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BEFORE THE ARIZONA CORPORATION COMMISSION

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CHAIRMAN

BOB STUMP
COMMISSIONER

BOB BURNS
COMMISSIONER

TOM FORESE
COMMISSIONER

DOUG LITTLE
COMMISSIONER

IN THE MATTER OF THE APPLICATION OF UNS ELECTRIC, INC. FOR THE ESTABLISHMENT OF JUST AND REASONABLE RATES AND CHARGES DESIGNED TO REALIZE A REASONABLE RATE OF RETURN ON THE FAIR VALUE OF THE PROPERTIES OF UNS ELECTRIC, INC. DEVOTED TO ITS OPERATIONS THROUGHOUT THE STATE OF ARIZONA, AND FOR RELATED APPROVALS.	**DOCKET NO. E-04204A-15-0142** **DIRECT TESTIMONY OF J. RANDALL WOOLRIDGE**

The Alliance for Solar Choice hereby provides notice of filing the Direct Testimony of J. Randall Woolridge in the above-referenced matter. This filing contains confidential information. Therefore, we are filing this redacted version and will be providing copies of the un-redacted copy directly to Brian Smith, Judge Jane L. Rodda and Thomas Broderick under separate seal.

Respectfully submitted this 6th day of November, 2015.

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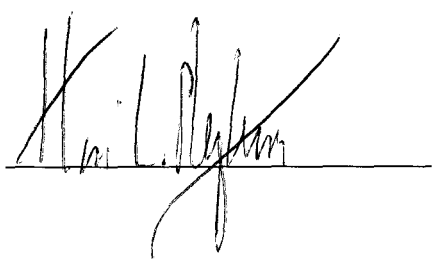
By: 

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Before the

Arizona Corporation Commission

IN THE MATTER OF THE APPLICATION OF UNS ELECTRIC, INC. FOR THE ESTABLISHMENT OF JUST AND REASONABLE RATES AND CHARGES DESIGNED TO REALIZE A REASONABLE RATE OF RETURN ON THE FAIR VALUE OF THE PROPERTIES OF UNS ELECTRIC, INC. DEVOTED TO ITS OPERATIONS THROUGHOUT THE STATE OF ARIZONA, AND FOR RELATED APPROVALS.	)	DOCKET NO. E-04204A-15-0142 DIRECT TESTIMONY OF J. RANDALL WOOLRIDGE

Testimony and Exhibits of

J. Randall Woolridge, Ph. D.
For The Alliance for Solar Choice

November 6, 2015

UNS Electric, Inc.
Docket No. E-04204A-15-0142

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

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LIST OF EXHIBITS

Q. PLEASE STATE YOUR FULL NAME, ADDRESS, AND OCCUPATION.

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

I. SUBJECT OF TESTIMONY AND SUMMARY OF RECOMMENDATIONS

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

A. I have been asked by The Alliance for Solar Choice ("TASC") to provide an opinion on the overall fair rate of return or cost of capital for UNSE Electric, Inc. ("UNSE" or "Company") and to evaluate UNSE's rate of return testimony in this proceeding.

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. A 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, determining an appropriate ROE requires determining the market-based cost of capital for the regulated firm. 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 the percentage rate of return equity investors require for a given risk-class of firms in order to set an appropriate ROE for a regulated firm. This analysis requires using market data of similar-risk firms.

[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*").

Q. HOW IS YOUR TESTIMONY ORGANIZED?

A. First, I review my cost of capital recommendation for UNSE and summarize the primary areas of contention between UNSE's rate of return position and my rate of return position. 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 UNSE. 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 UNSE. Finally, I critique the Company's rate of return analysis and testimony.

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

A. The Company has proposed a capital structure of 47.17% long-term debt and 52.83% common equity. The Company has recommended a long-term debt cost rate of 4.66%. UNSE witness Ms. Ann E. Bulkley has recommended a common equity cost rate of 10.35%. UNSE's overall proposed rate of return is 7.67%.

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

A. I have reviewed the Company's proposed capital structure and senior capital cost rates. I have adjusted the capital structure to be more in line with the capitalizations of electric utility companies and UNSE's parent organizations. I have employed the Company's recommended long-term debt cost rate. I show that interest rates and

capital costs remain at historically low levels. As such, I believe UNSE's common equity cost estimate of 10.35% is significantly overstated.

To estimate a more appropriate equity cost rate for UNSE, I have applied the Discounted Cash Flow Model ("DCF") and the Capital Asset Pricing Model ("CAPM") to my proxy group of electric utilities ("Electric Proxy Group") as well as the proxy group developed by UNSE's rate of return witness Ms. Bulkley ("Bulkley Proxy Group"). My recommendation is that the appropriate ROE for UNSE is 8.75%. Combined with my recommended capitalization ratios and senior capital cost rate, my overall rate of return or cost of capital for UNSE is 6.71% as summarized in Exhibit JRW-1.

Q. PLEASE SUMMARIZE THE PRIMARY ISSUES REGARDING RATE OF RETURN IN THIS PROCEEDING.

A. I show that the Company's proposed capital structure, with a common equity ratio of 52.83%, has more equity than the capitalizations of electric utilities. I have adjusted the proposed capitalization ratios and used a capital structure with 50% debt and 50% common equity. Other than the Company's proposed capital structure, the primary dispute is with respect to the appropriate ROE for UNSE. Ms. Bulkley has recommended an ROE of 10.35%, whereas my analysis indicates that an equity cost rate of 8.75% is appropriate for UNSE. Both Ms. Bulkley and I have applied the DCF and the CAPM approaches to groups of publicly-held electric utility companies. Ms. Bulkley has also used Risk Premium ("RP") approach to estimate an equity cost rate for UNSE.

Q. WHAT ARE THE PRIMARY ISSUES REGARDING THE ANALYSES USED TO DETERMINE THE EQUITY COST RATE OR ROE?

A. As I discuss in detail later in my testimony, my equity cost rate recommendation is consistent with the current economic environment. Long-term interest rates and capital costs are still at historically low levels. Ms. Bulkley has employed constant-growth and multi-stage growth versions of the DCF model. There are two primary errors in Ms. Bulkley's DCF analysis. First, she has given little weight to her DCF results. Second, she has used a projected Gross Domestic Product ("GDP") growth rate of 5.51% in her multi-stage DCF model which is excessive, is not reflective of prospective economic growth in the U.S., and is about 100 basis points above projections of GDP growth. In developing a DCF growth rate, I have reviewed thirteen growth rate measures, including historic and projected growth rate measures. I have also evaluated growth in dividends, book value, and earnings per share.

The CAPM approach requires an estimate of the risk-free interest rate, beta, and the equity risk premium. The major area of disagreement involves the measurement and magnitude of the market or equity risk premium. In short, Ms. Bulkley's market risk premium is excessive and does not reflect current market fundamentals. As I highlight in my testimony, there are three procedures for estimating a market or equity risk premium – historic returns, surveys, and expected return models. Ms. Bulkley uses a projected market risk premium of 10.67%. Ms. Bulkley's projected equity risk premium uses analysts' long-term earnings per share ("EPS") growth rate projections to compute an expected market return and market

risk premium. These EPS growth rate projections and the resulting expected market returns and risk premiums include unrealistic assumptions regarding future economic and earnings growth and stock returns. I have used an equity risk premium of 5.5%, which: (1) factors in all three approaches to estimating an equity premium; and (2) employs the results of many studies of the equity risk premium. As noted in my testimony, my assumed market risk premium reflects the market risk premiums that are: (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.

Ms. Bulkley also estimates an equity cost rate using the RP model. Her risk premium is based on the historical relationship between the yields on long-term Treasury yields and authorized ROEs for electric utility companies. She uses three estimates of the thirty-year bond yield: (1) the current yield of 2.50%; (2) a near-term forecast of 3.20%; and (3) a long-term forecast of 4.90%. She computes the risk premium based on quarterly authorized ROEs for electric utilities. There are several issues with her RP approach. First and foremost, this approach is a gauge of commission behavior and not investor behavior. Capital costs are determined in the market place through the financial decisions of investors and are reflected in such fundamental factors as dividend yields, expected growth rates, interest rates, and investors' assessment of the risk and expected return of different investments. Regulatory commissions evaluate capital market data in setting authorized ROEs, but also take into account other utility- and rate case-specific information in setting

ROEs. As such, Ms. Bulkley's RP approach and results reflect other factors used by utility commissions in authorizing ROEs in addition to capital costs. Second, Ms. Bulkley's RP methodology produces an inflated measure of the risk premium because she uses historic authorized ROEs and Treasury yields, and the resulting risk premium is applied to projected Treasury yields. Finally, the risk premium is inflated as a measure of investor's required risk premium since electric utility companies have been selling at market-to-book ratios in excess of 1.0. This indicates that the authorized rates of return have been greater than the return that investors require.

Q. HOW DO MS. BULKLEY'S RP ESTIMATES COMPARE TO THE ACTUAL STATE-LEVEL AUTHORIZED ROES FOR ELECTRIC UTILITY COMPANIES NATIONWIDE?

A. Ms. Bulkley's RP equity cost rate estimates for electric utility companies range from 9.70% to 10.72%. These figures are above the actual average state-level authorized ROEs. The authorized ROEs for electric utility companies have decreased in recent years such that the trend and the norm for authorized ROEs is below 10%.

Q. PLEASE SUMMARIZE THE PRIMARY DIFFERENCES IN POSITIONS REGARDING THE COMPANY'S COST OF CAPITAL.

A. In the end, the most significant areas of disagreement in measuring UNSE's cost of capital are: (1) the Company's proposed capital structure that includes a common equity ratio of 52.83%; (2) Ms. Bulkley's DCF equity cost rate estimates, and in

particular, (a) the lack of weight she gives to her growth DCF results, and (b) the unrealistic projected GDP growth rate of 5.51% in her multi-stage DCF model; (3) the projected interest rates and market or equity risk premiums in her RP and CAPM approaches; and (4) whether or not an equity cost rate consideration is needed to account for the size of UNSE.

II. CAPITAL COSTS IN TODAY'S MARKETS

Q. WHAT ARE YOUR OBSERVATIONS REGARDING THE OUTLOOK FOR INTEREST RATES AND CAPITAL COSTS?

A. Appendix B provides a more detailed assessment of the current market conditions. These are my summary observations:

First, the economy has been growing for five years, and, despite some weakness in the global economy, the Federal Reserve continues to see growing strength in the U.S. economy and is now expected to increase the Federal Funds rate in December. The labor market has improved better than expected, with unemployment now down to 5.1%.

Second, interest rates remain at historically low levels and are likely to remain low. There are two factors driving the continued lower interest rates: (1) as noted by the Federal Open Market Committee ("FOMC"), inflationary expectations in the U.S. remain very low and are below the FOMC's target of 2.0%; and (2) global economic growth – including Europe and Asia – remains stagnant. As a result, while the yields on ten-year U.S. Treasury bonds are low by historic standards, these yields are well

above the government bond yields in Germany, Japan, and the United Kingdom. Thus, U.S. Treasuries offer an attractive yield relative to those of other major governments around the world, thereby attracting capital to the U.S. and keeping U.S. interest rates down.

Third, reflective of the improving economic conditions and earnings growth and low interest rates, the stock market is near an all-time high.

Fourth, with the end on the Federal Reserves' monetary stimulus program and with the prospect of the Federal Reserve raising the Federal Funds rate, there have been ongoing forecasts of higher interest rates for some time, and these forecasts have continued to be wrong.[2] These forecasts have consistently been wrong. Whereas the Federal Reserve can affect short-term rates, long-term interest rates are driven by economic growth and inflation.

Q. PLEASE SUMMARIZE YOUR CONCLUSIONS ON THE STATE OF THE MARKETS AND CAPITAL COSTS.

A. Overall, the economy and capital markets have recovered and are looking to the future, and, with low interest rates and high stock prices, capital costs continue to be at historically low levels. Because an appropriate ROE should reflect the current cost of capital, and capital costs are historically low, ROEs should concomitantly be lower.

[2] Ben Eisen, *Yes, 100% of economists were dead wrong about yields*, MARKET WATCH, October 22, 2014. 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.

III. PROXY GROUP SELECTION

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

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 utility companies ("Electric Proxy Group"). Given the operations of UNSE, I have employed a proxy group of electric utility companies as well as the group of utilities developed by Ms. Bulkley ("Bulkley Proxy Group").

Q. PLEASE DESCRIBE YOUR PROXY GROUP OF ELECTRIC COMPANIES.

A. The selection criteria for the Electric Proxy Group includes the following:

1. At least 50% of revenues from regulated electric operations as reported by *AUS Utilities Report*;
2. Listed as an Electric Utility by *Value Line Investment Survey* and listed as an Electric Utility or Combination Electric & Gas Utility in *AUS Utilities Report*;
3. An investment-grade corporate credit rating;
4. Has paid a cash dividend in the past six months, with no cuts or omissions;
5. Not involved in an acquisition of another utility, the target of an acquisition, or in the sale or spin-off of utility assets, in the past six months; and
6. Analysts' long-term earnings per share ("EPS") growth rate forecasts available from Yahoo, Reuters, and/or Zacks.

Q. PLEASE PROVIDE SUMMARY FINANCIAL STATISTICS FOR YOUR PROXY GROUP OF ELECTRIC COMPANIES.

A. The Electric Proxy Group includes twenty-nine companies. Summary financial statistics for the proxy group are listed in Panel A of page 1 of Exhibit JRW-4.[3] The median operating revenues and net plant among members of the Electric Proxy Group are $3,261.8 million and $9,173.5 million, respectively. The group receives 82% of its revenues from regulated electric operations, has BBB+ and Baa1 issuer credit ratings from S&P and Moody's respectively, a current common equity ratio of 47.7%, and an earned return on common equity of 9.2%.

Q. PLEASE DESCRIBE THE BULKLEY PROXY GROUP.

A. Ms. Bulkley's group is smaller and includes only twelve electric companies.[4] Although I believe that my group provides a more comprehensive sample to estimate an equity cost rate for the Company, I will also include the Bulkley Proxy Group in my analysis.

Summary financial statistics for Ms. Bulkley's proxy group are provided in Panel B of page 1 of Exhibit JRW-4. The median operating revenues and net plant for the Bulkley Proxy Group are $2,199.9 million and $7,053.2 million, respectively. On average, the group receives 91% of its revenues from regulated electric operations, has BBB+/BBB and Baa1 issuer credit ratings from S&P and Moody's, a

[3] In my testimony, I present financial results using both mean and medians as measures of central tendency. However, due to outliers among means, I have used the median as a measure of central tendency.

[4] I have excluded Southern Company from the group since it has become involved significant merger and acquisition activity.

current common equity ratio of 49.3%, and a current earned return on common equity of 8.8%.

Q. HOW DOES UNSE COMPARE TO THE TWO PROXY GROUPS?

A. Summary financial statistics for UNSE are listed in Panel A of page 1 of Exhibit JRW-4. UNSE's operating revenues and net plant are [redacted] respectively. The Company receives [redacted] of its revenues from regulated electric operations respectively, has an and A3 issuer credit rating from Moody's, a current common equity ratio of [redacted] and a current earned return on common equity of [redacted]

Q. HOW DOES THE INVESTMENT RISK OF THE COMPANY COMPARE TO THAT OF THE TWO PROXY GROUPS?

A. I believe that bond ratings provide a good assessment of the investment risk of a company. Exhibit JRW-4 also shows S&P and Moody's issuer credit ratings for UNSE and the companies in the two groups. UNSE has an A3 issuer credit rating from Moody's, but is not rated by S&P. UNSE's Moody's issuer rating was upgraded from Baa1 to A3 on March 2, 2015. The Company's A3 rating is one-notch above the average Moody's ratings of the Electric (Baa1) and Bulkley (Baa1) Proxy Groups. Therefore, I believe that UNSE is less risky than the two proxy groups.

IV. CAPITAL STRUCTURE RATIOS AND DEBT COST RATES

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

A. The Company has proposed a capital structure of 47.17% long-term debt and 52.83% common equity. The Company has recommended a long-term debt cost rate of 4.66%. This is summarized on Panel A of Exhibit JRW-5.

Q. ARE YOU ADOPTING UNSE'S RECOMMENDED CAPITAL STRUCTURE?

A. No. The Company is proposing a capital structure that includes a higher common equity ratio than the averages of the two proxy groups as well as its parent organizations.

Q. PLEASE DESCRIBE YOUR RECOMMENDED CAPITAL STRUCTURE FOR UNSE.

A. The capital structure data for UNSE has a higher common equity ratio than the two proxy groups. To balance these capital structures, and to provide for a more reasonable capitalization, I use a capital structure with a common equity ratio of 50.0%. A capital structure with a 50% common equity ratio is still above the average common equity ratios of the proxy groups. The details of my proposed capital structure are provided in Appendix C.

In Panel C of Exhibit JRW-5, I have used a common equity ratio of 50.0% and I have adjusted UNSE's long-term debt upwards on a pro rata basis such that they

account, collectively, for 50.0% of total capital. The resulting capital structure includes 50.0% long-term debt, and 50.0% common equity.

Q. ARE YOU ADOPTING UNSE's RECOMMENDED SENIOR CAPITAL COST RATES?

A. I am adopting UNSE's recommended long-term debt cost rate of 4.66%.

V. THE COST OF COMMON EQUITY CAPITAL

A. Overview

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

A. In a competitive industry, the return on a firm's common equity capital is determined through the competitive market for its goods and services. Due to the capital requirements needed to provide utility services and the economic benefit to society from avoiding duplication of these services, some 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). A more detailed discussion of the cost of equity capital for utilities, and the approaches to estimate the cost of equity capital, are provided in Appendix D. In the sections below, I discuss the methodologies that I have applied to

my proxy group of electric utilities, the Discounted Cash Flow Model ("DCF") and the Capital Asset Pricing Model ("CAPM"), to estimate a more appropriate equity cost rate for UNSE.

Q. HOW DO YOU PLAN TO ESTIMATE THE COST OF EQUITY CAPITAL FOR UNSE?

A. I rely primarily on the DCF model to estimate the cost of equity capital. Given the investment valuation process and the relative stability of the utility business, I believe that the DCF model provides the best measure of equity cost rates for public utilities. It is my understanding that this Commission has traditionally relied on the DCF model. I have also performed a CAPM study; however, I give these results less weight because I believe that risk premium studies such as CAPM provide a less reliable indication of equity cost rates for public utilities.

B. DCF Analysis

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 FOR YOUR DCF ANALYSIS?

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 in Panel A of page 2 of Exhibit JRW-10. For the Electric Proxy Group, the median dividend yields using the 30-day, 90-day, and 180-day average stock prices range from 3.7% to 3.9%. I am using the average if the medians - 3.85% - as the dividend yield for the Electric Proxy Group. For the Bulkley Proxy Group, provided in Panel B of page 2 of Exhibit JRW-10, the median dividend yields range from 3.8% to 3.9% using the 30-day, 90-day, and 180-day average stock prices. I am using the average of the medians – 3.90% - for the Bulkley 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.[5]

In applying the DCF model, some analysts adjust the current dividend for growth over the coming year as opposed to the coming quarter. This can be complicated because firms tend to announce changes in dividends at different times during the year. As such, the dividend yield computed 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 of the expected growth to reflect growth over the coming year. This is the approach employed by the Federal Energy Regulatory Commission ("FERC").[6] 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.

[5] *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).
[6] Opinion No. 414-A, *Transcontinental Gas Pipe Line Corp.*, 84 FERC ¶61,084 (1998).

A. There is much 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 GROUPS?

A. I have analyzed a number of measures of growth for companies in the proxy groups. I reviewed *Value Line's* historical and projected growth rate estimates for earnings per share ("EPS"), dividends per share ("DPS"), and book value per share ("BVPS"). In addition, I utilized the average EPS growth rate forecasts of Wall Street analysts as provided by Yahoo, Reuters 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 THE HISTORICAL GROWTH OF THE COMPANIES IN THE PROXY GROUPS, AS PROVIDED BY *VALUE LINE.*

A. Page 3 of Exhibit JRW-10 provides the 5- and 10-year historical growth rates for EPS, DPS, and BVPS for the companies in the proxy groups, as published in the *Value Line Investment Survey.* The median historical growth measures for EPS, DPS,

and BVPS for the Electric Proxy Group, as provided in Panel A, range from 2.5% to 5.0%, with an average of 3.7%. For the Bulkley Proxy Group, as shown in Panel B of page 3 of Exhibit JRW-10, the historical growth measures in EPS, DPS, and BVPS, as measured by the medians, range from 0.8% to 4.5%, with an average of 3.0%.

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

A. *Value Line's* projections of EPS, DPS, and BVPS growth for the companies in the proxy groups are shown on page 4 of Exhibit JRW-10. As stated above, due to the presence of outliers, the medians are used in the analysis. For the Electric Proxy Group, as shown in Panel A of page 4 of Exhibit JRW-10, the medians range from 4.0% to 5.0%, with an average of 4.3%. For the Bulkley Proxy Group, as shown in Panel B of page 4 of Exhibit JRW-10, the medians range from 4.0% to 5.5%, with an average of 4.6%.

Also provided on page 4 of Exhibit JRW-10 are the prospective sustainable growth rates for the companies in the two proxy groups 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 and Bulkley Proxy Groups, the median prospective sustainable growth rates are 4.2% and 3.5%, respectively.

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

A. Yahoo, Zacks, and Reuters collect, summarize, and publish Wall Street analysts' long-term EPS growth rate forecasts for the companies in the proxy groups. These forecasts are provided for the companies in the proxy groups on page 5 of Exhibit JRW-10. I have reported both the mean and median growth rates for the groups. Since there is considerable overlap in analyst coverage between the three services, and not all of the companies have forecasts from the different services, I have averaged the expected five-year EPS growth rates from the three services for each company to arrive at an expected EPS growth rate for each company. The mean/median of analysts' projected EPS growth rates for the Electric and Bulkley Proxy Groups are 4.6%/4.8% and 5.1%/5.2%.[7]

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

A. Page 6 of Exhibit JRW-10 shows the summary DCF growth rate indicators for the proxy groups.

The historical growth rate indicators for my Electric Proxy Group imply a baseline growth rate of 3.7%. The average of the projected EPS, DPS, and BVPS growth rates from *Value Line* is 4.3%, and *Value Line*'s projected sustainable growth rate is 4.2%. The high end of the range for the Electric Proxy Group are the projected EPS growth rates of Wall Street analysts, which are 4.6% and 4.8% as measured by the mean and median growth rates. The overall range for the projected growth rate indicators (ignoring historical growth) is 4.2% to 4.8 %. Giving primary weight to the

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

projected EPS growth rate of Wall Street analysis, I will use 4.75% as the DCF growth rate for the Electric Proxy Group. This growth rate figure is clearly in the upper end of the range of historic and projected growth rates for the Electric Proxy Group.

The historical growth rate indicators for the Bulkley Proxy Group indicate a growth rate of 3.0%. *Value Line*'s average projected EPS, DPS, and BVPS growth rate for the group is 4.6%, and *Value Line*'s projected sustainable growth rate is 3.5%. The mean/median projected EPS growth rates of Wall Street analysts for the group are 5.1%/5.2%. The range for the projected growth rate indicators is 3.5% to 5.2%. Giving primary weight to the projected EPS growth rate of Wall Street analysis, I believe that a growth rate of 5.0% is appropriate for the Bulkley Proxy Group. As is the case for the Electric Proxy Group, this growth rate figure is clearly in the upper end of the range of historic and projected growth rates for the Bulkley Proxy Group.

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

A. My DCF-derived equity cost rates for the groups are summarized on page 1 of Exhibit JRW-10 and in the table below.

Table 1: DCF-derived Equity Cost Rate/ROE

	Dividend Yield	1 + ½ Growth Adjustment	DCF Growth Rate	Equity Cost Rate
Electric Proxy Group	**3.85%**	**1.02375**	**4.75%**	**8.70%**
Bulkley Proxy Group	**3.90%**	**1.02500**	**5.00%**	**9.00%**

The result for my Electric Proxy Group is the 3.85% dividend yield, times the one and one-half growth adjustment of 1.02375, plus the DCF growth rate of 4.75%, which results in an equity cost rate of 8.70%. The result for the Bulkley Proxy Group includes a dividend yield of 3.90%, times the one and one-half growth adjustment of 1.02500, plus the DCF growth rate of 5.00%, which results in an equity cost rate of 9.0%.

C. CAPM ANALYSIS

Q. PLEASE DISCUSS THE CAPM APPROACH

A. 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.

Q. PLEASE DISCUSS YOU INPUTS FOR THE CAPM APPROACH.

A. Exhibit JRW-11 provides the summary results for my CAPM study. Page 1 shows the results, and the following pages contain the supporting data. The inputs for the CAPM approach include the risk-free interest rate, Beta, and the market risk

premium. Additional details on the CAPM methodology and support for my assumptions are discussed in detail in Appendix D.

Q. PLEASE DISCUSS THE RISK-FREE INTEREST RATE.

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

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

A. As shown on page 2 of Exhibit JRW-11, the yield on 30-year U.S. Treasury bonds has been in the 2.5% to 4.0% range over the 2013–2015 time period. The 30-year Treasury yield is currently in the middle of this range. Given the recent range of yields and the possibility of higher interest rates, I use 4.0% as the risk-free rate, or R_f, in my CAPM.

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 Exhibit JRW-11, the slope of the regression line is the stock's ß. A steeper line indicates that the stock is more sensitive to the return on the overall market. This means that the stock has a higher ß and greater-than-average market risk. A less steep line indicates a lower ß and less market risk.

Several online investment information services, such as Yahoo and Reuters, provide estimates of stock betas. Usually these services report different betas for the same stock. The differences are usually due to: (1) the time period over which ß is 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 groups, I am using the betas for the companies as provided in the *Value Line Investment Survey*. As shown on page 3 of Exhibit JRW-11, the median betas for the companies in the Electric and Bulkley Proxy Groups are 0.75 and 0.78, respectively.

Q. PLEASE DISCUSS THE MARKET RISK PREMIUM ("MRP").

A. The MRP 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 MRP 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 MRP is easy to define conceptually, it is difficult to measure because it requires an estimate of the expected return on the market - $E(R_m)$. 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.[8]

Q. WHAT MARKET RISK PREMIUM ARE YOU USING IN YOUR CAPM?

A. Much of the data indicates that the market risk premium is in the 4.0% to 6.0% range. Several recent studies (such as Damodaran, American Appraisers, and Duarte and Rosa have suggested an increase in the market risk premium. Therefore, I will use 5.50%, which is in the upper end of the range, as the market risk premium or MRP.

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

A. The results of my CAPM study for the proxy groups are summarized on page 1 of Exhibit JRW-11 and in the table below.

Table 2: 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	**4.0%**	**0.75**	**5.5%**	**8.1%**
Bulkley Proxy Group	**4.0%**	**0.78**	**5.5%**	**8.3%**

For the Electric Proxy Group, the risk-free rate of 4.0% plus the product of the beta of 0.75 times the market risk premium of 5.5% results in an 8.1% equity cost rate. The CAPM equity cost rate for the Bulkley Proxy group is 8.3%, which includes a risk-free rate of 4.0%, a beta of 0.78, and a market risk premium of 5.5%.

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

D. Equity Cost Rate Summary and Recommendations

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

A. My DCF analyses for the Electric and Bulkley Proxy Groups indicate equity cost rates of 8.70% and 9.00%, respectively. The CAPM equity cost rates for the Electric and Bulkley Proxy Groups are 8.1% and 8.3%, respectively.

Table 3: ROEs Derived from DCF and CAPM Models

	DCF	CAPM
Electric Proxy Group	**8.70%**	**8.10%**
Bulkley Proxy Group	**9.00%**	**8.30%**

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

A. Given these results, I conclude that the appropriate equity cost rate for companies in the Electric and Bulkley Proxy Groups is in the 8.10% to 9.00% range. However, since I rely primarily on the DCF model, I am using the upper end of the range as the equity cost rate. Therefore, I conclude that the appropriate equity cost rate for the groups is 8.75%. This selection reflects the slightly lesser risk of UNSE relative to the proxy groups and the DCF results for the groups.

Q. ARE YOU RECOMMENDING 8.75% AS AN EQUITY COST RATE FOR UNSE?

A. Yes.

Q. PLEASE INDICATE WHY AN 8.75% RETURN ON EQUITY IS APPROPRIATE FOR THE COMPANY AT THIS TIME.

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

1. I have employed a capital structure with a common equity ratio of 50.0%. This common equity ratio is higher than: (1) the averages of the proxy groups; [redacted]

2. The investment risk of UNSE, as indicated by the Company's Moody's issuer credit ratings, is a little below the proxy groups;

3. As shown in Exhibit JRW-8, 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. As shown in Exhibits JRW-2 and JRW-3, 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; and

Q. HOW DOES THE PROPOSED 8.75% ROE COMPARE WITH THE ROE'S FOR OTHER ELECTRIC UTILITIES?

A. Authorized ROEs for electric and gas utilities have gradually decreased in recent years. These authorized ROEs for electric utilities have declined from 10.01% in 2012, to 9.8% in 2013, 9.76% in 2014, and 9.55% in the first three quarters of 2015

according to Regulatory Research Associates.[9] In my opinion, these 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. This has been especially true in recent years as some state commissions have been reluctant to authorize ROEs below 10%. However, the trend has been towards lower ROEs, and the norm now is below ten percent. 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 by state utility commissions.

Q. PLEASE DISCUSS YOUR RECOMMENDATION IN LIGHT OF A RECENT MOODY'S PUBLICATION.

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. [10]

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

[9] *Regulatory Focus*, Regulatory Research Associates, July, 2015. The electric utility authorized ROEs exclude the authorized ROEs in Virginia which include generation adders.

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

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.[11]

> 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.

In particular, UNSE's Lost Fixed Cost Recovery mechanism ("LFCR") is such a mechanism, and in this current application, UNSE has proposed an expansion of the LFCR to further insulate it from the impact of reduced sales.

Overall, this article establishes 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 8.75% 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 investments of similar risk; (2) sufficient to assure confidence in the company's

[11] *Ibid.*, p. 2.

financial integrity; and (3) adequate to maintain and support the company's credit and to attract capital. Despite earning an ROE of only 5.5% in 2014, the Company's Moody's issuer rating was upgraded to A3 on March 2, 2015 and the Company has raised over $100 million in capital this year. My recommendation reflects the downward trend in authorized and earned ROEs of electric and gas utility companies. This is highlighted in the Moody's publication cited above that states, despite authorized and earned ROEs below 10%, the credit quality of electric and gas companies has not been impaired and, in fact, has improved and utilities are raising about $50 billion per year in capital. Major positive factors in the improved credit quality of utilities are regulatory ratemaking mechanisms. Therefore, I do believe that my ROE recommendation meets the criteria established in the *Hope* and *Bluefield* decisions.

Q. DO UNSE'S CREDIT RATINGS SUGGEST IT HAS REGULATORY MECHANISMS IN PLACE TO PROMOTE CREDIT QUALITY?

A. Yes. In its summary rationale for upgrading UNSE's long-term rating to A3, Moody's made the following comments:[12]

> UNSE's A3 senior UNSE secured rating reflects a constructive Arizona regulatory environment, reduced regulatory lag associated with cost and investment recoveries and the expectation that projected financial metrics including CFO pre-W/C to debt remain in the mid 20% range, which is offset by the relatively small size of the utility.

VI. CRITIQUE OF UNSE'S RATE OF RETURN TESTIMONY

[12] UNSE response to UDR 1.005, Moody's Investors Service, Moody's 2015 03-02 UNSEE.

Q. PLEASE SUMMARIZE MS. BULKLEY'S RATE OF RETURN RECOMMENDATION FOR UNSE.

A. The Company's rate of return recommendation is summarized on page 1 of Exhibit JRW-12. The Company has proposed a capital structure of 47.17% long-term debt and 52.83% common equity. The Company has recommended a long-term debt cost rate of 4.66%. UNSE witness Ms. Bulkley has recommended a common equity cost rate of 10.35%. UNSE's overall proposed rate of return is 7.67%.

Q. PLEASE SUMMARIZE THE PRIMARY DIFFERENCES IN POSITIONS REGARDING THE COMPANY'S COST OF CAPITAL.

A. The most significant areas of disagreement in measuring UNSE's cost of capital are: (1) the Company's proposed capital structure that includes a common equity ratio of 52.83%; (2) Ms. Bulkley's DCF equity cost rate estimates, and in particular, (a) the lack of weight she gives to her DCF results, and (b) the unrealistic projected GDP growth rate in her multi-stage DCF model; (3) the projected interest rates and the risk premiums in her RP and CAPM approaches; and (4) whether or not an equity cost rate consideration is needed to account for the size of UNSE.

Q. PLEASE REVIEW MS. BULKLEY'S EQUITY COST RATE APPROACHES AND RESULTS.

A. Ms. Bulkley has developed a proxy group of electric utility companies and employs DCF, CAPM, and RP equity cost rate approaches. Ms. Bulkley's equity cost rate

estimates for UNSE are summarized in Exhibit JRW-13. Based on these figures, she concludes that the appropriate equity cost rate for the Company is 10.35%.

A. DCF Approach

Q. PLEASE SUMMARIZE MS. BULKLEY'S DCF ESTIMATES.

A. At pages 30-34 of her testimony and in Exhibits AEB-1 - AEB-3, Ms. Bulkley develops an equity cost rate by applying the DCF model to the Bulkley Proxy Group. Ms. Bulkley's DCF results are summarized in Panel A of Exhibit JRW-13. She uses constant-growth and multistage growth DCF models. Ms. Bulkley uses three dividend yield measures (30, 90, and 180 days) in her DCF models. In her constant-growth DCF models, Ms. Bulkley has relied on the forecasted EPS growth rates of Zacks, Yahoo, and *Value Line*. Her multi-stage DCF model uses analysts' EPS growth rate forecasts as a short-term growth rate and a long-term GDP growth of 5.51% that is based on historical GDP growth.

Q. WHAT ARE THE ERRORS IN MS. BULKLEY'S DCF ANALYSES?

A. The primary issues in Ms. Bulkley's DCF analyses are: (1) the low weight she gives her constant-growth DCF results; and (2) the projected GDP growth rate of 5.51% used in the multi-stage DCF model is not reflective of economic growth in the U.S., and is about 100 basis points above projections of GDP growth.

1. The Low Weight Given to the DCF Results

Q. HOW MUCH WEIGHT HAS MS. BULKLEY GIVEN HER DCF RESULTS IN ARRIVING AT AN EQUITY COST RATE FOR UNSE?

A. Apparently, not too much. The average of her mean constant-growth DCF equity cost rates is 9.24% and the average of her multi-stage DCF equity cost rates using a projected GDP growth rate of 5.51% is 9.44%. These are about 100 basis points below her 10.35% ROE recommendation. In addition, as explained in detail below, her multi-stage results are overstated because of her use of historical GDP growth.

2. Multi-Stage DCF Analysis with Historical GDP Growth

Q. PLEASE DISCUSS MS. BULKLEY'S MULTI-STAGE DCF ANALYSIS.

A. Ms. Bulkley employs a multi-stage DCF model and uses a historic long-term nominal GDP growth rate of 5.51%. The 5.51% GDP growth rate is based on (1) a real GDP growth rate of 3.26% which is calculated over the 1929-2014 time period and (2) an inflation rate of 2.19%.

Q. WHAT ARE THE ERRORS WITH MS. BULKLEY'S MULTI-STAGE DCF ANALYSIS.

A. There are two major errors in her analysis. First, Ms. Bulkley has not provided any theoretical or empirical support that historic long-term GDP growth is a reasonable proxy for the expected growth rate of the companies in her 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 Exhibit JRW-10, suggest growth that is more than

100 basis points below Ms. Bulkley's projected GDP growth rate. Ms. Bulkley has provided no evidence as to why investors would rely on her estimate of long-term GDP growth as the appropriate growth rate for electric utility companies.

The second error is the magnitude of Ms. Bulkley's long-term GDP growth rate estimate of 5.51%. On page 1 of Exhibit JRW-14 of my testimony, I provide an analysis of GDP growth since 1960. Since 1960, nominal GDP has grown at a compounded rate of 6.63%. The graphs on pages 2, 3, and 4 of Exhibit JRW-14 show 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 4 provides the compounded GDP growth rates for 10-, 20-, 30-, 40- and 50-years. Whereas the 50-year compounded GDP growth rate is 6.63%, there has been a monotonic and significant decline in nominal GDP growth over subsequent 10-year intervals. These figures clearly suggest that nominal GDP growth in recent decades has slowed and that a figure in the range of 4.0% to 5.0% is more appropriate today for the U.S. economy. Ms. Bulkley's long-term GDP growth rate of 5.51% is clearly inflated.

Table 4: Historic GDP Growth Rates

10-Year Average - 2005-2014	**3.9%**
20-Year Average - 1995-2014	**4.6%**
30-Year Average - 1985-2014	**5.2%**
40-Year Average - 1975-2014	**6.4%**
50-Year Average - 1965-2014	**6.8%**

Q. ARE THE LOWER GDP GROWTH RATES OF RECENT DECADES

CONSISTENT WITH THE FORECASTS OF GDP GROWTH?

A. Yes. 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 on page 5 of Exhibit JRW-14. The mean 10-year nominal GDP growth forecast (as of February 2015) by economists in the recent *Survey of Professional Forecasters* is 4.7%. The Energy Information Administration ("EIA"), in its projections used in preparing the *Annual Energy Outlook,* forecasts long-term GDP growth of 4.2% for the period 2013-2040.[13] The Congressional Budget Office ("CBO"), in its forecasts for the period 2015 to 2040, projects a nominal GDP growth rate of 4.3%.[14] Finally, the Social Security Administration ("SSA"), in its Annual OASDI Report, provides a projection of nominal GDP from 2015-2090.[15] The projected nominal GDP growth rate over this period is 4.5%. Overall, these projections of nominal GDP growth over extended future time periods provide direct evidence that Ms. Bulkley's long-term GDP growth rate of 5.51% is overstated by almost 100 basis points.

Q. WHAT IS IRONIC ABOUT MS. BULKLEY BASING A REAL GDP FORECAST ON HISTORIC DATA?

A. In developing a DCF growth rate for her constant-growth DCF analysis, Ms. Bulkley has totally ignored historic EPS, DPS, and BVPS data and relied solely on the long-term

[13]Energy Information Administration, A*nnual Energy Outlook,* http://www.cbo.gov/publication/49973.
[14]Congressional Budget Office, The *2015 Long-term Budget Outlook*, July 2015. https://www.cbo.gov/publication/50250.
[15] Social Security Administration, 2015 Annual Report of the Board of Trustees of the Old-Age, Survivors, and Disability Insurance (OASDI) Program. http://www.ssa.gov/oact/tr/2015/X1_trLOT.html

EPS growth rate projections of Wall Street analysts and *Value Line*. However, in developing a terminal DCF growth rate for her multi-stage growth DCF analysis, Ms. Bulkley employed a GDP growth rate based on historic data going back to 1929.

B. CAPM Approach

Q. PLEASE DISCUSS MS. BULKLEY'S CAPM.

A. On pages 34-38 of her testimony and in Exhibits AEB-4 – AEB-5, Ms. Bulkley estimates an equity cost rate by applying a CAPM model to her proxy group. The CAPM approach requires an estimate of the risk-free interest rate, beta, and the equity risk premium. Ms. Bulkley uses three measures of the risk-free interest rate: (a) a current yield of 2.50%, (b) a near-term projected yield of 3.20%, and (c) a long-term projected yield of 4.90%. She employs two different Betas (an average Bloomberg Beta of 0.665 and an average *Value Line* Beta of 0.750). She estimates a projected market risk premium ("MRP") for each of her risk-free rates which is based on a projected stock market return of 13.17%. Ms. Bulkley's CAPM results are provided in Panel B of Exhibit JRW-13 and range from 9.59% to 11.10%.

Q. WHAT ARE THE ERRORS IN MS. BULKLEY'S CAPM ANALYSES?

A. The two issues are: (1) the long-term projected 30-Year Treasury yield of 4.90%; and (2) primarily, the excessive MRP.

1. Risk-Free Interest Rate

Q. WHAT IS THE ISSUE WITH THE PROJECTED LONG-TERM TREASURY RATE OF 4.90%?

A. This figure is about 200 basis points above the current 30-year Treasury rate. This figure is simply not reasonable. Thirty-year Treasury bonds are currently yielding about 3.00%. Institutional investors would not be buying bonds at this yield if they expected interest rates to increase so dramatically in the coming years. An increase in yields of 200 basis points on 30-year Treasury bonds within the next couple years would result in significant capital losses for investors buying bonds today at current market yields, suggesting that Ms. Bulkley's use of a 4.90% 30-year projected treasury rate is unreasonable.

2. MRP

Q. PLEASE ASSESS MS. BULKLEY'S MRP DERIVED FROM APPLYING THE DCF MODEL TO THE S&P 500.

A. For her CAPM, Ms. Bulkley computes a MRP for each of her three risk-free interest rates by: (1) calculating an expected market return by applying the DCF model to the S&P 500; and (2) subtracting each of her three measure of the 30-year Treasury bond yield (2.50%, 3.20%, and 4.90%). The bottom line is that Ms. Bulkley's estimated expected stock market return of 13.19% is not realistic. She uses (1) a dividend yield of 2.00% and an expected DCF growth rate of 11.06%. The primary error is that the expected DCF growth rate is the projected 5-year EPS growth rate from Wall Street

analysts as reported by Bloomberg. As explained below, this produces an overstated expected market return and equity risk premium.

Q. WHAT EVIDENCE CAN YOU PROVIDE THAT MS. BULKLEY'S GROWTH RATES ARE ERRONEOUS?

A. Ms. Bulkley's expected long-term EPS growth rates of 11.06% represents the forecasted 5-year EPS growth rates of Wall Street analysts as compiled by Bloomberg. The error with this approach is that, as previously discussed, the EPS growth rate forecasts of Wall Street securities analysts are overly optimistic and upwardly biased.

Q. IS AN EPS GROWTH RATE OF 11.06% CONSISTENT WITH THE HISTORIC AND PROJECTED GROWTH IN EARNINGS AND THE ECONOMY?

A. No. A long-term EPS growth rates of 11.06% is not consistent with historic or projected economic and earnings growth in the U.S for several reasons: (1) long-term growth in EPS is far below Ms. Bulkley's projected EPS growth rates; (2) more recent trends in GDP growth, as well as projections of GDP growth, suggest slower long-term economic and earnings growth in the future; and (3) over time, EPS growth tends to lag behind GDP growth.

The long-term economic, earnings, and dividend growth rate in the U.S. has only been in the 5% to 7% range. I performed a study of the growth in nominal GDP, S&P 500 stock price appreciation, and S&P 500 EPS and DPS growth since 1960.

The results are provided on page 1 of Exhibit JRW-14, and a summary is provided in Table 5 below.

Table 5 - GDP, S&P 500 Stock Price, EPS, and DPS Growth
1960-Present

Nominal GDP	**6.63%**
S&P 500 Stock Price	**6.83%**
S&P 500 EPS	**6.92%**
S&P 500 DPS	**5.65%**
Average	**6.51%**

The results are presented graphically on page 6 of Exhibit JRW-14. In sum, the historical long-run growth rates for GDP, S&P EPS, and S&P DPS are in the 5% to 7% range.

Q. DO MORE RECENT DATA SUGGEST THAT U.S. ECONOMIC GROWTH IS FASTER OR SLOWER THAN THE LONG-TERM DATA?

A. As previously discussed and presented in Table 4, the more recent trend suggests lower future economic growth than the long-term historic GDP growth. The historic GDP growth rates for 10-, 20-, 30-, 40- and 50- years clearly suggest that nominal GDP growth in recent decades has slowed to the 4.0% to 5.0% area. By comparison, Ms. Bulkley's long-run EPS growth rate projection of 11.06% is vastly overstated. These estimates suggest that companies in the U.S. would be expected to: (1) increase their growth rate of EPS by almost 100% in the future; and (2) maintain that growth indefinitely in an economy that is expected to grow at about one-half of her projected growth rates.

Q. WHAT LEVEL OF GDP GROWTH IS FORECASTED BY ECONOMISTS AND VARIOUS GOVERNMENT AGENCIES?

A. As previously discussed, there are several forecasts of annual GDP growth that are available from economists and government agencies. These are listed in page 5 of Exhibit JRW-14.

Q. WHY IS GDP GROWTH RELEVANT IN YOUR DISCUSSION OF MS. BULKLEY'S USE OF THE LONG-TERM EPS GROWTH RATES IN DEVELOPING A MARKET RISK PREMIUM FOR her CAPM?

A. Because, as indicated in recent research, the long-term earnings growth rates of companies are on average limited to the growth rate in GDP.

Q. PLEASE HIGHLIGHT THE RESEARCH ON THE LINK BETWEEN ECONOMIC AND EARNINGS GROWTH AND EQUITY RETURNS.

A. Brad Cornell of the California Institute of Technology recently 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. Professor Cornell concludes with the following observations:[16]

> 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

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

> 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.

Given current inflation in the 2% to 3% range and real returns in the 4% to 5% range, the results imply nominal expected stock market returns in the 6% to 8% range. As such, Ms. Bulkley's projected earnings growth rates and implied expected stock market returns and equity risk premiums are not indicative of the realities of the U.S. economy and stock market. As such, her expected CAPM equity cost rate is significantly overstated.

Q. PLEASE PROVIDE A SUMMARY ASSESSMENT OF MS. BULKLEY'S PROJECTED EQUITY RISK PREMIUM DERIVED FROM EXPECTED MARKET RETURNS.

A. Ms. Bulkley's market risk premium derived from her DCF application to the S&P 500 is inflated due to errors and bias in her study. Investment banks, consulting firms, and CFOs use the equity risk premium concept every day in making financing, investment, and valuation decisions. On this issue, the opinions of CFOs and financial forecasters are especially relevant. CFOs deal with capital markets on an ongoing basis since they must continually assess and evaluate capital costs for their companies. They are well aware of the historical stock and bond return studies of Ibbotson. The CFOs in the September 2015 *CFO Magazine* – Duke University Survey of about 500 CFOs shows an expected return on the S&P 500 of 6.00% over

the next ten years. In addition, the financial forecasters in the February 2015 Federal Reserve Bank of Philadelphia survey expect an annual nominal market return of 5.79% over the next ten years. As such, with a more realistic equity or market risk premium, the appropriate equity cost rate for a public utility should be in the 8.0% to 9.0% range and not in the 10.0% to 11.0% range.

C. Risk Premium Approach

Q. PLEASE REVIEW MS. BULKLEY'S RP ANALYSIS.

A. On pages 38-41 of her testimony and in Exhibits AEB-6, Ms. Bulkley estimates an equity cost rate using an RP model. She uses the quarterly authorized ROEs for all electric utilities from Q1 1992 until Q1 2015. Ms. Bulkley develops an equity cost rate by: (1) regressing the authorized returns on equity for electric utility companies on the thirty-year Treasury Yield; and then (2) adding the risk premium established in (1) to each of her three different thirty-year Treasury yields: (a) a current yield of 2.50%, (b) a near-term projected yield of 3.20%, and (c) a long-term projected yield of 4.90%. Ms. Bulkley's RP results are provided in Panel C of Exhibit JRW-13. She reports RP equity cost rates ranging from 9.70% to 10.72%.

Q. WHAT ARE THE ERRORS IN MS. BULKLEY'S RP ANALYSIS?

A. The two issues are: (1) the long-term projected 30-Year Treasury yield of 4.90%; and (2) primarily, the excessive risk premium. The 4.90% base yield was discussed above.

1. Risk Premium

Q. WHAT ARE THE ISSUES WITH MS. BULKLEY'S RISK PREMIUM IN THE RP ANALYSIS?

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

In addition, Ms. Bulkley's RP approach is a gauge of *commission* behavior and not *investor* behavior. Capital costs are determined in the market place through the financial decisions of investors and are reflected in such fundamental factors as dividend yields, expected growth rates, interest rates, and investors' assessment of the risk and expected return of different investments. Regulatory commissions evaluate capital market data in setting authorized ROEs, but also take into account other utility- and rate case-specific information in setting ROEs. As such, Ms. Bulkley's approach and results reflect other factors such as capital structure, credit ratings and other risk measures, service territory, capital expenditures, energy supply issues, rate design, investment and expense trackers, and other factors used by utility commissions in determining an appropriate ROE in addition to capital costs. This may especially be true when the authorized ROE data includes the results of rate cases that are settled and not fully litigated.

Q. HOW DOES MS. BULKLEY'S RP RESULTS COMPARE TO THE CURRENT AUTHORIZED ROES FOR ELECTRIC UTILITIES?

A. Ms. Bulkley's results range from 9.70% to 10.72%. The current average ROEs for electric utilities are below the bottom of her range – 9.60%. Hence, her RP results overstate the current averages.

D. Size Premium

Q. PLEASE DISCUSS MS. BULKLEY'S PROPOSED SIZE ADJUSTMENT.

A. On pages 44-46 of her testimony and in Exhibit AEB-8, Ms. Bulkley estimates a size premium of 4.82% for the Company. Her estimate is based on the historical stock and bond return studies published by Morningstar. Whereas she does not make a specific adjustment for UNSE, she indicates: "Rather, I have considered the small size of UNSE Electric in my assessment of business risks in order to determine where, within a reasonable range of returns, UNSE Electric's required ROE falls."

Q. IS A SIZE ADJUSTMENT APPROPRIATE FOR UNSE?

A. No. There are three reasons that there is no need for a size adjustment or premium for UNSE: (1) a company's credit rating reflects the risk associated with the size of the company: (2) the size premium is based on historical returns which are upwardly biased measures of expected risk premiums; and (3) empirical studies show that size premiums are not required for utilities.

First, a Company's Moody's issuer credit rating of A3 incorporates many different risk factors, including the size of the company. In the case of UNSE, the Moody's credit ratings suggest the Company is a little less risky than the proxy groups. Therefore, there is no valid reason to include a size premium in the equity cost rate.

Second, this size adjustment is based on the historical stock market returns studies as performed by Morningstar (formerly Ibbotson Associates). There are a number of issues with the historical return methodology. First, this approach produces differing results depending on several factors, including the measure of central tendency used, the time period evaluated, and the stock and bond market index employed. In addition, there are a myriad of empirical problems in the approach, which result in historical market returns producing inflated estimates of expected risk premiums. Among the errors are the U.S. stock market survivorship bias (the "Peso Problem"), the company survivorship bias (only successful companies survive – poor companies do not survive), the measurement of central tendency (the arithmetic versus geometric mean), the historical time horizon used, the change in risk and required return over time, the downward bias in bond historical returns, and unattainable return bias (the Ibbotson procedure presumes monthly portfolio rebalancing).[17] The bottom line is that there are a number of empirical problems with using historical stock and bond returns to measure a size premium.

[17]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 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; and J. P. Morgan, "The Most Important Number in Finance," p. 6.

Third, 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.[18] 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 lack of a size premium.

E. Summary of Rate of Return Issues

Q. PLEASE REVIEW THE RATE OF RETURN ISSUES IN THIS CASE.

A. The primary rate of return issues that I have addressed include: (1) the Company's proposed capital structure that includes a common equity ratio of 52.83%; (2) Ms. Bulkley's DCF equity cost rate estimates, and in particular, (a) the lack of weight she

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

gives to her DCF results, and (b) the unrealistic projected GDP growth rate of 5.51% in her multi-stage DCF model; (3) the projected interest rates and the risk premiums in her RP and CAPM approaches; and (4) whether or not an equity cost rate consideration is needed to account for the size of UNSE.

Q. ARE YOU ALSO PROVIDING A RATE OF RETURN RECOMMENDATION ON THE FAIR VALUE OF UNSE'S RATE BASE?

A. No. In this case I am not making a separate recommendation on the Fair Rate of Return on Rate Base ("FVRB"). Instead, I will accept Staff's methodology and approach for FVRB, but my recommendation would include my capital structure and ROE inputs.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

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

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

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

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

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

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

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

APPENDIX B: CAPITAL COSTS IN TODAY'S MARKETS

This appendix provides a detailed assessment of current market conditions, and is intended to supplement Section II of my testimony. As discussed in my testimony, based on the information presented below, given low interest rates and high stock prices, capital costs continue to be at historically low levels. Because an appropriate ROE should reflect the current cost of capital, and capital costs are historically low, ROEs should concomitantly be lower.

Q. PLEASE DISCUSS CAPITAL COSTS IN U.S. MARKETS.

A. Long-term capital cost rates for U.S. corporations are a function of the required returns on risk-free securities plus a risk premium. The risk-free rate of interest is the yield on long-term U.S. Treasury bonds. The yields on 10-year U.S. Treasury bonds from 1953 to the present are provided on Panel A of Exhibit JRW-2. These yields peaked in the early 1980s and have generally declined since that time. These yields fell to below 3.0% in 2008 as a result of the financial crisis. From 2008 until 2011, these rates fluctuated between 2.5% and 3.5%. In 2012, the yields on 10-year Treasuries declined from 2.5% to 1.5% as the Federal Reserve initiated its Quantitative Easing III ("QEIII") program to support a low interest rate environment. These yields increased from mid-2012 to about 3.0% as of December of 2013 on speculation of a tapering of the Federal Reserve's QEIII policy. Since that time, the ten-year Treasury yield declined and bottomed out at 1.7% in January of 2015. These yields have increased in 2015, and now are above 2.0%.

Panel B on Exhibit JRW-2 shows the differences in yields between ten-year Treasuries and Moody's Baa-rated bonds since the year 2000. This differential primarily

reflects the additional risk premium required by bond investors for the risk associated with investing in corporate bonds as opposed to obligations of the U.S. Treasury. The difference also reflects, to some degree, yield curve changes over time. The Baa rating is the lowest of the investment grade bond ratings for corporate bonds. The yield differential hovered in the 2.0% to 3.5% range until 2005, declined to 1.5% until late 2007, and then increased significantly in response to the financial crisis. This differential peaked at 6.0% at the height of the financial crisis in early 2009, due to tightening in credit markets. The adjustment in credit markets increased corporate bond yields, and the "flight to quality," which decreased Treasury yields. The differential subsequently declined, and has remained in the 2.5% range.

Q. WHAT IS THE RISK PREMIUM?

A. The risk premium is the return premium required by investors to purchase riskier securities. The risk premium required by investors to buy corporate bonds is observable based on yield differentials in the markets. The market risk premium is the return premium required to purchase stocks as opposed to bonds. The market or equity risk premium is not readily observable in the markets (like bond risk premiums) since expected stock market returns are not readily observable. As a result, equity risk premiums must be estimated using market data. There are alternative methodologies to estimate the equity risk premium which have produced results that are subject to much debate. One way to estimate the equity risk premium is to compare the mean returns on bonds and stocks over long historical periods. Measured in this manner, the equity risk premium has ranged from 5% to 7%.[1] However, studies by leading academics indicate that the forward-looking equity

[1] See Exhibit JRW-11, p. 5-6.

risk premium is actually in the range of 4.0% to 6.0%. These lower equity risk premium results are consistent with the findings of equity risk premium surveys of CFOs, academics, analysts, companies, and financial forecasters.

Q. PLEASE DISCUSS INTEREST RATES ON LONG-TERM UTILITY BONDS.

A. Panel A of Exhibit JRW-3 provides the yields on A-rated public utility bonds. These yields peaked in November 2008 at 7.75% and have since declined significantly. These yields declined to below 4.0% in mid-2013, and then increased with interest rates in general to the 4.85% range as of late 2013. These rates dropped significantly during 2014 due to economic growth concerns and were bottomed out below 4.0% in the first quarter of 2015. They have since increased with interest rates in general and are back above 4.0%.

Panel B of Exhibit JRW-3 provides the yield spreads between long-term A-rated public utility bonds relative to the yields on 20-year U.S. Treasury bonds. These yield spreads increased dramatically in the third quarter of 2008 during the peak of the financial crisis and have decreased significantly since that time. For example, the yield spreads between 20-year U.S. Treasury bonds and A-rated utility bonds peaked at 3.4% in November 2008, declined to about 1.5% in the summer of 2012, and have remained in that range.

Q. PLEASE PROVIDE MORE DETAILS ABOUT THE FEDERAL RESERVE'S QEIII POLICY AND INTEREST RATES.

A. On September 13, 2012, the Federal Reserve released its policy statement relating to QEIII. In its statement, the Federal Reserve announced that it intended to expand and extend its

purchasing of long-term securities to about $85 billion per month.[2] The Federal Open Market Committee ("FOMC") also indicated that it intended to keep the target for the federal funds rate between 0 to 0.25% through at least mid-2015. In subsequent meetings over the next year, the Federal Reserve reiterated the continuation of its bond buying program and tied future monetary policy moves to unemployment rates and the level of interest rates.[3]

During 2013, the speculation in the markets was that the Federal Reserve's bond buying program would be tapered or scaled back. This speculation was fueled by more positive economic data on jobs and the economy. The speculation led to an increase in interest rates, with the ten-year Treasury yield increasing to about 3.0% as of December 2013. Due to continuing positive economic data, the Federal Reserve decided to reduce its purchases of mortgage-backed securities and Treasuries by $5 billion per month beginning in January of 2014.[4]

Q. PLEASE DISCUSS THE FEDERAL RESERVE'S ACTIONS IN 2014 AND 2015.

A. The January 29, 2014 FOMC meeting was historic as Janet Yellen took over from Ben Bernanke as Fed Chairman. In subsequent monthly meetings during 2014, the FOMC noted that it saw improvement in the economy and the housing and labor markets and it continued to taper its bond buying program. In its October 28-29, 2014 meeting, the FOMC put an end to its bond buying program primarily due to improving economic conditions and, in particular, the better employment market.[5] The announcement was

[2] Board of Governors of the Federal Reserve System, *Statement Regarding Transactions in Agency Mortgage-Backed Securities and Treasury Securities* (Sept. 13, 2012).
[3] Board of Governors of the Federal Reserve System, *FOMC Statement* (Dec. 12, 2012).
[4] *Ibid.*
[5] Board of Governors of the Federal Reserve System, *FOMC Statement* (Nov. 19, 2014).

expected, and speculation grew as to when the Federal Reserve would change course in its "highly accommodative" monetary policy and move to increase short-term interest rates. This speculation continued through the end of 2014 and into 2015 as the economy has continued to advance and the unemployment rate has declined to 5.1%. With the improvement in the economy and the labor and housing markets, the FOMC focused on the sluggish pace of inflation and when inflation would approach the Federal Reserve's target rate of 2.0%. Early in 2015, the markets focused on one key word regarding monetary policy– 'patient.' In its March 18 statement, the FOMC omitted the word 'patient' with respect to the normalization of monetary policy, and suggested that its target range for federal funds would only be increased once the outlook for the labor market and price increases improved.[6] Since that time, the market debate and speculation has turned to which monthly meeting would the Federal Reserve increase the Fed Funds rate. At the September 17th meeting, the FOMC once again opted to keep the rate unchanged, citing the low inflation rate, slow global economic growth, and recent stock market volatility.[7]

Q. HOW HAS THE YIELD ON TEN-YEAR TREASURY BONDS REACTED TO THE FEDERAL RESERVE'S MONETARY POLICY ACTIONS?

A. The yield on the ten-year Treasury note was 3.0% as of January 2, 2014. This yield trended down during 2014, and bottomed out at 1.7% in January of 2015. With speculation growing about an increase in the Federal Reserve's discount rate, the ten-year yield subsequently increased to almost 2.5% in July. However, global economic growth

[6] Board of Governors of the Federal Reserve System, *FOMC Statement* (March 18, 2015).
[7] Board of Governors of the Federal Reserve System, *FOMC Statement* (September 17, 2015).

concerns, particularly those regarding China, have led to a decline in the ten-year Treasury yield to about 2.2%.[8]

Q. YOU DISCUSS THE RECENT FEDERAL RESERVE POLICY AND CURRENT CONDITIONS IN THE ECONOMY AND THE FINANCIAL MARKETS. PLEASE PROVIDE A LONG-TERM PERSPECTIVE ON INTEREST RATES AND CAPITAL COSTS.

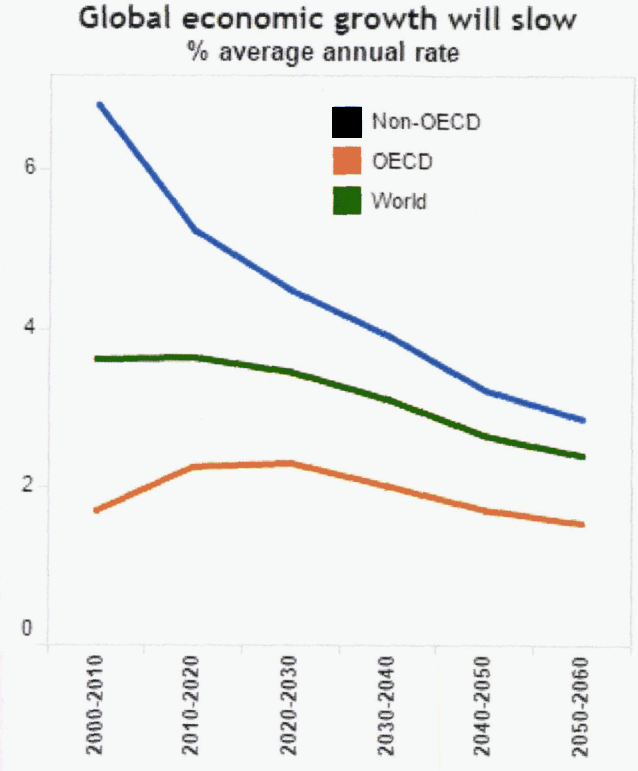
A. In the long run, the key drivers of economic growth measured in nominal dollars are population growth, the advancement and diffusion of science and technology, and currency inflation. Although the U.S. experienced rapid economic growth during the "post-war" period (the 63 years that separated the end of World War II and the 2008 financial crisis), the post-war period is not necessarily reflective of expected future growth. It was marked by a near-trebling of global population, from under 2.5 billion to approximately 6.7 billion. Over the succeeding 63 years, according to U.N. projections, the global population will grow considerably more slowly, reaching approximately 10.3 billion in 2070. With population growth slowing, life expectancies lengthening, and post-war "baby boomers" reaching retirement age, median ages in developed-economy nations have risen and continue to rise. The postwar period was also marked by rapid catch-up growth as Europe, Japan, and China recovered from successive devastations and as regions such as India and China deployed and leapfrogged technologies that had been developed over a much longer period in earlier-industrialized nations. That period of rapid catch-up growth is coming to an end. For example, although China remains one of the world's fastest-growing regions,

[8] http://research.stlouisfed.org/fred2/series/DGS10/downloaddata.

its growth is now widely expected to slow substantially. This convergence of projected growth in the former "second world" and "third world" towards the slower growth of the nations that have long been considered "first world" is illustrated in this "key findings" chart published by the Organization for Economic Co-operation and Development:[9]

Figure 1: Projected Global Growth

Global growth will slow from 3.6% in 2010-2020 to 2.4% in 2050-2060 and will be increasingly driven by innovation and investment in skills.



As to dollar inflation, it has declined to far below the level it reached in the 1970s. The Federal Reserve targets a 2% inflation rate, but (as noted above) has been unable to effect even that much inflation. Indeed, a recent Bloomberg article pointed out that "[t]he Fed's preferred measure of inflation has also fallen short of its 2 percent goal for 30

[9] See http://www.oecd.org/eco/outlook/lookingto2060.htm.

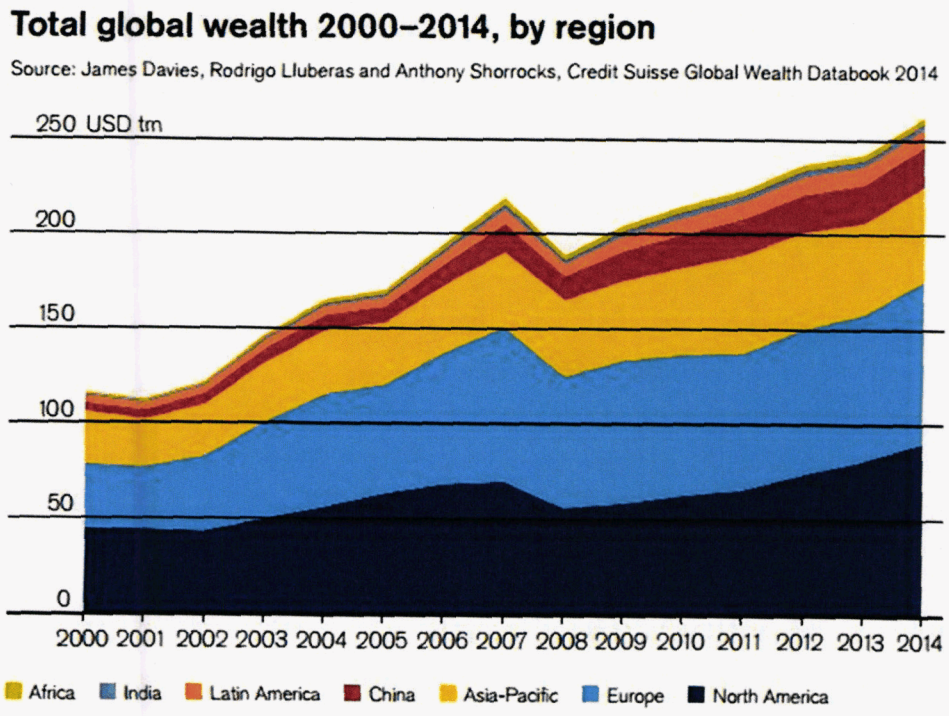
consecutive months, and he outlook for consumer-price increases over the next five years has fallen almost a percentage point since its high in June to a four-year low of 1.13 percent.[10] The U.S Energy Information Administration's (EIA) annual Energy Outlook includes in its nominal GDP growth projection a long-term inflation component, which is projected at only 1.8%.[11]

All of these factors signify slowed growth in annual economic production and income, even when measured in nominal rather than real dollars. Meanwhile, the stored wealth that is available to fund investments has continued to rise. As shown in the figure below, according to the most recent release of the Credit Suisse global wealth report, global wealth has more than doubled since the turn of this century, notwithstanding the temporary setback following the 2008 financial crisis.

[10] Susanne Walker, *Bond Investors Are Writing Off Inflation for Years, If Not Decades, to Come* (Dec 15, 2014), available at http://www.bloomberg.com/news/2014-12-15/wall-street-can-t-stop-stripping-bonds-as-inflation-deemed-dead.html.

[11] See EIA Annual Energy Outlook 2014, Table 20 (available at http://www.eia.gov/forecasts/aeo/tables_ref.cfm).

Figure 2: Global Wealth – 2000-2014



These long-term trends mean that overall, and relative to what had been the post-war norm, the world now has more wealth chasing fewer opportunities for investment rewards. Ben Bernanke, the former Chairman of the Federal Reserve, called this phenomenon a "global savings glut."[12] Like any other liquid market, capital markets are subject to the law of supply and demand. With a large supply of capital available for investment and relatively scarce demand for investment capital, it should be no surprise to see the cost of investment capital decline.

[12] Ben S. Bernanke, *The Global Saving Glut and the U.S. Current Account Deficit* (Mar. 10, 2005), available at http://www.federalreserve.gov/boarddocs/speeches/2005/200503102/.

Q. RELATEDLY, PLEASE HIGHLIGHT MR. BERNANKE'S RECENT TAKE ON THE LOW INTEREST RATES IN THE U.S.

A. Mr. Bernanke addressed the issue of the continuing low interest rates recently on his weekly Brookings Blog. Bernanke indicated that the focus should be on real and not nominal interest rates and noted that, in the long term, these rates are not determined by the Federal Reserve:[13]

> If you asked the person in the street, "Why are interest rates so low?," he or she would likely answer that the Fed is keeping them low. That's true only in a very narrow sense. The Fed does, of course, set the benchmark nominal short-term interest rate. The Fed's policies are also the primary determinant of inflation and inflation expectations over the longer term, and inflation trends affect interest rates, as the figure above shows. But what matters most for the economy is the real, or inflation-adjusted, interest rate (the market, or nominal, interest rate minus the inflation rate). The real interest rate is most relevant for capital investment decisions, for example. The Fed's ability to affect real rates of return, especially longer-term real rates, is transitory and limited. Except in the short run, real interest rates are determined by a wide range of economic factors, including prospects for economic growth—not by the Fed.

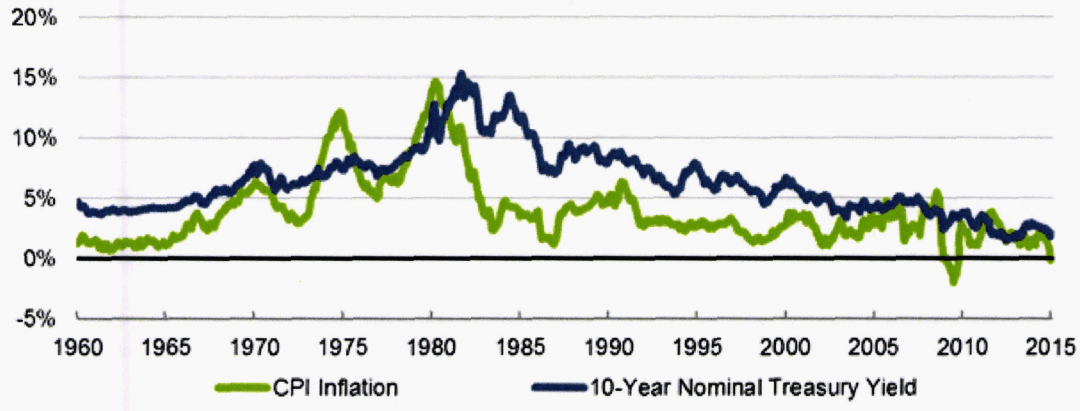
Bernanke also addressed the issue about whether low-interest rates are a short-term aberration or a long-term trend:[14]

> Low interest rates are not a short-term aberration, but part of a long-term trend. As the figure below shows, ten-year government bond yields in the United States were relatively low in the 1960s, rose to a peak above 15 percent in 1981, and have been declining ever since. That pattern is partly explained by the rise and fall of inflation, also shown in the figure. All else equal, investors demand higher yields when inflation is high to compensate them for the declining purchasing power of the dollars with which they expect to be repaid. But yields on inflation-protected bonds are also very low today; the real or inflation-adjusted return on lending to the U.S. government for five years is currently about minus 0.1

[13] Ben S. Bernanke, "Why are Interest Rates So Low," Weekly Blog, Brookings, March 30, 2015. http://www.brookings.edu/blogs/ben-bernanke/posts/2015/03/30-why-interest-rates-so-low.
[14] *Ibid.*

percent.

Figure 3:
Interest Rates and Inflation
1960-Present



Source: Federal Reserve Board, BLS.

BROOKINGS

Q. WHAT ARE YOUR OBSERVATIONS REGARDING THE OUTLOOK FOR INTEREST RATES AND CAPITAL COSTS?

A. I believe that there are several factors driving the markets.

First, the economy has been growing for five years, and, as noted above, despite some weakness in the global economy, the Federal Reserve continues to see growing strength in the U.S. economy. The labor market has improved better than expected, with unemployment now down to 5.1%.

Second, interest rates remain at historically low levels and are likely to remain low. There are two factors driving the continued lower interest rates: (1) as noted by the FOMC, inflationary expectations in the U.S. remain very low and are below the FOMC's target of 2.0%; and (2) global economic growth – including Europe and Asia – remains stagnant. As a result, while the yields on ten-year U.S. Treasury bonds are low by historic standards,

these yields are well above the government bond yields in Germany, Japan, and the United Kingdom. Thus, U.S. Treasuries offer an attractive yield relative to those of other major governments around the world, thereby attracting capital to the U.S. and keeping U.S. interest rates down.

Third, reflective of the economic conditions and earnings growth and low interest rates, the stock market is near an all-time high.

Finally, with the end of the Fed's QEIII program, there were forecasts of higher interest rates for some time. However, these forecasts proved to be wrong. In fact, all the economists in Bloomberg's interest rate survey forecasted interest rates would increase in 2014, and 100% of the economists were wrong. According to the *Market Watch* article:[15]

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

As a final note on this issue, these consensus forecasts of economists that interest rates are going higher seem to be continually wrong. In fact, in 2014, *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 forecasters' interest rate forecasts.[16]

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[15] Ben Eisen, *Yes, 100% of economists were dead wrong about yields*, MARKET WATCH, October 22, 2014.

[16] 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.

Q. PLEASE SUMMARIZE YOUR CONCLUSIONS ON THE STATE OF THE MARKETS AND CAPITAL COSTS.

A. Overall, the economy and capital markets have recovered and are looking to the future, and, with low interest rates and high stock prices, capital costs continue to be at historically low levels. Because an appropriate ROE should reflect the current cost of capital, and capital costs are historically low, ROEs should concomitantly be lower.

APPENDIX C: CAPITAL STRUCTURE RATIOS AND DEBT COST RATES

This appendix details my proposed capital structure, and is intended to supplement Section IV of my testimony. As stated in my testimony, based on the information below I recommend a capital structure for UNSE with 50% long-term debt, and 50% common equity.

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

A. The Company has proposed a capital structure of 47.17% long-term debt and 52.83% common equity. The Company has recommended a long-term debt cost rate of 4.66%. This is summarized on Panel A of Exhibit JRW-5.

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

A. As shown in Exhibit JRW-4, the median common equity ratios of the Electric and Bulkley Proxy Groups are 47.7% and 49.3%, respectively. This indicates that the Company's proposed capitalization has a higher common equity ratio than the two proxy groups.

Q. HOW DOES THE COMPANY'S PROPOSED COMMON EQUITY RATIOS COMPARE TO COMMON EQUITY RATIOS OF UNSE'S PARENT COMPANY, UNS ENERGY, AND UTLIMATE PARENT COMPANY, FORTIS, INC?

A. As of year-end 2013 and 2014, UNS Energy had common equity ratios of [redacted], respectively.[1] In addition, as shown in Panel B of Exhibit JRW-5, Fortis' 2014 year-end capitalization included a common equity ratio of 43.6%. [redacted]

Q. ARE YOU ADOPTING UNSE'S RECOMMENDED CAPITAL STRUCTURE?

A. No. The Company is proposing a capital structure that includes a higher common equity ratio than the averages of the two proxy groups as well as its parent organizations.

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

A. An electric utility's decision regarding the amount of equity capital it will incorporate into its capital structure involves fundamental trade-offs relating to the amount of financial risk the firm carries, the overall revenue requirements its customers are required to bear through the rates they pay, and the return on equity that investors will require.

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

A. Utilities satisfy their capital needs through a mix of equity and debt. Because equity capital is more expensive than debt, the issuance of debt enables a utility to raise more capital with a given commitment of dollars than it could raise with just equity. Debt is, therefore, a

[1] UNSE Response to UDR1.004 Capital Structure Ratios – Confidential.

means of "leveraging" capital dollars. However, as the amount of debt in the capital structure increases, its financial risk increases and the risk of the utility perceived by equity investors also increases. Significantly for this case, the converse is also true. As the amount of debt in the capital structure decreases, the financial risk decreases. The required return on equity capital is a function of the amount of overall risk that investors perceive, including financial risk in the form of debt.

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

A. Just as there is a direct correlation between the utility's authorized return on equity and the utility's revenue requirements (the higher the return, the greater the revenue requirement), there is a direct correlation between the amount of equity in the capital structure and the revenue requirements the customers are called on to bear. Again, equity capital is more expensive than debt. Not only does equity command a higher cost rate, it also adds more to the income tax burden that ratepayers are required to pay through rates. As the equity ratio increases, the utility's revenue requirements increase and the rates paid by customers increase. If the proportion of equity is too high, rates will be higher than they need to be. For this reason, the utility's management must pursue a capital acquisition strategy that results in the proper balance in the capital structure.

Q. HOW HAVE ELECTRIC UTILITIES TYPICALLY STRUCK THIS BALANCE?

A. Due to regulation and the essential nature of its output, an electric utility is exposed to less business risk than other companies that are not regulated. This means that an electric utility

can reasonably carry relatively more debt in its capital structure than can most unregulated companies. The utility should take appropriate advantage of its lower business risk to employ cheaper debt capital at a level that will benefit its customers through lower revenue requirements. Typically, one may see equity ratios for electric utilities range from 40% to 50%.

Q. GIVEN YOUR VIEW THAT UNSE'S EQUITY RATIO IS HIGHER THAN THAT OF THE PROXY GROUPS, WHAT SHOULD THE COMMISSION DO IN THIS RATEMAKING PROCEEDING?

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

Q. PLEASE ELABORATE ON THIS "DOWNWARD IMPACT."

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

ignored.

Q. PLEASE DESCRIBE YOUR RECOMMENDED CAPITAL STRUCTURE FOR UNSE.

A. The capital structure data for UNSE has a higher common equity ratio than the two proxy groups. To balance these capital structures, and to provide for a more reasonable capitalization, I use a capital structure with a common equity ratio of 50.0%. A capital structure with a 50% common equity ratio is still above the average common equity ratios of the proxy groups.

In Panel C of Exhibit JRW-5, I have used a common equity ratio of 50.0% and I have adjusted UNSE's long-term debt upwards on a pro rata basis such that they account, collectively, for 50.0% of total capital. The resulting capital structure includes 50.0% long-term debt, and 50.0% common equity.

Q. ARE YOU ADOPTING UNSE'S RECOMMENDED SENIOR CAPITAL COST RATES?

A. I am adopting UNSE's recommended long-term debt cost rate of 4.66%.

APPENDIX D: THE COST OF COMMON EQUITY CAPITAL

This appendix provides a detailed discussion of the cost of equity capital for utilities, and my approach to estimate the cost of equity capital. This discussion is intended to supplement Section V of my testimony. As stated in my testimony and discussed below, I rely primarily on the Discounted Cash Flow Model ("DCF") model to estimate the cost of equity capital. While I have also performed a Capital Asset Pricing Model ("CAPM") study, I give these results less weight because I believe that risk premiums studies such as CAPM provide a less reliable indication of equity cost rates for public utilities.

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

In the real world, 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 that 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:[1]

> 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.

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.

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

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

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

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

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

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, electric utility, and water utility companies. I used all companies in these three industries that are covered by *Value Line* and have estimated ROE and market-to-book ratio data. The results are presented in Panels A-C of Exhibit JRW-6. The average R-squares for the electric, gas, and water companies are 0.78, 0.63, and 0.49, respectively.[3] This demonstrates the strong positive relationship between ROEs and market-to-book ratios for public utilities.

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

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

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

A. Exhibit JRW-7 provides indicators of public utility equity cost rates over the past decade.

Page 1 shows the yields on long-term A-rated public utility bonds. These yields decreased from 2000 until 2003, and then hovered in the 5.50%-6.50% range from mid-2003 until mid-2008. These yields spiked up to the 7.75% range with the onset of the financial crisis, and remained high and volatile until early 2009. These yields declined to below 4.0% in mid-2013, and then increased with interest rates in general to the 4.85% range as of late 2013. They subsequently declined to below 4.0% in the first quarter of 2015, but have increased with interest rates in general since that time.

Page 2 provides the dividend yields for electric utilities over the past decade. The dividend yields for this electric group declined from the year 2000 to 2007, increased to 5.2% in 2009, and dropped to 3.80% in 2014.

Average earned returns on common equity and market-to-book ratios for the electric group are on page 3 of Exhibit JRW-7. For the electric group, earned returns on common equity have declined gradually since the year 2000 and have been in the 9.50% range in recent years. The average market-to-book ratios for this group peaked at 1.68X in 2007, declined to 1.07X in 2009, and have increased since that time. As of 2014, the average market-to-book for the group was 1.50X. This means that, for at least the last decade, returns on common equity have been greater than the cost of capital, or more than necessary to meet investors' required returns. This also means that customers have been paying more than they need 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 and financial risk. Business risk encompasses all factors that affect a firm's operating revenues and expenses. Financial risk results from incurring fixed obligations in the form of debt in financing its assets.

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

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

Exhibit JRW-8 provides an assessment of investment risk for 99 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, water, and gas utility companies are 0.74, 0.73, and 0.80, respectively. As such, the cost of equity for utilities is among the lowest of all industries in the U.S.

Q. WHAT IS THE COST OF COMMON EQUITY CAPITAL?

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

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

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

A. Models have been developed to ascertain the cost of common equity capital for a firm. Each model, however, has been developed using restrictive economic assumptions. Consequently, judgment is required in selecting appropriate financial valuation models to estimate a firm's cost of common equity capital, in determining the data inputs for these

models, and in interpreting the models' results. All of these decisions must take into consideration the firm involved as well as current conditions in the economy and the financial markets.

Q. HOW DO YOU PLAN TO ESTIMATE THE COST OF EQUITY CAPITAL FOR UNSE?

A. I rely primarily on the DCF model to estimate the cost of equity capital. Given the investment valuation process and the relative stability of the utility business, I believe that the DCF model provides the best measure of equity cost rates for public utilities. It is my understanding that this Commission has traditionally relied on the DCF model. I have also performed a CAPM study; however, I give these results less weight because I believe that risk premium studies such as CAPM provide a less reliable indication of equity cost rates for public utilities.

B. DCF Analysis

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:

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

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

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

A. Yes. Virtually all investment firms use some form of the DCF model as a valuation technique. One common application for investment firms is called the three-stage DCF or dividend discount model ("DDM"). The stages in a three-stage DCF model are presented in Exhibit JRW-9, Page 1 of 2. 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.

C. DCF Growth Rate

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

A. There is much 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 GROUPS?

A. I have analyzed a number of measures of growth for companies in the proxy groups. I reviewed *Value Line's* historical and projected growth rate estimates for earnings per share ("EPS"), dividends per share ("DPS"), and book value per share ("BVPS"). In addition, I utilized the average EPS growth rate forecasts of Wall Street analysts as provided by Yahoo, Reuters 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 element 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. PLEASE PROVIDE AN EXAMPLE OF THESE EPS FORECASTS.

A. The following example provides the EPS forecasts compiled by Reuters for Alliant Energy Corp. (stock symbol "LNT"). The figures are provided on page 2 of Exhibit JRW-9. The top line shows that one analyst has provided EPS estimates for the quarter ending December 31. The mean, high and low estimates are $0.53, $0.63, and $0.41, respectively. The second line shows the quarterly EPS estimates for the quarter ending March 31, 2016

of $0.94 (mean), $0.94 (high), and $0.94 (low). Lines three and four show the annual EPS estimates for the fiscal year ending December 2015 ($3.63 (mean), $3.68 (high), and $3.60 (low)) and for the fiscal year ending December 2016 ($3.83 (mean), $3.91 (high), and $3.75 (low)). The quarterly and annual EPS forecasts in lines 1-4 are expressed in dollars and cents. As in the LNT case shown here, it is common for more analysts to provide estimates of annual EPS as opposed to quarterly EPS. The bottom line shows the projected long-term EPS growth rate, which is expressed as a percentage. For LNT, two analysts have provided a long-term EPS growth rate forecast, with mean, high, and low growth rates of 5.75%, 6.00%, and 5.50%.

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 issues with using the EPS growth rate forecasts of Wall Street analysts as DCF growth rates. First, the appropriate growth rate in the DCF model is the dividend growth rate, not the earnings growth rate. Nonetheless, over the very long term, dividend and earnings will have to grow at a similar growth rate. Therefore, consideration must be

given to other indicators of growth, including prospective dividend growth, internal growth, as well as projected earnings growth. Second, a 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.[4] Employing data over a twenty-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 has been demonstrated in a number of academic studies over the years.[5] 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.[6]

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

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

[6] 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).

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

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

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

A. According to the DCF model, the equity cost rate is a function of the dividend yield and expected growth rate. Because stock prices reflect the bias, it would affect the dividend yield. In addition, the DCF growth rate needs to be adjusted downward from the projected EPS growth rate to reflect the upward bias.

D. CAPM Analysis

Q. PLEASE DISCUSS THE CAPM APPROACH.

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 EXHIBIT JRW-11.

A. Exhibit JRW-11 provides the summary results for my CAPM study. Page 1 shows the results, and the following pages contain the supporting data.

Q. PLEASE DISCUSS THE RISK-FREE INTEREST RATE.

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

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

A. As shown on page 2 of Exhibit JRW-11, the yield on 30-year U.S. Treasury bonds has been in the 2.5% to 4.0% range over the 2013–2015 time period. The 30-year Treasury yield is currently in the middle of this range. Given the recent range of yields and the possibility of higher interest rates, I use 4.0% as the risk-free rate, or R_f, in my CAPM.

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 Exhibit JRW-11, the slope of the regression line is the stock's ß. A steeper line indicates that the stock is more sensitive to the return on the overall market. This means that the stock has a higher ß and greater-than-average market risk. A less steep line indicates a lower ß and less market risk.

Several online investment information services, such as Yahoo and Reuters, provide estimates of stock betas. Usually these services report different betas for the same stock. The differences are usually due to: (1) the time period over which ß is 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 groups, I am using the betas for the companies as provided in the *Value Line Investment Survey*. As shown on page 3 of Exhibit JRW-11, the median betas for the companies in the Electric and Bulkley Proxy Groups are 0.75 and 0.78, respectively.

Q. PLEASE DISCUSS THE MARKET RISK PREMIUM ("MRP").

A. The MRP 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 MRP 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 MRP 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.[7]

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

Q. PLEASE DISCUSS THE ALTERNATIVE APPROACHES TO ESTIMATING THE MRP.

A. Page 4 of Exhibit JRW-11 highlights the primary approaches to, and issues in, estimating the expected MRP. The traditional way to measure the MRP 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. Most historical assessments of the equity risk premium suggest an equity risk premium range of 5% to 7% above the rate on long-term U.S. Treasury bonds. However, this 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. This is discussed in more detail 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.[8]

In addition, there are a number of surveys of financial professionals regarding the MRP. 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 500 CFOs participate in the survey.[9] 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.*[10] 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.[11]

Q. PLEASE PROVIDE A SUMMARY OF THE MRP STUDIES.

A. Derrig and Orr (2003), Fernandez (2007), and Song (2007) have completed the most comprehensive reviews to date of the research on the MRP.[12] Derrig and Orr's study evaluated the various approaches to estimating MRPs, as well as the issues with the

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

[9] *See* DUKE/CFO MAGAZINE GLOBAL BUSINESS OUTLOOK SURVEY, www.cfosurvey.org (September, 2015).

[10] Federal Reserve Bank of Philadelphia, *Survey of Professional Forecasters (Feb. 13, 2015).* 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.

[11] Pablo Fernandez, Alberto Ortiz and Isabel Fernandez Acín, "Discount Rate (Risk-Free Rate and Market Risk Premium), used for 41 countries in 2015: a survey," April 23, 2015.

[12] *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).

alternative approaches and summarized the findings of the published research on the MRP. Fernandez examined four alternative measures of the MRP – historical, expected, required, and implied. He also reviewed the major studies of the MRP and presented the summary MRP results. Song provides an annotated bibliography and highlights the alternative approaches to estimating the MRP.

Page 5 of Exhibit JRW-11 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 MRP. In developing page 5 of Exhibit JRW-11, I have categorized the studies as discussed on page 4 of Exhibit JRW-11. 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 EXHIBIT JRW-11.

A. Page 5 of JRW-11 provides a summary of the results of the MRP studies that I have reviewed. These include the results of: (1) the various studies of the historical risk premium; (2) *ex ante* MRP studies; (3) MRP surveys of CFOs, financial forecasters, analysts, companies and academics; and (4) the Building Blocks approach to the MRP. There are results reported for over thirty studies, and the median MRP is 4.42%.

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

A. The studies cited on page 5 of Exhibit JRW-11 include every MRP study and survey I could identify that was published over the past decade and that provided an MRP estimate. Most of these studies were published prior to the financial crisis. In addition, some of these studies were published in the early 2000s at the market peak. It should be noted that many of these studies (as indicated) used data over long periods of time (as long as fifty years of data) and so were not estimating an MRP as of a specific point in time (e.g., the year 2001). To assess the effect of the earlier studies on the MRP, I have reconstructed page 5 of Exhibit JRW-11 on page 6 of Exhibit JRW-11; however, I have eliminated all studies dated before January 2, 2010. The median for this subset of studies is 4.82%.

Q. GIVEN THESE RESULTS, WHAT MRP ARE YOU USING IN YOUR CAPM?

A. Much of the data indicates that the market risk premium is in the 4.0% to 6.0% range. Several recent studies (such as Damodaran, American Appraisers, and Duarte and Rosa have suggested an increase in the market risk premium. Therefore, I will use 5.50%, which is in the upper end of the range, as the market risk premium or MRP.

Q. IS YOUR *EX ANTE* MRP CONSERVATIVE COMPARED TO THE MRPS USED BY CFOS?

A. Yes. In the September, 2015 CFO survey conducted by *CFO Magazine* and Duke University, which included about 450 responses, the expected 10-year MRP was 3.8%.[13]

[13] *Id.* p. 66.

Q. IS YOUR *EX ANTE* MRP CONSERVATIVE COMPARED TO THE MRPS OF PROFESSIONAL FORECASTERS?

A. Yes. The financial forecasters in the previously referenced Federal Reserve Bank of Philadelphia survey projected both stock and bond returns. In the February 2015 survey, the median long-term expected stock and bond returns were 5.79% and 3.91%, respectively. This provides an *ex ante* MRP of 1.88% (5.79%-3.91%).

Q. IS YOUR *EX ANTE* MRP CONSISTENT WITH THE MRPS OF FINANCIAL ANALYSTS AND COMPANIES?

A. Yes. Pablo Fernandez recently published the results of a 2015 survey of academics, financial analysts, and companies.[14] This survey included over 4,000 responses. The median MRP employed by U.S. analysts and companies was 5.5%.

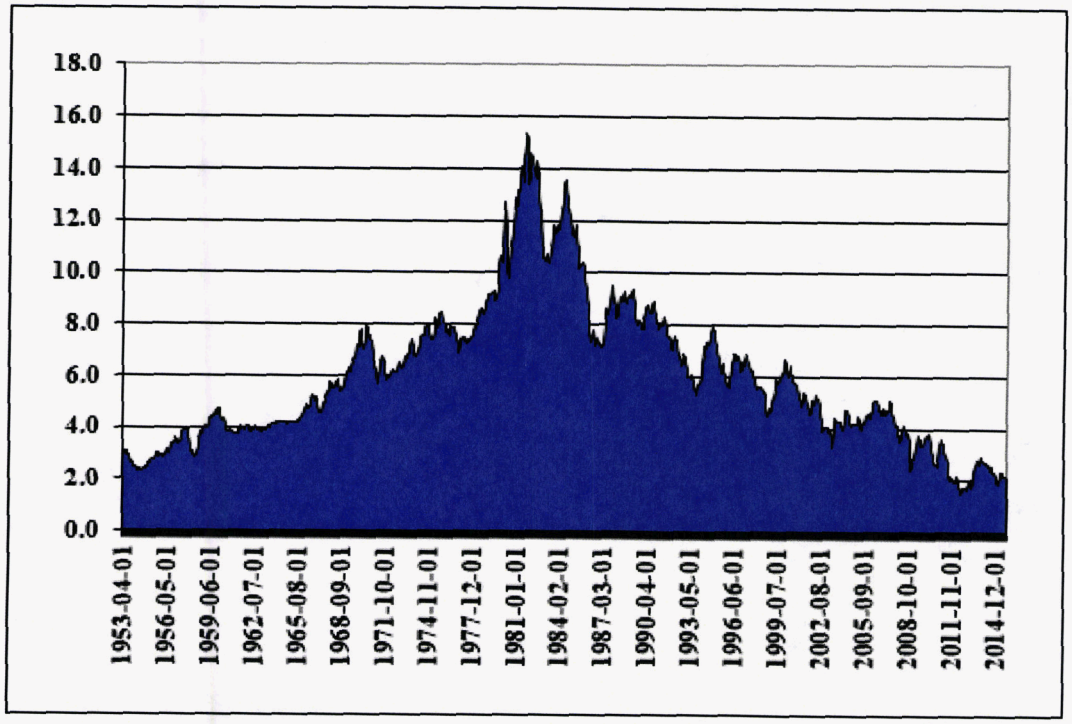
[14] *Ibid.* p. 3.

Exhibit JRW-1
UNS Electric, Inc.
Recommended Cost of Capital

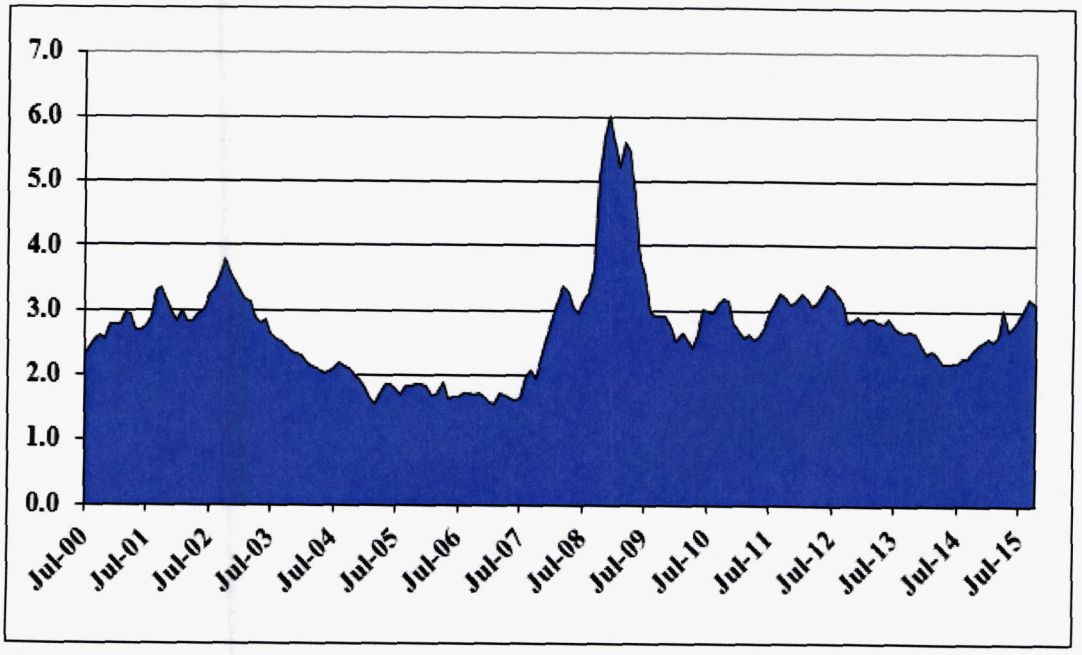
Capital Source	Capitalization Ratio	Cost Rate	Weighted Cost Rate
Long-Term Debt	50.00%	4.66%	2.33%
Common Equity	50.00%	8.75%	4.38%
Total	100.00%		6.71%

Exhibit JRW-2

Panel A
Ten-Year Treasury Yields
1953-Present

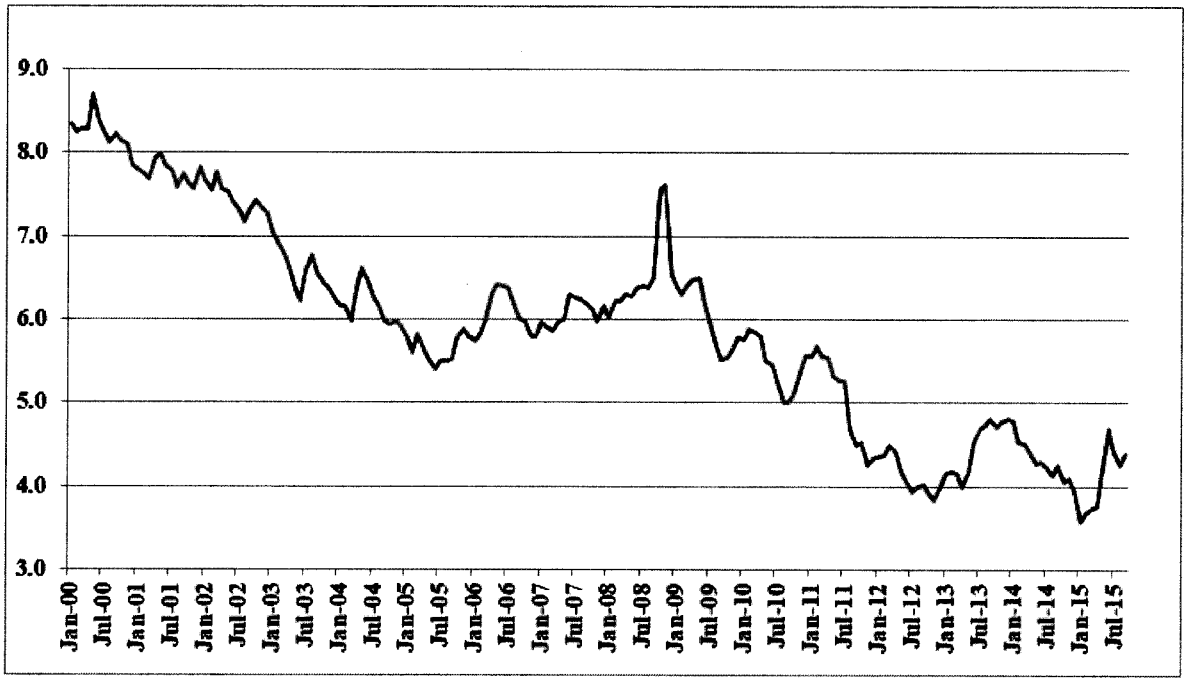


Panel B
Long-Term Moody's Baa Yields Minus Ten-Year Treasury Yields
2000-Present

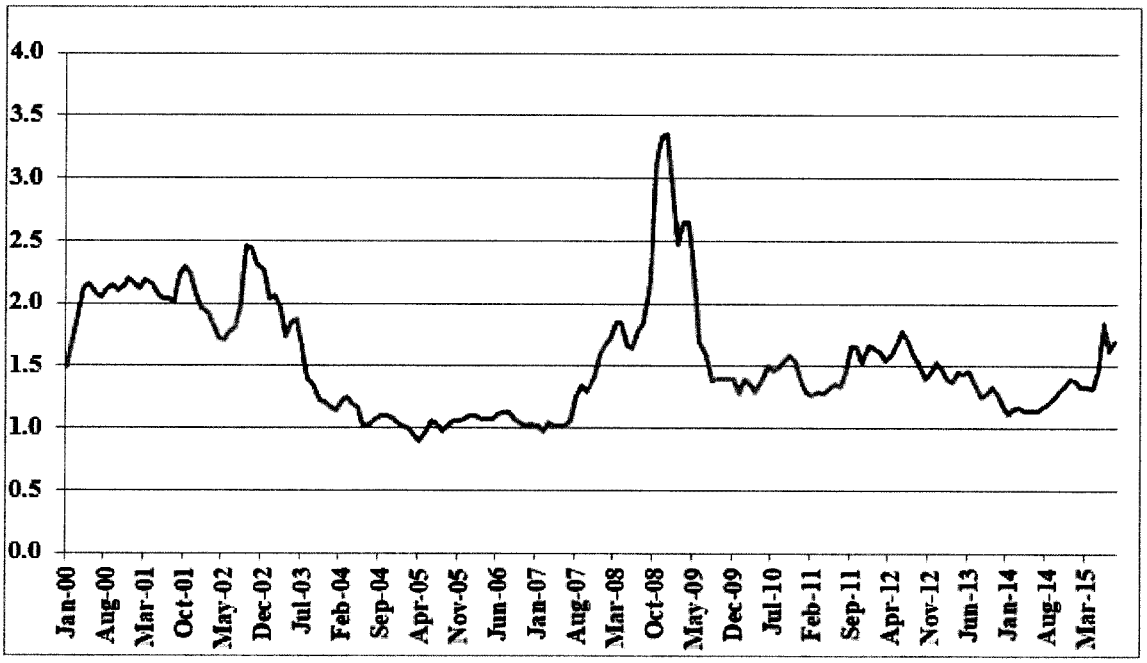


Source: Federal Reserve Bank of St. Louis, FRED Database.

Exhibit JRW-3
Panel A
Long-Term, A-Rated Public Utility Yields



Panel B
Long-Term, A-Rated Public Utility Yields minus -Twenty-Year Treasury Yields



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

Exhibit JRW-4

UNS Electric, Inc.

Summary Financial Statistics for Proxy Groups

Panel A

Electric Proxy Group

Company	Operating Revenue ($mil)	Percent Elec Revenue	Percent Gas Revenue	Net Plant ($mil)	Market Cap ($mil)	S&P Issuer Credit Rating	Moody's Long Term Rating	Pre-Tax Interest Coverage	Primary Service Area	Common Equity Ratio	Return on Equity	Market to Book Ratio
ALLETE, Inc. (NYSE-ALE)	1,222.9	82		3,451.5	2.38	BBB+	A3	3.9	MN, WI	56.1	8.6	1.34
Alliant Energy Corporation (NYSE-LNT)	3,261.8	83	14	9,173.5	6.43	A-	A3	10.0	WI,IA,IL,MN	48.4	10.3	1.68
Ameren Corporation (NYSE-AEE)	6,015.0	82	18	17,700.0	9.90	BBB+	Baa1	4.0	IL,MO	47.7	9.1	1.48
American Electric Power Co. (NYSE-AEP)	16,978.0	81		45,013.0	26.99	BBB	Baa1	4.0	10 States	45.7	10.2	1.55
Avista Corporation (NYSE-AVA)	1,497.2	69	34	3,726.7	1.97	BBB	Baa1	3.4	WA,ID,AK	48.8	7.8	1.30
Black Hills Corporation (NYSE-BKH)	1,375.4	50	43	3,300.2	1.70	BBB	Baa1	3.9	CO,SD,WY,MT,NE,IA,KS	46.1	9.4	1.21
CMS Energy Corporation (NYSE-CMS)	6,649.0	63	32	13,775.0	9.34	BBB+	Baa2	2.8	MI	30.5	12.3	2.45
Consolidated Edison, Inc. (NYSE-ED)	12,622.0	71	14	30,448.0	19.19	A-	A3	3.8	NY,PA	48.4	8.8	1.50
Dominion Resources, Inc. (NYSE-D)	12,149.0	63	2	38,668.0	41.12	A-	Baa2	3.8	VA,NC,OH,WV	31.2	14.3	3.31
Duke Energy Corporation (NYSE-DUK)	23,608.0	90	2	71,759.0	47.53	A-	A3	3.4	NC,SC,FL,OH,KY	48.9	6.9	1.20
Edison International (NYSE-EIX)	12,891.0	100		33,594.0	19.90	BBB+	A3	5.2	CA	43.2	14.5	1.76
El Paso Electric Company (NYSE-EE)	895.8	100		2,541.6	1.43	BBB	Baa1	2.6	TX,NM	44.7	9.4	1.47
Empire District Electric Co. (NYSE-EDE)	637.2	91	7	1,945.9	0.95	BBB	Baa1	3.0	KS,MO,OK,AR	48.0	7.8	1.20
Entergy Corporation (NYSE-ETR)	12,206.2	79	1	28,808.0	11.41	BBB	Baa3	3.1	LA,AR,MS,TX	41.6	8.3	1.12
Eversource Energy (NYSE-ES)	8,104.1	87	13	19,079.2	15.14	A	Baa1	4.7	CT,NH,MA	50.7	9.2	1.49
FirstEnergy Corporation (ASE-FE)	14,764.0	67		36,117.0	12.86	BBB-	Baa3	1.6	OH,PA,NY,NJ,WV,MD	35.5	2.5	1.04
Great Plains Energy Incorporated (NYSE-GXP)	2,492.8	100		8,537.9	3.97	BBB+	Baa2	2.7	MO,KS	46.2	6.5	1.11
IDACORP, Inc. (NYSE-IDA)	1,287.7	100		3,934.2	3.10	BBB	Baa1	3.4	ID	53.0	10.9	1.55
MGE Energy, Inc. (NYSE-MGEE)	573.1	69	30	1,223.2	1.39	AA-	A1	6.5	WI	62.8	10.7	2.07
NorthWestern Corporation (NYSE-NWE)	1,181.4	71	24	3,843.2	2.60	BBB	A3	2.4	SD,MT,NE	43.6	11.6	1.71
OGE Energy Corp. (NYSE-OGE)	2,310.9	100		7,085.8	5.35	A-	A3	4.6	OK,AR	53.5	11.8	1.63
Otter Tail Corporation (NDQ-OTTR)	715.2	56		1,333.4	0.95	BBB	Baa2	3.5	MN,ND,SD	52.1	9.7	1.62
PG&E Corporation (NYSE-PCG)	17,363.0	80	20	45,010.0	25.04	BBB	Baa1	3.8	CA	48.8	8.9	1.56
Pinnacle West Capital Corp. (NYSE-PNW)	3,461.0	100		11,343.5	6.90	A-	Baa1	4.8	AZ	52.6	9.0	1.57
PNM Resources, Inc. (NYSE-PNM)	1,446.6	100		4,409.7	2.09	BBB	Baa3	2.4	NM,TX	43.0	7.0	1.20
Portland General Electric Company (NYSE-POR)	1,907.0	100		5,874.0	3.17	BBB	A3	2.3	OR	49.6	8.2	1.43
SCANA Corporation (NYSE-SCG)	4,692.0	55	19	12,591.0	7.54	BBB+	Baa3	3.4	SC,NC,GA	45.9	14.7	1.41
Westar Energy, Inc. (NYSE-WR)	2,564.0	100		8,232.3	4.93	BBB+	Baa1	2.8	KS	47.3	9.2	1.49
Xcel Energy Inc. (NYSE-XEL)	11,275.8	83	17	29,350.4	17.29	A-	A3	3.3	MN,WI,ND,SD,MI	44.0	9.1	1.68
Mean	6,418.9	82	18	17,305.8	10.8	BBB+	Baa1	3.8		46.8	9.5	1.56
Median	3,261.8	82	18	9,173.5	6.4	BBB+	Baa1	3.4		47.7	9.2	1.49

Data Source: AUS Utility Reports, October, 2015; Pre-Tax Interest Coverage and Primary Service Territory are from Value Line Investment Survey, 2015.

UNS Electric, Inc.*			NM	na	A3		AZ		NM

*Source: Confidential - UDR 2.01 UNSE FS 2014- Confidential; and UDR 2.5 Authorized and Earned ROE - Confidential.

Panel B

Bulkey Proxy Group

Company	Operating Revenue ($mil)	Percent Elec Revenue	Percent Gas Revenue	Net Plant ($mil)	Market Cap ($mil)	S&P Issuer Credit Rating	Moody's Long Term Rating	Pre-Tax Interest Coverage	Primary Service Area	Common Equity Ratio	Return on Equity	Market to Book Ratio
ALLETE, Inc. (NYSE-ALE)	1,222.9	82		3,451.5	2.38	BBB+	A3	3.9	MN, WI	56.1	8.6	1.34
American Electric Power Co. (NYSE-AEP)	16,978.0	81		45,013.0	26.99	BBB	Baa1	4.0	10 States	45.7	10.2	1.55
Duke Energy Corporation (NYSE-DUK)	23,608.0	90	2	71,759.0	47.53	A-	A3	3.4	NC,SC,FL,OH,KY	48.9	6.9	1.20
Empire District Electric Co. (NYSE-EDE)	637.2	91	7	1,945.9	0.95	BBB	Baa1	3.0	KS,MO,OK,AR	48.0	7.8	1.20
Eversource Energy (NYSE-ES)	8,104.1	87	13	19,079.2	15.14	A	Baa1	4.7	CT,NH,MA	50.7	9.2	1.49
Great Plains Energy Incorporated (NYSE-GXP)	2,492.8	100		8,537.9	3.97	BBB+	Baa2	2.7	MO,KS	46.2	6.5	1.11
IDACORP, Inc. (NYSE-IDA)	1,287.7	100		3,934.2	3.10	BBB	Baa1	3.4	ID	53.0	10.9	1.55
Otter Tail Corporation (NDQ-OTTR)	715.2	56		1,333.4	0.95	BBB	Baa2	3.5	MN,ND,SD	52.1	9.7	1.62
Pinnacle West Capital Corp. (NYSE-PNW)	3,461.0	100		11,343.5	6.90	A-	Baa1	4.8	AZ	52.6	9.0	1.57
PNM Resources, Inc. (NYSE-PNM)	1,446.6	100		4,409.7	2.09	BBB	Baa3	2.4	NM,TX	43.0	7.0	1.20
Portland General Electric Company (NYSE-POR)	1,907.0	100		5,874.0	3.17	BBB	A3	2.3	OR	49.6	8.2	1.43
Westar Energy, Inc. (NYSE-WR)	2,564.0	100		8,232.3	4.93	BBB+	Baa1	2.8	KS	47.3	9.2	1.49
Mean	5,368.7	91	7	15,409.5	9.8	BBB+/BBB	Baa1	3.4		49.4	8.6	1.40
Median	2,199.9	96	7	7,053.2	3.6	BBB+/BBB	Baa1	3.4		49.3	8.8	1.46

Data Source: AUS Utility Reports, October, 2015; Pre-Tax Interest Coverage and Primary Service Territory are from Value Line Investment Survey, 2015.

Exhibit JRW-4
UNS Electric, Inc.
Value Line Risk Metrics

Panel A
Electric Proxy Group

Company	Beta	Financial Strength	Safety	Earnings Predictability	Stock Price Stability
ALLETE, Inc. (NYSE-ALE)	0.80	A	2	80	95
Alliant Energy Corporation (NYSE-LNT)	0.80	A	2	75	100
Ameren Corporation (NYSE-AEE)	0.75	A	2	85	95
American Electric Power Co. (NYSE-AEP)	0.70	A	2	90	100
Avista Corporation (NYSE-AVA)	0.80	A	2	80	95
Black Hills Corporation (NYSE-BKH)	0.95	B++	2	40	80
CMS Energy Corporation (NYSE-CMS)	0.70	B++	2	75	100
Consolidated Edison, Inc. (NYSE-ED)	0.60	A+	1	85	100
Dominion Resources, Inc. (NYSE-D)	0.70	B++	2	80	100
Duke Energy Corporation (NYSE-DUK)	0.60	A	2	80	100
Edison International (NYSE-EIX)	0.70	A	2	65	95
El Paso Electric Company (NYSE-EE)	0.75	B++	2	85	90
Empire District Electric Co. (NYSE-EDE)	0.70	B++	2	85	90
Entergy Corporation (NYSE-ETR)	0.65	B++	3	80	95
Eversource Energy (NYSE-ES)	0.75	A	1	85	100
FirstEnergy Corporation (ASE-FE)	0.65	B+	3	50	90
Great Plains Energy Incorporated (NYSE-GXP)	0.85	B+	3	70	95
IDACORP, Inc. (NYSE-IDA)	0.80	B++	2	95	95
MGE Energy, Inc. (NYSE-MGEE)	0.75	A	1	95	95
NorthWestern Corporation (NYSE-NWE)	0.70	B+	3	95	100
OGE Energy Corp. (NYSE-OGE)	0.90	A+	1	95	90
Otter Tail Corporation (NDQ-OTTR)	0.85	B+	3	50	85
PG&E Corporation (NYSE-PCG)	0.65	B+	3	60	95
Pinnacle West Capital Corp. (NYSE-PNW)	0.75	A+	1	70	100
PNM Resources, Inc. (NYSE-PNM)	0.85	B	3	30	85
Portland General Electric Company (NYSE-POR	0.80	B++	2	70	100
SCANA Corporation (NYSE-SCG)	0.75	B++	2	100	100
Westar Energy, Inc. (NYSE-WR)	0.75	B++	2	90	100
Xcel Energy Inc. (NYSE-XEL)	0.65	A	1	100	100
Mean	0.75	B++	2.0	77	95

Data Source: *Value Line Investment Survey*, 2015.

Panel B
Bulkey Proxy Group

Company	Beta	Financial Strength	Safety	Earnings Predictability	Stock Price Stability
ALLETE, Inc. (NYSE-ALE)	0.80	A	2	80	95
American Electric Power Co. (NYSE-AEP)	0.70	A	2	90	100
Duke Energy Corporation (NYSE-DUK)	0.60	A	2	80	100
Empire District Electric Co. (NYSE-EDE)	0.70	B++	2	85	90
Eversource Energy (NYSE-ES)	0.75	A	1	85	100
Great Plains Energy Incorporated (NYSE-GXP)	0.85	B+	3	70	95
IDACORP, Inc. (NYSE-IDA)	0.80	B++	2	95	95
Otter Tail Corporation (NDQ-OTTR)	0.85	B+	3	50	85
Pinnacle West Capital Corp. (NYSE-PNW)	0.75	A+	1	70	100
PNM Resources, Inc. (NYSE-PNM)	0.85	B	3	30	85
Portland General Electric Company (NYSE-POR	0.80	B++	2	70	100
Westar Energy, Inc. (NYSE-WR)	0.75	B++	2	90	100
Mean	0.77	B++	2.1	75	95

Exhibit JRW-5
UNS Electric, Inc.
Recommended Cost of Capital

Panel A - UNSE's Proposed Capitalization

Capital Source	Capitalization Ratio	Cost Rate
Short-Term Debt	0.00%	
Long-Term Debt	47.17%	4.66%
Common Equity	52.83%	
Total	100.00%	

Panel B - Fortis Inc. 2014 Capitalization

Capital Source	Capitalization Amount	Capitalization Ratio
Short-Term Debt	$ 713.0	3.6%
Long-Term Debt	$ 10,544.0	52.9%
Common Equity	$ 8,691.0	43.6%
Total	$ 19,948.0	100.00%

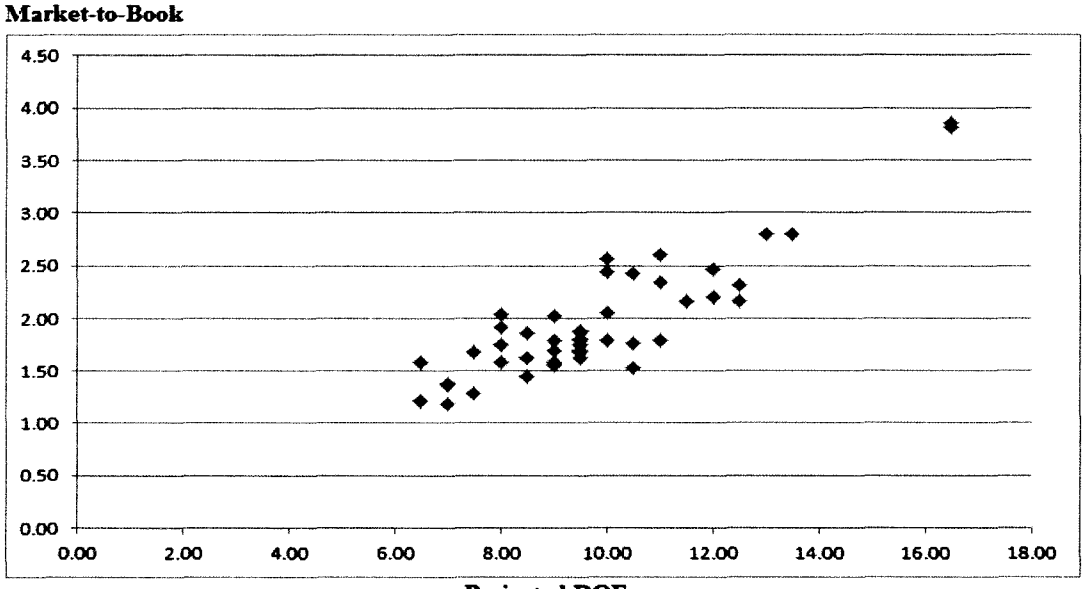
Source: Fortis Inc., *Value Line Investment Survey*, July 17, 2015.

Panel C - TASC's Proposed Capitalization - Capital Structure Ratios from Investor-Provided Capital

Capital Source	Adjustment Factor*	Capitalization Ratio	Cost Rate
Short-Term Debt	0.00%	0.00%	
Long-Term Debt	106.00%	50.00%	4.66%
Common Equity	94.64%	50.00%	
Total		100.00%	

* Adjustment is to short-term and long-term debt and common equity ratios to provide a 50% debt and 50% equity capital structure.

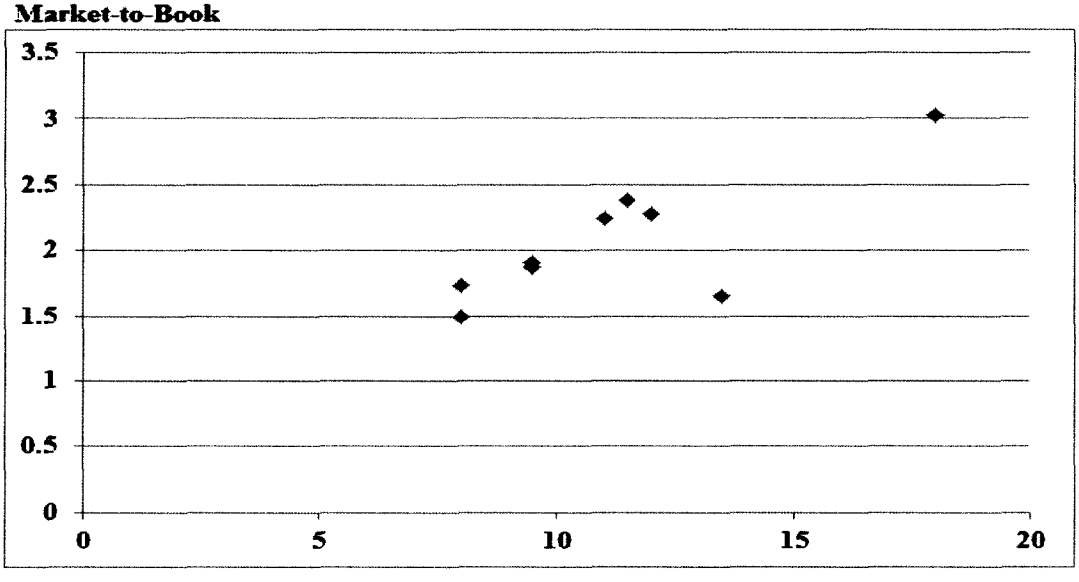
Exhibit JRW-6
Electric Utilities
Panel A



Value Line Investment Survey, 2015

R-Square = .78, N=46

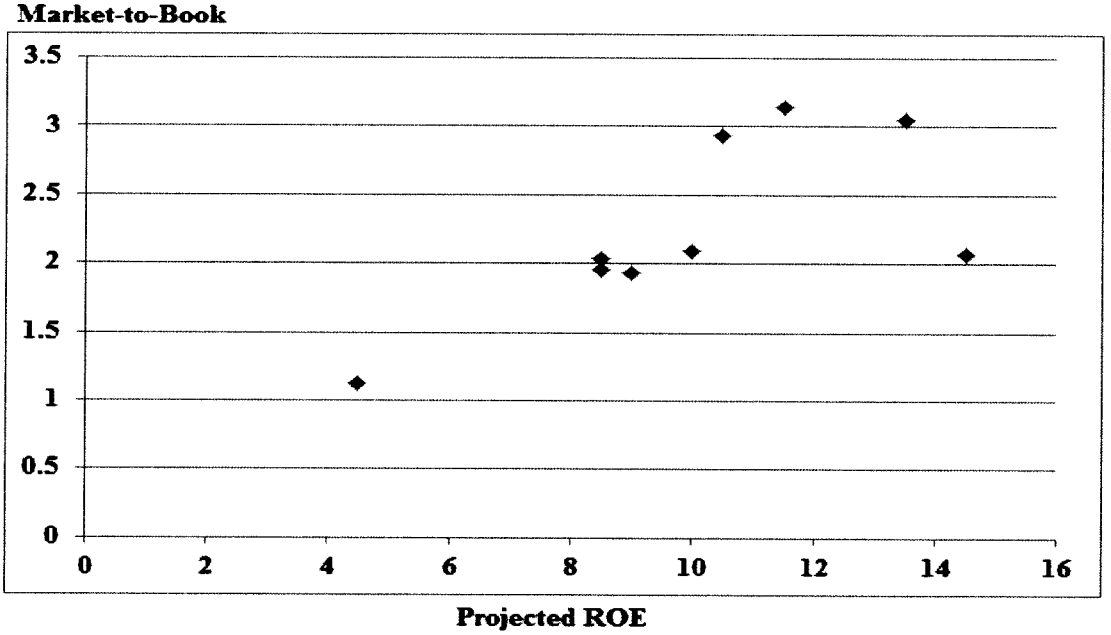
Panel B
Gas Companies



Value Line Investment Survey, 2015

R-Square = .63, N=9

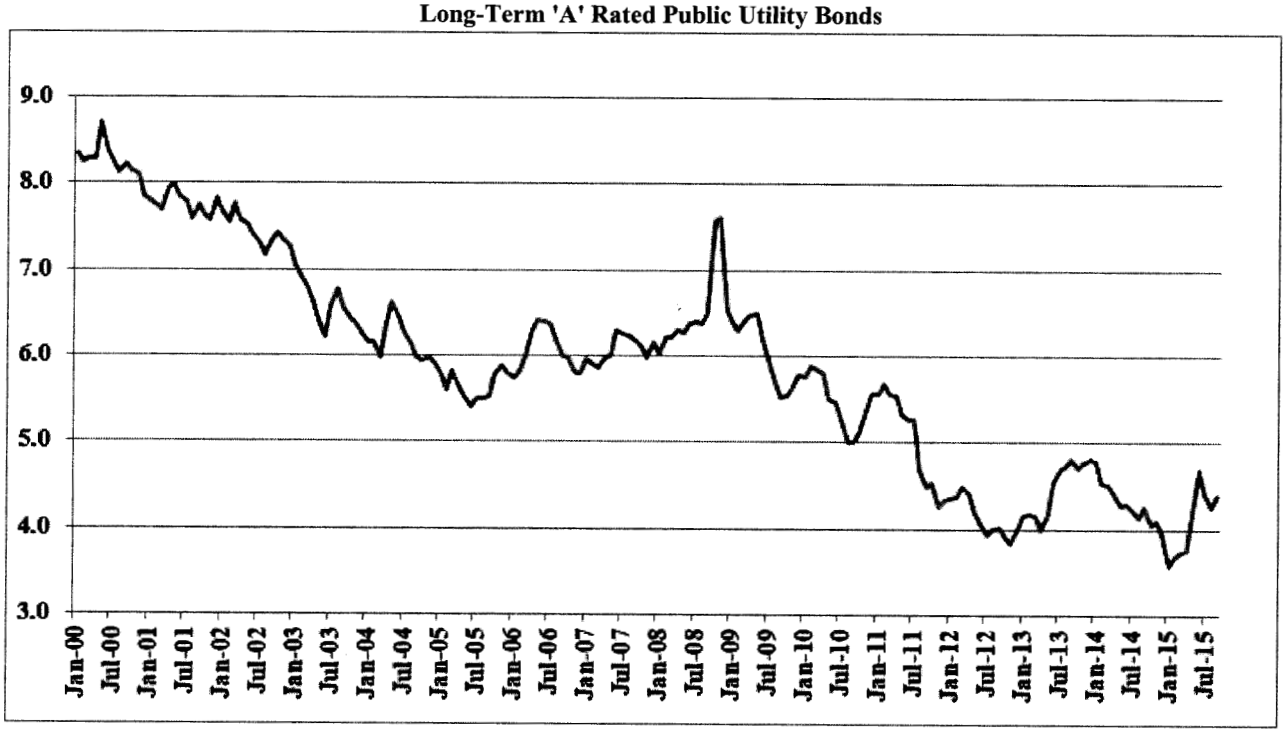
Exhibit JRW-6
Water Companies
Panel C



Value Line Investment Survey, 2015

R-Square = .49, N=9

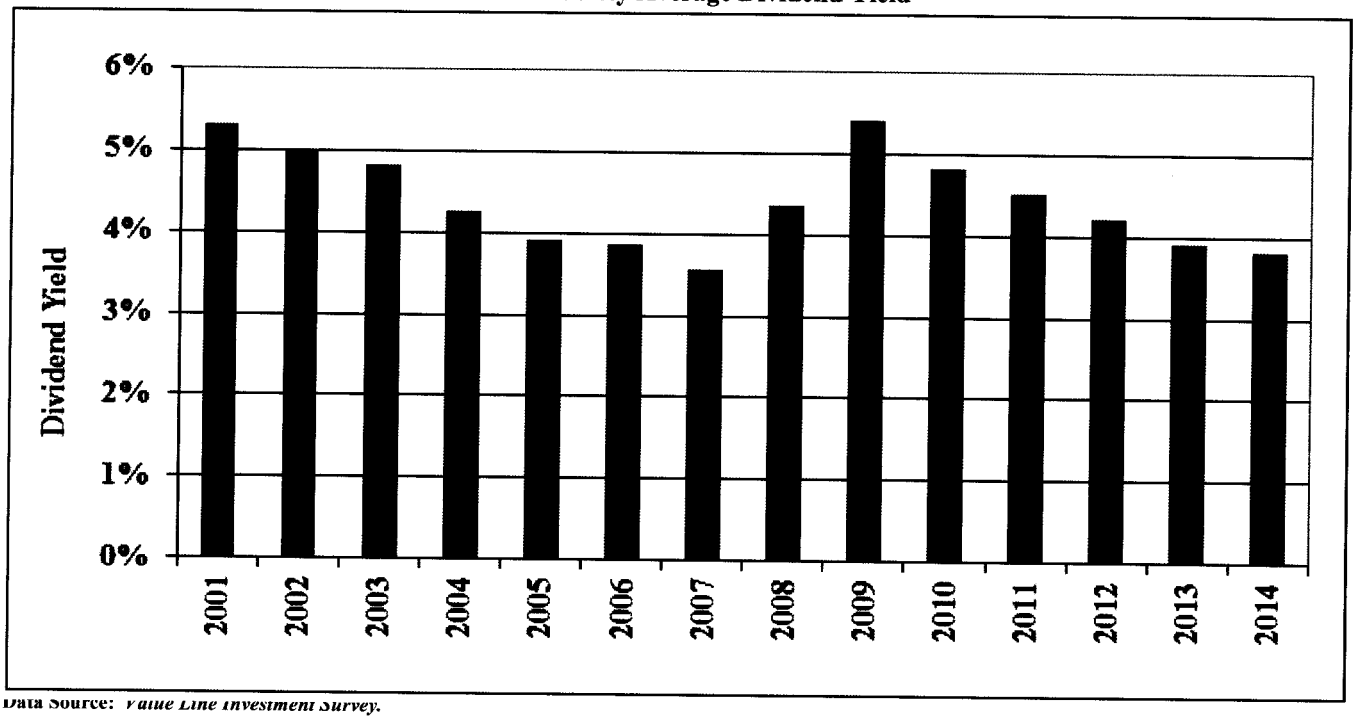
Exhibit JRW-7
Long-Term 'A' Rated Public Utility Bonds



Data Source: Mergent Bond Record

Exhibit JRW-7

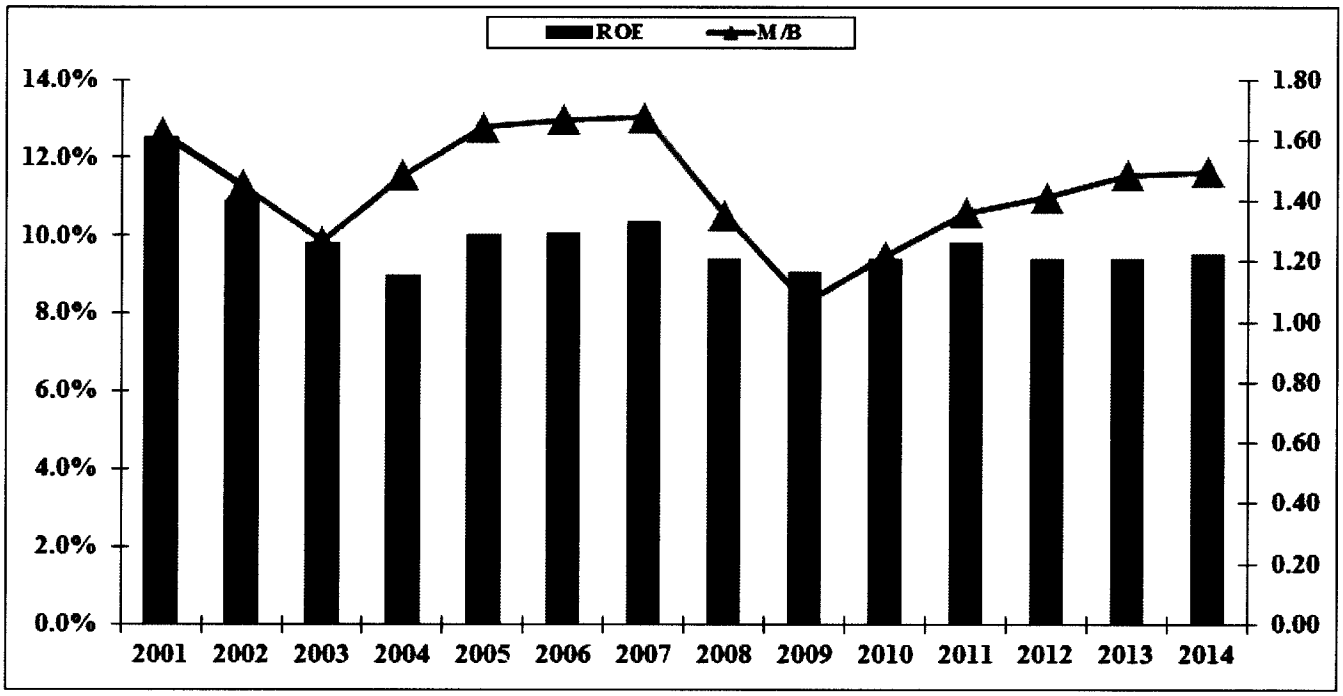
Electric Utility Average Dividend Yield



Data Source: *Value Line Investment Survey.*

Exhibit JRW-7

Electric Utility Average Return on Equity and Market-to-Book Ratios



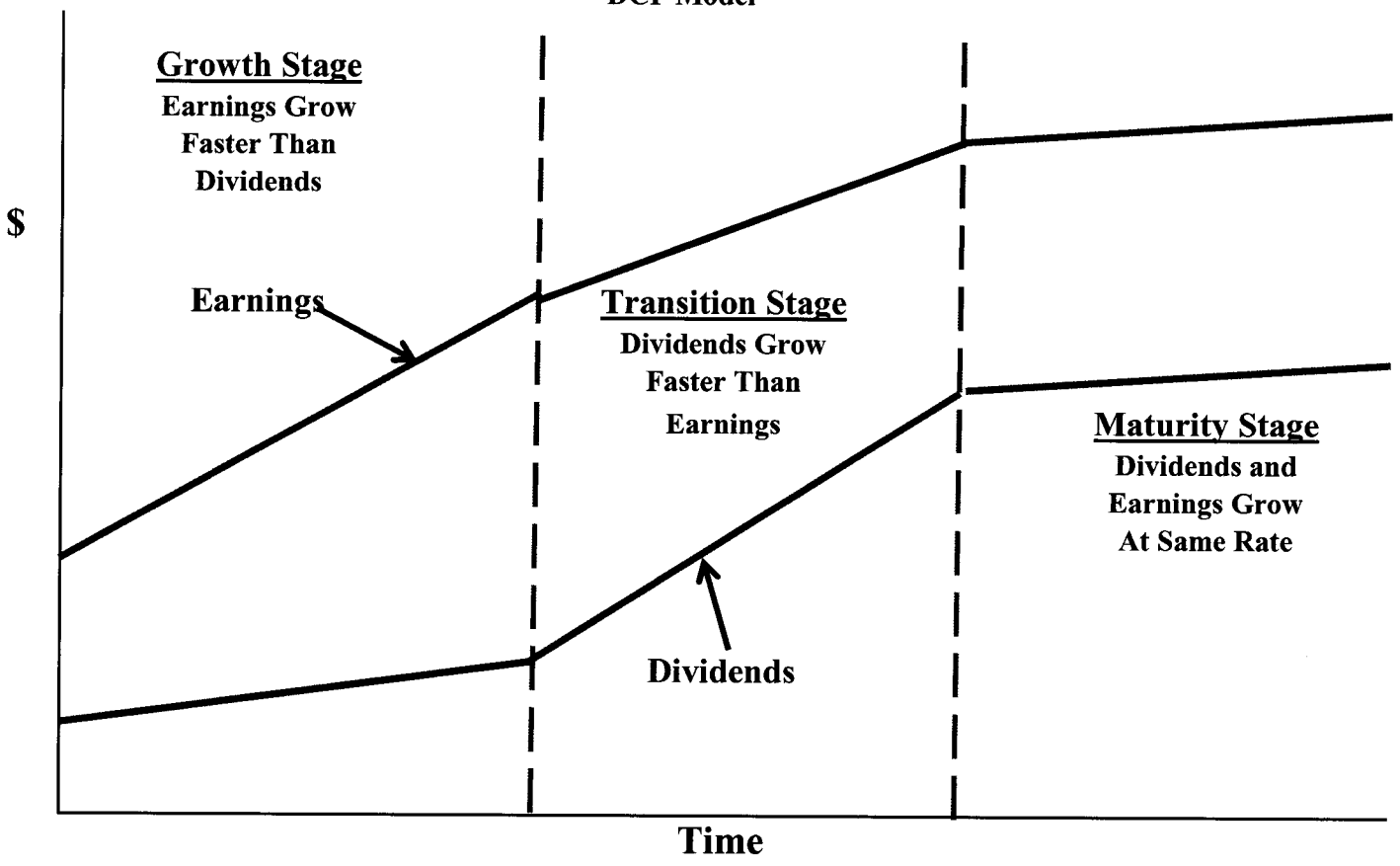
Data Source: *Value Line Investment Survey.*

Exhibit JRW-8

Industry Average Betas

Industry Name	Beta	Industry Name	Beta	Industry Name	Beta
Homebuilding	1.47	Chemical (Basic)	1.17	Retail Building Supply	1.01
Heavy Truck & Equip	1.44	Diversified Co.	1.16	Investment Co.(Foreign)	1.01
Metals & Mining (Div.)	1.43	Educational Services	1.16	Toiletries/Cosmetics	1.01
Petroleum (Producing)	1.38	Advertising	1.16	Med Supp Non-Invasive	1.00
Oilfield Svcs/Equip.	1.38	Automotive	1.16	Shoe	0.98
Steel	1.38	Computers/Peripherals	1.15	Retail Automotive	0.98
Metal Fabricating	1.37	Trucking	1.15	Retail (Softlines)	0.98
Auto Parts	1.37	Financial Svcs. (Div.)	1.15	Telecom. Utility	0.96
Building Materials	1.33	Entertainment Tech	1.14	R.E.I.T.	0.95
Maritime	1.33	Retail (Hardlines)	1.13	Information Services	0.95
Hotel/Gaming	1.30	Publishing	1.12	Med Supp Invasive	0.95
Electrical Equipment	1.29	Internet	1.12	Drug	0.94
Semiconductor Equip	1.28	Entertainment	1.12	Precious Metals	0.93
Semiconductor	1.28	Apparel	1.12	Environmental	0.93
Insurance (Life)	1.27	Newspaper	1.12	Restaurant	0.92
Public/Private Equity	1.27	Wireless Networking	1.10	Thrift	0.92
Engineering & Const	1.27	Industrial Services	1.09	Funeral Services	0.92
Railroad	1.27	Bank	1.09	Pharmacy Services	0.91
Human Resources	1.25	Computer Software	1.09	Retail Store	0.89
Natural Gas (Div.)	1.25	Recreation	1.09	Beverage	0.87
Chemical (Diversified)	1.24	Biotechnology	1.08	Reinsurance	0.86
Chemical (Specialty)	1.23	Paper/Forest Products	1.07	Pipeline MLPs	0.85
Power	1.23	Bank (Midwest)	1.06	Insurance (Prop/Cas.)	0.85
Petroleum (Integrated)	1.23	Oil/Gas Distribution	1.06	Household Products	0.84
Electronics	1.21	Medical Services	1.05	Food Processing	0.84
Machinery	1.21	Telecom. Services	1.05	Investment Co.	0.80
Precision Instrument	1.21	Healthcare Information	1.04	Natural Gas Utility	0.80
Coal	1.21	Air Transport	1.04	Retail/Wholesale Food	0.78
Telecom. Equipment	1.19	IT Services	1.04	Electric Utility (West)	0.77
Securities Brokerage	1.19	Foreign Electronics	1.02	Tobacco	0.77
Furn/Home Furnishings	1.19	Aerospace/Defense	1.02	Electric Util. (Central)	0.76
Office Equip/Supplies	1.19	Cable TV	1.02	Water Utility	0.73
E-Commerce	1.18	Packaging & Container	1.02	Electric Utility (East)	0.68

Exhibit JRW-9
DCF Model



Source: William F. Sharpe, Gordon J. Alexander, and Jeffrey V. Bailey, Investments (Prentice-Hall, 1995), pp. 590-91.

Exhibit JRW-9
DCF Model
Consensus Earnings Estimates
Alliant Energy Corp. (LNT)
www.reuters.com
10/1/2015

Line	Date	# of Estimates	Mean	High	Low
1	Quarter Ending Dec-15	4	0.53	0.63	0.41
2	Quarter Ending Mar-16	1	0.94	0.94	0.94
3	Year Ending Dec-15	10	3.63	3.68	3.60
4	Year Ending Dec-16	10	3.83	3.91	3.75
5	LT Growth Rate (%)	2	5.75	6.00	5.50

Exhibit JRW-10

UNS Electric, Inc.
Discounted Cash Flow Analysis

Panel A
Electric Proxy Group

Dividend Yield*	3.85%
Adjustment Factor	1.0238
Adjusted Dividend Yield	3.9%
Growth Rate**	4.75%
Equity Cost Rate	8.70%

* Page 2 of Exhibit JRW-10

** Based on data provided on pages 3, 4, 5, and 6 of Exhibit JRW-10

Panel B
Bulkey Proxy Group

Dividend Yield*	3.90%
Adjustment Factor	1.0250
Adjusted Dividend Yield	4.00%
Growth Rate**	5.00%
Equity Cost Rate	9.00%

* Page 2 of Exhibit JRW-10

** Based on data provided on pages 3, 4, 5, and 6 of Exhibit JRW-10

Exhibit JRW-10
UNS Electric, Inc.
Monthly Dividend Yields

Panel A
Electric Proxy Group

Company	Annual Dividend	Dividend Yield 30 Day	Dividend Yield 90 Day	Dividend Yield 180 Day
ALLETE, Inc. (NYSE-ALE)	$ 2.02	4.2%	4.2%	4.0%
Alliant Energy Corporation (NYSE-LNT)	$ 2.20	3.9%	3.8%	3.6%
Ameren Corporation (NYSE-AEE)	$ 1.64	4.1%	4.2%	4.1%
American Electric Power Co. (NYSE-AEP)	$ 2.12	3.9%	3.9%	3.8%
Avista Corporation (NYSE-AVA)	$ 1.32	4.2%	4.2%	4.1%
Black Hills Corporation (NYSE-BKH)	$ 1.62	4.1%	3.9%	3.6%
CMS Energy Corporation (NYSE-CMS)	$ 1.16	3.5%	3.5%	3.4%
Consolidated Edison, Inc. (NYSE-ED)	$ 2.60	4.1%	4.2%	4.2%
Dominion Resources, Inc. (NYSE-D)	$ 2.59	3.7%	3.7%	3.7%
Duke Energy Corporation (NYSE-DUK)	$ 3.30	4.7%	4.6%	4.4%
Edison International (NYSE-EIX)	$ 1.67	2.8%	2.9%	2.8%
El Paso Electric Company (NYSE-EE)	$ 1.18	3.3%	3.3%	3.3%
Empire District Electric Co. (NYSE-EDE)	$ 1.04	4.8%	4.7%	4.4%
Entergy Corporation (NYSE-ETR)	$ 3.32	5.2%	4.8%	4.5%
Eversource Energy (NYSE-ES)	$ 1.67	3.5%	3.5%	3.4%
FirstEnergy Corporation (ASE-FE)	$ 1.44	4.6%	4.4%	4.2%
Great Plains Energy Incorporated (NYSE-GXP)	$ 0.98	3.9%	3.9%	3.8%
IDACORP, Inc. (NYSE-IDA)	$ 1.88	3.1%	3.2%	3.1%
MGE Energy, Inc. (NYSE-MGEE)	$ 1.18	3.0%	3.0%	2.9%
Northwestern Corp. (NYSE-NWE)	$ 1.92	3.7%	3.8%	3.7%
OGE Energy Corp. (NYSE-OGE)	$ 1.10	4.0%	3.8%	3.6%
Otter Tail Corporation (NDQ-OTTR)	$ 1.23	4.8%	4.7%	4.3%
PG&E Corporation (NYSE-PCG)	$ 1.82	3.6%	3.6%	3.5%
Pinnacle West Capital Corp. (NYSE-PNW)	$ 2.38	3.9%	4.0%	3.9%
PNM Resources, Inc. (NYSE-PNM)	$ 0.80	3.1%	3.1%	3.0%
Portland General Electric Company (NYSE-POR)	$ 1.20	3.4%	3.5%	3.4%
SCANA Corporation (NYSE-SCG)	$ 2.18	4.1%	4.2%	4.1%
Westar Energy, Inc. (NYSE-WR)	$ 1.44	3.9%	4.0%	3.9%
Xcel Energy Inc. (NYSE-XEL)	$ 1.28	3.8%	3.8%	3.8%
Mean		3.9%	3.9%	3.7%
Median		3.9%	3.9%	3.8%

Data Sources: http://quote.yahoo.com, October, 2015.

Panel B
Bulkey Proxy Group

	Annual	Dividend Yield	Dividend Yield	Dividend Yield
ALLETE, Inc. (NYSE-ALE)	$ 2.02	4.2%	4.2%	4.0%
American Electric Power Co. (NYSE-AEP)	$ 2.12	3.9%	3.9%	3.8%
Duke Energy Corporation (NYSE-DUK)	$ 3.30	4.7%	4.6%	4.4%
Empire District Electric Co. (NYSE-EDE)	$ 1.04	4.8%	4.7%	4.4%
Eversource Energy (NYSE-ES)	$ 1.67	3.5%	3.5%	3.4%
Great Plains Energy Incorporated (NYSE-GXP)	$ 0.98	3.9%	3.9%	3.8%
IDACORP, Inc. (NYSE-IDA)	$ 1.88	3.1%	3.2%	3.1%
Otter Tail Corporation (NDQ-OTTR)	$ 1.23	4.8%	4.7%	4.3%
Pinnacle West Capital Corp. (NYSE-PNW)	$ 2.38	3.9%	4.0%	3.9%
PNM Resources, Inc. (NYSE-PNM)	$ 0.80	3.1%	3.1%	3.0%
Portland General Electric Company (NYSE-POR)	$ 1.20	3.4%	3.5%	3.4%
Westar Energy, Inc. (NYSE-WR)	$ 1.44	3.9%	4.0%	3.9%
Mean		3.9%	3.9%	3.8%
Median		3.9%	3.9%	3.8%

Data Sources: http://quote.yahoo.com, October, 2015.

Exhibit JRW-10

UNS Electric, Inc.
DCF Equity Cost Growth Rate Measures
Value Line Historic Growth Rates

Panel A
Electric Proxy Group

Company	*Value Line* Historic Growth					
	Past 10 Years			Past 5 Years		
	Earnings	Dividends	Book Value	Earnings	Dividends	Book Value
ALLETE, Inc. (NYSE-ALE)	7.0	nmf	4.5	1.0	2.0	5.0
Alliant Energy Corporation (NYSE-LNT)	8.0	3.5	3.5	6.5	6.5	3.5
Ameren Corporation (NYSE-AEE)	-2.0	-4.5		-4.5	-6.0	-3.5
American Electric Power Co. (NYSE-AEP)	1.5	0.5	4.5	1.5	4.0	4.5
Avista Corporation (NYSE-AVA)	7.5	9.5	4.0	6.5	11.5	4.0
Black Hills Corporation (NYSE-BKH)	2.5	2.5	3.5	7.5	1.5	2.0
CMS Energy Corporation (NYSE-CMS)			3.0	12.0	23.5	4.0
Consolidated Edison, Inc. (NYSE-ED)	3.5	1.0	4.0	2.5	1.0	3.5
Dominion Resources, Inc. (NYSE-D)	3.0	5.5	1.5	2.5	7.0	2.0
Duke Energy Corporation (NYSE-DUK)				3.5	2.5	3.0
Edison International (NYSE-EIX)	10.0		6.5	4.5	2.5	2.0
El Paso Electric Company (NYSE-EE)	13.5		8.5	6.5		8.0
Empire District Electric Co. (NYSE-EDE)	2.5	-2.5	1.5	5.0	-4.5	2.0
Entergy Corporation (NYSE-ETR)	4.0	7.5	4.0	-1.5	3.0	4.5
Eversource Energy (NYSE-ES)	8.0	9.5	5.5	5.5	11.5	9.5
FirstEnergy Corporation (ASE-FE)	-1.5	0.5	2.0	-13.0	-4.0	1.5
Great Plains Energy Incorporated (NYSE-GXP)	-4.0	-6.0	4.5	2.5	-8.5	2.5
IDACORP, Inc. (NYSE-IDA)	9.0		5.0	10.0	5.5	6.0
MGE Energy, Inc. (NYSE-MGEE)	6.5	2.0	6.0	7.0	2.5	5.5
Northwestern Corp. (NYSE-NWE)			3.5	8.0	3.0	5.5
OGE Energy Corp. (NYSE-OGE)	8.5	2.5	8.5	8.0	4.5	9.0
Otter Tail Corporation (NDQ-OTTR)	-2.0	1.0	1.0	2.0		-4.5
PG&E Corporation (NYSE-PCG)	14.5		9.0	-5.0	3.0	4.0
Pinnacle West Capital Corp. (NYSE-PNW)	3.5	3.5	2.0	8.0	3.0	2.0
PNM Resources, Inc. (NYSE-PNM)	-2.5	0.5	1.5	8.0	-6.0	-1.0
Portland General Electric Company (NYSE-POR)				3.0	2.5	2.0
SCANA Corporation (NYSE-SCG)	3.0	4.0	5.0	4.0	2.0	5.0
Westar Energy, Inc. (NYSE-WR)	6.5	3.5	5.0	9.0	3.5	3.5
Xcel Energy Inc. (NYSE-XEL)	7.0	2.5	4.5	6.0	3.5	4.5
Mean	4.7	2.3	4.3	4.0	3.0	3.4
Median	4.0	2.5	4.3	5.0	3.0	3.5
Data Source: *Value Line Investment Survey.*	Average of Median Figures =			3.7		

Panel B
Bulkey Proxy Group

Company	*Value Line* Historic Growth					
	Past 10 Years			Past 5 Years		
	Earnings	Dividends	Book Value	Earnings	Dividends	Book Value
ALLETE, Inc. (NYSE-ALE)	7.0	nmf	4.5	1.0	2.0	5.0
American Electric Power Co. (NYSE-AEP)	1.5	0.5	4.5	1.5	4.0	4.5
Duke Energy Corporation (NYSE-DUK)				3.5	2.5	3.0
Empire District Electric Co. (NYSE-EDE)	2.5	-2.5	1.5	5.0	-4.5	2.0
Eversource Energy (NYSE-ES)	8.0	9.5	5.5	5.5	11.5	9.5
Great Plains Energy Incorporated (NYSE-GXP)	-4.0	-6.0	4.5	2.5	-8.5	2.5
IDACORP, Inc. (NYSE-IDA)	9.0		5.0	10.0	5.5	6.0
Otter Tail Corporation (NDQ-OTTR)	-2.0	1.0	1.0	2.0		-4.5
Pinnacle West Capital Corp. (NYSE-PNW)	3.5	3.5	2.0	8.0	3.0	2.0
PNM Resources, Inc. (NYSE-PNM)	-2.5	0.5	1.5	8.0	-6.0	-1.0
Portland General Electric Company (NYSE-POR)				3.0	2.5	2.0
Westar Energy, Inc. (NYSE-WR)	6.5	3.5	5.0	9.0	3.5	3.5
Mean	3.0	1.3	3.5	4.9	1.4	2.9
Median	3.0	0.8	4.5	4.3	2.5	2.8
Data Source: *Value Line Investment Survey.*	Average of Median Figures =			3.0		

Exhibit JRW-10

UNS Electric, Inc.
DCF Equity Cost Growth Rate Measures
***Value Line* Projected Growth Rates**

Panel A
Electric Proxy Group

Company	*Value Line* Projected Growth Est'd. '12-'14 to '18-'20			*Value Line* Sustainable Growth		
	Earnings	Dividends	Book Value	Return on Equity	Retention Rate	Internal Growth
ALLETE, Inc. (NYSE-ALE)	6.5	4.0	4.5	9.0%	39.0%	3.5%
Alliant Energy Corporation (NYSE-LNT)	6.0	4.5	4.0	11.5%	37.0%	4.3%
Ameren Corporation (NYSE-AEE)	7.0	3.5	3.5	10.5%	44.0%	4.6%
American Electric Power Co. (NYSE-AEP)	5.0	5.0	4.0	10.0%	34.0%	3.4%
Avista Corporation (NYSE-AVA)	5.0	4.0	3.5	8.5%	35.0%	3.0%
Black Hills Corporation (NYSE-BKH)	4.5	4.0	3.5	8.5%	40.0%	3.4%
CMS Energy Corporation (NYSE-CMS)	5.5	6.5	5.5	13.5%	38.0%	5.1%
Consolidated Edison, Inc. (NYSE-ED)	3.0	2.5	3.5	9.0%	36.0%	3.2%
Dominion Resources, Inc. (NYSE-D)	8.0	7.5	6.5	17.5%	28.0%	4.9%
Duke Energy Corporation (NYSE-DUK)	5.0	3.5	1.5	8.5%	30.0%	2.6%
Edison International (NYSE-EIX)	3.0	10.0	6.5	11.5%	48.0%	5.5%
El Paso Electric Company (NYSE-EE)	3.5	5.0	4.5	9.5%	50.0%	4.8%
Empire District Electric Co. (NYSE-EDE)	3.0	3.0	2.5	9.0%	33.0%	3.0%
Entergy Corporation (NYSE-ETR)	0.0	2.5	3.0	8.5%	31.0%	2.6%
Eversource Energy (NYSE-ES)	8.5	6.5	4.0	10.0%	44.0%	4.4%
FirstEnergy Corporation (ASE-FE)	7.0	-1.5	3.0	8.5%	48.0%	4.1%
Great Plains Energy Incorporated (NYSE-GXP)	5.0	6.0	3.0	7.5%	39.0%	2.9%
IDACORP, Inc. (NYSE-IDA)	1.0	6.0	4.0	8.5%	42.0%	3.6%
MGE Energy, Inc. (NYSE-MGEE)	7.0	4.0	6.0	13.0%	58.0%	7.5%
NorthWestern Corporation (NYSE-NWE)	6.5	6.5	5.5	10.0%	42.0%	4.2%
OGE Energy Corp. (NYSE-OGE)	3.0	10.0	5.0	11.5%	32.0%	3.7%
Otter Tail Corporation (NDQ-OTTR)	9.0	1.5	3.5	12.5%	41.0%	5.1%
PG&E Corporation (NYSE-PCG)	10.5	3.0	5.0	10.0%	49.0%	4.9%
Pinnacle West Capital Corp. (NYSE-PNW)	4.0	3.5	3.5	9.5%	36.0%	3.4%
PNM Resources, Inc. (NYSE-PNM)	9.0	10.0	3.5	9.5%	51.0%	4.8%
Portland General Electric Company (NYSE-POR)	6.0	5.5	4.5	9.5%	47.0%	4.5%
SCANA Corporation (NYSE-SCG)	4.5	3.5	5.5	9.5%	44.0%	4.2%
Westar Energy, Inc. (NYSE-WR)	6.0	3.0	5.0	9.5%	45.0%	4.3%
Xcel Energy Inc. (NYSE-XEL)	4.5	6.0	4.5	10.5%	38.0%	4.0%
Mean	5.4	4.8	4.2	10.2%	40.7%	4.1%
Median	5.0	4.0	4.0	9.5%	40.0%	4.2%
Average of Median Figures =		4.3			Median =	4.2%

Data Source: *Value Line Investment Survey.*

Panel B
Bulkey Proxy Group

Company	*Value Line* Projected Growth Est'd. '12-'14 to '18-'20			*Value Line* Sustainable Growth		
	Earnings	Dividends	Book Value	Return on Equity	Retention Rate	Internal Growth
ALLETE, Inc. (NYSE-ALE)	6.5	4.0	4.5	9.0%	39.0%	3.5%
American Electric Power Co. (NYSE-AEP)	5.0	5.0	4.0	10.0%	34.0%	3.4%
Duke Energy Corporation (NYSE-DUK)	5.0	3.5	1.5	8.5%	30.0%	2.6%
Empire District Electric Co. (NYSE-EDE)	3.0	3.0	2.5	9.0%	33.0%	3.0%
Eversource Energy (NYSE-ES)	8.5	6.5	4.0	10.0%	44.0%	4.4%
Great Plains Energy Incorporated (NYSE-GXP)	5.0	6.0	3.0	7.5%	39.0%	2.9%
IDACORP, Inc. (NYSE-IDA)	1.0	6.0	4.0	8.5%	42.0%	3.6%
Otter Tail Corporation (NDQ-OTTR)	9.0	1.5	3.5	12.5%	41.0%	5.1%
Pinnacle West Capital Corp. (NYSE-PNW)	4.0	3.5	3.5	9.5%	36.0%	3.4%
PNM Resources, Inc. (NYSE-PNM)	9.0	10.0	3.5	9.5%	51.0%	4.8%
Portland General Electric Company (NYSE-POR)	6.0	5.5	4.5	9.5%	47.0%	4.5%
Westar Energy, Inc. (NYSE-WR)	6.0	3.0	5.0	9.5%	45.0%	4.3%
Mean	5.7	4.8	3.6	9.4%	40.1%	3.8%
Median	5.5	4.5	3.8	9.5%	40.0%	3.5%
Average of Median Figures =		4.6			Median =	3.5%

Data Source: *Value Line Investment Survey.*

Exhibit JRW-10

UNS Electric, Inc.
DCF Equity Cost Growth Rate Measures
Analysts Projected EPS Growth Rate Estimates

Panel A
Electric Proxy Group

Company	Yahoo	Reuters	Zacks	Mean
ALLETE, Inc. (NYSE-ALE)	6.0%	NA	NA	6.0%
Alliant Energy Corporation (NYSE-LNT)	5.8%	5.8%	5.3%	5.6%
Ameren Corporation (NYSE-AEE)	4.6%	4.6%	4.9%	4.7%
American Electric Power Co. (NYSE-AEP)	6.3%	6.3%	6.8%	6.4%
Avista Corporation (NYSE-AVA)	5.0%	NA	NA	5.0%
Black Hills Corporation (NYSE-BKH)	3.5%	NA	NA	3.5%
CMS Energy Corporation (NYSE-CMS)	6.8%	6.8%	6.2%	6.6%
Consolidated Edison, Inc. (NYSE-ED)	2.7%	2.7%	2.7%	2.7%
Dominion Resources, Inc. (NYSE-D)	5.4%	5.4%	6.3%	5.7%
Duke Energy Corporation (NYSE-DUK)	4.3%	4.3%	4.7%	4.5%
Edison International (NYSE-EIX)	2.4%	2.4%	4.7%	3.2%
El Paso Electric Company (NYSE-EE)	7.0%	NA	6.7%	6.9%
Empire District Electric Co. (NYSE-EDE)	3.0%	NA	5.0%	4.0%
Entergy Corporation (NYSE-ETR)	-2.1%	-2.1%	-4.6%	-3.0%
Eversource Energy (NYSE-ES)	6.3%	6.2%	6.8%	6.4%
FirstEnergy Corporation (ASE-FE)	0.9%	0.9%	NA	0.9%
Great Plains Energy Incorporated (NYSE-GXP)	6.4%	6.4%	6.1%	6.3%
IDACORP, Inc. (NYSE-IDA)	4.0%	4.0%	4.0%	4.0%
MGE Energy, Inc. (NYSE-MGEE)	4.0%	NA	NA	4.0%
NorthWestern Corporation (NYSE-NWE)	5.3%	5.3%	5.0%	5.2%
OGE Energy Corp. (NYSE-OGE)	3.3%	3.3%	5.0%	3.9%
Otter Tail Corporation (NDQ-OTTR)	6.0%	NA	NA	6.0%
PG&E Corporation (NYSE-PCG)	5.9%	5.9%	4.9%	5.5%
Pinnacle West Capital Corp. (NYSE-PNW)	5.4%	5.4%	5.2%	5.3%
PNM Resources, Inc. (NYSE-PNM)	8.6%	8.6%	8.0%	8.4%
Portland General Electric Company (NYSE-POR)	4.1%	4.1%	4.3%	4.1%
SCANA Corporation (NYSE-SCG)	4.3%	4.3%	4.2%	4.3%
Westar Energy, Inc. (NYSE-WR)	3.4%	3.4%	3.9%	3.6%
Xcel Energy Inc. (NYSE-XEL)	4.7%	4.7%	5.0%	4.8%
Mean	4.6%	4.5%	4.8%	4.6%
Median	4.7%	4.7%	5.0%	4.8%

Data Sources: www.reuters.com, www.zacks.com, http://quote.yahoo.com, October, 2015.

Panel B
Bulkey Proxy Group

Company	Yahoo	Reuters	Zacks	Mean
ALLETE, Inc. (NYSE-ALE)	6.0%	NA	NA	6.0%
American Electric Power Co. (NYSE-AEP)	6.3%	6.3%	6.8%	6.4%
Avista Corporation (NYSE-AVA)	5.0%	NA	NA	5.0%
Duke Energy Corporation (NYSE-DUK)	4.3%	4.3%	4.7%	4.5%
Empire District Electric Co. (NYSE-EDE)	3.0%	NA	5.0%	4.0%
Eversource Energy (NYSE-ES)	6.3%	6.2%	6.8%	6.4%
Great Plains Energy Incorporated (NYSE-GXP)	6.4%	6.4%	6.1%	6.3%
IDACORP, Inc. (NYSE-IDA)	4.0%	4.0%	4.0%	4.0%
Otter Tail Corporation (NDQ-OTTR)	6.0%	NA	NA	6.0%
Pinnacle West Capital Corp. (NYSE-PNW)	5.4%	5.4%	5.2%	5.3%
Portland General Electric Company (NYSE-POR)	4.1%	4.1%	4.3%	4.1%
Westar Energy, Inc. (NYSE-WR)	3.4%	3.4%	3.9%	3.6%
Mean	5.0%	5.0%	5.2%	5.1%
Median	5.2%	4.9%	5.0%	5.2%

Data Sources: www.reuters.com, www.zacks.com, http://quote.yahoo.com, October, 2015.

Exhibit JRW-10

UNS Electric, Inc.
DCF Growth Rate Indicators

Electric and Bulkey Proxy Groups

Growth Rate Indicator	Electric Proxy Group	Bulkey Proxy Group
Historic *Value Line* Growth in EPS, DPS, and BVPS	3.7%	3.0%
Projected *Value Line* Growth in EPS, DPS, and BVPS	4.3%	4.6%
Sustainable Growth ROE * Retention Rate	4.2%	3.5%
Projected EPS Growth from Yahoo, Zacks, and Reuters - Mean/Median	4.6%/4.8%	5.1%/5.2%

Exhibit JRW-11

UNS Electric, Inc.
Capital Asset Pricing Model

Panel A
Electric Proxy Group

Risk-Free Interest Rate	4.00%
Beta*	0.75
Ex Ante Equity Risk Premium**	5.50%
CAPM Cost of Equity	8.1%

* See page 3 of Exhibit JRW-11

** See pages 5 and 6 of Exhibit JRW-11

Panel B
Bulkey Proxy Group

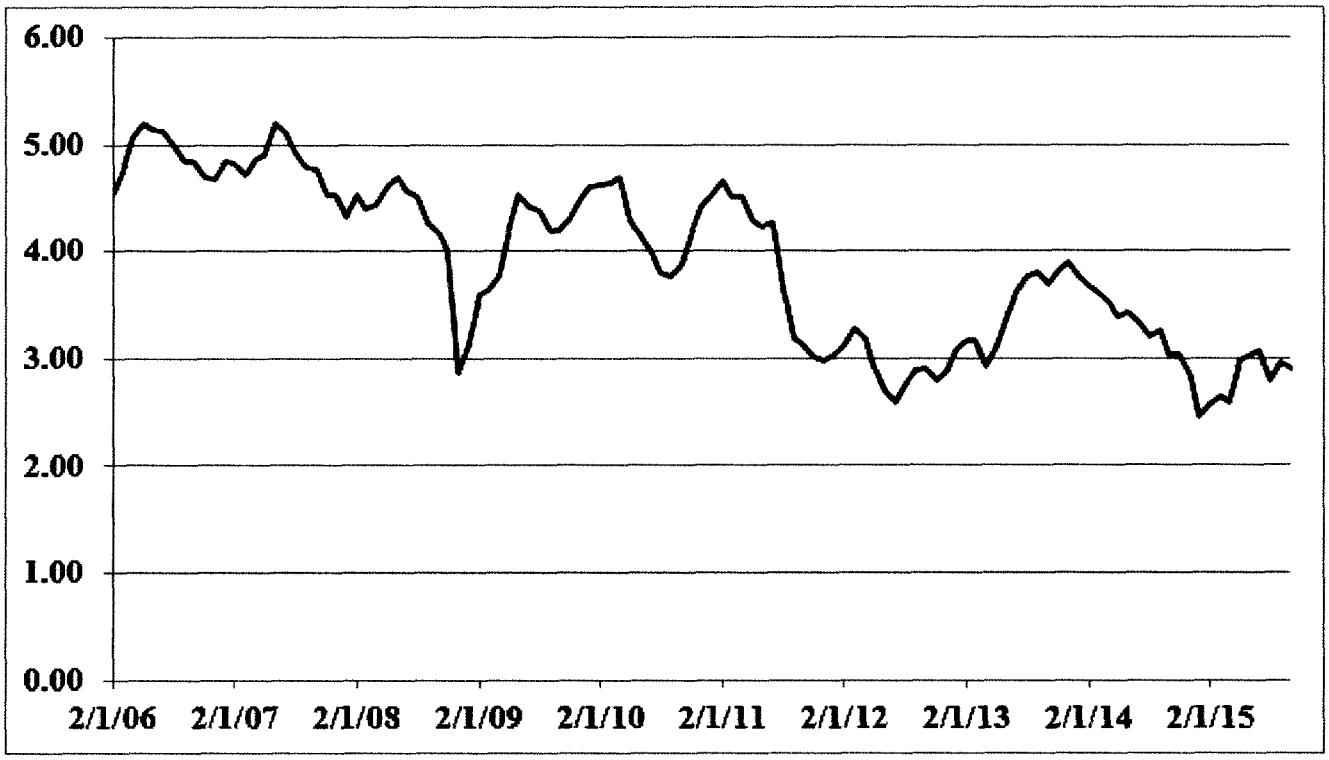
Risk-Free Interest Rate	4.00%
Beta*	0.78
Ex Ante Equity Risk Premium**	5.50%
CAPM Cost of Equity	8.3%

* See page 3 of Exhibit JRW-11

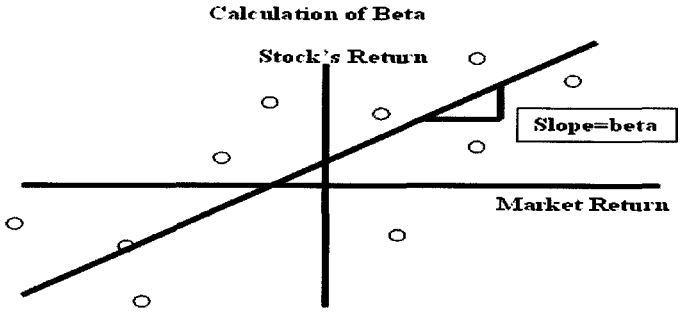
** See pages 5 and 6 of Exhibit JRW-11

Exhibit JRW-11

Thirty-Year U.S. Treasury Yields
January 2006-Present



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



Panel A
Electric Proxy Group

Company Name	Beta
ALLETE, Inc. (NYSE-ALE)	0.80
Alliant Energy Corporation (NYSE-LNT)	0.80
Ameren Corporation (NYSE-AEE)	0.75
American Electric Power Co. (NYSE-AEP)	0.70
Avista Corporation (NYSE-AVA)	0.80
Black Hills Corporation (NYSE-BKH)	0.95
CMS Energy Corporation (NYSE-CMS)	0.70
Consolidated Edison, Inc. (NYSE-ED)	0.60
Dominion Resources, Inc. (NYSE-D)	0.70
Duke Energy Corporation (NYSE-DUK)	0.60
Edison International (NYSE-EIX)	0.70
El Paso Electric Company (NYSE-EE)	0.75
Empire District Electric Co. (NYSE-EDE)	0.70
Entergy Corporation (NYSE-ETR)	0.65
Eversource Energy (NYSE-ES)	0.75
FirstEnergy Corporation (ASE-FE)	0.65
Great Plains Energy Incorporated (NYSE-GXP)	0.85
IDACORP, Inc. (NYSE-IDA)	0.80
MGE Energy, Inc. (NYSE-MGEE)	0.75
NorthWestern Corporation (NYSE-NWE)	0.70
OGE Energy Corp. (NYSE-OGE)	0.90
Otter Tail Corporation (NDQ-OTTR)	0.85
PG&E Corporation (NYSE-PCG)	0.65
Pinnacle West Capital Corp. (NYSE-PNW)	0.75
PNM Resources, Inc. (NYSE-PNM)	0.85
Portland General Electric Company (NYSE-POR)	0.80
SCANA Corporation (NYSE-SCG)	0.75
Westar Energy, Inc. (NYSE-WR)	0.75
Xcel Energy Inc. (NYSE-XEL)	0.65
Mean	0.75
Median	0.75

Data Source: *Value Line Investment Survey*, 2015.

Panel B
Bulkey Proxy Group

ALLETE, Inc. (NYSE-ALE)	0.80
American Electric Power Co. (NYSE-AEP)	0.70
Duke Energy Corporation (NYSE-DUK)	0.60
Empire District Electric Co. (NYSE-EDE)	0.70
Eversource Energy (NYSE-ES)	0.75
Great Plains Energy Incorporated (NYSE-GXP)	0.85
IDACORP, Inc. (NYSE-IDA)	0.80
Otter Tail Corporation (NDQ-OTTR)	0.85
Pinnacle West Capital Corp. (NYSE-PNW)	0.75
PNM Resources, Inc. (NYSE-PNM)	0.85
Portland General Electric Company (NYSE-POR)	0.80
Westar Energy, Inc. (NYSE-WR)	0.75
Mean	0.77
Median	0.78

Data Source: *Value Line Investment Survey*, 2015.

Exhibit JRW-11
Risk Premium Approaches

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

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

Exhibit JRW-8

UNS Electric, Inc.
Capital Asset Pricing Model
Equity Risk Premium

Category	Study Authors	Publication Date	Time Period Of Study	Methodology	Return Measure	Range Low	Range High	Midpoint of Range	Mean	Median
Historical Risk Premium										
	Ibbotson	2015	1928-2014	Historical Stock Returns - Bond Returns	Arithmetic				6.00%	
					Geometric				4.40%	
	Damodaran	2015	1928-2014	Historical Stock Returns - Bond Returns	Arithmetic				6.25%	
					Geometric				4.60%	
	Dimson, Marsh, Staunton	2015	1900-2014	Historical Stock Returns - Bond Returns	Arithmetic					
					Geometric				4.40%	
	Bate	2008	1900-2007	Historical Stock Returns - Bond Returns	Geometric				4.50%	
	Shiller	2006	1926-2005	Historical Stock Returns - Bond Returns	Arithmetic				7.00%	
					Geometric				5.50%	
	Siegel	2005	1926-2005	Historical Stock Returns - Bond Returns	Arithmetic				6.10%	
					Geometric				4.60%	
	Dimson, Marsh, and Staunton	2006	1900-2005	Historical Stock Returns - Bond Returns	Arithmetic				5.50%	
	Goyal & Welch	2006	1872-2004	Historical Stock Returns - Bond Returns					4.77%	
	Median									5.14%
Ex Ante Models (Puzzle Research)										
	Claus Thomas	2001	1985-1998	Abnormal Earnings Model					3.00%	
	Arnott and Bernstein	2002	1810-2001	Fundamentals - Div Yld + Growth					2.40%	
	Constantinides	2002	1872-2000	Historical Returns & Fundamentals - P/D & P/E					6.90%	
	Cornell	1999	1926-1997	Historical Returns & Fundamental GDP/Earnings		3.50%	5.50%	4.50%	4.50%	
	Easton, Taylor, et al	2002	1981-1998	Residual Income Model					5.30%	
	Fama French	2002	1951-2000	Fundamental DCF with EPS and DPS Growth		2.55%	4.32%		3.44%	
	Harris & Marston	2001	1982-1998	Fundamental DCF with Analysts' EPS Growth					7.14%	
	Best & Byrne	2001								
	McKinsey	2002	1962-2002	Fundamental (P/E, D/P, & Earnings Growth)		3.50%	4.00%		3.75%	
	Siegel	2005	1802-2001	Historical Earnings Yield	Geometric				2.50%	
	Grabowski	2006	1926-2005	Historical and Projected		3.50%	6.00%	4.75%	4.75%	
	Maheu & McCurdy	2006	1885-2003	Historical Excess Returns, Structural Breaks,		4.02%	5.10%	4.56%	4.56%	
	Bostock	2004	1960-2002	Bond Yields, Credit Risk, and Income Volatility		3.90%	1.30%	2.60%	2.60%	
	Bakshi & Chen	2005	1982-1998	Fundamentals - Interest Rates					7.31%	
	Donaldson, Kamstra, & Kramer	2006	1952-2004	Fundamental, Dividend yld., Returns,, & Volatility		3.00%	4.00%	3.50%	3.50%	
	Campbell	2008	1982-2007	Historical & Projections (D/P & Earnings Growth)		4.10%	5.40%		4.75%	
	Best & Byrne	2001	Projection	Fundamentals - Div Yld + Growth					2.00%	
	Fernandez	2007	Projection	Required Equity Risk Premium					4.00%	
	DeLong & Magin	2008	Projection	Earnings Yield - TIPS					3.22%	
	Siegel - Rethink ERP	2011	Projection	Real Stock Returns and Components					5.50%	
	Duarte & Rosa - NY Fed	2015	Projection	Projections from 29 Models					5.70%	
	Duff & Phelps	2015	Projection	Normalized with 4.0% Long-Term Treasury Yield					5.00%	
	Mschchowski - VL - 2014	2014	Projection	Fundamentals - Expected Return Minus 10-Year Treasury Rate					5.50%	
	American Appraisal Quarterly ERP	2015	Projection	Fundamental Economic and Market Factors					6.00%	
	Damodaran	2015	Projection	Fundamentals - Implied from FCF to Equity Model					6.25%	
	Social Security									
	Office of Chief Actuary		1900-1995							
	John Campbell	2001	1860-2000	Historical & Projections (D/P & Earnings Growth)	Arithmetic	3.00%	4.00%	3.50%	3.50%	
			Projected for 75 Years		Geometric	1.50%	2.50%	2.00%	2.00%	
	Peter Diamond	2001	Projected for 75 Years	Fundamentals (D/P, GDP Growth)		3.00%	4.80%	3.90%	3.90%	
	John Shoven	2001	Projected for 75 Years	Fundamentals (D/P, P/E, GDP Growth)		3.00%	3.50%	3.25%	3.25%	
	Median									4.25%
Surveys										
	New York Fed	2013	Five-Year	Survey of Wall Street Firms					5.20%	
	Survey of Financial Forecasters	2015	10-Year Projection	About 20 Financial Forecastsers					1.88%	
	Duke - CFO Magazine Survey	2015	10-Year Projection	Approximately 500 CFOs					3.80%	
	Welch - Academics	2008	30-Year Projection	Random Academics		5.00%	5.74%	5.37%	5.37%	
	Fernandez - Academics, Analysts, and Compan	2015	Long-Term	Survey of Academics, Analysts, and Companies					5.50%	
	Median									4.59%
Building Block										
	Ibbotson and Chen	2015	Projection	Historical Supply Model (D/P & Earnings Growth)	Arithmetic			6.22%	5.21%	
					Geometric			4.20%		
	Chen - Rethink ERP	2010	20-Year Projection	Combination Supply Model (Historic and Projection)	Geometric				4.00%	
	Ilmanen - Rethink ERP	2010	Projection	Current Supply Model (D/P & Earnings Growth)	Geometric				3.00%	
	Grinold, Kroner, Siegel - Rethink ERP	2011	Projection	Current Supply Model (D/P & Earnings Growth)	Arithmetic			4.63%	4.12%	
					Geometric			3.60%		
	Woolridge		2015	Current Supply Model (D/P & Earnings Growth)					4.75%	
	Median									4.12%
Mean										**4.52%**
Median										**4.42%**

Exhibit JRW-8

UNS Electric, Inc.
Capital Asset Pricing Model
Equity Risk Premium

Summary of 2010-15 Equity Risk Premium Studies

Category	Study Authors	Publication Date	Time Period Of Study	Methodology	Return Measure	Range Low	Range High	Midpoint of Range	Mean	Average
Historical Risk Premium										
	Ibbotson	2015	1928-2014	Historical Stock Returns - Bond Returns	Arithmetic				6.00%	
					Geometric				4.40%	
	Damodaran	2015	1928-2014	Historical Stock Returns - Bond Returns	Arithmetic				6.25%	
					Geometric				4.60%	
	Dimson, Marsh, Staunton	2015	1900-2014	Historical Stock Returns - Bond Returns	Arithmetic					
					Geometric				4.40%	
	Median									5.13%
Ex Ante Models (Puzzle Research)										
	Siegel - Rethink ERP	2011	Projection	Real Stock Returns and Components					5.50%	
	Duarte & Rosa - NY Fed	2015	Projection	Projections from 29 Models					5.70%	
	Duff & Phelps	2015	Projection	Normalized with 4.0% Long-Term Treasury Yield					5.00%	
	Mschchowski - VL - 2014	2014	Projection	Fundamentals - Expected Return Minus 10-Year Treasury Rate					5.50%	
	American Appraisal Quarterly ERP	2015	Projection	Fundamental Economic and Market Factors					6.00%	
	Damodaran	2015	Projection	Fundamentals - Implied from FCF to Equity Model					6.25%	
	Median									5.60%
Surveys										
	New York Fed	2013	Five-Year	Survey of Wall Street Firms					5.20%	
	Survey of Financial Forecasters	2015	10-Year Projection	About 20 Financial Forecastsers					1.88%	
	Duke - CFO Magazine Survey	2015	10-Year Projection	Approximately 500 CFOs					3.80%	
	Fernandez - Academics, Analysts, and Companies	2015	Long-Term	Survey of Academics, Analysts, and Companies					5.50%	
	Median									4.50%
Building Block										
	Ibbotson and Chen	2015	Projection	Historical Supply Model (D/P & Earnings Growth)	Arithmetic			6.22%	5.21%	
					Geometric			4.20%		
	Chen - Rethink ERP	2010	20-Year Projection	Combination Supply Model (Historic and Projection)	Geometric				4.00%	
	Ilmanen - Rethink ERP	2010	Projection	Current Supply Model (D/P & Earnings Growth)	Geometric				3.00%	
	Grinold, Kroner, Siegel - Rethink ERP	2011	Projection	Current Supply Model (D/P & Earnings Growth)	Arithmetic			4.63%	4.12%	
					Geometric			3.60%		
	Woolridge	2015	Projection	Current Supply Model (D/P & Earnings Growth)	Geometric				4.75%	
	Median									4.12%
Mean										**4.84%**
Median										**4.82%**

Exhibit JRW-12

UNS Electric, Inc.

Company's Proposed Cost of Capital

Capital Source	Capitalization Ratio	Cost Rate	Weighted Cost Rate
Short-Term Debt	0.00%	2.07%	0.00%
Long-Term Debt	47.17%	4.66%	2.20%
Common Equity	52.83%	10.35%	5.47%

Summary of Ms. Bulkey's ROE Results

Panel A

Summary of Constant Growth DCF Results

	Mean Low	Mean	Mean High
30-Day Average	8.19%	9.04%	10.05%
90-Day Average	8.28%	9.14%	10.14%
180-Day Average	8.49%	9.34%	10.35%

Summary of Multi-Stage Growth DCF Results

	Mean Low	Mean	Mean High
30-Day Average	9.08%	9.30%	9.58%
90-Day Average	9.17%	9.40%	9.69%
180-Day Average	9.39%	9.63%	9.92%

Panel B
Summary of CAPM Results

	Current 30-Year Treasury - 2.57%	2015-2016 Projected Risk-Free Rate - 3.20%	2016-2020 Projected Risk-Free Rate - 4.90%
Bloomberg Beta	9.59%	9.83%	10.40%
Value Line Beta	10.50%	10.68%	11.10%

Panel C
Summary of RP Results

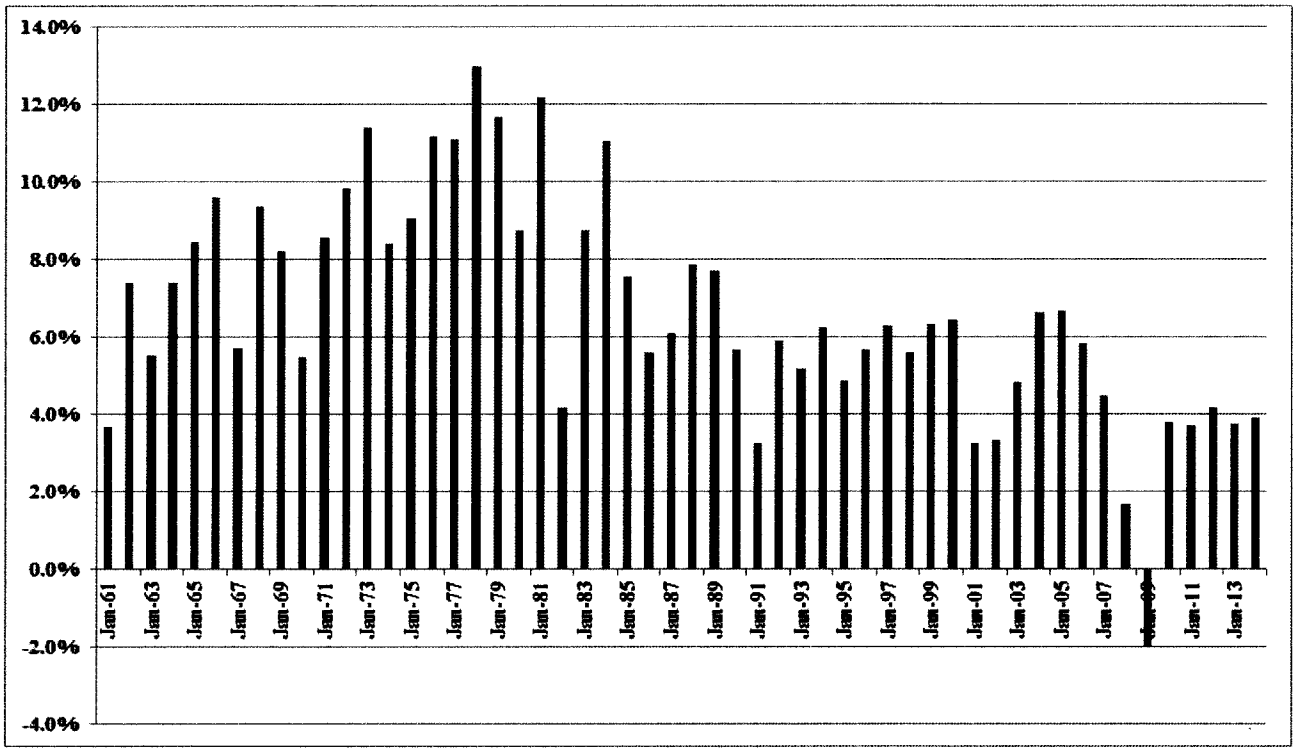
	Current 30-Year Treasury - 2.57%	2015-2016 Projected Risk-Free Rate - 3.20%	2016-2020 Projected Risk-Free Rate - 4.90%
Bond Yield Risk Premium	9.70%	10.00%	10.72%
Size Premium		4.82%	

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

	GDP	S&P 500	Earnings	Dividends	
1960	543.3	58.11	3.10	1.98	
1961	563.3	71.55	3.37	2.04	
1962	605.1	63.10	3.67	2.15	
1963	638.6	75.02	4.13	2.35	
1964	685.8	84.75	4.76	2.58	
1965	743.7	92.43	5.30	2.83	
1966	815.1	80.33	5.41	2.88	
1967	861.7	96.47	5.46	2.98	
1968	942.5	103.86	5.72	3.04	
1969	1019.9	92.06	6.10	3.24	
1970	1075.9	92.15	5.51	3.19	
1971	1167.8	102.09	5.57	3.16	
1972	1282.4	118.05	6.17	3.19	
1973	1428.6	97.55	7.96	3.61	
1974	1548.8	68.56	9.35	3.72	
1975	1688.9	90.19	7.71	3.73	
1976	1877.6	107.46	9.75	4.22	
1977	2086.0	95.10	10.87	4.86	
1978	2356.6	96.11	11.64	5.18	
1979	2632.2	107.94	14.55	5.97	
1980	2862.5	135.76	14.99	6.44	
1981	3211.0	122.55	15.18	6.83	
1982	3345.0	140.64	13.82	6.93	
1983	3638.1	164.93	13.29	7.12	
1984	4040.7	167.24	16.84	7.83	
1985	4346.8	211.28	15.68	8.20	
1986	4590.1	242.17	14.43	8.19	
1987	4870.2	247.08	16.04	9.17	
1988	5252.6	277.72	24.12	10.22	
1989	5657.7	353.40	24.32	11.73	
1990	5979.6	330.22	22.65	12.35	
1991	6174.1	417.09	19.30	12.97	
1992	6539.3	435.71	20.87	12.64	
1993	6878.7	466.45	26.90	12.69	
1994	7308.8	459.27	31.75	13.36	
1995	7664.1	615.93	37.70	14.17	
1996	8100.2	740.74	40.63	14.89	
1997	8608.5	970.43	44.09	15.52	
1998	9089.2	1229.23	44.27	16.20	
1999	9660.6	1469.25	51.68	16.71	
2000	10284.8	1320.28	56.13	16.27	
2001	10621.8	1148.09	38.85	15.74	
2002	10977.5	879.82	46.04	16.08	
2003	11510.7	1111.91	54.69	17.88	
2004	12274.9	1211.92	67.68	19.41	
2005	13093.7	1248.29	76.45	22.38	
2006	13855.9	1418.30	87.72	25.05	
2007	14477.6	1468.36	82.54	27.73	
2008	14718.6	903.25	65.39	28.05	
2009	14418.7	1115.10	59.65	22.31	
2010	14964.4	1257.64	83.66	23.12	
2011	15517.9	1257.60	97.05	26.02	Average
2012	16163.2	1426.19	102.47	30.44	
2013	16768.1	1848.36	107.45	36.28	
2014	17420.7	2058.90	114.74	38.57	
Growth Rates	**6.63**	**6.83**	**6.92**	**5.65**	**6.51**

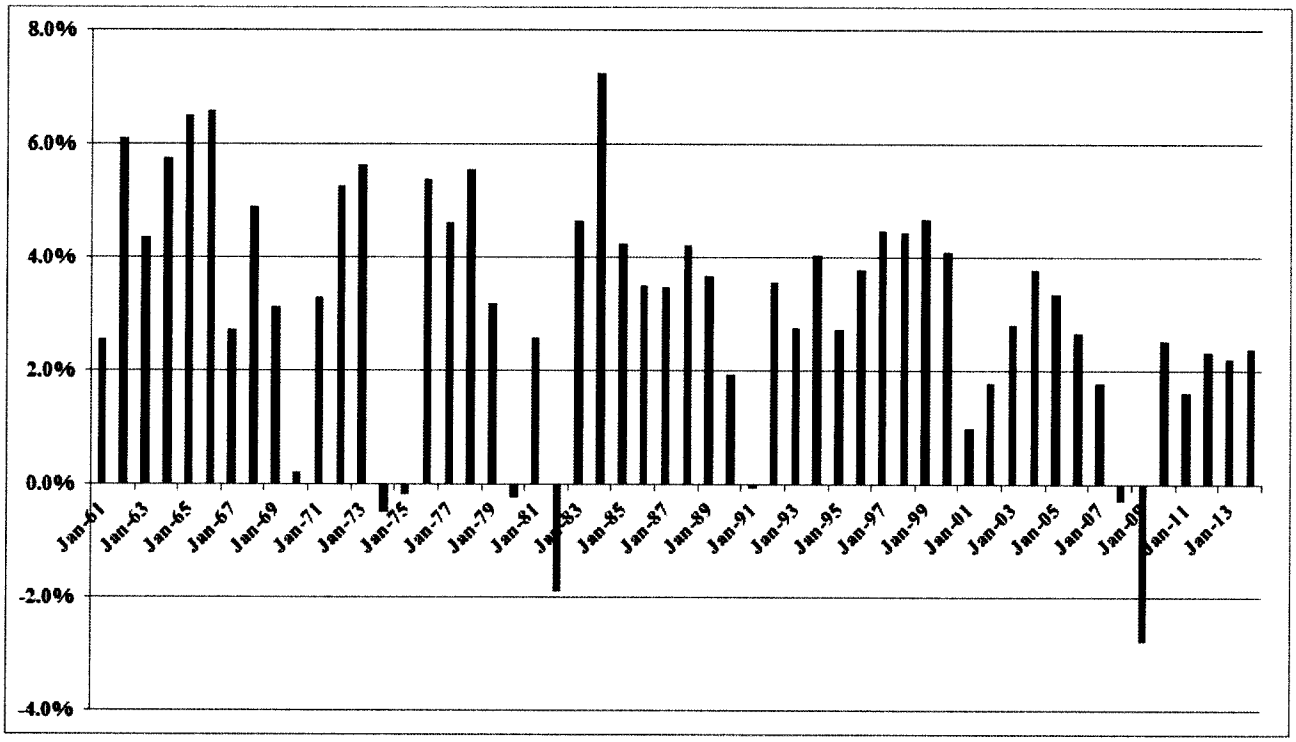
Data Sources: GDPA -http://research.stlouisfed.org/fred2/series/GDPA/downloaddat

Nominal GDP Growth Rates
Annual Growth Rates - 1961-2014



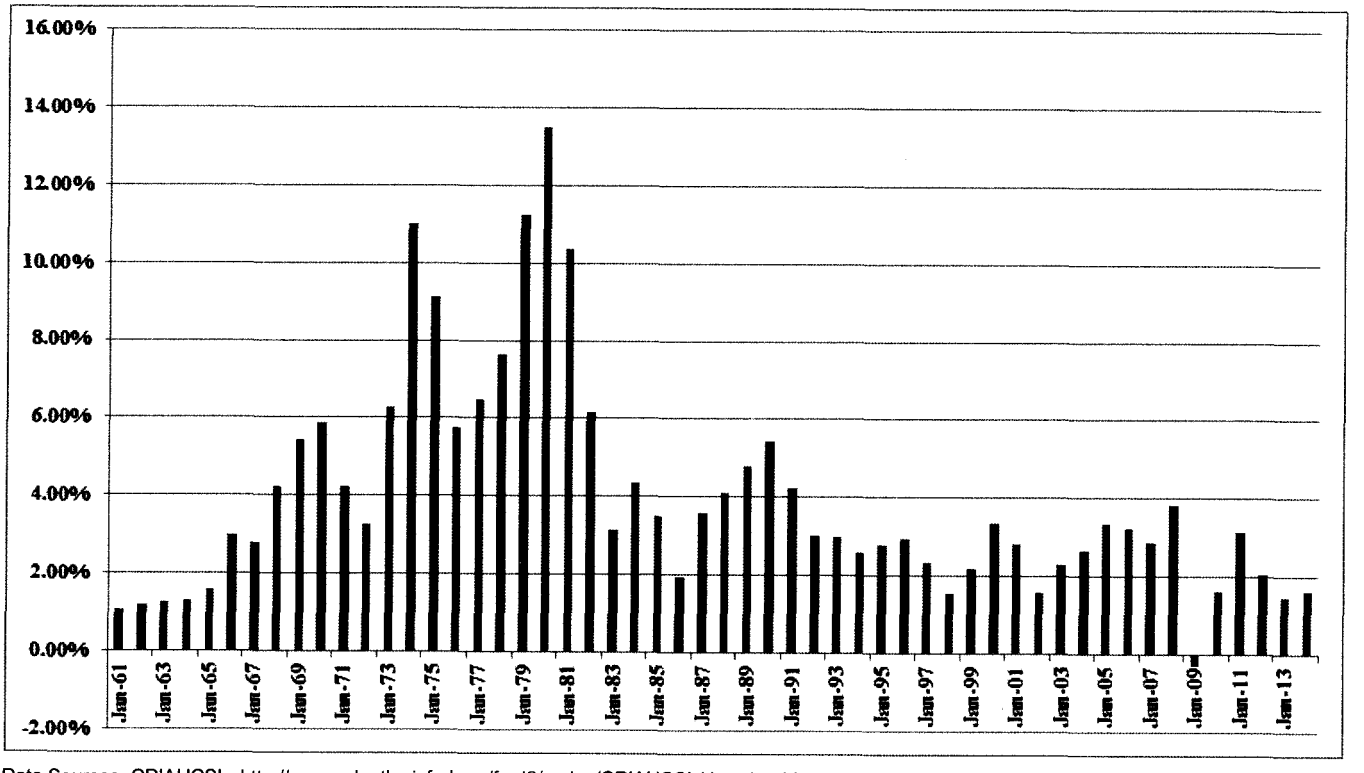
Data Sources: GDPA -http://research.stlouisfed.org/fred2/series/GDPA/downloaddata

Annual Real GDP Growth Rates
Rolling Five-Year Periods – 1961-2014



Data Sources: GDPC1 -http://research.stlouisfed.org/fred2/series/GDPC1/downloaddata

Annual Inflation Rates
1961-2014



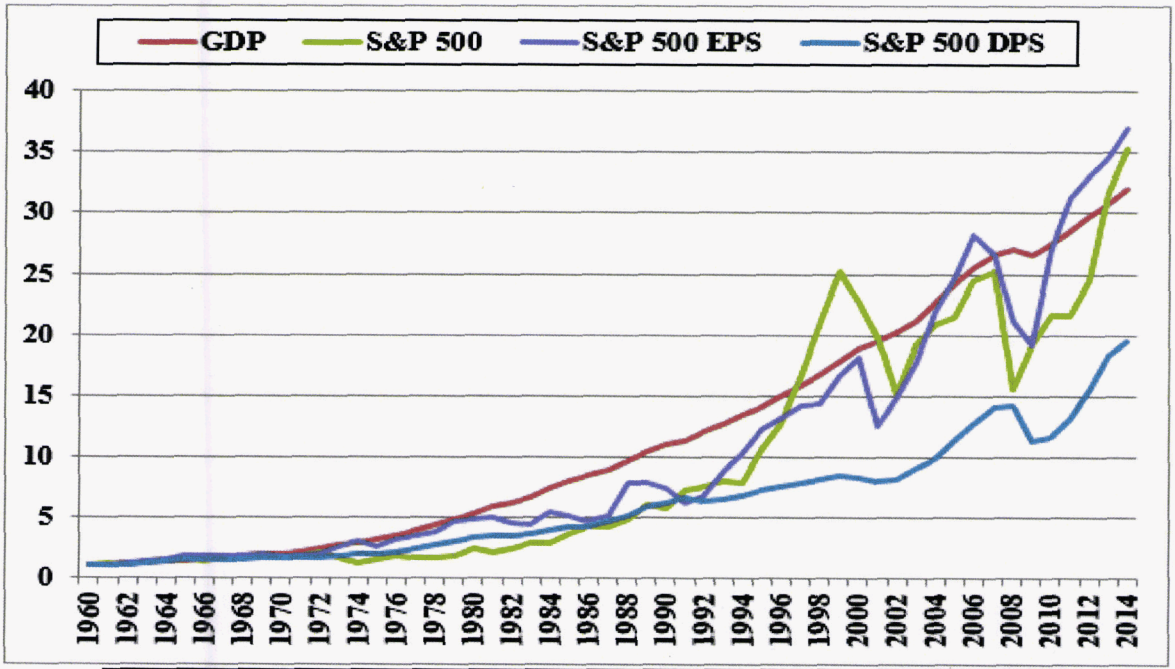
Data Sources: CPIAUCSL -http://research.stlouisfed.org/fred2/series/CPIAUCSL/downloaddata

Projected GDP Growth Rates

	Time Frame	Projected Nominal GDP Growth Rate
Congressional Budget Office	**2015-2040**	**4.3%**
Survey of Financial Forecasters	**Ten Year**	**4.7%**
Social Security Administration	**2015-2090**	**4.5%**
Energy Information Administration	**2013-2040**	**4.2%**

Sources:
http://www.cbo.gov/topics/budget/budget-and-economic-outlook
http://www.eia.gov/forecasts/aeo/tables_ref.cfm Table 20
http://www.philadelphiafed.org/research-and-data/real-time-center/survey-of-professional-forecasters/2015/
http://www.ssa.gov/oact/tr/2015/X1_trLOT.html

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



	GDP	S&P 500	S&P 500 EPS	S&P 500 DPS
Growth Rates	6.63	6.83	6.92	5.65

Data Sources: GDPA -http://research.stlouisfed.org/fred2/series/GDPA/downloaddata
S&P 500, EPS and DPS - http://pages.stern.nyu.edu/~adamodar/