STATE OF NEW HAMPSHIRE
PUBLIC UTILITIES COMMISSION

DOCKET NO. DE 19-064

IN THE MATTER OF: **LIBERTY UTILITIES (GRANITE STATE ELECTRIC) CORP. D/B/A LIBERTY UTILITIES**

Distribution Service Rate Case

DIRECT TESTIMONY

OF

Dr. J. Randall Woolridge

December 6, 2019

Liberty Utilities (Granite State Electric) Corp.
Docket No. DE 19-064

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TABLE OF CONTENTS

I. Introduction

Q. Please state your full name.

A. My name is J. Randall Woolridge.

Q. By whom are you employed and what is your business address?

A. I am a Professor of Finance and the Goldman, Sachs & Co. and Frank P. Smeal Endowed University Fellow in Business Administration at the University Park Campus of Pennsylvania State University. I am also the Director of the Smeal College Trading Room and President of the Nittany Lion Fund, LLC. A summary of my educational background, research, and related business experience is provided in Attachment JRW-1.

Q. What is the purpose of your testimony in this proceeding?

A. I have been asked by the Staff of the New Hampshire Public Utilities Commission to provide an opinion as to the overall fair rate of return or cost of capital for the regulated electric distribution service of Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities ("Granite State" or the "Company") and to evaluate Granite State's rate of return testimony in this proceeding.

Q. How is your testimony organized?

A. First, I will review my cost of capital recommendation for Liberty Utilities (Granite State Electric), and review the primary areas of contention between Granite State's rate of return position and Staff's. Second, I provide an assessment of capital costs in today's capital markets. Third, I discuss my proxy group of electric utility companies for estimating the cost of capital for Granite State. Fourth, I present my recommendations for the Company's capital structure and debt cost rate. Fifth, I discuss the concept of the cost of equity capital, and then estimate the equity cost rate for Liberty. Finally, I critique the Company's rate of return analysis and testimony. I have a table of contents just after the title page for a more detailed outline.

A. Overview

Q. What comprises a utility's "rate of return"?

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

Q. What is a utility's ROE intended to reflect?

A. An ROE is most simply described as the allowed rate of profit for a regulated company. In a competitive market, a company's profit level is determined by a variety of factors, including the state of the economy, the degree of competition a company faces, the ease of entry into its markets, the existence of substitute or complementary products/services, the company's cost structure, the impact of technological changes, and the supply and demand for its services and/or products. For a regulated monopoly, the regulator determines the level of profit available to the utility. The United States Supreme Court established the guiding principles for establishing an appropriate level of profitability for regulated public utilities in two cases: (1) *Bluefield* and (2) *Hope*.[1] In those cases, the Court recognized that the fair rate of return on equity should be: (1) comparable to returns investors expect to earn on other investments of similar risk; (2) sufficient to assure confidence in the company's financial integrity; and (3) adequate to maintain and support the company's credit and to attract capital.

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

Q. Please review the company's proposed rate of return.

A. The Company has proposed a capital structure of 45.0% long-term debt and 55.0% common equity. The Company has recommended a long-term debt cost rate of 5.97%. Granite State witness Mr. John Cochran has recommended a common

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

equity cost rate of 10.0% for the electric distribution operations of Granite State. The Company's overall proposed rate of return is 8.19%.

Q. What are your recommendations regarding the appropriate rate of return for Granite State?

A. I have reviewed the Company's proposed capital structure and overall cost of capital. I have used a capital structure that is more reflective of the capital structures of electric utility companies. I am using a capital structure consisting of 50.0% debt and 50.00% common equity. To estimate an equity cost rate for the Company, I have applied the Discounted Cash Flow Model ("DCF") and the Capital Asset Pricing Model ("CAPM") to my proxy group of electric utility companies ("Electric Proxy Group"). My recommendation is that the appropriate ROE for the Company is 8.25%. This figure is at the upper end of my equity cost rate range of 6.9% to 8.25%. Combined with my recommended capitalization ratios and senior capital cost rate, my overall rate of return or cost of capital for the Company is 7.11% as summarized in Attachment JRW-3.

Table 1
Recommended Cost of Capital

Capital Source	Capitalization Ratios	Cost Rate	Weighted Cost Rate
Long-Term Debt	**50.00%**	**5.97%**	**2.99%**
Common Equity	**50.00%**	**8.25%**	**4.13%**
Total Capitalization	**100.00%**		**7.11%**

Q. Isn't your ROE recommendation low by historic standards?

A. Yes. But, as I discuss in my testimony, with interest rates near historic lows and stock prices near historic highs, capital costs are at historic lows. In addition, I show that utility stocks have performed extremely well in this economic environment.

B. Primary Rate of Return Issues in this Case

Q. Please summarize the primary issues regarding rate of return in this proceeding.

A. The primary rate of return issues in this case are the appropriate capital structure and ROE for the Company.

Capital Structure - The Company has proposed a hypothetical capital structure that includes a common equity ratio that is higher than the average common equity ratios (1) employed by the proxy group, (2) approved for electric delivery companies. I have used a capital structure with 50% debt and 50% common equity which is more reflective of the capital structures of electric utilities.

The Company's ROE Analysis is Out-of-Date - The Company ROE study was prepared in March of this year. Since that time, the Federal Reserve has cut the federal funds rate three times and the 30-year Treasury rate has fallen about seventy-five basis points. Capital costs are lower now than when the Company's case was filed.

DCF Approach – Mr. Cochran and I have both employed the traditional constant-growth DCF model. Mr. Cochran has also used a multi-stage growth version of the model. There are several errors in Mr. Cochran's DCF analyses: (1) he gives little weight to his constant-growth DCF results; (2) he has exclusively used the overly optimistic and upwardly biased EPS growth rate forecasts of Wall Street analysts and *Value Line*; (3) the terminal growth rate of 5.40% in his multi-stage DCF model is inflated and does not reflect the prospective economic growth in the U.S. and is about 100 basis points above the projected long-term GDP growth; and (4) he has claimed that the DCF results underestimate the market-determined cost of equity capital due to high utility stock valuations and low dividend yields. On the other hand, when developing the DCF growth rate that I have used in my analysis, I have reviewed thirteen growth rate measures including historical and projected growth rate measures and have evaluated growth in dividends, book value, and earnings per share.

<u>CAPM Approach</u> – The CAPM approach requires an estimate of the risk-free interest rate, beta, and the market or risk premium. The primary issue with Mr. Cochran's CAPM is his market risk premium of 13.49%. There are problems with Mr. Cochran's CAPM analyses. First, the 13.49% market risk premium is much larger than: (1) indicated by historic stock and bond return data; and (2) found in the published studies and surveys of the market risk premium. Second, the 13.49% market risk premium is based on totally unrealistic assumptions of future economic and earnings growth and stock returns. To compute his market risk premium, Mr. Cochran has applied the DCF to the S&P 500 and employed analysts' three-to-five-year earnings per share ("EPS") growth-rate projections as a growth rate to compute an expected market return and market risk premiums As I demonstrate later in my testimony, the EPS growth-rate projection used for the S&P 500 and the resulting expected market return and market risk premium

include totally unrealistic assumptions regarding future economic and earnings growth and stock returns.

As I highlight in my testimony, there are three procedures for estimating a market risk premium – historic returns, surveys, and expected return models. I have used a market risk premium of 5.75%, which: (1) factors in all three approaches – historic returns, surveys, and expected return models – to estimate a market premium; and (2) employs the results of many studies of the market risk premium. As I note, the 5.75% figure reflects the market risk premiums: (1) determined in recent academic studies by leading finance scholars; (2) employed by leading investment banks and management consulting firms; and (3) found in surveys of companies, financial forecasters, financial analysts, and corporate CFOs.

Flotation Costs - Mr. Cochran's recommendation includes a consideration of equity flotation costs and size in his determination of the appropriate ROE for Granite State. Yet, Mr. Cochran has not identified any flotation costs that have been paid by Granite State. Therefore, the Company should not be rewarded with a higher ROE that includes flotation costs when the Company has not paid any such costs. Furthermore, the Commission has traditionally not allowed flotation costs.

Company Size – Mr. Cochran's ROE recommendation also includes a consideration of a size premium for the Company. However, as I show, any such premiums for size is not appropriate for a regulated public utility. In addition, the Commission has traditionally not allowed a size premium.

II. Capital Market Conditions and Authorized ROEs

Q. Please review the Federal Reserve's decisions to raise the federal funds rate in recent years.

A. On December 16, 2015, the Federal Reserve increased its target rate for federal funds from 0.25 to 0.50 percent.[2] This increase came after the rate was kept in the 0.00 to 0.25 percent range for over five years in order to spur economic growth in the wake of the financial crisis associated with the Great Recession. As the economy has improved, with lower unemployment, steady but slow GDP growth, the Federal Reserve has increased the target federal funds rate on eight additional occasions: December 2016; March, June, and December of 2017; and March, June, September, and December of 2018.

Q. How have long-term rates responded to the actions of the Federal Reserve?

A. Figure 1, below, shows the yield on 30-year Treasury bonds over the period of 2015-2019. I have highlighted the dates when the Federal Reserve increased the federal funds rate. The 30-year Treasury yield hit its lowest point in the 2015-2016 timeframe in the summer of 2016 and subsequently increased with improvements in the economy. Financial markets moved significantly in the wake

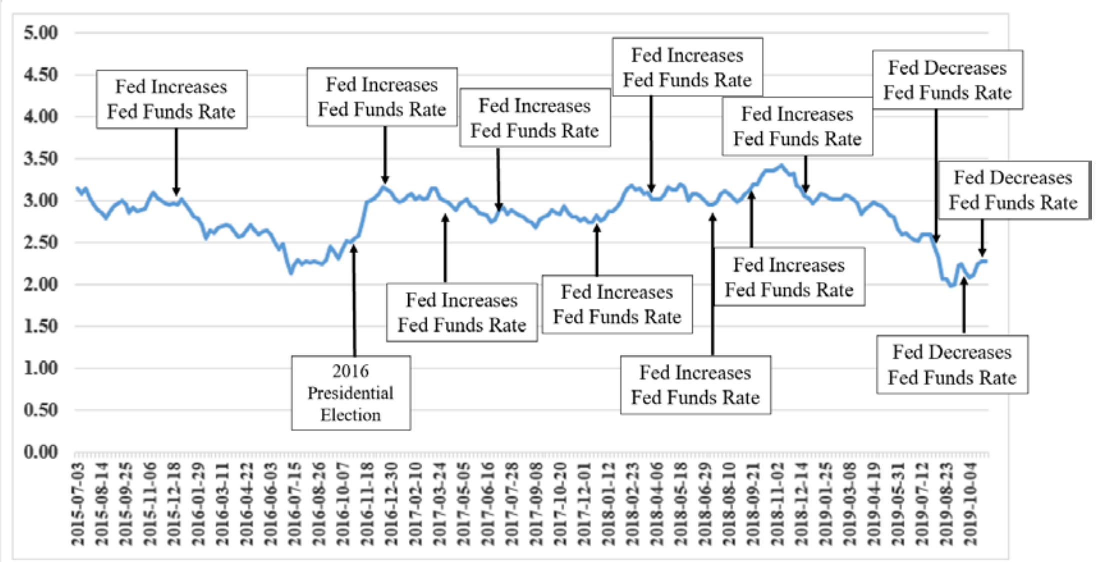
[2] The federal funds rate is set by the Federal Reserve and is the borrowing rate applicable to the most creditworthy financial institutions when they borrow and lend funds overnight to each other.

of the results in the U.S. presidential election on November 8, 2016. The stock market gained more than 10% and the 30-year Treasury yield increased about 50 basis points to 3.2% by year-end 2016. However, over the past three years, even as the Federal Reserve has increased the federal funds rate, the yield on thirty-year bonds remained in the 2.8% to 3.4% range through 2018. These yields peaked at 3.48% in November of 2018, shortly before the December 2018 rate increase by the Federal Reserve.

Q. Please review long-term treasury yields in 2019.

A. Despite the Fed's efforts to stimulate the economy, economic growth and inflation have remained low, even with record low unemployment levels. The rate increase in December of 2018 was seen by many as maybe too aggressive. Also, with the imposition of trade tariffs aimed at China, economic growth and inflation in the U.S. have remained at low levels. This led the Federal Reserve to cut the federal fund rate to the 2.0%-2.25% range in July of 2019. Thirty-year Treasury yields, which began the year in the 3.0% range declined significantly in the second quarter and, in August, declined to record lows and even traded below 2.0%. As a result, the Federal Reserve has cut the discount rate two more times since the July rate cut – in September and October. The irony is, despite the record low levels, the 30-year Treasury yield in the U.S. is still somewhat higher than the government bond rates in Japan, the U.K., Germany, and much of the rest of Europe.

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



Q. Why have long-term treasury yields remained in the 2.0%-3.0% range?

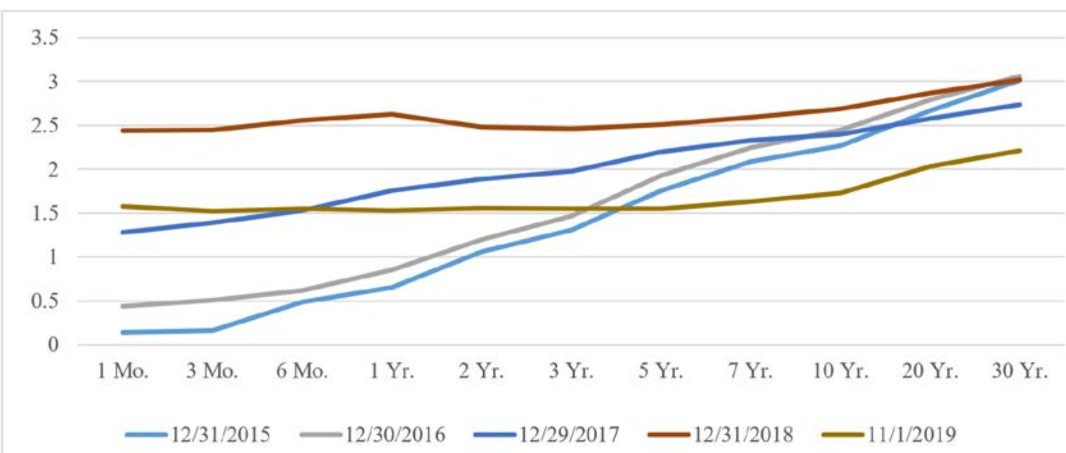
A. Whereas the Federal Reserve can directly affect short-term rates by adjustments to the federal funds rate, long-term rates are primarily driven by expected economic growth and inflation.[3] The relationship between short- and long-term rates is normally evaluated using the yield curve. The yield curve depicts the relationship between the yield-to-maturity and the time-to-maturity for U.S. Treasury bills, notes, and bonds. Figure 2, below, shows the yield curve on a semi-annual basis since the Federal Reserve started increasing the federal funds rate at the end of 2015. It shows that, from the time the Federal Reserve began increasing the federal funds rate in 2015 and until 2018, with the exception of mid-year 2016,

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

the 30-year Treasury yield has remained in the 2.8%-3.4% range over this time frame despite the fact that short-term rates have increased from near 0.0% to about 2.50%. As such, long-term interest rates and capital costs did not increase in any meaningful way even with the Federal Reserve's actions and the increase in short-term rates.

In 2019, with the large decline in long-term Treasury rates, the concern has been an "inverted yield curve." An inverted yield curve occurs when short-term Treasury yields are above long-term Treasury yields and is commonly associated with a pending recession. In Figure 2, the yields curve for November 1, 2019, is shown in green and is not quite inverted, due in large part to the three rate cuts.

Figure 2
Semi-Annual Yield Curves
2015-2019

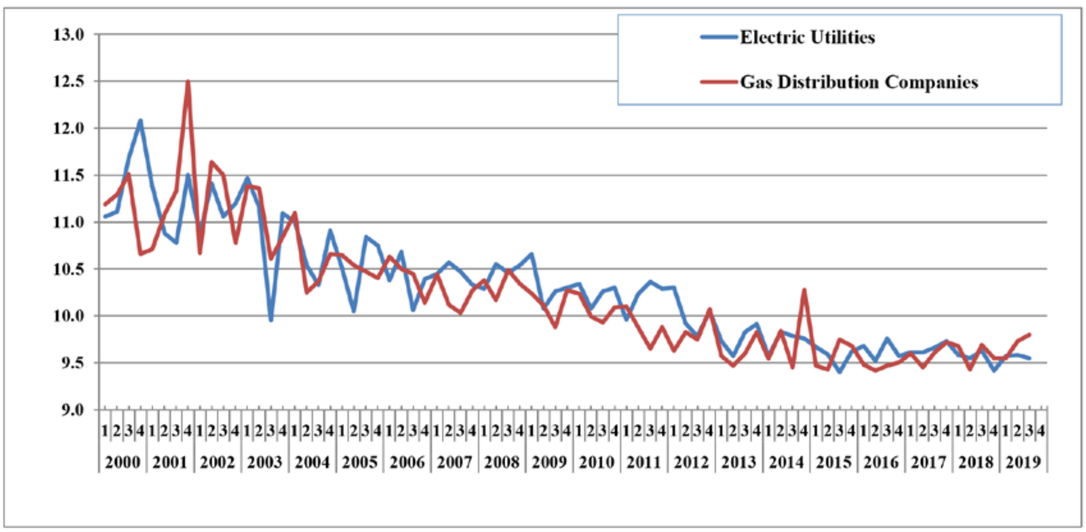


Date Source: https://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=yieldYear&year=2019

Q. Please discuss the trend in authorized returns on equity for electric and gas companies.

A. Over the past five years, with historically low interest rates and capital costs, authorized ROEs for electric utility and gas distribution companies have slowly declined to reflect the low capital cost environment. In Figure 3, below, I have graphed the quarterly authorized ROEs for electric and gas companies from 2000 to 2018. There is a clear downward trend in the data. On an annual basis, these authorized ROEs for electric utilities have declined from an average of 10.01% in 2012, 9.8% in 2013, 9.76% in 2014, 9.58% in 2015, 9.60% in 2016, 9.68% in 2017, 9.56% in 2018, and 9.56% in the first three quarters of 2019, according to Regulatory Research Associates.[4]

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



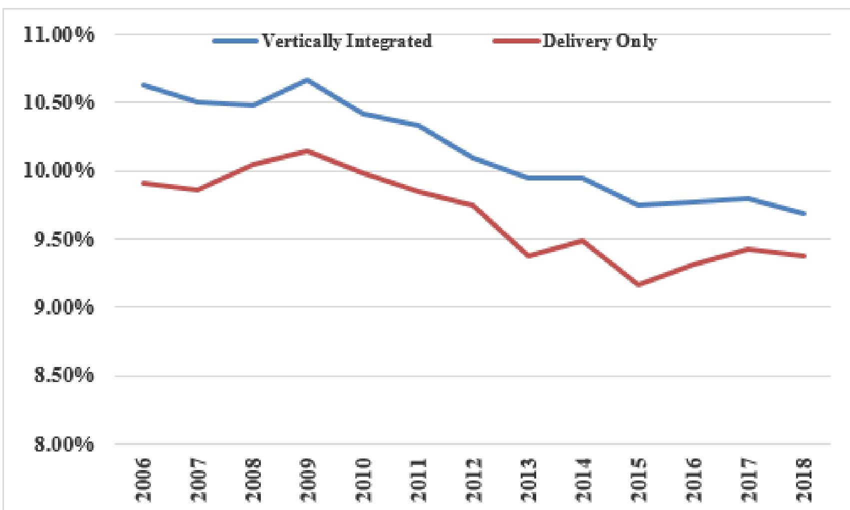
Q. Do authorized ROEs for electric distribution companies like the Company differ from the authorized ROEs for integrated electric utilities?

A. Yes. One consistent factor in electric utility authorized ROEs is that the ROEs for delivery or distribution companies have been below those of vertically integrated

[4] S&P Global Market Intelligence, RRA *Regulatory Focus*, 2019. The electric utility authorized ROEs exclude the authorized ROEs in Virginia, which include generation adders.

utilities. This is shown in Figure 4. The lower authorized ROEs are usually attributed to the fact that delivery or distribution companies do not own and operate electric generation which is presumed to be the riskier part of electric utility operations. I believe that Commissions in states who have deregulated recognize the lesser risk and award lower ROEs. The authorized ROEs for electric delivery companies have been 30-50 basis points below those of vertically-integrated electric utilities in recent years. Over the 2018-19 time period, the average authorized ROE for electric delivery companies was 9.40%.[5]

Figure 4
Authorized ROEs for Vertically Integrated versus Delivery Only Electric Utilities
2006-2018



[5] S&P Global Market Intelligence, RRA *Regulatory Focus*, 2019. The electric utility authorized ROEs exclude the authorized ROEs in Virginia which include generation adders.

III. Proxy Group Selection

Q. Please describe your approach to developing a fair rate of return recommendation for Granite State.

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

Q. Please describe your proxy group of electric companies.

A. I am using the proxy group developed by Mr. Cochran. He uses screening criteria similar to those that I use. I have excluded El Paso since it is being acquired. With that exception, there are twenty-six companies in the Electric Proxy Group

Summary financial statistics for the Electric Proxy Group are listed on page 1 of Attachment JRW-4. The median operating revenues and net plant among members of the Electric Proxy Group are $5,283.5 million and $18,454.3 million, respectively. The group receives, on average, 81% of revenues from regulated electric operations, and have average BBB+ and Baa1 average issuer credit ratings from S&P and Moody's, a median common equity ratio of 46.0%, and a median earned return on common equity of 9.6%.

Q. How does the investment risk of the Company compare to that of the Electric Proxy Group?

A. I believe that bond ratings provide a good assessment of the investment risk of a company. Attachment JRW-4 also shows S&P and Moody's issuer credit ratings for the companies in the Electric Proxy Group. These average S&P and Moody's issuer credit ratings for the group are BBB+ and Baa1. Granite State is not rated by any rating agencies. Granite State's parent, Liberty Utilities, is rated BBB by S&P. However, this is a corporate-wide credit rating for Liberty Utilities ("LU") owner, Algonquin Power and Utilities Corp ("APUC"). APUC owns Algonquin Power Company, an independent power producer as well as LU. As indicated in a recent S&P report, APUC's credit rating benefits from the stable cash flows of LU.[6] APUC and LU are also rated by DBRS Limited, primarily a credit agency for Canadian companies. The DBRS ratings for APUC and LU are BBB (stable).[7] Overall, these credit ratings suggest that Granite State is at the high end of the investment risk spectrum of the proxy group. However, APUC's unregulated power business, acquisitions, and more highly-levered balance sheet would impact these ratings in a negative way.

Q. How does the investment risk of the electric group compare based on the various risk metrics published by *Value Line*?

A. On page 2 of Attachment JRW-2, I have assessed the riskiness of the electric group using five different risk measures. These risk measures include Beta (0.56), Financial Strength (A), Safety (1.8), Earnings Predictability (81), and Stock Price Stability (96). On balance, these measures suggest that the Electric Proxy Group is low risk.

[6] Standard & Poor's Rating Services, Algonquin Power & Utilities Corp., January 2, 2019 Provided in response to Staff 8-6, Attachment Staff 8-6.4. See Attachment JRW-2.

[7] As provided in Company response to Staff 8-7.2. See Attachment JRW-2.

IV. <u>Capital Structure Ratios and Debt Cost Rate</u>

Q. Please describe Granite State's proposed capital structure and senior capital cost rate.

A. The Company has proposed a capital structure of 45.0% long-term debt and 55.0% common equity and a long-term debt cost rate of 5.97%.

Q. What are the average common equity ratios in the capitalizations of the proxy group?

A. As shown in Attachment JRW-2, the median common equity ratio for the companies in the Electric Proxy Group is 46.0%. This indicates that the Company's proposed capitalization has a higher common equity ratio than the proxy group. It should be noted that the capitalization ratios of the proxy groups include total debt which consists of both short-term and long-term debt. In assessing financial risk, short-term debt is included because, just like long-term debt, short-term has a higher claim on the assets and earnings of the company and requires timely payment of interest and repayment of principal.

Q. How does the Company's proposed capitalization compare to the average capitalization adopted by state utility commissions for electric delivery companies?

A. Over the 2018-19 time period, the average authorized common equity ratio for electric delivery companies was 50.16%.[8] Therefore, the Company's proposed

[8] S&P Global Market Intelligence, RRA *Regulatory Focus*, 2019. The electric utility authorized ROEs exclude the authorized ROEs in Virginia which include generation adders.

capital structure includes a higher common equity ratio and lower financial risk than the average authorized capitalization in the U.S. for electric delivery companies by state regulatory commissions.

Q. Given that the Company's proposed capitalization has a higher common equity ratio than the average common equity ratios (1) employed by the proxy group, (2) approved for electric delivery companies, what capital structure and debt cost rate are you recommending for Granite State?

A. I am recommending a capital structure composed of 50.0% long-term debt and 50.0% common equity. I will use the Company's proposed long-term debt cost rate of 5.97%.

V. <u>The Cost of Common Equity Capital</u>

A. Overview

Q. Why must an overall cost of capital or fair rate of return be established for a public utility?

A. In a competitive industry, the return on a firm's common equity capital is determined through the competitive market for its goods and services. Due to the capital requirements needed to provide utility services and the economic benefit to society from avoiding duplication of these services and the construction of utility infrastructure facilities, many public utilities are monopolies. Because of the lack of competition and the essential nature of their services, it is not appropriate to permit monopoly utilities to set their own prices. Thus, regulation seeks to establish prices that are fair to consumers and, at the same time, sufficient to meet the operating and capital costs of the utility, *i.e.*, provide an adequate return on capital to attract investors.

Q. Please provide an overview of the cost of capital in the context of the theory of the firm.

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

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

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

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

> Fundamentally, the value of a company is determined by the cash flow it generates over time for its owners, and the minimum acceptable rate of return required by capital investors. This "cost of equity capital" is used to discount the expected equity cash flow, converting it to a present value. The cash flow is, in turn, produced by the interaction of a company's return on equity and the annual rate of equity growth. High return on equity (ROE) companies in low-growth markets, such as Kellogg, are prodigious generators of cash flow, while low ROE companies in high-growth markets, such as Texas Instruments, barely generate enough cash flow to finance growth.
>
> A company's ROE over time, relative to its cost of equity, also determines whether it is worth more or less than its book value. If its ROE is consistently greater than the cost of equity capital (the investor's minimum acceptable return), the business is economically profitable and its market value will exceed book value. If, however, the business earns an ROE consistently less than its cost of equity, it is economically unprofitable and its market value will be less than book value. [9]

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

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

Q. Please provide additional insights into the relationship between ROE and market-to-book ratios.

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

> For a given industry, more profitable firms – those able to generate higher returns per dollar of equity – should have higher market-to-book ratios. Conversely, firms which are unable to generate returns in excess of their cost of equity [(K)] should sell for less than book value.

Profitability	*Value*
If ROE > K	*then Market/Book > 1*
If ROE = K	*then Market/Book =1*
If ROE < K	*then Market/Book< 1*[10]

To assess the relationship by industry, as suggested above, I performed a regression study between estimated ROE and market-to-book ratios using natural gas distribution and electric utility companies. I used all companies in these two industries that are covered by *Value Line* and have estimated ROE and market-to-book ratio data. The results are presented in Attachment JRW-6. The average R-

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

square is 0.50.[11] This demonstrates the strong positive relationship between ROEs and market-to-book ratios for public utilities. Given that the market-to-book ratios have been above 1.0 for a number of years, this also demonstrates that utilities have been earning ROEs above the cost of equity capital for many years.

Q. What economic factors have affected the cost of equity capital for public utilities?

A. Attachment JRW-7 provides indicators of public utility equity cost rates over the past almost two decades.

Page 1 shows the yields on long-term A-rated public utility bonds. These yields decreased from 2000 until 2003, and then hovered in the 5.50%-6.50% range from mid-2003 until mid-2008. These yields peaked in November 2008 at 7.75% during the Great Recession. These yields have generally declined since then, dropping below 4.0% on four occasions - in mid-2012, in early 2015, in the summer of 2016, and in late 2017. These yields increased in 2018 but have fallen back and declined with interest rates in general. As of the end of the third quarter of 2019, the yield was 3.50%.

Page 2 of Attachment JRW-7 provides the dividend yields for electric utility companies over the past 18 years. The dividend yields for the electric group declined from 5.3% to 3.4% between the years 2000 to 2007, increased to over

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

5.0% in 2009, and have declined steadily since that time. The average dividend yield was 3.3% in 2018.

Average earned returns on common equity and market-to-book ratios for electric utilities are on page 3 of Attachment JRW-7. For the electric group, earned returns on common equity have declined gradually over the years. In the past three years, the average earned ROE for the group has been in the 9.0% to 10.0% range. The average market-to-book ratios for this group declined to about 1.1X in 2009 during the financial crisis and have increased since that time. As of 2018, the average market-to-book for the group was 1.80X. This means that, for at least the last decade, returns on common equity for electric utilities have been greater than the cost of capital, and thus more than necessary to meet investors' required returns. This also means that customers have been paying more than necessary to support an appropriate profit level for regulated utilities.

Q. What factors determine investors' expected or required rate of return on equity?

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

Q. How does the investment risk of utilities compare with that of other industries?

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

Page 4 of Attachment JRW-7 provides an assessment of investment risk for 97 industries as measured by beta, which, according to modern capital market theory, is the only relevant measure of investment risk. These betas come from the *Value Line Investment Survey*. The study shows that the investment risk of utilities is very low. The average betas for electric, gas, and water utility companies are 0.60, 0.67, and 0.70, respectively.[12] As such, the cost of equity for utilities is the lowest of all industries in the U.S., based on modern capital market theory.

Q. What is the cost of common equity capital?

A. The costs of debt and preferred stock are normally based on historical or book values and can be determined with a great degree of accuracy. The cost of common equity capital, however, cannot be determined precisely and must instead

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

be estimated from market data and informed judgment. This return requirement of the stockholder should be commensurate with the return requirement on investments in other enterprises having comparable risks.

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

Q. How can the expected or required rate of return on common equity capital bet determined?

A. Models have been developed to ascertain the cost of common equity capital for a firm. Each model, however, has been developed using restrictive economic assumptions. Consequently, judgment is required in selecting appropriate financial valuation models to estimate a firm's cost of common equity capital, in determining the data inputs for these models, and in interpreting the models' results. All of these decisions must take into consideration the firm involved as well as current conditions in the economy and the financial markets.

Q. How did you estimate the cost of equity capital for the Company?

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

Q. Please explain why you believe that the CAPM provides a less reliable indicator of equity cost rates?

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

B. DCF Approach

Q. Please describe the theory behind the traditional DCF model.

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

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

where P is the current stock price, D_n is the dividend in year n, and k is the cost of common equity.

Q. Is the DCF model consistent with valuation techniques employed by investment firms?

A. Yes. Virtually all investment firms use some form of the DCF model as a valuation technique. One common application for investment firms is called the three-stage DCF or dividend discount model ("DDM"). The stages in a three-stage DCF model are presented in Attachment JRW-8. This model presumes that a company's dividend payout progresses initially through a growth stage, then proceeds through a transition stage, and finally assumes a maturity (or steady-state) stage. The dividend-payment stage of a firm depends on the profitability of its internal investments which, in turn, is largely a function of the life cycle of the product or service.

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

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

3. Maturity (steady-state) stage: Eventually, the company reaches a position where its new investment opportunities offer, on average, only slightly attractive ROEs. At that time, its earnings growth rate, payout ratio, and ROE stabilize for the remainder of its life.

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

Q. How do you estimate stockholders' expected or required rate of return using the DCF model?

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

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

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

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

Q. In your opinion, is the constant-growth DCF model appropriate for public utilities?

A. Yes. The economics of the public utility business indicate that the industry is in the steady-state or constant-growth stage of a three-stage DCF. The economics include the relative stability of the utility business, the maturity of the demand for public utility services, and the regulated status of public utilities (especially the fact that their returns on investment are effectively set through the ratemaking process). The DCF valuation procedure for companies in this stage is the constant-growth DCF. In the constant-growth version of the DCF model, the current dividend payment and stock price are directly observable. However, the primary problem and controversy in applying the DCF model to estimate equity cost rates entails estimating investors' expected dividend growth rate.

Q. What factors should one consider when applying the DCF methodology?

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

Q. What dividend yields have you reviewed?

A. I have calculated the dividend yields for the companies in the proxy group using the current annual dividend and the 30-day, 90-day, and 180-day average stock prices. These dividend yields are provided on page 2 of Attachment JRW-9. For the Electric Proxy Group, the median dividend yields using the 30-day, 90-day, and 180-day average stock prices range from 2.7% to 3.1%. Therefore, I am using the 2.9% as the dividend yield which is the average of the 30-day dividend yields for the Electric Proxy Group.

Q. Please discuss the appropriate adjustment to the spot dividend yield.

A. According to the traditional DCF model, the dividend yield term relates to the dividend yield over the coming period. As indicated by Professor Myron Gordon, who is commonly associated with the development of the DCF model for popular use, this is obtained by: (1) multiplying the expected dividend over the coming quarter by 4, and (2) dividing this dividend by the current stock price to determine the appropriate dividend yield for a firm that pays dividends on a quarterly basis.[13] In applying the DCF model, some analysts adjust the current dividend for growth over the coming year as opposed to the coming quarter. This can be complicated because firms tend to announce changes in dividends at different times during the

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

year. As such, the dividend yield computed based on presumed growth over the coming quarter as opposed to the coming year can be quite different. Consequently, it is common for analysts to adjust the dividend yield by some fraction of the long-term expected growth rate.

Q. Given this discussion, what adjustment factor do you use for your dividend yield?

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

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

Q. Please discuss the growth rate component of the DCF model.

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

Q. What growth data have you reviewed for the proxy group?

A. I have analyzed a number of measures of growth for companies in the proxy group. I reviewed *Value Line's* historical and projected growth rate estimates for earnings per share ("EPS"), dividends per share ("DPS"), and book value per share ("BVPS"). In addition, I utilized the average EPS growth rate forecasts of Wall Street analysts as provided by Yahoo and Zacks. These services solicit five-year earnings growth rate projections from securities analysts and compile and publish the means and medians of these forecasts. Finally, I also assessed prospective growth as measured by prospective earnings retention rates and earned returns on common equity.

Q. Please discuss historical growth in earnings and dividends as well as internal growth.

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

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

Q. Please discuss the services that provide analysts' EPS forecasts.

A. Analysts' EPS forecasts for companies are collected and published by a number of different investment information services, including Institutional Brokers Estimate System ("I/B/E/S"), Bloomberg, FactSet, Zacks, First Call and Reuters, among others. Thompson Reuters publishes analysts' EPS forecasts under different product names, including I/B/E/S, First Call, and Reuters. Bloomberg, FactSet, and Zacks publish their own set of analysts' EPS forecasts for companies. These services do not reveal: (1) the analysts who are solicited for forecasts; or (2) the identity of the analysts who actually provide the EPS forecasts that are used in the compilations published by the services. I/B/E/S, Bloomberg, FactSet, and First Call are fee-based services. These services usually provide detailed reports and other data in addition to analysts' EPS forecasts. Thompson Reuters and Zacks do provide limited EPS forecast data free-of-charge on the internet. Yahoo finance (http://finance.yahoo.com) lists Thompson Reuters as the source of its summary EPS forecasts. The Reuters website (www.reuters.com) also publishes EPS forecasts from Thompson Reuters, but with more detail. Zacks (www.zacks.com) publishes its summary forecasts on its website. Zacks estimates are also available on other websites, such as msn.money (http://money.msn.com).

Q. Which of these EPS forecasts is used in developing a DCF growth rate?

A. The DCF growth rate is the long-term projected growth rate in EPS, DPS, and BVPS. Therefore, in developing an equity cost rate using the DCF model, the projected long-term growth rate is the projection used in the DCF model.

Q. Why do you not rely exclusively on the EPS forecasts of Wall Street analysts in arriving at a DCF growth rate for the proxy group?

A. There are several reasons. First, the appropriate growth rate in the DCF model is the dividend growth rate, not the earnings growth rate. Nonetheless, over the very long term, dividends and earnings will have to grow at a similar growth rate. Therefore, consideration must be given to other indicators of growth, including prospective dividend growth, internal growth, as well as projected earnings growth. Second, a 2011 study by Lacina, Lee, and Xu has shown that analysts' long-term earnings growth rate forecasts are not more accurate at forecasting future earnings than just using last year's earnings figure as the projected future earnings number.[14] Employing data over a 20-year period, these authors demonstrate that using the most recent year's EPS figure to forecast EPS in the next 3-5 years proved to be just as accurate as using the EPS estimates from analysts' long-term earnings growth rate forecasts. In the authors' opinion, these results indicate that analysts' long-term earnings growth rate forecasts should be used with caution as inputs for valuation and cost of capital purposes. Finally, and most significantly, it is well known that the long-term EPS growth rate forecasts of Wall Street securities analysts are overly optimistic and upwardly biased. This

[14] M. Lacina, B. Lee & Z. Xu (2011),*Advances in Business and Management Forecasting* Vol. 8, Kenneth D. Lawrence, Ronald K. Klimberg (ed.), Emerald Group Publishing Limited, pp.77-101.

has been demonstrated in a number of academic studies over the years.[15] Hence, using these growth rates as a DCF growth rate will provide an overstated equity cost rate. On this issue, a study by Easton and Sommers (2007) found that optimism in analysts' growth rate forecasts leads to an upward bias in estimates of the cost of equity capital of almost 3.0 percentage points.[16]

Q. Are the projected EPS growth rates of *Value Line* also overly optimistic and upwardly biased?

A. Yes. A study by Szakmary, Conover, and Lancaster (2008) evaluated the accuracy of *Value Line*'s three-to-five-year EPS growth rate forecasts using companies in the Dow Jones Industrial Average over a thirty-year time period and found these forecasted EPS growth rates to be significantly higher than the EPS growth rates that these companies subsequently achieved.[17]

Q. Is it your opinion that stock prices reflect the upward bias in the EPS growth rate forecast?

[15] The studies that demonstrate analysts' long-term EPS forecasts are overly-optimistic and upwardly biased include: R.D. Harris, "The Accuracy, Bias, and Efficiency of Analysts' Long Run Earnings Growth Forecasts," *Journal of Business Finance & Accounting*, pp. 725-55 (June/July 1999); P. DeChow, A. Hutton, and R. Sloan, "The Relation Between Analysts' Forecasts of Long-Term Earnings Growth and Stock Price Performance Following Equity Offerings," *Contemporary Accounting Research* (2000); K. Chan, L., Karceski, J., & Lakonishok, J., "The Level and Persistence of Growth Rates," *Journal of Finance* pp. 643−684, (2003); M. Lacina, B. Lee and Z. Xu, (2011), *Advances in Business and Management Forecasting (Vol. 8)*, Kenneth D. Lawrence, Ronald K. Klimberg (ed.), Emerald Group Publishing Limited, pp.77-101; and Marc H. Goedhart, Rishi Raj, and Abhishek Saxena, "Equity Analysts, Still Too Bullish," *McKinsey on Finance*, pp. 14-17, (Spring 2010).

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

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

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

Q. How does that affect the use of these forecasts in a DCF equity cost rate study?

A. According to the DCF model, the equity cost rate is a function of the dividend yield and expected growth rate. Since this bias is well known, stock prices and therefore dividend yields reflect this bias. However, in the DCF model, the growth rate needs to be adjusted downward from the projected EPS growth rate to reflect the upward bias.

Q. Please discuss the historical growth of the companies in the proxy group, as provided by V*alue Line.*

A. Page 3 of Attachment JRW-9 provides the 5- and 10-year historical growth rates for EPS, DPS, and BVPS for the companies in the proxy group, as published in the *Value Line Investment Survey*. The median historical growth measures for EPS, DPS, and BVPS for the Electric Proxy Group range from 4.0% to 4.8%, with an average of the medians of 4.4%.

Q. Please summarize V*alue Line's* projected growth rates for the companies in the proxy group.

A. *Value Line's* projections of EPS, DPS, and BVPS growth for the companies in the proxy group are shown on page 4 of Attachment JRW-9. Due to the presence of outliers, the medians are used in the analysis. For the Electric Proxy Group, as shown on page 4 of Attachment JRW-9, the medians range from 4.0% to 5.3%, with an average of the medians of 4.8%.[18]

Also provided on page 4 of Attachment JRW-9 are the prospective sustainable growth rates for the companies in the proxy group as measured by *Value Line*'s average projected retention rate and return on shareholders' equity. As noted above, sustainable growth is a significant and a primary driver of long-run earnings growth. For the Electric Proxy Group, the median prospective sustainable growth rate is 3.5%.

Q. Please assess growth for the proxy group as measured by analysts' forecasts of expected 5-year eps growth.

A. Yahoo and Zacks collect, summarize, and publish Wall Street analysts' long-term EPS growth rate forecasts for the companies in the proxy group. These forecasts are provided for the companies in the proxy group on page 5 of Attachment JRW-9. I have reported both the mean and median growth rates for the group. Since there is considerable overlap in analyst coverage between the two services, and not all of the companies have forecasts from the different services, I have averaged the expected five-year EPS growth rates from the two services for each company to arrive at an expected EPS growth rate for each company. The mean/median of analysts' projected EPS growth rates for the Electric Proxy Group are 5.0% and

[18] It should be noted that *Value Line* uses a different approach in estimating projected growth. *Value Line* does not project growth from today, but *Value Line* projects growth from a three-year base period – 2016-2018 – to a projected three-year period for the period 2022-2024. Using this approach, the three-year based period can have a significant impact on the *Value L*ine growth rate if this base period includes years with abnormally high or low earnings. Therefore, I evaluate these growth rates separately from analysts EPS growth rates.

5.3%, respectively.[19]

Q. Please summarize your analysis of the historical and prospective growth of the proxy group.

A. Page 6 of Attachment JRW-9 shows the summary DCF growth rate indicators for the proxy group.

The historical growth rate indicators for my Electric Proxy Group imply a baseline growth rate of 4.4%. The average of the projected EPS, DPS, and BVPS growth rates from *Value Line* is 4.8%, and *Value Line*'s projected sustainable growth rate is 3.5%. The projected EPS growth rates of Wall Street analysts for the Electric Proxy Group are 5.0% and 5.3% as measured by the mean and median growth rates. The overall range for the projected growth rate indicators (ignoring historical growth) is 3.5% to 5.3%. Giving primary weight to the projected EPS growth rate of Wall Street analysts, I believe that the appropriate projected growth rate range is 5.25%. This growth rate figure is clearly in the upper end of the range of historic and projected growth rates for the Electric Proxy Group.

Q. What are the results from your application of the DCF model?

A. My DCF-derived equity cost rate for the group are summarized on page 1 of Attachment JRW-10 and in Table 2 below.

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

Table 2
DCF-derived Equity Cost Rate/ROE

	Dividend Yield	1 + ½ Growth Adjustment	DCF Growth Rate	Equity Cost Rate
Electric Proxy Group	**2.90%**	**1.02625**	**5.25%**	**8.25%**

The result for the Electric Proxy Group is the 2.90% dividend yield, times the one and one-half growth adjustment of 1.02625, plus the DCF growth rate of 5.25%, which results in an equity cost rate of 8.25%.

B. Capital Asset Pricing Model

Q. Please discuss the Capital Asset Pricing Model ("CAPM").

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

$$k = R_f + RP$$

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

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

$$K = (R_f) + ß * [E(R_m) - (R_f)]$$

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

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

Q. Please discuss Attachment JRW10.

A. Attachment JRW-10 provides the summary results for my CAPM study. Page 1 shows the results, and the following pages contain the supporting data.

Q. Please discuss the risk-free interest rate.

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

Q. What risk-free interest rate are you using in your CAPM?

A. As shown on page 2 of Attachment JRW-10, the yield on 30-year U.S. Treasury bonds has been in the 2.0% to 4.0% range over the 2013–2019 time period. The current 30-year Treasury yield is near the bottom of this range. Given the recent range of yields, I have chosen to use the top end of the range as my risk-free interest rate. Therefore, I am using 3.75% as the risk-free rate, or R_f, in my CAPM. This is similar to the normalized risk-free interest rate used by the investment advisory firm Duff & Phelps.[20]

Q. Does the 3.75% risk-free interest rates take into consideration of forecasts of higher interest rates?

A. No, it does not. Forecasts of higher interest rates have been notoriously wrong for a decade.[21] My 3.75% risk-free interest rate takes into account the range of

[20] https://www.duffandphelps.com/insights/publications/valuation-insights/valuation-insights-first-quarter-2019/us-equity-risk-premium-recommendation.

[21] Ben Eisen, "Yes, 100% of economists were dead wrong about yields, *Market Watch*," October 22, 2014. Perhaps reflecting this fact, *Bloomberg* reported that the Federal Reserve Bank of New York has stopped using the interest rate estimates of professional forecasters in the Bank's interest rate model due to the unreliability of those interest rate forecasts. See Susanne Walker and Liz Capo McCormick, "Unstoppable $100 Trillion Bond Market Renders Models Useless," *Bloomberg.com* (June 2, 2014). http://www.bloomberg.com/news/2014-06-01/the-unstoppable-100-trillion-bond-market-renders-models-useless.html. Joe Weisenthal, "How Interest Rates Keep Making People on Wall Street Look Like Fools," Bloomberg.com, March 16, 2015. http://www.bloomberg.com/news/articles/2015-03-16/how-interest-rates-keep-making-people-on-wall-street-look-like-fools. Akin Oyedele, "Interest Rate Forecasters are Shockingly Wrong

interest rates in the past and effectively synchronizes the risk-free rate with the market risk premium. The risk-free rate and the market risk premium are interrelated in that the market risk premium is developed in relation to the risk-free rate. As discussed below, my market risk premium is based on the results of many studies and surveys that have been published over time. Therefore, my risk-free interest rate of 3.75% is effectively a normalized risk-free rate of interest.

Q. What Betas are you employing in your CAPM?

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

As shown on page 3 of Attachment JRW-10, the slope of the regression line is the stock's ß. A steeper line indicates that the stock is more sensitive to the return on the overall market. This means that the stock has a higher ß and greater-than-average market risk. A less steep line indicates a lower ß and less market risk. Several online investment information services, such as Yahoo and Reuters,

Almost All of the Time," Business *Insider*, July 18, 2015. http://www.businessinsider.com/interest rate-forecasts-are-wrong-most-of-the-time-2015-7. "*Market Watch*," October 22, 2014.

provide estimates of stock betas. Usually these services report different betas for the same stock. The differences are usually due to: (1) the time period over which ß is measured; and (2) any adjustments that are made to reflect the fact that betas tend to regress to 1.0 over time. In estimating an equity cost rate for the proxy group, I am using the betas for the companies as provided in the *Value Line Investment Survey*. As shown on page 3 of Attachment JRW-10, the median beta for the companies in the Electric Proxy Group is 0.55.

Q. Please discuss the market risk premium.

A. The market risk premium is equal to the expected return on the stock market (e.g., the expected return on the S&P 500, $E(R_m)$ minus the risk-free rate of interest (R_f)). The market risk premium is the difference in the expected total return between investing in equities and investing in "safe" fixed-income assets, such as long-term government bonds. However, while the market risk premium is easy to define conceptually, it is difficult to measure because it requires an estimate of the expected return on the market - $E(R_m)$. As is discussed below, there are different ways to measure $E(R_m)$, and studies have come up with significantly different magnitudes for $E(R_m)$. As Merton Miller, the 1990 Nobel Prize winner in economics indicated, $E(R_m)$ is very difficult to measure and is one of the great mysteries in finance.[22]

Q. Please discuss the alternative approaches to estimating the market risk premium.

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

A. Page 4 of Attachment JRW-10 highlights the primary approaches to, and issues in, estimating the expected market risk premium. The traditional way to measure the market risk premium was to use the difference between historical average stock and bond returns. In this case, historical stock and bond returns, also called *ex post* returns, were used as the measures of the market's expected return (known as the *ex ante* or forward-looking expected return). This type of historical evaluation of stock and bond returns is often called the "Ibbotson approach" after Professor Roger Ibbotson, who popularized this method of using historical financial market returns as measures of expected returns. However, this historical evaluation of returns can be a problem because: (1) *ex post* returns are not the same as *ex ante* expectations; (2) market risk premiums can change over time, increasing when investors become more risk-averse and decreasing when investors become less risk-averse; and (3) market conditions can change such that *ex post* historical returns are poor estimates of *ex ante* expectations.

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

Mehra and Prescott in which the authors first questioned the magnitude of historical equity risk premiums relative to fundamentals.[23]

In addition, there are a number of surveys of financial professionals regarding the market risk premium. There have also been several published surveys of academics on the equity risk premium. *CFO Magazine* conducts a quarterly survey of CFOs, which includes questions regarding their views on the current expected returns on stocks and bonds. Usually, over 200 CFOs participate in the survey.[24] Questions regarding expected stock and bond returns are also included in the Federal Reserve Bank of Philadelphia's annual survey of financial forecasters, which is published as the *Survey of Professional Forecasters*.[25] This survey of professional economists has been published for almost fifty years. In addition, Pablo Fernandez conducts annual surveys of financial analysts and companies regarding the equity risk premiums they use in their investment and financial decision-making.[26]

Q. Please provide a summary of the market risk premium studies.

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

[24] DUKE/CFO Magazine Global Business Outlook Survey, (June 2019), https://www.cfosurvey.org/wp-content/uploads/2019/06/Q2-2019-US-Toplines-1.pdf.

[25] Federal Reserve Bank of Philadelphia, *Survey of Professional Forecasters* (Mar. 22, 2019), https://www.philadelphiafed.org/-/media/research-and-data/real-time-center/survey-of-professional-forecasters/2019/spfq119.pdf?la=en. The Survey of Professional Forecasters was formerly conducted by the American Statistical Association ("ASA") and the National Bureau of Economic Research ("NBER") and was known as the ASA/NBER survey. The survey, which began in 1968, is conducted each quarter. The Federal Reserve Bank of Philadelphia, in cooperation with the NBER, assumed responsibility for the survey in June 1990.

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

A. Derrig and Orr (2003), Fernandez (2007), and Song (2007) completed the most comprehensive review of the research on the market risk premium.[27] Derrig and Orr's study evaluated the various approaches to estimating market risk premiums, as well as the issues with the alternative approaches and summarized the findings of the published research on the market risk premium. Fernandez examined four alternative measures of the market risk premium – historical, expected, required, and implied. He also reviewed the major studies of the market risk premium and presented the summary market risk premium results. Song provides an annotated bibliography and highlights the alternative approaches to estimating the market risk premium.

Page 5 of Attachment JRW-10 provides a summary of the results of the primary risk premium studies reviewed by Derrig and Orr, Fernandez, and Song, as well as other more recent studies of the market risk premium. In developing page 5 of Attachment JRW-10, I have categorized the studies as discussed on page 5 of Attachment JRW-10. I have also included the results of studies of the "Building Blocks" approach to estimating the equity risk premium. The Building Blocks approach is a hybrid approach employing elements of both historical and *ex ante* models.

Q. Please discuss page 5 of Attachment JRW-10.

[27] *See* Richard Derrig & Elisha Orr, "Equity Risk Premium: Expectations Great and Small," Working Paper (version 3.0), Automobile Insurers Bureau of Massachusetts, (August 28, 2003); Pablo Fernandez, "Equity Premium: Historical, Expected, Required, and Implied," IESE Business School Working Paper, (2007); Zhiyi Song, "The Equity Risk Premium: An Annotated Bibliography," CFA Institute, (2007).

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

Q. Please highlight the results of the more recent risk premium studies and surveys.

A. The studies cited on page 5 of Attachment JRW-10 include every market risk premium study and survey I could identify that was published over the past two decades and that provided a market risk premium estimate. Most of these studies were published prior to the financial crisis that began in 2008. In addition, some of these studies were published in the early 2000s at the market peak. It should be noted that many of these studies (as indicated) used data over long periods of time (as long as fifty years of data) and so were not estimating a market risk premium as of a specific point in time (e.g., the year 2001). To assess the effect of the earlier studies on the market risk premium, I have reconstructed page 5 of Attachment JRW-10 on page 6 of Attachment JRW-10; however, I have eliminated all studies dated before January 2, 2010. The median for this subset of studies is 5.24%.

Q. Please summarize the market risk premium studies and surveys.

A. As noted above, there are three approaches to estimating the market risk premium – historic stock and bond returns, ex ante or expected returns models, and surveys.

The studies on page 6 of Attachment JRW-8 can be summarized in the following manners:

Historic Stock and Bond Returns - Historic stock and bond returns suggest a market risk premium in the 4.40% to 6.26% range, depending on whether one uses arithmetic or geometric mean returns.

Ex Ante Models - Market risk premium studies that use expected or ex ante return models indicate market risk premium in the range of 4.29% to 6.00%.

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

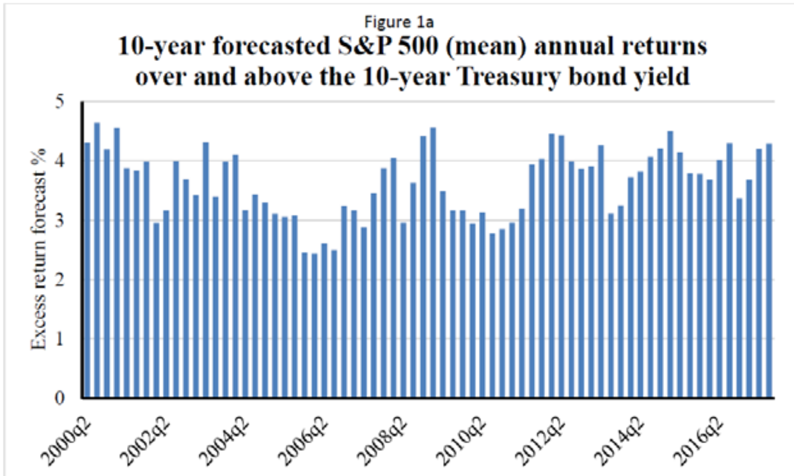
Q. Please highlight the ex ante market risk premium studies and surveys that you believe are most timely and relevant.

A. I will highlight several studies/surveys.

CFO Magazine conducts a quarterly survey of CFOs, which includes questions regarding their views on the current expected returns on stocks and bonds. In the September 2019 CFO survey conducted by *CFO Magazine* and Duke University, which included approximately 200 responses, the expected 10-year market risk premium was 4.62%.[28] Figure 5, below, shows the market risk premium associated with the CFO Survey, which has been in the 4.0% range in recent years.

[28] DUKE/CFO Magazine Global Business Outlook Survey, at 61, (September 2019), https://www.cfosurvey.org/wp-content/uploads/2019/06/Q2-2019-US-Toplines-1.pdf.

Figure 5
Market Risk Premium
CFO Survey



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

Pablo Fernandez conducts annual surveys of financial analysts and companies regarding the equity risk premiums they use in their investment and financial decision-making.[29] His survey results are included on pages 5 and 6 of Attachment JRW-10. The results of his 2019 survey of academics, financial analysts, and companies, which included 4,000 responses, indicated a mean market risk premium employed by U.S. analysts and companies of 5.6%.[30] His estimated market risk premium for the U.S. has been in the 5.00%-5.50% range in recent years.

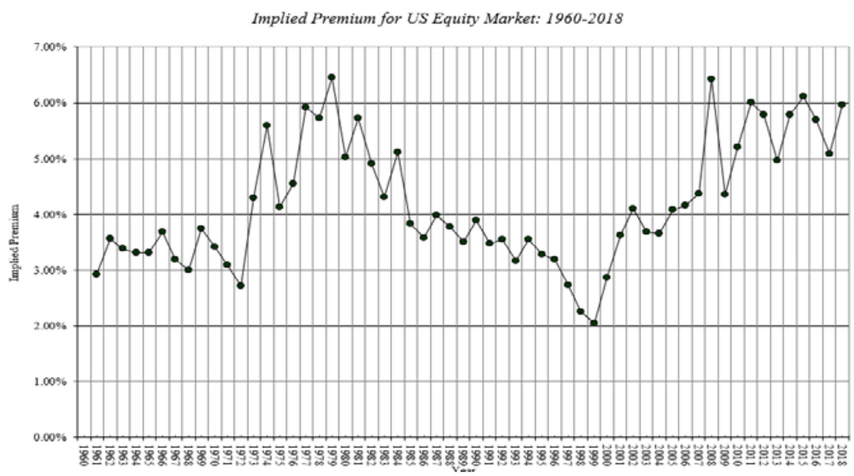
Professor Aswath Damodaran of NYU, a leading expert on valuation and the market risk premium, provides a monthly updated market risk premium which is

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

[30] *Ibid.* p. 3.

based on projected S&P 500 EPS and stock price level and long-term interest rates. His estimated market risk premium, shown graphically in Figure 6, below, for the past almost sixty years, has primarily been in the range of 5.0% to 6.0% since 2010.

Figure 6
Damodaran Market Risk Premium



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

Duff & Phelps, an investment advisory firm, provides recommendations for the risk-free interest rate and market risk premiums to be used in calculating the cost of capital data. Their recommendations over the 2008-2019 time periods are shown on page 7 of Attachment JRW-10. Duff & Phelps' recommended market risk premium has been in the 5.0% to 6.0% range over the past decade. Most recently, in the first quarter of 2019, Duff & Phelps increased its recommended market risk premium from 5.0% to 5.50%.[31]

[31] Duff & Phelps, "U.S. Equity Risk Premium Recommendation," (Feb. 19, 2019), https://www.duffandphelps.com/insights/publications/cost-of-capital/recommended-us-equity-risk-premium-and-corresponding-risk-free-rates.

KPMG is one of the largest public accounting firms in the world. Its recommended market risk premium over the 2013-2019 time period is shown in Panel A of page 8 of Attachment JRW-10. KPMG's recommended market risk premium has been in the 5.50% to 6.50% range over this time period. In the first quarter of 2019, KPMG increased its estimated market risk premium from 5.50% to 5.75%.[32]

Finally, the website *market-risk-premia.com* provides risk-free interest rates, implied market risk premiums, and overall cost of capital for thirty-six countries around the world. These parameters for the U.S. over the 2002-2019 time period are shown in Panel B of page 8 of Attachment JRW-10. As of July 31, 2019, *market-risk-premia.com* estimated an implied cost of capital for the U.S. of 6.12% consisting of a risk-free rate of 2.02% and an implied market risk premium of 4.10.[33]

Q. Given these results, what market risk premium are you using in your CAPM?

A. The studies on page 6 of Attachment JRW-8, and more importantly the more timely and relevant studies just cited, suggest that the appropriate market risk premium in the U.S. is in the 4.0% to 6.0% range. I will use an expected market risk premium of 5.75%, which is in the upper end of the range, as the market risk premium. I gave most weight to the market risk premium estimates of the CFO Survey, Duff & Phelps, KPMG, the Fernandez survey, and Damodaran. This is a

[32] KPMG, "Equity Market Risk Premium Research Summary," (March 31, 2019), https://assets.kpmg/content/dam/kpmg/nl/pdf/2019/advisory/equity-market-risk-premium-research-summary-31032019.pdf.

[33] Market-Risk-Premia.com, "Implied Market-risk-premia (market risk premium): USA," http://www.market-risk-premia.com/us.html.

conservatively high estimate of the market risk premium considering the many studies and surveys of the market risk premium.

Q. What equity cost rate is indicated by your CAPM analysis?

A. The results of my CAPM study for the proxy group are summarized on page 1 of Attachment JRW-10 and in Table 3 below.

Table 3
CAPM-derived Equity Cost Rate/ROE
$K = (R_f) + ß * [E(R_m) - (R_f)]$

	Risk-Free Rate	Beta	Equity Risk Premium	Equity Cost Rate
Electric Proxy Group	**3.75%**	**0.55**	**5.75%**	**6.90%**

For the Electric Proxy Group, the risk-free rate of 3.75% plus the product of the beta of 0.55 times the equity risk premium of 5.75% results in a 6.90% equity cost rate.

D. Equity Cost Rate Summary

Q. Please summarize the results of your equity cost rate studies.

A. My DCF and CAPM analyses for the Electric Proxy Group indicate equity cost rates of 8.25% and 6.90%, respectively.

Table 4
ROEs Derived from DCF and CAPM Models

	DCF	CAPM
Electric Proxy Group	**8.25%**	**6.90%**

Q. Given these results, what is your estimated equity cost rate for the group?

A. Given these results, I conclude that the appropriate equity cost rate for companies in the Electric Proxy Group is in the 6.90% to 8.25% range. However, since I rely primarily on the DCF model, I am using the upper end of the range as the equity cost rate. In addition, given that Granite State is in the upper end of the spectrum of the investment risk of the proxy group companies, I conclude that the appropriate equity cost rate for the Company is 8.25%.

Q. Please indicate why an equity cost rate of 8.25% is appropriate for the electric operations of Granite State.

A. There are a number of reasons why an equity cost rate of 8.25% is appropriate and fair for the Company in this case:

1. As shown in Attachment JRW-7, page 1, capital costs for utilities, as indicated by long-term bond yields, are still at historically low levels. In addition, given low inflationary expectations and slow global economic growth, interest rates are likely to remain at low levels for some time.

2. As shown in Attachment JRW-7, page 4, the electric utility industry is among the lowest risk industries in the U.S. as measured by beta. As such, the cost of equity capital for this industry is amongst the lowest in the U.S., according to the CAPM.

4. The investment risk of Granite State, as indicated by the Company's S&P and DBRS credit ratings, is at the upper end of the risk level of the proxy group. Therefore, I have used the upper end of the equity cost rate range (8.25%).

5. The authorized ROEs for electric utility companies have declined from 10.01% in 2012, 9.8% in 2013, 9.76% in 2014, 9.58% in 2015, 9.60% in 2016, 9.68% in 2017, 9.56% in 2018, and 9.56% in the first three quarters of 2019.[34] In addition, the authorized ROEs for electric distribution companies have been 30-40 basis points below those for integrated electric utilities. In my opinion, authorized ROEs have lagged behind capital market cost rates, or in other words, authorized ROEs have been slow to reflect low capital market cost rates. However, the <u>trend</u> has been towards lower ROEs and the <u>norm</u> now is below 10%. Hence, I believe that my recommended ROE reflects our present historically low capital cost rates, and these low capital cost rates are finally being recognized as the norm by state utility regulatory commissions.

Q. Please discuss your recommendation in light of a Moody's publication on the subject of utility company ROEs and credit quality.

A. Moody's recently published an article on utility ROEs and credit quality. In the article, Moody's recognizes that authorized ROEs for electric and gas companies are declining due to lower interest rates. [35]

> The credit profiles of US regulated utilities will remain intact over the next few years despite our expectation that regulators will continue to trim the sector's profitability by lowering its authorized returns on equity (ROE). Persistently low interest rates and a comprehensive suite of cost recovery mechanisms ensure a low business risk profile for utilities, prompting regulators to scrutinize their profitability, which is defined as the ratio of net income to book equity. We view cash flow measures as a more important rating driver than authorized ROEs, and we note that regulators can lower

[34] *S*&P Global Market Intelligence, RRA *Regulatory Focus*, 2019.

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

> authorized ROEs without hurting cash flow, for instance by targeting depreciation, or through special rate structures.

Moody's indicates that with the lower authorized ROEs, electric and gas companies are earning ROEs of 9.0% to 10.0%, but this is not impairing their credit profiles and is not deterring them from raising record amounts of capital. With respect to authorized ROEs, Moody's recognizes that utilities and regulatory commissions are having trouble justifying higher ROEs in the face of lower interest rates and cost recovery mechanisms.[36]

> Robust cost recovery mechanisms will help ensure that US regulated utilities' credit quality remains intact over the next few years. As a result, falling authorized ROEs are not a material credit driver at this time, but rather reflect regulators' struggle to justify the cost of capital gap between the industry's authorized ROEs and persistently low interest rates. We also see utilities struggling to defend this gap, while at the same time recovering the vast majority of their costs and investments through a variety of rate mechanisms.

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

Q. Do you believe that your 8.25% ROE recommendation meets *Hope* and *Bluefield* standards?

A. Yes. As previously noted, according to the *Hope* and *Bluefield* decisions, returns on capital should be: (1) comparable to returns investors expect to earn on other

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

investments of similar risk; (2) sufficient to assure confidence in the company's financial integrity; and (3) adequate to maintain and support the company's credit and to attract capital.

Q. Are utilities able to attract capital with the lower ROEs?

A. As shown on page 3 of Attachment JRW-7, utilities have been earning ROEs of about 9.0% (on average) in recent years. As shown on page 1 of Attachment JRW-4, utilities in the proxy group earned an average ROE of 9.20% in 2018. Moody's also highlights in the article that utilities are raising about $50 billion a year in debt capital, despite the lower ROEs.[37] Therefore, I believe that my ROE recommendation meets the criteria established in the *Hope* and *Bluefield* decisions.

Q. Have the lower ROEs hurt the stock performance of utility stocks?

A. No. Figure 7 shows the Dow Jones Utility Index ("DJU") versus the S&P 500 since January 1, 2019.[38] Both the DJU and the S&P 500 are near or have achieved record levels, and the DJU has performed right along with the S&P 500 over this time period. As a result, with high stock prices, utility dividend yields and DCF equity cost rates are low.

Figure 7
Dow Jones Utilities vs. S&P 500
2019

[37] *Ibid.*

[38] https://finance.yahoo.com/.

VI. Critique of Granite State Rate of Return Testimony

Q. Please summarize the company's rate of return recommendation.

A. The Company has proposed a capital structure of 45.0% long-term debt and 55.0% common equity. The Company has recommended a long-term debt cost rate of 5.97%. Mr. Cochran has recommended a common equity cost rate of 10.0% for the electric utility operations of Granite State. The Company's overall proposed rate of return is 8.19%. This is summarized on page 1 of in Attachment JRW-11.

Q. Please review Mr. Cochran's equity cost rate approaches and results.

A. Mr. Cochran has developed a proxy group of electric utility companies and employs DCF and CAPM equity cost rate approaches. Mr. Cochran's equity cost rate estimates for the Company are summarized on page 2 of Attachment JRW-11. Based on these figures, he concludes that the appropriate equity cost rate for the Company is 10.0%. As I discuss below, there are a number of issues with the inputs, applications, and results of his equity cost rate models.

Q. What issues do you have with the Company's cost of capital position?

A. The primary rate of return issues in this case are the appropriate capital structure and ROE for the Company.

Capital Structure - The Company has proposed a hypothetical capital structure that includes more common equity and less financial risk than other electric utilities. I have used a capital structure with 50% debt and 50% common equity which is more reflective of the capital structures of electric utilities.

The Company's ROE Analysis is Out-of-Date - The Company ROE study was prepared in March of this year. Since that time, the Federal Reserve has cut the federal funds rate three times and the 30-year Treasury rate has fallen about 75 basis points. Capital costs are lower now than when the Company's case was filed.

DCF Approach – Mr. Cochran and I have both employed the traditional constant-growth DCF model. Mr. Cochran has also used a multi-stage growth version of the model. There are several errors in Mr. Cochran's DCF analyses: (1) he gives little weight to his constant-growth DCF results; (2) he has exclusively used the overly optimistic and upwardly biased EPS growth rate forecasts of Wall Street analysts and *Value Line*; (3) the terminal growth rate of his multi-stage DCF model is inflated and does not reflect the prospective economic growth in the U.S. and is about 100 basis points above the projected long-term GDP growth; and (4) he has claimed that the DCF results underestimate the market-determined cost of equity capital due to high utility stock valuations and low dividend yields. On the other hand, when developing the DCF growth rate that I have used in my analysis, I have reviewed thirteen growth rate measures including historical and projected growth rate measures and have evaluated growth in dividends, book value, and earnings per share.

CAPM Approach – The CAPM approach requires an estimate of the risk-free interest rate, beta, and the market or risk premium. The primary issue with Mr. Cochran's CAPM is his market risk premium of 13.49%. The 13.49% market risk premium is much larger than: (1) indicated by historic stock and bond return data; and (2) found in the published studies and surveys of the market risk premium. In addition, the 13.49% market risk premium is based on totally unrealistic assumptions of future economic and earnings growth and stock returns. To compute his market risk premium, Mr. Cochran has applied the DCF to the S&P 500 and employed analysts' three-to-five-year earnings per share ("EPS") growth-rate projections as a growth rate to compute an expected market return and market risk premiums As I demonstrate later in my testimony, the EPS growth-rate projection used for the S&P 500 and the resulting expected market return and market risk premium include totally unrealistic assumptions regarding future economic and earnings growth and stock returns.

Flotation Costs - Mr. Cochran's recommendation includes consideration of equity flotation costs and size in his determination of the appropriate ROE for Granite State. Yet, Mr. Cochran has not identified any flotation costs that have been paid by Granite State. Therefore, the Company should not be rewarded with a higher ROE that includes flotation costs when the Company has not paid any such costs.

Company Size – Mr. Cochran's ROE recommendation also includes a consideration of a size premium for the Company. However, as I show, any such premiums for size is not appropriate for a regulated public utility.

The out-of-date ROE study and capital structure issues were addressed above. The other issues are discussed below.

A. The Company's DCF Approach

Q. Please summarize Mr. Cochran's DCF estimates.

A. On pages 12-22 of his testimony and in Attachments JC-4 - JC-5, Mr. Cochran develops an equity cost rate by applying the DCF model to his proxy group. Mr. Cochran's DCF results are summarized in Panel A of page 2 of Attachment JRW-11 He uses constant-growth and multistage growth DCF models. Mr. Cochran uses three dividend yield measures (30, 90, and 180 days) in his DCF models. In his constant-growth DCF models, Mr. Cochran has relied on the forecasted EPS growth rates of Zacks, Yahoo Finance, and *Value Line*. His multi-stage DCF model uses analysts' EPS growth rate forecasts as a short-term growth rate and his projection of GDP growth of 5.40% as the long-term growth rate. For all three models, he reports Mean Low, Mean, and Mean High results. The average of his constant-growth and multi-stage growth DCF models is 8.98%.

Q. What are the errors in Mr. Cochran's DCF analyses?

A. The primary issues in Mr. Cochran's DCF analyses are: (1) the lack of weight he gives to his constant-growth DCF results; (2) his exclusive use of the overly optimistic and upwardly biased EPS growth rate forecasts of Wall Street analysts and *Value Line*; (3) the use of an inflated terminal growth rate of 5.40% in his multi-stage DCF model that it is not reflective of prospective economic growth in the U.S. and is about 100 basis points above the projected long-term GDP growth; and (4) he has claimed that the DCF results underestimate the market-determined cost of equity capital due to high utility stock valuations and low dividend yields.

1. <u>The Low Weight Given to the Constant-Growth DCF Results</u>

Q. How much weight has Mr. Cochran given his DCF results in arriving at an equity cost rate for the company?

A. Apparently, not a lot. The average of all of his mean constant-growth and multi-stage stage DCF equity cost rates is only 8.98%. Had he given these results more weight, he would have arrived at a much lower equity cost rate recommendation.

2. <u>Analysts' EPS Growth Rate Forecasts</u>

Q. Please discuss Mr. Cochran's exclusive reliance on the projected growth rates of Wall Street analysts and *Value Line.*

A. It seems highly unlikely that investors today would rely exclusively on the EPS growth rate forecasts of Wall Street analysts and ignore other growth rate measures in arriving at their expected growth rates for equity investments. As I previously indicated, the appropriate growth rate in the DCF model is the dividend growth rate, not the earnings growth rate. Hence, consideration must be given to other indicators of growth, including historical prospective dividend growth, internal growth, as well as projected earnings growth. In addition, a recent study by Lacina, Lee, and Xu (2011) has shown that analysts' long-term earnings growth rate forecasts are not more accurate at forecasting future earnings than naïve random walk forecasts of future earnings.[39] As such, the weight given to analysts' projected EPS growth rates should be limited. And finally, and most significantly, it is well-known that the long-term EPS growth rate forecasts of Wall Street securities analysts are overly optimistic and upwardly biased.[40] Hence, using these growth rates as a DCF growth rate produces an overstated equity cost rate. A recent study by Easton and Sommers (2007) found that optimism in analysts' earnings growth rate forecasts leads to an upward bias in estimates of the cost of equity capital of almost 3.0 percentage points.[41] Therefore, exclusive reliance on these forecasts for a DCF growth rate results in failure of one the basic inputs in the equation. In addition, as noted above, a study by Szakmary, Conover, and Lancaster (2008) discovered that the three-to-five-year EPS growth rate forecasts

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

[40] See references in footnote 15.

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

of *Value Line*'s to be significantly higher than the EPS growth rates that these companies subsequently achieved.[42]

Q. Have changes in regulations impacting Wall Street analysts and their research impacted the upward bias in their projected EPS growth rates?

A. No. A number of the studies I have cited above demonstrate that the upward bias has continued despite changes in regulations and reporting requirements over the past two decades. This observation is highlighted by a 2010 McKinsey study entitled "Equity Analysts: Still Too Bullish," which involved a study of the accuracy of analysts' long-term EPS growth rate forecasts. The authors conclude that after a decade of stricter regulation, analysts' long-term earnings forecasts continue to be excessively optimistic. They made the following observation:[43]

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

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

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

> *years, with estimates ranging from 10 to 12 percent a year, compared with actual earnings growth of 6 percent. Over this time frame, actual earnings growth surpassed forecasts in only two instances, both during the earnings recovery following a recession. On average, analysts' forecasts have been almost 100 percent too high.*

This is the same observation made in a *Bloomberg Businessweek* article.[44] The author concluded:

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

3. <u>The GDP Growth Rate in the Multi-Stage DCF Analysis</u>

Q. Please discuss Mr. Cochran's multi-stage DCF analysis.

A. Mr. Cochran has employed a multi-stage growth DCF model; (1) the first-stage is the average projected analyst growth rate of Wall Street analysts as published by Yahoo Finance, Zacks, and *Value Line;* and (2) the terminal stage is his projected measure of long-term GDP growth. He uses a long-term nominal GDP growth rate of 5.40% which is based on (1) a real GDP growth rate of 3.22% which is calculated over the 1929-2018 time period and (2) an inflation rate of 2.18%.

Q. What are the primary errors with Mr. Cochran's multi-stage DCF analysis?

A There are two primary errors with Mr. Cochran's multi-stage DCF analysis; (1) the first-stage DCF growth rate is the average projected EPS growth rate from Wall

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

Street analysis which, as discussed above, are overly optimistic and upwardly biased; and (2) the long-term GDP growth rate is based on historical GDP growth and is about 100 basis points above long-term projections of GDP growth.

Q. Please identify the errors with Mr. Cochran's projected long-term GDP growth rate of 5.40%.

A. There are two major errors in this analysis. First, Mr. Cochran has not provided any theoretical or empirical support that long-term GDP growth is a reasonable proxy for the expected growth rate of the companies in his proxy group. Five-year and ten-year historic measures of growth for earnings and dividends for electric utility companies, as shown on page 3 of Attachment JRW-9, suggest growth that is about 100 basis points below Mr. Cochran's 5.40% GDP growth rate. Mr. Cochran has provided no evidence as to why investors would rely on his estimate of long-term GDP growth as the appropriate growth rate for electric utility companies.

The second error is the magnitude of Mr. Cochran's long-term GDP growth rate estimate of 5.40%. On page 1 of Attachment JRW-12 of my testimony, I provide an analysis of GDP growth since 1960. Since 1960, nominal GDP has grown at a compounded rate of 6.46%. Whereas GDP has grown at a compounded rate of 6.46% since 1960, economic growth in the U.S. has slowed considerably in recent decades. Page 2 of Attachment JRW-12 provides the nominal annual GDP growth rates over the 1961 to 2018 time period. Nominal GDP growth grew from 6.0% to over 12% from the 1960s to the early 1980s due in large part to inflation and higher prices. Despite an uptick during the mid-2000s, annual nominal GDP growth rates have declined to the 2.0% to 4.0% range over the past decade.[45]

The components of nominal GDP growth are real GDP growth and inflation. Page 3 of Attachment JRW-12 shows annual real GDP growth rate over the 1961 to 2018 time period. Real GDP growth has gradually declined from the 5.0% to 6.0% range in the 1960s to the 2.0% to 3.0% during the most recent five-year period. The second component of nominal GDP growth is inflation. Page 4 of Attachment JRW-12 shows inflation as measured by the annual growth rate in the Consumer Price Index (CPI) over the 1960 to 2018 time period. The large increase in prices from the late 1960s to the early 1980s is readily evident. Equally evident is the rapid decline in inflation during the 1980s as inflation declined from above 10% to about 4%. Since that time inflation has gradually declined and has been in the 2.0% range or below over the past five years.

The graphs on pages 2, 3, and 4 of Attachment JRW-12 provide very clear evidence of the decline in nominal GDP as well as its components, real GDP and inflation, in recent decades. To gauge the magnitude of the decline in nominal GDP growth, Table 5 and page 5 of Attachment JRW-12 provide the compounded GDP growth rates for 10-, 20-, 30-, 40- and 50- years. Whereas the 50-year compounded GDP growth rate is 6.36%, there has been a monotonic and significant decline in nominal GDP growth over subsequent 10-year intervals, especially in the most recent 10-year interval. These figures clearly suggest that nominal GDP growth

[45] Nominal GDP did increase to 5.0% in 2018. However, this is a one-time boost associated with the 2017 decrease in income taxes.

in recent decades has slowed and that a growth rate in the range of 3.50% to 4.5% is more appropriate today for the U.S. economy. Mr. Cochran's long-term GDP growth rate of 5.40% is clearly inflated.

Table 5
Historic GDP Growth Rates

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

Q. Are the lower GDP growth rates of recent decades consistent with the forecasts of GDP growth?

A. A lower range is also consistent with long-term GDP forecasts. There are several forecasts of annual GDP growth that are available from economists and government agencies. These are listed in Panel B of on page 5 of Attachment JRW-12. The mean 10-year nominal GDP growth forecast (as of March 2019) by economists in the recent *Survey of Financial Forecasters* is 4.25%.[46] The Energy Information Administration ("EIA"), in its projections used in preparing *Annual Energy Outlook*, forecasts long-term GDP growth of 4.20% for the period 2018-2050.[47] The Congressional Budget Office ("CBO"), in its forecasts for the period 2019 to 2049, projects a nominal GDP growth rate of 4.40%.[48] Finally, the Social

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

[47] U.S. Energy Information Administration, *Annual Energy Outlook 2019*, Table: Macroeconomic Indicators, https://www.eia.gov/outlooks/aeo/pdf/appa.pdf.

[48] Congressional Budget Office, The *2019 Long-Term Budget Outlook*, June 15, 2019 https://www.eia.gov/outlooks/aeo/pdf/appa.pdf.

Security Administration ("SSA"), in its Annual OASDI Report, provides a projection of nominal GDP from 2018-2095.[49] SSA's projected growth GDP growth rate over this period is 4.35%. Overall, these forecasts suggest long-term GDP growth rate in the 4.0% - 4.4% range. The trends and projections indicating slower GDP growth indicate that Mr. Cochran's GDP growth rate of 5.40% is inflated.

Q. Does Mr. Cochran provide any reasons why he has ignored the well-known long-term GDP forecasts of the CBO, SSA, and EIA?

A. No.

Q. In your opinion, what is wrong with Mr. Cochran's real GDP forecast on historic data and ignoring the well-known long-term GDP forecasts of the CBO, SSA, and EIA?

A. In developing a DCF growth rate for his constant-growth DCF analysis, Mr. Cochran has totally ignored historic EPS, DPS, and BVPS data and relied solely on the long-term EPS growth rate projections of Wall Street analysts and *Value Line*. However, in developing a terminal DCF growth rate for his multi-stage growth DCF analysis, Mr. Cochran has also totally ignored the well-known long-term real GDP growth rate forecasts of the CBO and EIA and relied solely on historic data going back to 1929. Simply put, he is inconsistent in his methodology.

[49] Social Security Administration, *2019 Annual Report of the Board of Trustees of the Old-Age, Survivors, and Disability Insurance (OASDI) Program*, Table VI.G4, p. 211 (June 15, 2019), https://www.ssa.gov/oact/TR/2019/VI_G2_OASDHI_GDP.html#200732. The 4.35% represents the compounded growth rate in projected GDP from $21,485 trillion in 2019 to $546,311 trillion in 2095.

4. <u>Mr. Cochrane's Claim that the DCF Model Understates the Cost of Equity Capital</u>

Q. Please discuss Mr. Cochran's claim that the DCF model understates the cost of equity capital.

A. On page 22 of his testimony, Mr. Cochran makes the claim that using current utility stock valuations and low dividend yields will underestimate the market-determined ROE. As a result, he says that he considered the results: (1) from the high-end of his range of his DCF results; and (2) his CAPM approach.

Q. What is your response to this claim?

A. Mr. Cochran's claim is totally without merit for the following reasons: (1) he is saying that utility stocks are overvalued and their stock prices will decline in the future (and therefore their dividend yield will increase). Hence, Mr. Cochran presumes that he knows more than investors in the stock market. Actually, if he believes that utility sock prices will decline in the future, he should be forecasting negative returns!; (2) his high-end results are the sum of the dividend yield and only the highest projected growth rate for each proxy utility. Therefore, this approach is reliant on one analyst and is not a consensus forecast of growth; (3) the DCF approach directly measures the cost of equity capital because it uses dividends, stock prices, and expected growth rates. The CAPM is an indirect method of measuring the cost of equity capital with the only company-specific input being beta. In addition, it is highly dependent on the market risk premium which, as discussed above, is one of the great mysteries in finance; and (4) as discussed below, Mr. Cochran's CAPM result is grossly inflated due to its totally unrealistic assumptions on future earnings and economic growth and future stock returns.

B. CAPM Approach

Q. Please discuss Mr. Cochran's CAPM.

A. On pages 22-6 of his testimony and in Attachments JC-6-JC-8, Mr. Cochran estimates an equity cost rate by applying a CAPM model to his proxy group. The CAPM approach requires an estimate of the risk-free interest rate, beta, and the equity risk premium. Mr. Cochran uses: (1) a current (30-day average) 30-Year Treasury bond yield 3.03%; (2) an average *Value Line* Beta of 0.57; and (3)a market risk premium of 13.49%. Based on these figures, he finds a CAPM equity cost rate of 13.49%. Mr. Cochran's CAPM results are summarized on page 1 of Attachment JRW-10.

Q. What are the errors in Mr. Cochran's CAPM analysis?

A. The two issues are: (1) the current 30-Year Treasury yield of 3.03%; and (2) Mr. Cochran's CAPM analysis are the expected market risk premium of 13.49%.

1. Current Risk-Free Interest Rate

Q. What is the issue with the current long-term Treasury rate of 3.03%?

A. Mr. Cochran's current 30-year Treasury yield is stale. As previously discussed, interest rates have declined significantly in 2019 and the Federal Reserve has cut the federal funds rate on three occasions. The 3.03% current 30-year Treasury yield is more than 75 basis points above current 30-year Treasury yield of about 2.25%.

2. Market Risk Premium

Q. What are the errors in Mr. Cochran's CAPM analyses?

A. The primary error in Mr. Cochran's CAPM analysis is the market premium of 13.49%.

Q. Please assess Mr. Cochran's market risk premium derived from applying the DCF model to the S&P 500 using *Value Line* EPS growth rates.

A. Mr. Cochran computes a market risk premium of 13.49% by: (1) calculating an expected stock market return by applying the DCF model to the S&P 500; and, then (2) subtracting the current 30-year Treasury bond yield. Mr. Cochran's estimated expected market return is 16.53% (using *Value Line* EPS growth rate estimates). Mr. Cochran also uses (1) a dividend yield of 2.17% and an expected DCF growth rate of 14.35%. The market risk premium is then computed as the expected stock market return minus the risk-free interest rate (16.53%-3.03% =13.49%).

Q. How did Mr. Cochran err when analyzing market premium?

A. The error is that Mr. Cochran computed the expected market return using the DCF model with the growth rate being the projected 5-year EPS growth rate from *Value Line*. Simply stated, the expected EPS growth rates and the associated expected stock market return and resulting market risk premium are totally unrealistic and defy economic logic.

Q. Is Mr. Cochran's market risk premium of 13.49% reflective of the market risk premiums found in published studies and surveys?

A. No. It is well in excess of the market risk premiums: (1) found in studies of the market risk premiums by leading academic scholars; (2) produced by analyses of historic stock and bond returns; and (3) found in surveys of financial professionals. Page 5 of Attachment JRW-10 provides the results of over thirty market risk premiums studies from the past fifteen years. Historic stock and bond returns suggest a market risk premium in the 4.5% to 7.0% range, depending on whether one uses arithmetic or geometric mean returns. There have been many studies using expected return (also called *ex ante*) models, and their market risk premiums results vary from as low as 2.0% to as high as 7.31%. Finally, the market risk premiums developed from surveys of analysts, companies, financial professionals, and academics suggest lower market risk premiums, in a range of from 1.85% to 5.70%. The bottom line is that there is no support in historic return data, surveys, academic studies, or reports for investment firms for a market risk premium as high as those used by Mr. Cochran.

Q. Please once again address the issues with analysts' as well as *Value Line*'s EPS growth rate forecasts.

A. The key point is that Mr. Cochran's CAPM market risk premium methodology is based entirely on the concept that *Value Line*'s projections of companies' EPS growth rates reflect investors' expected *long-term* EPS growth for those companies. However, this seems highly unrealistic given the research on these projections. As noted above, the EPS growth rate forecasts of *Value Line*, such as those used by Mr. Cochran, have been to be significantly higher than the EPS growth rates that these companies subsequently achieve.[50]

Q. Is there other evidence that indicates that Mr. Cochran's market risk premium developed using *Value Line*'s EPS growth rates is excessive?

A. Yes. The fact is that a long-term EPS growth rate of 14.35% is inconsistent with both historic and projected economic and earnings growth in the U.S for several reasons: (1) long-term EPS and economic growth is about one-half of Mr. Cochran's projected EPS growth rate of 14.35%; (2) as discussed below, long-term EPS and GDP growth are directly linked; and (3) more recent trends in GDP growth, as well as projections of GDP growth, suggest slower economic and earnings growth in the future.

<u>Long-Term Historic EPS and GDP Growth have been in the 6%-7% Range</u> – In Attachment JRW-12, I performed a study of the growth in nominal GDP, S&P

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

500 stock price appreciation, and S&P 500 EPS and DPS growth since 1960. The results are provided on page 1 of Attachment JRW-10, and a summary is shown in Table 6, below.

Table 6
GDP, S&P 500 Stock Price, EPS, and DPS Growth
1960-Present

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

The results show that the historical long-run growth rates for GDP, S&P EPS, and S&P DPS are in the 6% to 7% range. By comparison, Mr. Cochran's long-run growth rate projection of 14.35% is at best overstated. This estimate suggests that companies in the U.S. would be expected to: (1) increase their growth rate of EPS by 100% in the future, and (2) maintain that growth indefinitely in an economy that is expected to grow at about one-third of his projected growth rates.

There is a Direct Link Between Long-Term EPS and GDP Growth - The results in Attachment JRW-12 and Table 6 show that historically there has been a close link between long-term EPS and GDP growth rates. Brad Cornell of the California Institute of Technology published a study on GDP growth, earnings growth, and equity returns. He finds that long-term EPS growth in the U.S. is directly related to GDP growth, with GDP growth providing an upward limit on EPS growth. In addition, he finds that long-term stock returns are determined by long-term earnings growth. He concludes with the following observations:[51]

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

The Trend and Projections Indicate Slower GDP Growth in the Future - The components of nominal GDP growth are real GDP growth and inflation. As discussed above and shown on pages 2-5 of Attachment JRW-12, real GDP growth has gradually declined from the 5.0% to 6.0% range in the 1960s to the 2.0% to 3.0% range during the recent years. In addition, inflation as measured by the annual growth rate in the CPI has declined and has been in the 2.0% range or below over the past five years. This decline in nominal GDP growth was shown in Table 5 and suggest that a figure in the range of 4.0% to 5.0% is more appropriate today for the U.S. economy.

Long-Term GDP Projections also Indicate Slower GDP Growth in the Future Likewise, as discussed above, projections of nominal GDP by various government and industry agencies in including the EIA, CBO, and suggest long-term GDP growth rate in the 4.0% - 4.4% range. Given this range, Mr. Cochran's market

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

risk premium presumes a projected EPS growth rate of 14.35% that is almost three times projected GDP growth. Given the connection between EPS and GDP growth rates, this defies economic logic.

Q. What fundamental factors have led to the decline in prospective GDP growth?

A. As addressed in a study by the consulting firm McKinsey & Co., two factors drive real GDP growth over time: (a) the number of workers in the economy (employment); and (2) the productivity of those workers (usually defined as output per hour).[52] According to McKinsey, real GDP growth over the past 50 years was driven by population and productivity growth which grew at compound annual rates of 1.7% and 1.8%, respectively.

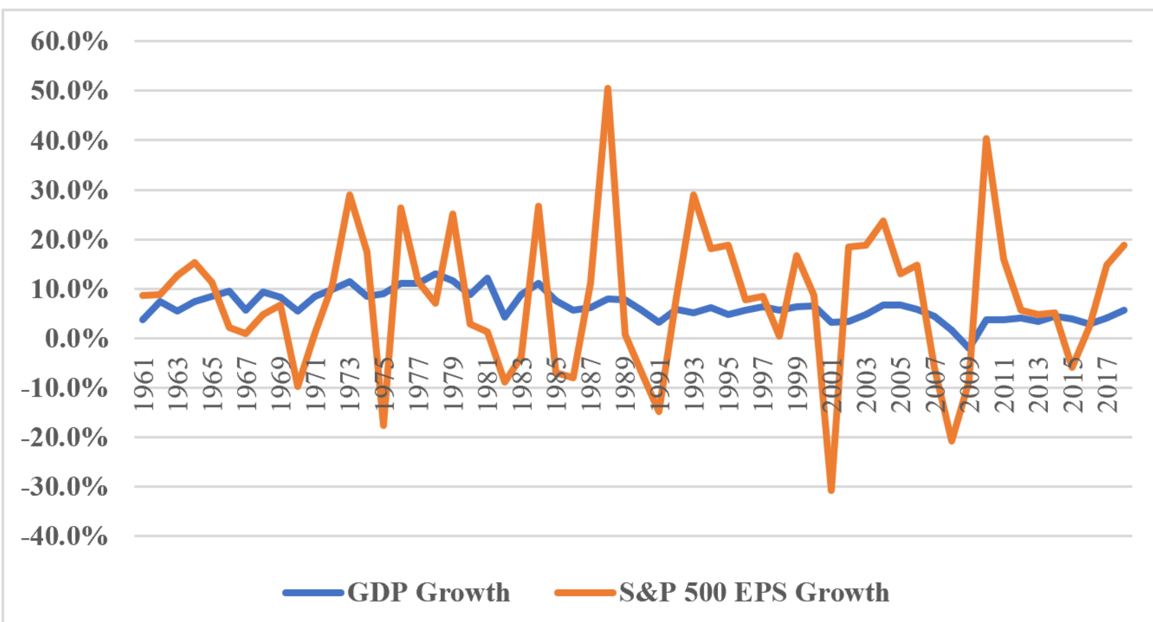
However, global economic growth is projected to slow significantly in the years to come. The primary factor leading to the decline is slow growth in employment (working-age population), which results from slower population growth and longer life expectancy. McKinsey estimates that employment growth will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

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

Q. Please provide more insights into the relationship between S&P 500 EPS and GDP growth.

A. Figure 8 shows the average annual growth rates for GDP and the S&P 500 EPS since 1960. The one very apparent difference between the two is that the S&P 500 EPS growth rates are much more volatile than the GDP growth rates, when compared using the relatively short, and somewhat arbitrary, annual conventions used in these data.[53] Volatility aside, however, it is clear that over the medium to long run, S&P 500 EPS growth does not outpace GDP growth.

Figure 8
Average Annual Growth Rates
GDP and S&P 500 EPS
1960-2018



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

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

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

Corporate Profits are Constrained by GDP – Milton Friedman, the noted economist, warned investors and others not to expect corporate profit growth to sustainably exceed GDP growth, stating, "Beware of predictions that earnings can grow faster than the economy for long periods. When earnings are exceptionally high, they don't just keep booming."[54] Friedman also noted in the *Fortune* interview that profits must move back down to their traditional share of GDP. In Table 7, below, I show that currently the aggregate net income levels for the S&P 500 companies, using 2018 figures, represent 6.73% of nominal GDP.

Table 7
S&P 500 Aggregate Net Income as a Percent of GDP

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

Data Sources: 2018 Net Income for S&P 500 companies – *Value Line* (March 12, 2019).
2018 Nominal GDP – Moody's - https://www.economy.com/united-states/nominal-gross-domestic-product.

Short-Term Factors Impact S&P 500 EPS – The growth rates in the S&P 500 EPS and GDP can diverge on a year-to-year basis due to short-term factors that impact S&P 500 EPS in a much greater way than GDP. As shown above, S&P EPS growth rates are much more volatile than GDP growth rates. The EPS growth for the S&P 500 companies has been influenced by low labor costs and interest

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

rates, commodity prices, the recovery of different sectors such as the energy and financial sectors, the cut in corporate tax rates, etc. These short-term factors can make it appear that there is a disconnect between the economy and corporate profits.

The Differences Between the S&P 500 EPS and GDP – In the last three years, as the EPS for the S&P 500 has grown at a faster rate than U.S. nominal GDP, some have pointed to the differences between the S&P 500 and GDP.[55] These differences include: (a) corporate profits are about 2/3 manufacturing driven, while GDP is 2/3 services driven; (b) consumer discretionary spending accounts for a smaller share of S&P 500 profits (15%) than of GDP (23%); (c) corporate profits are more international-trade driven, while exports minus imports tend to drag on GDP; and (d) S&P 500 EPS is impacted not just by corporate profits but also by share buybacks on the positive side (fewer shares boost EPS) and by share dilution on the negative side (new shares dilute EPS). While these differences may seem significant, it must be remembered that the Income Approach to measure GDP includes corporate profits (in addition to employee compensation and taxes on production and imports) and therefore effectively accounts for the first three factors.[56]

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

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

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

Q. Please provide addition evidence showing that Mr. Cochran's S&P 500 EPS growth rate of 14.35% is not realistic.

A. Beyond my previous discussion, I have also performed the following analysis of S&P 500 EPS and GDP growth in Table 8 below. Specifically, I started with the 2018 aggregate net income for the S&P 500 companies and 2018 nominal GDP for the U.S. As shown in Table 7, the aggregate profit for the S&P 500 companies represented 6.73% of nominal GDP in 2018. In Table 8, I then project the aggregate net income level for the S&P 500 companies and GDP as of the year 2050. For the growth rate for the S&P 500 companies, I used Mr. Cochran's *Value Line* projected EPS growth rate of 14.73%. As a growth rate for nominal GDP, I used the average of the long-term projected GDP growth rates from CBO, SSA, and EIA (4.0%, 4.4%, and 4.3%), which is 4.23%. The projected 2050 level for the aggregate net income level for the S&P 500 companies is $102.7 trillion. However, over the same period GDP only grows to $78.7 trillion. As such, if the aggregate net income for the S&P 500 grows in accordance with the growth rates used by Mr. Cochran, and if nominal GDP grows at rates projected by major government agencies, the net income of the S&P 500 companies will represent growth from 6.73% of GDP in 2018 to 130.59% of GDP in 2050. Obviously, it is implausible for the net income of the S&P 500 to become larger than GDP!

Table 8
Projected S&P 500 Earnings and Nominal GDP
2018-2050
S&P 500 Aggregate Net Income as a Percent of GDP

	2018 Value	Growth Rate	No. of Years	2050 Value
Aggregate Net Income for S&P 500	1,406,400.0	14.35%	32	102,722,661.7
2018 Nominal U.S. GDP	20,891,000.0	4.23%	32	78,735,624.7
Net Income/GDP (%)	6.73%			130.47%

Data Sources: 2018 Aggregate Net Income for S&P 500 companies – *Value Line* (March 12, 2019).
2018 Nominal GDP – Moody's - https://www.economy.com/united-states/nominal-gross-domestic-product.
S&P 500 EPS Growth Rate – Mr. Cochran's *Value Line* projected EPS growth rate - 14.35%;
Nominal GDP Growth Rate – The average of the long-term projected GDP growth rates from CBO, SSA, and EIA (4.0%, 4.4%, and 4.3%).

Q. Please provide a summary assessment of GDP and S&P 500 EPS growth rates.

A. As noted above, the long-term link between corporate profits and GDP is inevitable. The short-term differences in growth between the two has been highlighted by some notable market observers, including Warren Buffet, who indicated that corporate profits as a share of GDP tend to go far higher after periods where they are depressed, and then drop sharply after they have been hovering at historically high levels. In a famous 1999 *Fortune* article, Mr. Buffet made the following observation:[57]

> You know, someone once told me that New York has more lawyers than people. I think that's the same fellow who thinks profits will

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

> become larger than GDP. When you begin to expect the growth of a component factor to forever outpace that of the aggregate, you get into certain mathematical problems. In my opinion, you have to be wildly optimistic to believe that corporate profits as a percent of GDP can, for any sustained period, hold much above 6%. One thing keeping the percentage down will be competition, which is alive and well. In addition, there's a public-policy point: If corporate investors, in aggregate, are going to eat an ever-growing portion of the American economic pie, some other group will have to settle for a smaller portion. That would justifiably raise political problems – and in my view a major reslicing of the pie just isn't going to happen.

In sum, Mr. Cochran's long-term S&P 500 EPS growth rate of 14.35% is grossly overstated and has no basis in economic reality. In the end, the big question remains as to whether corporate profits can grow faster than GDP. Jeremy Siegel, the renowned finance professor at the Wharton School of the University of Pennsylvania, believes that going forward, earnings per share can grow about half a point faster than nominal GDP, or about 5.0%, due to the big gains in the technology sector. But he also believes that sustained EPS growth matching analysts' near-term projections is absurd: "The idea of 8% or 10% or 12% growth is ridiculous. It will not happen."[58]

Q. Finally, please provide an overall evaluation of Mr. Cochran's expected stock market return that is used to develop his market risk premium.

A. The are several additional issues with the *Value Line* results. Simply put, the 16.53% expected stock market return is outrageous. The compounded annual return in the U.S. stock market is about 10% (9.49% according to Damodaran

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

between 1928-2018).[59] Mr. Cochran's *Value Line* CAPM results assume that return on the U.S. stock market will be more than 100% higher in the future than it has been in the past! The extremely high expected stock market return, and the resulting market risk premium and equity cost rate results, is directly related to the 14.35% expected EPS growth rate. There are numerous fallacies with this growth rate. First, the expected growth rate is not from today going forward, but instead it is computed from a three-year base period in the past (2015-2017) to a projected three-year period in the future (2021-2023). The problem here is that it incorporates historic growth in the base period, which can inflate projected growth for the future if the base period includes poor earnings. Second, and most significantly, a projected growth rate of 14.35% does not reflect economic reality. As noted above, it assumes that S&P 500 companies can grow their earnings in the future at a rate that is triple the expected GDP growth rate.

D. Flotation Cost and Size Adjustments

Q. Please discuss Mr. Cochran's consideration of flotation costs.

A. Mr. Cochran claims than a flotation cost adjustment of 0.10% is justified to account for flotation costs. However, this is unnecessary for two reasons. First, as indicated in response to Staff 8-10, there have been no equity infusions into Granite State in the past five years. Second, as stated in response to Staff 8-21,

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

Granite State has not paid any flotation costs in the past five years. He has not identified any equity issuances/infusions or flotation costs for Granite State. Therefore, he is claiming that the Company deserves additional revenues in the form of a high ROE to account for flotation costs that have not been identified or paid.

Beyond this issue, it is commonly argued that a flotation cost adjustment (such as that used by the Company) is necessary to prevent the stock price dilution of the existing shareholders. However, this is incorrect for several reasons:

(1) If an equity flotation cost adjustment is similar to a debt flotation cost adjustment, the fact that the market-to-book ratios for electric utility companies are over 1.5X actually suggests that there should be a flotation cost *reduction* (and not an increase) to the equity cost rate. This is because when (a) a bond is issued at a price in excess of face or book value, and (b) the difference between its market price and the book value is greater than the flotation or issuance costs, the cost of that debt is lower than the coupon rate of the debt. The amount by which market values of electric utility companies are in excess of book values is much greater than flotation costs. Hence, if common stock flotation costs were exactly like bond flotation costs, and one was making an explicit flotation cost adjustment to the cost of common equity, the adjustment would be downward;

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

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

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

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

stock prices paid for stocks would lead to lower dividend yields and equity cost rates. This would result in a downward adjustment to their DCF equity cost rate.

Finally, I would point out that the New Hampshire PUC has found that, lacking any evidence of actual or planned issuances, such costs should not be compensated." *See* Re: Pennichuck Water Works, Inc. 70 NH PUC 850, 863 (1985, 70 NH PUC 862).

Q. What other adjustments does Mr. Cochran propose?

A. In his assessment of the Company's business risk, Mr. Cochran claims that Granite State deserves a small size premium.

Q. Do you agree with Mr. Cochran's claim that the company deserves a small size premium?

A. No. The inclusion of a size premium is erroneous for two reasons.

First, I have used the credit ratings of Granite State and the companies in the proxy group for risk comparison purposes. In their assessment of business risk, credit rating agencies include various factors including the size and geographic service territory of a utility. Therefore, there is no reason to make a separate adjustment for size.

Second, Mr. Cochran justifies his size adjustment based on the historical stock market returns studies as performed by Morningstar (formerly Ibbotson Associates). There are numerous errors in using historical market returns to compute risk premiums.[60] These errors provide inflated estimates of expected

[60] These issues are addressed in a number of studies, including: Aswath. Damodaran, "Equity Risk Premiums (ERP): Determinants, Estimation and Implications – The 2015 Edition" NYU Working Paper, 2015, pp. 32-5; See Richard Roll, "On Computing Mean Returns and the Small Firm

risk premiums. Among the errors are survivorship bias (only successful companies survive – poor companies do not) and unattainable return bias (the Ibbotson procedure presumes monthly portfolio rebalancing). The net result is that Ibbotson's size premiums are poor measures for risk adjustment to account for the size of a utility.

In addition, Professor Annie Wong has tested for a size premium in utilities and concluded that, unlike industrial stocks, utility stocks do not exhibit a significant size premium.[61] As explained by Professor Wong, there are several reasons why such a size premium would not be attributable to utilities. Utilities are regulated closely by state and federal agencies and commissions, and hence, their financial performance is monitored on an ongoing basis by both the state and federal governments. In addition, public utilities must gain approval from government entities for common financial transactions such as the sale of securities. Furthermore, unlike their industrial counterparts, accounting standards and reporting are fairly standardized for public utilities. Finally, a utility's earnings are predetermined to a certain degree through the ratemaking process in which performance is reviewed by state commissions and other interested parties. Overall, in terms of regulation, government oversight, performance review, accounting standards, and information disclosure, utilities are much different than industrials, which could account for the

Premium," *Journal of Financial Economics*, pp. 371-86, (1983); Jay Ritter, "The Biggest Mistakes We Teach," *Journal of Financial Research* (Summer 2002); Bradford Cornell, *The Equity Risk Premium* (New York, John Wiley & Sons),1999, pp. 36-78; J. P. Morgan, "The Most Important Number in Finance," p. 6., Duff & Phelps, Client Alert, March 16, 2016, p. 35.

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

lack of a size premium.

Q. Please discuss the research on the size premium in estimating the equity cost rate.

A. As noted, there are errors in using historical market returns to compute risk premiums. With respect to the small firm premium, Richard Roll (1983) found that one-half of the historic return premium for small companies disappears once biases are eliminated and historic returns are properly computed. The error arises from the assumption of monthly portfolio rebalancing and the serial correlation in historic small firm returns.[62]

In another paper, Ching-Chih Lu (2009) estimated the size premium over the long-run. Lu acknowledges that many studies have demonstrated that smaller companies have historically earned higher stock market returns. However, Lu highlights that these studies rebalance the size portfolios on an annual basis. This means that at the end of each year the stocks are sorted based on size, split into deciles, and the returns are computed over the next year for each stock decile. This annual rebalancing creates the problem. Using a size premium in estimating a CAPM equity cost rate requires that a firm carry the extra size premium in its discount factor for an extended period of time, not just for one year, which is the presumption with annual rebalancing. Through an analysis of small firm stock returns for longer time periods (and without annual rebalancing), Lu finds that the size premium disappears within two years. Lu's conclusion with respect to the

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

size premium is that "a small firm should not be expected to have a higher size premium going forward sheerly because it is small now":[63]

> However, an analysis of the evolution of the size premium will show that it is inappropriate to attach a fixed amount of premium to the cost of equity of a firm simply because of its current market capitalization. For a small stock portfolio which does not rebalance since the day it was constructed, its annual return and the size premium are all declining over years instead of staying at a relatively stable level. This confirms that a small firm should not be expected to have a higher size premium going forward sheerly because it is small now.

Finally, in a more recent paper, Ang (2017) tested for a size effect over the time period 1981-2016.[64] He used value-weighted size-based decile returns obtained from French's Data Library, with the smallest size-based decile as a proxy for small stocks and the largest size-based decile as a proxy for large stocks. He found that small stocks underperformed large stocks by 12% over the period 1981 to 2016. He claims that this result is consistent with other studies that the size effect vanished in the 1980s. He concluded with the following:[65]

> My review of the evidence and analysis strongly suggests the proponents of the size effect are nowhere close to meeting their burden. I find that investors use the CAPM and do not demand compensation for size when setting their required rate of return, which directly contradicts the need to augment or modify the CAPM Cost of Equity with a size premium. I show that small stocks do not outperform large stocks, which calls into question the very premise of a size effect. I also find that studies finding a size effect suffer from the twin fatal flaws of lacking a theoretical basis and data mining, which are very difficult, if not impossible, to overcome. Given the

[63] Ching-Chih Lu, "The Size Premium in the Long Run," 2009 Working Paper, SSRN abstract no. 1368705.

[64] Clifford Ang, "The Absence of a Size Effect Relevant to the Cost of Equity," June 9, 2017, available at https://ssrn.com/abstract=2984599.

[65] *Ibid.*, p. 6.

above, practitioners should abandon the practice of augmenting or modifying the CAPM Cost of Equity with a size premium.

Q. Does this conclude your testimony?

A. Yes, it does.

Liberty Utilities (Granite State Electric) Corp.
Docket No. DE 19-064

Direct Testimony of
Dr. J. Randall Woolridge

LIST OF ATTACHMENTS

Attachment	Title
JRW-1	Qualifications of J. Randall Woolridge
JRW-2	Credit Reports
JRW-3	Recommended Cost of Capital
JRW-4	Summary Financial Statistics for Proxy Group
JRW-5	Capital Structure and Debt Cost Rate
JRW-6	The Relationship Between Estimated ROE and Market-to-Book Ratios
JRW-7	Utility Capital Cost Indicators
JRW-8	DCF Model
JRW-9	DCF Study
JRW-10	CAPM Study
JRW-11	Granite State's Rate of Return Recommendation
JRW-12	GDP and S&P 500 Growth Rates