71] He calculated equity risk premium of 5.45% based on the average of the following two approaches:

<u>Beta approach: 5.91%</u>

Average of Ibbotson historical risk premiums (5.54%), regression on Ibbotson risk premium data (8.35%), Ibbotson equity risk premium based on PRPM (9.05%), market return projects from Value Line (9.73%, 10.62%) and Bloomberg (10.48%) applied to the adjusted beta (0.66) of his Utility Proxy Group.[72]

<u>S&P Utility Index and Moody's A-rated public utility bonds: 4.98%</u>

Average of historical risk premiums (4.00%), regression on historical equity risk premium (6.04%) and forecasted equity risk premiums (6.24% and 4.83%).

Adding this 5.45% equity risk premium to the risk-free rate for each of the 6 companies in his proxy group results in a RPM based 9.80% cost of equity.[73]

[68] Ibid.
[69] Ibid. page 19, lines 1-15.
[70] Ibid. page 19, lines 16-20 and page 20, lines 1-2.
[71] Ibid.
[72] Ibid. Schedule DWD-4, page 8 of 12.
[73] Ibid. Schedule DWD-4, page 3 of 12.

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Mr. D'Ascendis used the average (10.39%) of the two risk premium results as support for his cost of equity recommendation.[74]

Q. PLEASE COMMENT ON MR. D'ASCENDIS' RISK PREMIUM METHODS.

A. Mr. D'Ascendis' RPM results are too high (above rates indicated by market data) primarily because his overall market result expectations are above. The market expects less than a 32% probability of growth in the S&P 500 will provide a market return of 10.55%[75]. Investors expect a return of 11.62%[76] and 14.52%[77], as proposed by Mr. D'Ascendis to be even more unlikely. Therefore, Mr. D'Ascendis' RPM results are unreliable and significantly overstate BGWC's cost of equity

CAPM Method

Q. PLEASE SUMMARIZE MR. D'ASCENDIS' CAPM METHOD.

A. Mr. D'Ascendis explains that, "The model is applied by adding a risk-free rate of return to a market risk premium, which is adjusted proportionally to reflect the systematic risk of the individual security relative to the total market as measured by the beta coefficient."[78] The traditional CAPM model is expressed as:

Rs	=	Rf+ p(Rm-Rf)...Where:
R	=	Return rate on the common stock
Rf	=	Risk-free rate of return
Rm	=	Return rate on the market as a whole
β	=	adjusted beta (volatility of the security relative to the market

[74] Ibid. pages 26, lines 1-5.
[75] Exhibit ALR 5, page 3.
[76] D'Ascendis Corrected Direct Testimony, page 20, lines 20-21.
[77] Ibid. page 23, line 13.
[78] Ibid. page 26, lines 16-19.

as a whole)" [79]

He uses a risk-free rate of 2.91% based on the Blue Chip consensus forecast of 30-Year U.S. Treasury bond yields.[80] The risk premium portion of his CAPM analysis (shown on Schedule DWD-5, Page 2 of 2) is 10.03%[81] which is derived from an average of the following components:

- Historical: 8.80% (Ave of Measure 1, 2 and 3);

  Measure 1: 6.77%

  The arithmetic mean monthly returns of large company stocks relative to long-term U.S. Treasury bond yields from 1926-2018;

  Measure 2: 9.42%

  Regression analysis applied to Ibbotson historical data (1926-2018);

  Measure 3: 10.2%

  Application of PRPM[82] to historical data (1926-2018).

- Value Line Projected: 11.20% (Ave of Measure 4 and 5);

  Measure 4: 10.72%

  Value Line projected return on market (13.63%)[83] – Projected Risk Free Rate (2.91%).

  Measure 5: 11.61%

  Value Line projected return on S&P 500 (14.52%) – Projected Risk Free Rate (2.91%).

[79] Ibid. page 26, line 19 and page 27, lines 1-6.
[80] Ibid. page 30, lines 3-8.
[81] Ibid. Schedule DWD-5, page 2 of 2.
[82] See description of Mr. D'Ascendis' PRPM in my critique of his Risk Premium Method above.
[83] 3-5 years hence.

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- Bloomberg Projected MRP: 11.47% (Measure 6);

  Bloomberg projected return on S&P 500 (14.38%) – Projected Risk Free Rate (2.91%).

Q. PLEASE SUMMARIZE MR. D'ASCENDIS' ECAPM METHOD.

A. Mr. D'Ascendis' ECAPM is based on a security market[84] line that is not as steeply sloped as described by the CAPM formula.[85] The revised security market line used in his ECAPM results in higher cost of equity (10.34%) results for water utility companies than his "traditional CAPM" (9.47%).[86]

Q. DO YOU AGREE WITH THE RESULTS OF MR. D'ASCENDIS' CAPM AND ECAPM ANALYSES?

A. No, I do not agree with results of either of Mr. D'Ascendis' CAPM analyses because I believe that they significantly and inaccurately overstate the Company's cost of equity. The arithmetic average return that Mr. D'Ascendis uses overstates the historical risk premium by 300 basis points. Mr. D'Ascendis used the arithmetic mean returns of 11.89% for large company stocks between 1926 and 2018.[87] The 2019 SBBI Yearbook shows that investors actually earned a compounded annual return of 10.0%[88] between 1926 and 2018. The arithmetic mean return of 11.89%[89] is possibly valuable to stock brokers and fund managers attempting to predict future bonuses, but not for calculating the cost of equity. A Dow Jones Newswire article stated, "Some financial advisers rely too heavily on a formula

[84] The security market line is systematic risk, as measured by beta, plotted against expected return of the market.
[85] D'Ascendis Corrected Direct Testimony, Schedule DWD-5, page 1 of 2.
[86] Ibid. Schedule DWD-5, page 1 of 2.
[87] Ibid. Schedule DWD-5, Page 2 of 2.
[88] 2019 SBBI Yearbook, page 2-3.
[89] D'Ascendis Corrected Direct Testimony, Schedule DWD-5, Page 2 of 2.

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known as the arithmetic average, which can be misleading when investing for the long term. Financial advisors who use this formula may be overstating your potential profit and leading you to take risks you might otherwise avoid…"[90]

As discussed in Section V. E of this testimony, stock options traded on the S&P 500 indicate that a market risk premium of between 8% and 9% is conservatively high. The market expects less than a 32% probability of growth in the S&P 500 that would result in a risk premium of between 8% and 9%. Investors expect a growth rate equivalent to a 10.03%[91] market risk premium to be even more unlikely. Therefore, Mr. D'Ascendis' CAPM results are unreliable and significantly overstate BGWC's cost of equity based on market data.

MR. D'ASCENDIS' RISK ADJUSTMENT

Q. IS MR. D'ASCENDIS' ADDER FOR A SMALL SIZE EFFECT AN APPROPRIATE PART OF A COST OF EQUITY ANALYSIS FOR A PUBLIC UTILITY?

A. No. Mr. D'Ascendis' 0.50% premium adder for the small size of BGWC relative to the average capitalization of the Water Proxy Group is not justifiable. Mr. D'Ascendis states that "size has a bearing on business risk"[92] because they are "less able to cope with significant events that affect sales, revenues, and earnings"[93]

[90] Kaja Whitehouse, To Financial Advisors and Fuzzy Math, Dow Jones Newswires October 8, 2003.
[91] D'Ascendis Corrected Direct Testimony, Schedule DWD-5, Page 2 of 2.
[92] Ibid. page 38, lines 12-19.
[93] Ibid.

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Q. IS THERE UNIVERSAL AGREEMENT THAT SMALLER COMPANIES HAVE A HIGHER COST OF EQUITY?

A. No. *The Principles of Corporate Finance* stated that the so called "small firm" was most likely supported by "data mining". The textbook goes on to say that if you search enough you are likely to find pattern. Professor Aswath Damodaran from New York University states the following regarding the supposed "small cap premium":

> Even if you believe that small cap companies are more exposed to market risk than large cap ones, this is an extremely sloppy and lazy way of dealing with that risk, since risk ultimately has to come from something fundamental (and size is not a fundamental factor).[94]

Mr. D'Ascendis claims that BGWC's recent reorganization was completed so that the Company had access to additional resources including management expertise, sharing business functions and increase access to financing. At a minimum, BGWC's recent reorganization indicates that its business risk has declined since its last rate case and therefor its cost of capital has decreased as well.

Mr. D'Ascendis recommendation that BGWC's cost of equity should be increased by 0.50%[95] to account for its size is likely excessive. With that said, my 8.65% cost of equity recommendation is on the high end of results to account for the possibly that BGWC's small size impacts the return expectations required by investors and their market-based cost of equity.

[94]Aswath Damodaran, Equity Risk Premiums (ERP): Determinates, Estimation and Implications – The 2015 Edition (paper updated, March 2015). Page 42.
[95] D'Ascendis Corrected Direct Testimony, page 36, lines 27-28.

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VII. CONCLUSION

Q. PLEASE SUMMARIZE YOUR RECOMMENDATIONS IN THIS CASE.

A. Based on the evidence presented in my testimony I conclude that the cost of equity allowed for the Company should be 8.65% with an overall cost of capital of 7.27% (See Table 1) based on the average common equity ratio of the Water Proxy Group. My cost of equity recommendation is based upon my applying my there cost of equity models (Constant Growth DCF, Non-Constant Growth DCF, CAPM) to a proxy group of 6 regulated utility companies. My 8.65% cost of equity recommendation satisfies the requirements of *Hope* and *Bluefield* that regulated utility companies should have opportunity to earn a return commensurate with returns on investments in other enterprises having corresponding risks.

Mr. D'Ascendis' cost of equity recommendation of 10.20%-10.70% is unreasonably high primarily because it is based, in part, on model results applied to a group of 14 companies (Non-Price Regulated Proxy Group) that are riskier that water utilities. Additionally, the equity risk premium he uses in his RPM and CAPM are higher than appropriate. His Constant Growth DCF produces a result of 9.03% which on the high side of reasonable, but closer to the market-based cost of equity than any of his other methods. My recommendations are consistent with legal standards set by the United States Supreme Court and market data. My 8.65% cost of equity and an overall cost of capital (rate of return) of 7.27% will allow BGWC to raise capital on reasonable terms while fulling their obligation to provide safe and reliable service.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

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Exhibit ALR-1

RESUME OF AARON L. ROTHSCHILD

SUMMARY

Financial professional providing expert rate of return testimony in utility (water, electric and gas) rate case proceedings, applied mathematics research for utility industry as an affiliate of the New England Complex Systems Institute, and industry experience includes Head of Business Analysis for a major US telecom firm in Asia Pacific.

EXPERIENCE

Rothschild Financial Consulting, Ridgefield, CT **November 2001- present**
Independent consulting firm specializing in utility sector
President

- Providing technical and expert witness services to the California Public Advocates Office to evaluate the financial health, basic operation, wildfire cost recovery and organizational culture/governance of gas and electric utilities (I.15-08-019), including evaluating alternatives to PG&E.
- Provide financial testimony (e.g. rate of return and M&A) to state governments in utility rate cases, including the 2020 California energy cost of capital proceedings.
- Present at utility regulation conferences (NARUC/NASUCA and MARC) regarding rate of return, power purchase agreements, complex systems science and subsidy auctions.
- Provided investment banking consulting services as an affiliate of Chapman, Spira & Carson, LLC.

360 Networks, **Hong Kong** **January 2001 - October 2001**
Pioneer of the fiber optic telecommunications industry
Senior Manager

- Business development and investment evaluation
- Negotiated landing rights and formed local partnerships in Korea, Japan, Singapore and Hong Kong for $1 billion undersea cable project
- Structured fiber optic bandwidth swapping agreement with Enron and Global Crossing
- Established relationships with Hong Kong based Investment Bankers to communicate Asia Pacific objectives and accomplishments to Wall Street

Dantis, **Chicago, IL** **July 2000- December 2000**
Start-up managed data-hosting services provider
Director

- Built capital raise valuation models and negotiated with potential investors

- Team raised $100M from venture capital firm through valuation negotiations and internal strategic analysis

MFS, MCI-WorldCom, Chicago, Hong Kong, Tokyo September 1996- July 2000
American Telecommunications Company
Head of Business Analysis for Japan operations

- Managed staff of 5 business development analysts
- Raised $80M internally for Japanese national fiber network expansion plan by conducting an investment evaluation and presenting findings to CEO of international operations in London, UK
- Built financial model for local fiber optic investment evaluation that was used by business development offices in Oak Brook, IL and Sydney, Australia

EDUCATION

Vanderbilt University, Nashville, TN 1994-1996
MBA, Finance

- Completed business plan for Nextlink Communications in support of their national fiber optic network expansion, including identifying opportunities from passage of Telecom Act of 1996
- Developed analytical framework to evaluate predictability of rare events
- Provided financial and accounting analysis to Chicago's consumer advocate, the Citizens Utility Board (CUB) as a summer intern

Clark University, **Worchester, MA**
1990 - 1994
BA, Mathematics

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TESTIFYING EXPERIENCE OF AARON L. ROTHSCHILD

Through January 2020

CALIFORNIA

Southern California Edison, Application 19-04-014, Rate of Return, August 2019

Pacific Gas and Electric Company, Application 19-04-015, Rate of Return, August 2019

San Diego Gas & Electric Company, Application 19-04-017, Rate of Return, August 2019

Southern California Gas Company, Application 19-04-016, Rate of Return, August 2019

Great Oaks Water Company, Application A.18-05-001, Rate of Return, August 2018

Liberty Utilities, Application A.18-05-006, Rate of Return, August 2018

San Gabriel Water Company, Application A.18-05-005, Rate of Return, August 2018

Suburban Water Company, Application A.18-05-004, Rate of Return, August 2018

California American Water Company, Application A.17-04-003, Rate of Return, August 2017

California Water Service Company, Application A.17-04-006, Rate of Return, August 2017

Golden State Water Company, Application A.17-04-002, Rate of Return, August 2017

San Jose Water Company, Application A.17-04-001, Rate of Return, August 2017

COLORADO

Public Service Company of Colorado; Docket No. 11AL-947E, Rate of Return, March 2012

CONNECTICUT

United Water Connecticut; Docket No. 07-05-44, Rate of Return, November 2008

Valley Water Systems; Docket No. 06-10-07, Rate of Return, May 2007

DELAWARE

Tidewater Utilities, Inc.; PSC Docket No. 11-397, Rate of Return, April 2012

Delmarva Power & Light, PSC Docket No. 09-414, Rate of Return, February 2010

Delmarva Power & Light, PSC Docket No. 09-276T, Rate of Return, February 2010

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FLORIDA

Florida Power & Light (FPL); Docket No. 070001-EI, October 2007

Florida Power Corp; Docket No. 060001 Fuel Clause, September 2007

NEW JERSEY

Aqua New Jersey, Inc.; BPU Docket No. WR11120859, Rate of Return, April 2012

MARYLAND

Potomac Electric Power Company; Case No. 9311, Rate of Return, 2013

Delmarva Power & Light; Case No. 9317, Rate of Return, June 2013

Columbia Gas of Maryland; Case No. 9316, Rate of Return, May 2013

Delmarva Power & Light; Case No. 9285, Rate of Return, March 2012

Potomac Electric Power Company; Case No. 9286, Rate of Return, March 2012

NORTH DAKOTA

Otter Tail Power Company; Case No. PU-17-398, Rate of Return, May 2018

Montana-Dakota Utilities Co; Case No. PU-15-90, Rate of Return, August 2015

Northern States Power; Case No. PU-400-04-578, Rate of Return, March 2005

PENNSYLVANIA

Twin Lakes Utilities, Inc., Docket No. R-2019-3010958, Rate of Return, October 2019

City of Lancaster Sewer Fund, Docket No. R-2019-3010955, Rate of Return, October 2019

Newtown Artesian Water Company, Docket No. R-20019-3006904, Rate of Return, May 2019

Community Utilities of Pennsylvania Inc. Water Division, Docket No. R-2019-3008947, Rate of Return, July 2019

Community Utilities of Pennsylvania Inc. Wastewater Division, Docket No. R-2019-3008948, Rate of Return, July 2019

Hidden Valley Utility Services, L.P. – Water; Docket No. R-2018-3001306, Rate of Return, September 2018

Hidden Valley Utility Services, L.P. – Wastewater Division; Docket No. R-2018-3001307, Rate of Return, September 2018

The York Water Company; Docket No. R-2018-3000019, Rate of Return, August 2018

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SUEZ PA Pennsylvania, Inc.; Docket No. R-2018-000834, Rate of Return, July 2018

UGI Utilities, Inc. – Electric Division; Docket No. R-2017-2640058, Rate of Return, April 2018

Citizens' Electric Company of Lewisburg, Pa; Docket No. R-2016-2531550, Rate of Return, December 2016

Wellsboro Electric Company; Docket No. R-2016-2531551, Rate of Return, December 2016

Columbia Gas of Pennsylvania, Inc.; Docket No. R-2016-2529660, Rate of Return, June 2016

Columbia Gas of Pennsylvania, Inc.; Docket No. R-2015-2468056, Rate of Return, June 2015

Pike County Light & Power Company; Docket No. R-2013-2397237(electric), Rate of Return, April 2014

Pike County Light & Power Company; Docket No. R-2013-2397353 (gas), Rate of Return, April 2014

Columbia Water Company; Docket No. R-2013-2360798, Rate of Return, August 2013

Peoples TWP LLC; Docket No. R-2013-2355886, Rate of Return, July 2013

City of Dubois – Bureau of Water; Docket No. R-2013-2350509, Rate of Return, July 2013

City of Lancaster – Sewer Fund, Docket No. R-2012-2310366, Rate of Return, December 2012

Citizens' Electric Company of Lewisburg, Pa; Docket No. R-2010-2172662, Rate of Return, September 2010

Wellsboro Electric Company; Docket No. R-2010-2172665, Rate of Return, September 2010

York Water Company; Docket No. R-2010-2157140, Rate of Return, August 2010

T.W. Phillips Gas and Oil Company; Docket No. R-2010-2167797, Rate of Return, August 2010

Joint Application of The Peoples Natural Gas Company, Dominion Resources, Inc. and Peoples Hope Gas Company LLC, Docket No. A-2008-2063737, Financial Analysis, December 2008

York Water Company; Docket No. R-2008-2023067, Rate of Return, August 2008

VERMONT

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