EXHIBIT NO. ___(RAM-1T)
DOCKET NO. UE-121697/UG-121705
DOCKET NO. UE-130137/UG-130138
WITNESS: DR. ROGER A. MORIN

BEFORE THE
WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION,
 	
    Complainant,
 	
    v.
 	
PUGET SOUND ENERGY, INC.,
 	
    Respondent.
	DOCKET NOS. UE-121697
	and UG-121705 (*consolidated*)

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION,
 	
    Complainant,
 	
    v.
 	
PUGET SOUND ENERGY, INC.,
 	
    Respondent.
	DOCKET NOS. UE-130137
	and UG-130138 (*consolidated*)

PREFILED DIRECT TESTIMONY (NONCONFIDENTIAL) OF
DR. ROGER A. MORIN
ON BEHALF OF PUGET SOUND ENERGY, INC.

NOVEMBER 5, 2014

REVISED
FEBRUARY 5, 2015

PUGET SOUND ENERGY, INC.

**PREFILED DIRECT TESTIMONY
(NONCONFIDENTIAL) OF DR. ROGER A. MORIN**

CONTENTS

1 **PUGET SOUND ENERGY, INC.**

2 **PREFILED DIRECT TESTIMONY (NONCONFIDENTIAL) OF**
3 **DR. ROGER A. MORIN**

4 **I.   INTRODUCTION**

5 **Q.   Please state your name, business address, and occupation.**

6 A.   My name is Dr. Roger A. Morin. My business address is Georgia State

7 University, Robinson College of Business, University Plaza, Atlanta, Georgia,

8 30303. I am Emeritus Professor of Finance at the Robinson College of Business,

9 Georgia State University and Professor of Finance for Regulated Industry at the

10 Center for the Study of Regulated Industry at Georgia State University. I am also

11 a principal in Utility Research International, an enterprise engaged in regulatory

12 finance and economics consulting to business and government. I am testifying on

13 behalf of Puget Sound Energy, Inc. ("PSE").

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

15 A.   The purpose of my testimony in this proceeding is to determine if the return on

16 equity ("ROE") of 9.8% authorized by the Commission in Order 08 in Dockets

17 UE-111048 and UG-111049[1] remained within the range of reasonableness when

18 the Commission issued its Order 07 in these proceedings[2] and remains within the

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[1] *WUTC v. Puget Sound Energy, Inc.*, Order 08 Rejecting Tariff Sheets; Authorizing and Requiring Compliance Filing, Dockets UE-111048 and UG-111049 (consolidated) (May 7, 2012).

[2] *WUTC v. Puget Sound Energy, Inc.*, Order 07 Final Order Granting Petition, Dockets UE-121697, *et al*. (consolidated) (June 25, 2013).

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1   range of reasonableness through the rate plan period. I have formed my

2   professional judgment as to whether an ROE of 9.8%:

3   (i)   remains fair to customers,

4   (ii)   allows PSE to attract capital on reasonable terms,

5   (iii)   maintains PSE's financial integrity, and

6   (iv)   remains comparable to returns offered on comparable risk
7   investments.

8   **Q.   Please summarize your findings concerning PSE's cost of common equity.**

9   A.   Based on the results of various methodologies, capital market conditions that

10   existed in the first half of 2013, and economic industry conditions that existed in

11   the first half of 2013, I recommend an ROE for PSE in the reasonable range of

12   9.8% to 10.7%, with a midpoint of 10.3%.

13   Based on the results of various methodologies, capital market conditions that

14   existed in the second half of 2014, and economic industry conditions that existed

15   in the second half of 2014, I would recommend an ROE for PSE in the reasonable

16   range of 9.4% to 11.0%, with a midpoint of 10.2%.

17   In short, the ROE of 9.8% authorized by the Commission in Order 08 in Dockets

18   UE-111048 and UG-111049 remained within the range of reasonableness when

19   the Commission issued its Order 07 in these proceedings and remains within the

20   range of reasonableness through the rate plan period.

21   **Q.   How did you arrive at these reasonable ranges of ROEs for PSE?**

22   A.   The reasonable ROE ranges presented above for PSE for the first half of 2013 and

23   the second half of 2014 are derived from cost of capital studies that I performed

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1   using the financial models available to me and from the application of my

2   professional judgment to the results. I applied various cost of capital

3   methodologies, including the Discounted Cash Flow ("DCF") model, the Capital

4   Asset Pricing Model ("CAPM"), and the risk premium model to groups of

5   investment-grade dividend-paying combination gas and electric utilities that are

6   covered in Value Line's Electric Utility Composite. The companies were

7   required to have the majority of their revenues from regulated utility operations.

8   My ROE results reflect the application of my professional judgment to the results

9   in light of the indicated returns from my DCF, CAPM, and risk premium

10   analyses.

11   **II.   REGULATORY FRAMEWORK AND RATE OF RETURN**

12   **Q.   Please explain how a regulated company's rates should be set under**

13   **traditional cost of service regulation.**

14   A.   Under the traditional regulatory process, a regulated company's rates should be

15   set so that the company recovers its costs, including taxes and depreciation, plus a

16   fair and reasonable return on its invested capital. The allowed rate of return must

17   necessarily reflect the cost of the funds obtained, that is, investors' return

18   requirements. In determining a company's required rate of return, the starting

19   point is investors' return requirements in financial markets. A rate of return can

20   then be set at a level sufficient to enable the company to earn a return

21   commensurate with the cost of those funds.

1   Funds can be obtained in two general forms, debt capital and equity capital. The

2   cost of debt funds can be easily ascertained from an examination of the

3   contractual interest payments. The cost of common equity funds (i.e., investors'

4   required rate of return) is more difficult to estimate. It is the purpose of the next

5   section of my testimony to estimate fair and reasonable ROE ranges for PSE's

6   cost of common equity capital.

7   **Q.   What fundamental principles underlie the determination of a fair and**

8   **reasonable ROE?**

9   A.   The heart of utility regulation is the setting of just and reasonable rates by way of

10   a fair and reasonable return. There are two landmark United States Supreme

11   Court cases that define the legal principles underlying the regulation of a public

12   utility's rate of return and provide the foundations for the notion of a fair return:

13   1.   *Bluefield Water Works & Improvement Co. v. Public*
14   *Service Commission of West Virginia*, 262 U.S. 679 (1923);
15   and

16   2.   *Federal Power Commission v. Hope Natural Gas Co.*,
17   320 U.S. 591 (1944).

18   The *Bluefield* case set the standard against which just and reasonable rates of

19   return are measured:

20   A public utility is entitled to such rates as will permit it to earn a
21   return on the value of the property which it employs for the
22   convenience of the public *equal to that generally being made at*
23   *the same time and in the same general part of the country on*
24   *investments in other business undertakings which are attended by*
25   *corresponding risks and uncertainties* ... The *return should be*
26   *reasonable*, sufficient to assure confidence in the financial
27   soundness of the utility, and should be adequate, under efficient
28   and economical management, to *maintain and support its credit*

1   and *enable it to raise money* necessary for the proper discharge of

2   its public duties.

3   *Bluefield Water Works & Improvement Co.*, 262 U.S. at 692 (emphasis added).

4   The *Hope* case expanded on the guidelines to be used to assess the reasonableness

5   of the allowed return. The Court reemphasized its statements in the *Bluefield* case

6   and recognized that revenues must cover "capital costs." The Court stated:

7   From the investor or company point of view it is important that
8   there be enough revenue not only for operating expenses but also
9   for the capital costs of the business. These include service on the
10   debt and dividends on the stock ... By that standard *the return to*
11   *the equity owner should be commensurate with returns on*
12   *investments in other enterprises having corresponding risks.* That
13   return, moreover, should be sufficient to *assure confidence in the*
14   *financial integrity of the enterprise, so as to maintain its credit and*
15   *attract capital.*

16   *Hope Natural Gas Co.*, 320 U.S. at 603 (emphasis added).

17   The United States Supreme Court reiterated the criteria set forth in *Hope* in

18   *Federal Power Commission v. Memphis Light, Gas & Water Division*, 411 U.S.

19   458 (1973); in *Permian Basin Rate Cases*, 390 U.S. 747 (1968); and, most

20   recently, in *Duquesne Light Co. v. Barasch*, 488 U.S. 299 (1989). In the *Permian*

21   *Basin Rate Cases*, the Supreme Court stressed that a regulatory agency's rate of

22   return order should

23   reasonably be expected to maintain financial integrity, attract
24   necessary capital, and fairly compensate investors for the risks they
25   have assumed.

26   *Permian Basin Rate Cases*, 390 U.S. at 792.

27   Therefore, the "end result" of this Commission's decision should be to allow PSE

28   the opportunity to earn a return on equity that is:

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1   (i)   commensurate with returns on investments in other firms
2   having corresponding risks;

3   (ii)   sufficient to assure confidence in PSE's financial integrity;
4   and

5   (iii)   sufficient to maintain PSE's creditworthiness and ability to
6   attract capital on reasonable terms.

7   **Q.   How is the fair rate of return determined?**

8   A.   The aggregate return required by investors is called the "cost of capital." The cost

9   of capital is the opportunity cost, expressed in percentage terms, of the total pool

10   of capital employed by the utility. It is the composite weighted cost of the various

11   classes of capital (e.g., bonds, preferred stock, common stock) used by the utility,

12   with the weights reflecting the proportions of the total capital that each class of

13   capital represents. The fair return in dollars is obtained by multiplying the rate of

14   return set by the regulator by the utility's "rate base." The rate base is essentially

15   the net book value of the utility's plant and other assets used to provide utility

16   service in a particular jurisdiction.

17   Although utilities like PSE enjoy varying degrees of monopoly in the sale of

18   public utility services, they (or their parent companies) must compete with

19   everyone else in the free, open market for the input factors of production, whether

20   labor, materials, machines, or capital, including the capital investments required

21   to support the utility infrastructure. The prices of these inputs are set in the

22   competitive marketplace by supply and demand, and it is these input prices that

23   are incorporated in the cost of service computation. This is just as true for capital

24   as for any other factor of production. Since utilities and other investor-owned

1   businesses must go to the open capital market and sell their securities in

2   competition with every other issuer, there is obviously a market price to pay for

3   the capital they require (e.g., the interest on debt capital or the expected return on

4   equity). In order to attract the necessary capital, utilities must compete with

5   alternative uses of capital and offer a return commensurate with the associated

6   risks.

7   **Q.   How does the concept of a fair return relate to the concept of opportunity**

8   **cost?**

9   A.   The concept of a fair return is intimately related to the economic concept of

10 "opportunity cost." When investors supply funds to a utility by buying its stocks

11 or bonds, they are not only postponing consumption, giving up the alternative of

12 spending their dollars in some other way, they are also exposing their funds to

13 risk and forgoing returns from investing their money in alternative comparable

14 risk investments. The compensation they require is the price of capital. If there

15 are differences in the risk of the investments, competition among firms for a

16 limited supply of capital will bring different prices. The capital markets translate

17 these differences in risk into differences in required return, in much the same way

18 that differences in the characteristics of commodities are reflected in different

19 prices.

20 The important point is that the required return on capital is set by supply and

21 demand, and is influenced by the relationship between the risk and return

22 expected for those securities and the risks expected from the overall menu of

23 available securities.

1 **Q.** **What economic and financial concepts have guided your assessment of PSE's**

2 **cost of common equity?**

3 A. Two fundamental economic principles underlie the appraisal of PSE's cost of

4 equity, one relating to the supply side of capital markets, the other to the demand

5 side.

6 On the supply side, the first principle asserts that rational investors maximize the

7 performance of their portfolios only if they expect the returns on investments of

8 comparable risk to be the same. If not, rational investors will switch out of those

9 investments yielding lower returns at a given risk level in favor of those

10 investment activities offering higher returns for the same degree of risk. This

11 principle implies that a company will be unable to attract capital funds unless it

12 can offer returns to capital suppliers that are comparable to those achieved on

13 competing investments of similar risk.

14 On the demand side, the second principle asserts that a company will continue to

15 invest in real physical assets if the return on these investments equals, or exceeds,

16 the company's cost of capital. This principle suggests that a regulatory board

17 should set rates at a level sufficient to create equality between the return on

18 physical asset investments and the company's cost of capital.

19 **Q.** **How does PSE obtain its capital and how is its overall cost of capital**

20 **determined?**

21 A. The funds employed by PSE are obtained in two general forms, debt capital and

22 equity capital. The cost of debt funds can be ascertained easily from an

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1   examination of the contractual interest payments. The cost of common equity

2   funds, that is, equity investors' required rate of return, is more difficult to estimate

3   because the dividend payments received from common stock are not contractual

4   or guaranteed in nature. They are uneven and risky, unlike interest payments.

5   Once a cost of common equity estimate has been developed, it can then easily be

6   combined with the embedded cost of debt based on the utility's capital structure,

7   in order to arrive at the overall cost of capital (overall rate of return).

8   **Q.   What is the market required rate of return on equity capital?**

9   A.   The market required rate of return on common equity, or cost of equity, is the

10   return demanded by the equity investor. Investors establish the price for equity

11   capital through their buying and selling decisions in capital markets. Investors set

12   return requirements according to their perception of the risks inherent in the

13   investment, recognizing the opportunity cost of forgone investments in other

14   companies, and the returns available from other investments of comparable risk.

15   **Q.   What must be considered in estimating a fair ROE?**

16   A.   The basic premise is that the allowable ROE should be commensurate with

17   returns on investments in other firms having corresponding risks. The allowed

18   return should be sufficient to assure confidence in the financial integrity of the

19   firm, in order to maintain creditworthiness and ability to attract capital on

20   reasonable terms. The "attraction of capital" standard focuses on investors' return

21   requirements that are generally determined using market value methods, such as

22   the DCF, CAPM, or risk premium methods. These market value tests define "fair

1   return" as the return investors anticipate when they purchase equity shares of

2   comparable risk in the financial marketplace. This is a market rate of return,

3   defined in terms of anticipated dividends and capital gains as determined by

4   expected changes in stock prices, and reflects the opportunity cost of capital. The

5   economic basis for market value tests is that new capital will be attracted to a firm

6   only if the return expected by the suppliers of funds is commensurate with that

7   available from alternative investments of comparable risk.

8   **Q.   Please explain how low allowed ROEs can increase both the future cost of**

9   **equity and debt financing.**

10 A.   If a utility is authorized a ROE below the level required by equity investors, the

11   utility will find it difficult to access the equity market through common stock

12   issuance at its current market price. Investors will not provide equity capital at

13   the current market price if the earnable return on equity is below the level they

14   require given the risks of an equity investment in the utility. The equity market

15   corrects this by generating a stock price in equilibrium that reflects the valuation

16   of the potential earnings stream from an equity investment at the risk-adjusted

17   return equity investors require. In the case of a utility that has been authorized a

18   return below the level investors believe is appropriate for the risk they bear, the

19   result is a decrease in the utility's market price per share of common stock. This

20   reduces the financial viability of equity financing in two ways. First, because the

21   utility's price per share of common stock decreases, the net proceeds from issuing

22   common stock are reduced. Second, since the utility's market to book ratio

23   decreases with the decrease in the share price of common stock, the potential risk

1   from dilution of equity investments reduces investors' inclination to purchase new

2   issues of common stock. The ultimate effect is the utility will have to rely more

3   on debt financing to meet its capital needs.

4   As the company relies more on debt financing, its capital structure becomes more

5   leveraged. Because debt payments are a fixed financial obligation to the utility,

6   and income available to common equity is subordinate to fixed charges, this

7   decreases the operating income available for dividend and earnings growth.

8   Consequently, equity investors face greater uncertainty about future dividends and

9   earnings from the firm. As a result, the firm's equity becomes a riskier

10   investment. The risk of default on the company's bonds also increases, making

11   the utility's debt a riskier investment. This increases the cost to the utility from

12   both debt and equity financing and increases the possibility the company will not

13   have access to the capital markets for its outside financing needs.

14   **III.   COST OF EQUITY CAPITAL ESTIMATES FOR PSE FOR**
15   **THE FIRST HALF OF 2013 AND THE SECOND HALF OF 2014**

16   Q.   **How did you estimate a fair ROE for PSE for the first half of 2013 and the**

17   **second half of 2014?**

18   A.   To estimate a fair ROE for PSE for the first half of 2013 and the second half of

19   2014, I employed three methodologies:

20   (i)   DCF methodologies;

21   (ii)   CAPM methodologies; and

22   (iii)   risk premium methodologies.

1   All three methodologies are market-based methodologies designed to estimate the

2   return required by investors on the common equity capital committed to PSE. I

3   applied the aforementioned methodologies to groups of combination gas and

4   electric utilities as reference groups for PSE.

5   **Q.   Why did you use more than one approach for estimating the cost of equity?**

6   A.   No one single method provides the necessary level of precision for determining a

7   fair return, but each method provides useful evidence to facilitate the exercise of

8   an informed judgment. Reliance on any single method or preset formula is

9   inappropriate when dealing with investor expectations because of possible

10   measurement difficulties and vagaries in individual companies' market data.

11   Examples of such vagaries include dividend suspension, insufficient or

12   unrepresentative historical data due to a recent merger, impending merger or

13   acquisition, and a new corporate identity due to restructuring activities. The

14   advantage of using several different approaches is that the results of each one can

15   be used to check the others.

16   As a general proposition, it is extremely dangerous to rely on only one generic

17   methodology to estimate equity costs. The difficulty is compounded when only

18   one variant of that methodology is employed. It is compounded even further

19   when that one methodology is applied to a single company. Hence, several

20   methodologies applied to several comparable risk companies should be employed

21   to estimate the cost of common equity.

22   As I have stated, there are three broad generic methods available to measure the

23   cost of equity: DCF, CAPM, and risk premium. All three of these methods are

1   accepted and used by the financial community and firmly supported in the

2   financial literature. The weight accorded to any one method may vary depending

3   on unusual circumstances in capital market conditions.

4   Each methodology requires the exercise of considerable judgment on the

5   reasonableness of the assumptions underlying the method and on the

6   reasonableness of the proxies used to validate the theory and apply the method.

7   Each method has its own way of examining investor behavior, its own premises,

8   and its own set of simplifications of reality. Investors do not necessarily

9   subscribe to any one method, nor does the stock price reflect the application of

10   any one single method by the price-setting investor. There is no guarantee that a

11   single DCF result is necessarily the ideal predictor of the stock price and of the

12   cost of equity reflected in that price, just as there is no guarantee that a single

13   CAPM or risk premium result constitutes the perfect explanation of a stock's

14   price or the cost of equity.

15 **Q.   Are there any practical difficulties in applying cost of capital methodologies**

16   **in environments of volatility in capital markets and economic uncertainty?**

17 A.   Yes, there are practical difficulties in applying cost of capital methodologies in

18   the environments of volatility in capital markets and economic uncertainty.

19   The traditional cost of equity estimation methodologies are difficult to implement

20   when you are dealing with the instability and volatility in the capital markets and

21   the highly uncertain economy both in the U.S. and abroad. This is not only

22   because stock prices are extremely volatile at this time, but also because utility

23   company historical data have become less meaningful for an industry

1   experiencing substantial change (e.g., the transition to stringent renewable

2   standards and the need to secure vast amounts of external capital over the next

3   decade, regardless of capital market conditions).

4   Past earnings and dividend trends may simply not be indicative of the future. For

5   example, historical growth rates of earnings and dividends have been depressed

6   by eroding margins due to a variety of factors, including the sluggish economy,

7   restructuring, and falling margins. As a result, this historical data may not be

8   representative of the future long-term earning power of these companies.

9   Moreover, historical growth rates may not be necessarily representative of future

10   trends for several utilities involved in mergers and acquisitions, as these

11   companies going forward are not the same companies for which historical data are

12   available.

13   **A.   DCF Estimates**

14   **1.   Overview of the DCF Methodology**

15   **Q.   Please describe the DCF approach to estimating the cost of equity capital.**

16   A.   According to DCF theory, the value of any security to an investor is the expected

17   discounted value of the future stream of dividends or other benefits. One widely

18   used method to measure these anticipated benefits in the case of a non-static

19   company is to examine the current dividend plus the increases in future dividend

20   payments expected by investors. This valuation process can be represented by the

21   following formula, which is the traditional DCF model:

$$K_e = D_1/P_0 + g$$

        where: K_e = investors' expected return on equity
                              D_1 = expected dividend at the end of the coming year
                              P_0 = current stock price
                              g = expected growth rate of dividends, earnings, stock price, and book value

The traditional DCF formula states that under certain assumptions, which are described in the next paragraph, the equity investor's expected return, K_e, can be viewed as the sum of an expected dividend yield, D_1/P_0, plus the expected growth rate of future dividends and stock price, g. The returns anticipated at a given market price are not directly observable and must be estimated from statistical market information. The idea of the market value approach is to infer K_e from the observed share price, the observed dividend, and an estimate of investors' expected future growth.

The assumptions underlying this valuation formulation are well known, and are discussed in detail in Chapter 4 of my reference book, *Regulatory Finance*, and Chapter 8 of my more recent reference text, *The New Regulatory Finance*. The standard DCF model requires the following main assumptions:

    (i)   a constant average growth trend for both dividends and earnings;

    (ii)   a stable dividend payout policy;

    (iii)   a discount rate in excess of the expected growth rate; and

    (iv)   a constant price-earnings multiple, which implies that growth in price is synonymous with growth in earnings and dividends.

1   The standard DCF model also assumes that dividends are paid at the end of each

2   year when in fact dividend payments are normally made on a quarterly basis.

3 **Q.   How did you estimate PSE's cost of equity for the first half of 2013 and the**

4   **second half of 2014 with the DCF model?**

5 A.   In estimating PSE's cost of equity for the first half of 2013 and the second half of

6   2014 with the DCF model, I applied the DCF model to a group of investment-

7   grade, dividend-paying, combination gas and electric utilities with the majority of

8   their revenues from regulated operations that are covered in the Value Line

9   database.

10   In order to apply the DCF model, two components are required: the expected

11   dividend yield (D_1/P_0), and the expected long-term growth (g). The expected

12   dividend (D_1) in the annual DCF model can be obtained by multiplying the

13   current indicated annual dividend rate by the growth factor $(1 + g)$.

14 **Q.   How did you estimate the dividend yield component of the DCF model?**

15 A.   From a conceptual viewpoint, the stock price to employ in calculating the

16   dividend yield is the then-current price of the security at the time of estimating the

17   cost of equity. This is because the current stock prices provide a better indication

18   of expected future prices than any other price in an efficient market. An efficient

19   market implies that prices adjust rapidly to the arrival of new information.

20   Therefore, current prices reflect the fundamental economic value of a security. A

21   considerable body of empirical evidence indicates that capital markets are

22   efficient with respect to a broad set of information. This implies that observed

1   current prices represent the fundamental value of a security, and that a cost of

2   capital estimate should be based on current prices.

3   In implementing the DCF model, I have used the dividend yields reported in the

4   Value Line Investment Analyzer ("VLIA") on-line database. Basing dividend

5   yields on average results from a large group of companies reduces the concern

6   that the vagaries of individual company stock prices will result in an

7   unrepresentative dividend yield.

8 **Q.**   **Why did you multiply the spot dividend yield by (1 + g) rather than by**

9   **(1 + 0.5g)?**

10 A.   Some analysts multiply the spot dividend yield by one plus one half the expected

11   growth rate (1 + 0.5g) rather than the conventional one plus the expected growth

12   rate (1 + g). This procedure understates the return expected by the investor.

13   The fundamental assumption of the basic annual DCF model is that dividends are

14   received annually at the end of each year and that the first dividend is to be

15   received one year from now. Thus, the appropriate dividend to use in a DCF

16   model is the full prospective dividend to be received at the end of the year. Since

17   the appropriate dividend to use in a DCF model is the prospective dividend one

18   year from now rather than the dividend one-half year from now, multiplying the

19   spot dividend yield by (1 + 0.5g) understates the proper dividend yield.

20   Moreover, the basic annual DCF model ignores the time value of quarterly

21   dividend payments and assumes dividends are paid once a year at the end of the

22   year. Multiplying the spot dividend yield by (1 + g) is actually a conservative

1 attempt to capture the reality of quarterly dividend payments. Use of this method

2 is conservative in the sense that the annual DCF model fully ignores the more

3 frequent compounding of quarterly dividends.

4 **Q.** **How did you estimate the growth component of the DCF model?**

5 A. The principal difficulty in calculating the required return by the DCF approach is

6 in ascertaining the growth rate that investors currently expect. Since no explicit

7 estimate of expected growth is observable, proxies must be employed.

8 As proxies for expected growth, I examined the consensus growth estimate

9 developed by professional analysts. Projected long-term growth rates actually

10 used by institutional investors to determine the desirability of investing in

11 different securities influence investors' growth anticipations. These forecasts are

12 made by large reputable organizations, and the data are readily available and are

13 representative of the consensus view of investors. Because of the dominance of

14 institutional investors in investment management and security selection, and their

15 influence on individual investment decisions, analysts' growth forecasts influence

16 investor growth expectations and provide a sound basis for estimating the cost of

17 equity with the DCF model.

18 Growth rate forecasts of several analysts are available from published investment

19 newsletters and from systematic compilations of analysts' forecasts, such as those

20 tabulated by Zacks Investment Research Inc. and Yahoo Finance. I used analysts'

21 long-term growth forecasts contained in Yahoo Finance as proxies for investors'

22 growth expectations in applying the DCF model. I also used Value Line's growth

23 forecasts as additional proxies.

1   **Q.**   **Why did you reject the use of historical growth rates in applying the DCF**

2   **model to utilities?**

3   A.   I have rejected historical growth rates as proxies for expected growth in the DCF

4   calculation for two reasons. First, historical growth patterns are already

5   incorporated in analysts' growth forecasts that should be used in the DCF model,

6   and are therefore redundant. Second, published studies in the academic literature

7   demonstrate that growth forecasts made by security analysts are reasonable

8   indicators of investor expectations, and that investors rely on analysts' forecasts.

9   This considerable literature is summarized in Chapter 9 of my most recent

10   textbook, *The New Regulatory Finance*.

11   **Q.**   **Did you consider any other method of estimating expected growth to apply**

12   **the DCF model?**

13   A.   Yes, I did. I considered using the so-called "sustainable growth" method, also

14   referred to as the "retention growth" method. According to this method, future

15   growth is estimated by multiplying the fraction of earnings expected to be

16   retained by the company, 'b', by the expected return on book equity, ROE, as

17   follows:

18           $$g = b \times ROE$$

19   where: g = expected growth rate in earnings/dividends
20   b = expected retention ratio
21   ROE = expected return on book equity

1   **Q.   Do you have any reservations in regards to the sustainable growth method?**

2   A.   Yes, I do. First, the sustainable method of predicting growth contains a logic trap:

3   the method requires an estimate of expected return on book equity to be

4   implemented. But if the expected return on book equity input required by the

5   model differs from the recommended return on equity, a fundamental

6   contradiction in logic follows. Second, the empirical finance literature

7   demonstrates that the sustainable growth method of determining growth is not as

8   significantly correlated to measures of value, such as stock prices and

9   price/earnings ratios, as analysts' growth forecasts. I therefore chose not to rely

10   on this method.

11   **Q.   Did you consider dividend growth in applying the DCF model?**

12   A.   No, not at this time. The reason is that as a practical matter, while there is an

13   abundance of earnings growth forecasts, there are very few forecasts of dividend

14   growth. Moreover, it is widely expected that some utilities will continue to lower

15   their dividend payout ratios over the next several years in response to heightened

16   business risk and the need to fund very large construction programs over the next

17   decade. Dividend growth has remained largely stagnant in past years as utilities

18   are increasingly conserving financial resources in order to hedge against rising

19   business risks and finance large infrastructure investments. As a result, investors'

20   attention has shifted from dividends to earnings. Therefore, earnings growth

21   provides a more meaningful guide to investors' long-term growth expectations.

22   Indeed, it is growth in earnings that will support future dividends and share prices.

1   **Q.** **Is there any empirical evidence documenting the importance of earnings in**

2   **evaluating investors' expectations?**

3   A.   Yes, there is an abundance of evidence attesting to the importance of earnings in

4   assessing investors' expectations. First, the sheer volume of earnings forecasts

5   available from the investment community relative to the scarcity of dividend

6   forecasts attests to their importance. To illustrate, Value Line, Yahoo Finance,

7   Zacks Investment, First Call Thompson, Reuters, and Multex provide

8   comprehensive compilations of investors' earnings forecasts. The fact that these

9   investment information providers focus on growth in earnings rather than growth

10   in dividends indicates that the investment community regards earnings growth as

11   a superior indicator of future long-term growth. Second, Value Line's principal

12   investment rating assigned to individual stocks, Timeliness Rank, is based

13   primarily on earnings, which accounts for 65% of the ranking.

14   **Q.** **How did you approach the composition of comparable groups in order to**

15   **estimate PSE's cost of equity with the DCF method?**

16   A.   Because PSE is not publicly traded, the DCF model cannot be applied to PSE and

17   proxies must be used. There are two possible approaches in forming proxy

18   groups of companies.

19   The first approach is to apply cost of capital estimation techniques to a select

20   group of companies directly comparable in risk to PSE. These companies are

21   chosen by the application of stringent screening criteria to a universe of utility

22   stocks in an attempt to identify companies with the same investment risk as PSE.

23   Examples of screening criteria include bond rating, beta risk, size, percentage of

1   revenues from utility operations, and common equity ratio. The end result is a

2   small sample of companies with a risk profile similar to that of PSE, provided the

3   screening criteria are defined and applied correctly.

4   The second approach is to apply cost of capital estimation techniques to a large

5   group of utilities representative of the utility industry average and then make

6   adjustments to account for any difference in investment risk between the company

7   and the industry average, if any. As explained below, in view of substantial

8   changes in circumstances in the utility industry, I have chosen the latter approach.

9   In the unstable capital market environments, it is important to select relatively

10   large sample sizes representative of the utility industry as a whole, as opposed to

11   small sample sizes consisting of a handful of companies. This is because the

12   equity market as a whole and utility industry capital market data are volatile. As a

13   result of this volatility, the composition of small groups of companies is very

14   fluid, with companies exiting the sample due to dividend suspensions or

15   reductions, insufficient or unrepresentative historical data due to recent mergers,

16   impending merger or acquisition, and changing corporate identities due to

17   restructuring activities.

18   From a statistical standpoint, confidence in the reliability of the DCF model result

19   is considerably enhanced when applying the DCF model to a large group of

20   companies. Any distortions introduced by measurement errors in the two DCF

21   components of equity return for individual companies, namely dividend yield and

22   growth are mitigated. Utilizing a large portfolio of companies reduces the

23   influence of either overestimating or underestimating the cost of equity for any

1   one individual company. For example, in a large group of companies, positive

2   and negative deviations from the expected growth will tend to cancel out owing to

3   the law of large numbers, provided that the errors are independent.[3] The average

4   growth rate of several companies is less likely to diverge from expected growth

5   than is the estimate of growth for a single firm. More generally, the assumptions

6   of the DCF model are more likely to be fulfilled for a large group of companies

7   than for any single firm or for a small group of companies.

8   Moreover, small samples are subject to measurement error, and in violation of the

9   Central Limit Theorem of statistics.[4] From a statistical standpoint, reliance on

10   robust sample sizes mitigates the impact of possible measurement errors and

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[3]   If σ_i^2 represents the average variance of the errors in a group of N companies, and σ_{ij} the average covariance between the errors, then the variance of the error for the group of N companies, σ_N^2 is:

$$\sigma_N^2 = \frac{1}{N}\bar{\sigma}_i^2 + \frac{N-1}{N}\bar{\sigma}_{ij}$$

If the errors are independent, the covariance between them (σ_{ij}) is zero, and the variance of the error for the group is reduced to:

$$\sigma_N^2 = \frac{1}{N}\sigma_i^2$$

As N gets progressively larger, the variance gets smaller and smaller.

[4]   The Central Limit Theorem describes the characteristics of the distribution of values we would obtain if we were able to draw an infinite number of random samples of a given size from a given population and we calculated the mean of each sample. The Central Limit Theorem asserts: [1] The mean of the sampling distribution of means is equal to the mean of the population from which the samples were drawn. [2] The variance of the sampling distribution of means is equal to the variance of the population from which the samples were drawn divided by the size of the samples. [3] If the original population is distributed normally, the sampling distribution of means will also be normal. If the original population is not normally distributed, the sampling distribution of means will increasingly approximate a normal distribution as sample size increases.

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1 vagaries in individual companies' market data. Examples of such vagaries

2 include dividend suspension, insufficient or unrepresentative historical data due to

3 a recent merger, impending merger or acquisition, and a new corporate identity

4 due to restructuring.

5 The point of all this is that the use of a handful of companies in a highly fluid and

6 unstable industry produces fragile and statistically unreliable results. A far safer

7 procedure is to employ large sample sizes representative of the industry as a

8 whole and apply subsequent risk adjustments to the extent that the company's risk

9 profile differs from that of the industry average.

10 **Q.** **Can you describe the proxy groups for PSE's utility business?**

11 A. As proxies for PSE, I examined groups of investment-grade dividend-paying

12 combination gas and electric utilities covered in Value Line's Electric Utility

13 industry group, meaning that these companies all possess utility assets similar to

14 PSE's. I began with all the companies designated as utilities by Value Line, that

15 is, with Standard Industrial Classification codes 4911 to 4913. Foreign

16 companies, private partnerships, private companies, non-dividend-paying

17 companies, and companies below investment-grade (with a Moody's bond rating

18 below Baa3 as reported in AUS Utility Reports) were eliminated, as well as those

19 companies whose market capitalization was less than $1 billion, in order to

20 minimize any stock price anomalies due to thin trading.[5] The final groups of

21 companies only include those companies with at least 50% of their revenues from

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[5] This is necessary in order to minimize the well-known thin trading bias in measuring beta.

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1   regulated utility operations. Please see page 2 of Exhibit No. ___(RAM-4) for the

2   PSE proxy group for the first half of 2013 and page 2 of Exhibit No. ___(RAM-

3   10) for the PSE proxy group for the second half of 2014,

4   I stress that these proxy groups must be viewed as portfolios of comparable risk.

5   It would be inappropriate to select any particular company or subset of companies

6   from these groups and infer the cost of common equity from that company or

7   subset alone.

8   **2.   DCF Estimates for PSE for the First Half of 2013**

9   **a.   DCF Estimates for PSE for the First Half of 2013 Using**
10   **Value Line Growth Projections**

11   **Q.   What DCF results did you obtain for PSE for the first half of 2013 using**

12   **Value Line growth projections?**

13   A.   Page 1 of Exhibit No. ___(RAM-4) shows the raw dividend yield and growth

14   input data for the 28 companies, and page 2 of Exhibit No. ___(RAM-4) displays

15   the DCF analysis for the 25 companies selected. (Ameren, Exelon, and Public

16   Service Enterprise have negative projected growth rates and are excluded.

17   Moreover, Exelon was eliminated since less than 50% of its revenues are subject

18   to regulation.)

19   As shown on page 2, column 3, line 27 of Exhibit No. ___(RAM-4), the average

20   long-term earnings per share growth forecast obtained from Value Line is 5.50%

21   for this group. Combining this growth rate with the average expected dividend

22   yield of 4.54% shown on page 2, column 4, line 27 of Exhibit No. ___(RAM-4)

1   produces an estimate of equity costs of 10.04% for the group, as shown on page 2,

2   column 5, line 27 of Exhibit No. ___(RAM-4).

3   **b.   DCF Estimates for PSE for the First Half of 2013 Using**
4   **Analysts' Consensus Growth Forecasts**

5   **Q.   What DCF results did you obtain for PSE for the first half of 2013 using**

6   **analysts' consensus growth forecasts?**

7   A.   Page 1 of Exhibit No. ___(RAM-5) shows the raw dividend yield and growth

8   input data for the 28 companies, and page 2 of Exhibit No. ___(RAM-5) displays

9   the DCF analysis for the 25 companies selected. (Ameren, Exelon, and Public

10   Service Enterprise have negative projected growth rates and are excluded.

11   Moreover, Exelon was eliminated since less than 50% of its revenues are subject

12   to regulation.)

13   As shown on page 2, column 3, line 27 of Exhibit No. ___(RAM-5), the average

14   consensus analysts' earnings growth forecast is 5.31% for this group. Combining

15   this growth rate with the average expected dividend yield of 4.53% shown on

16   page 2, column 4, line 27 of Exhibit No. ___(RAM-5) produces an estimate of

17   equity costs of 9.84% for the group, as shown on page 2, column 5, line 27 of

18   Exhibit No. ___(RAM-5).

1   **c.**   **Summary of DCF Estimates for PSE for the First Half**

2   **of 2013**

3   **Q.**   **Please summarize the DCF estimates for PSE for the first half of 2013.**

4   A.   Table 1 below summarizes the DCF estimates for PSE for the first half of 2013:

5   **Table 1. DCF Estimates for PSE for the First Half of 2013**

DCF STUDY	ROE
Utilities Value Line Growth	10.0%
Utilities Analysts Growth	9.8%

6   **3.**   **DCF Estimates for PSE for the Second Half of 2014**

7   **a.**   **DCF Estimates for PSE for the Second Half of 2014**

8   **Using Value Line Growth Projections**

9   **Q.**   **What DCF results did you obtain for PSE for the second half of 2014 using**

10   **Value Line growth projections?**

11   A.   Page 1 of Exhibit No. ___(RAM-10) shows the raw dividend yield and growth

12   input data for the 26 companies, and page 2 of Exhibit No. ___(RAM-10)

13   displays the DCF analysis for the 25 companies selected. (Exelon was eliminated

14   because less than 50% of its revenues are subject to regulation.) Please note that

15   the only difference between the group of 28 companies identified in Exhibit

16   No. ___(RAM-4) and the 26 companies identified in Exhibit No. ___(RAM-10) is

17   that NV Energy and UNS Energy are included in Exhibit No. ___(RAM-4) but

18   excluded from Exhibit No. ___(RAM-10) because NV Energy and UNS Energy

19   were purchased by Berkshire Hathaway and Fortis, respectively, in the

20   intervening periods

1   As shown on page 2, column 3, line 27 of Exhibit No. ___(RAM-10), the average

2   long-term earnings per share growth forecast obtained from Value Line is 5.38%

3   for this group. Combining this growth rate with the average expected dividend

4   yield of 4.05% shown on page 2, column 4, line 27 of Exhibit No. ___(RAM-10)

5   produces an estimate of equity costs of 9.43% for the group, as shown on page 2,

6   column 5, line 27 of Exhibit No. ___(RAM-10).

7   **b.   DCF Estimates for PSE for the Second Half of 2014**
8   **Using Analysts' Consensus Growth Forecasts**

9   **Q.**   **What DCF results did you obtain using the analysts' consensus growth**

10   **forecast?**

11   A.   Page 1 of Exhibit No. ___(RAM-11) shows the raw dividend yield and growth

12   input data for the 26 companies, and page 2 of Exhibit No. ___(RAM-11)

13   displays the DCF analysis for the 25 companies selected. (Exelon was eliminated

14   because less than 50% of its revenues are subject to regulation.)

15   As shown on page 2, column 3, line 27 of Exhibit No. ___(RAM-11), the average

16   consensus analysts' earnings growth forecast is 5.51% for this group. Combining

17   this growth rate with the average expected dividend yield of 4.06% shown on

18   page 2, column 4, line 27 of Exhibit No. ___(RAM-5) produces an estimate of

19   equity costs of 9.57% for the group shown on page 2, column 5, line 27 of Exhibit

20   No. ___(RAM-11).

1   **c.   Summary of DCF Estimates for PSE for the Second**
2   **Half of 2014**

3   **Q.   Please summarize the DCF estimates for PSE for the second half of 2014.**

4   A.   Table 2 below summarizes the DCF estimates for PSE for the second half of

5   2014:

6   **Table 2. DCF Estimates for PSE for the Second Half of 2014**

DCF STUDY	ROE
Utilities Value Line Growth	9.4%
Utilities Analysts Growth	9.6%

7   **Q.   Can you explain why the DCF estimates for the second half of 2014 are lower**

8   **than the DCF estimates for the first half of 2013.**

9   A.   The DCF estimates for the second half of 2014 are lower than the DCF estimates

10   for the first half of 2013 largely because of the decrease in average expected

11   dividend yield (from an average expected dividend yield of 4.54% in the second

12   half of 2013 to an average expected dividend yield of 4.06% in the second half of

13   2014). This decrease in average expected dividend yield is largely attributable to

14   the substantial average increase in utility stock prices in the period between the

15   first half of 2013 to the second half of 2014. For example, the Dow Jones Utility

16   Index (DJU) increased approximately 13.5% during this period (from a closing

17   price of $508.40 on March 28, 2013, to a closing price of $577.03 on October 23,

18   2014). This increase in average stock prices has decreased average dividend

19   yields because stock prices are the denominator in the dividend yield calculation.

1 **B.   CAPM Estimates**

2   **1.   Overview of the CAPM Methodologies**

3   **a.   Overview of the Traditional CAPM Methodology**

4 **Q.   Please describe the application of the CAPM risk premium approach.**

5 A.   My first two risk premium estimates are based on the CAPM and on an empirical

6   approximation to the CAPM. The CAPM is a fundamental paradigm of finance.

7   Simply put, the fundamental idea underlying the CAPM is that risk-averse

8   investors demand higher returns for assuming additional risk, and higher-risk

9   securities are priced to yield higher expected returns than lower-risk securities.

10   The CAPM quantifies the additional return, or risk premium, required for bearing

11   incremental risk. It provides a formal risk-return relationship anchored on the

12   basic idea that only market risk matters, as measured by beta. According to the

13   CAPM, securities are priced such that their:

14   EXPECTED RETURN = RISK-FREE RATE + RISK PREMIUM

15   Denoting the risk-free rate by R_F and the return on the market as a whole by R_M,

16   the CAPM is stated as follows:

17                   $$K = R_F + \beta * (R_M - R_F)$$

18   This is the seminal CAPM expression, which states that the return required by

19   investors is made up of a risk-free component (R_F) plus a risk premium

20   determined by the product of beta (β) and the difference between the market

21   return and the risk-free rate ($R_M - R_F$). The bracketed expression ($R_M - R_F$)

22   expression is known as the market risk premium ("MRP").

1   To derive the CAPM risk premium estimate, three quantities are required: the

2   risk-free rate (R_F), beta (β), and the MRP, (R_M - R_F).

3 **Q.   How did you arrive at the risk-free rate estimate of ~~5.0~~4.6% in the CAPM**

4   **and risk premium analyses?**

5 A.   To implement the CAPM and risk premium methods, an estimate of the risk-free

6   return is required as a benchmark. I relied on noted economic forecasts, which

7   call for a rising trend in interest rates in response to the recovering economy,

8   renewed inflation, and record high federal deficits.

9 **Q.   Why did you rely on long-term bonds instead of short-term bonds?**

10 A.   The appropriate proxy for the risk-free rate in the CAPM is the return on the

11   longest term Treasury bond possible. This is because common stocks are very

12   long-term instruments more akin to very long-term bonds rather than to short-

13   term Treasury bills or intermediate-term Treasury notes. In a risk premium

14   model, the ideal estimate for the risk-free rate has a term to maturity equal to the

15   security being analyzed. Since common stock is a very long-term investment

16   because the cash flows to investors in the form of dividends last indefinitely, the

17   yield on the longest-term possible government bonds, that is the yield on 30-year

18   Treasury bonds, is the best measure of the risk-free rate for use in the CAPM.

19   The expected common stock return is based on very long-term cash flows,

20   regardless of an individual's holding time period. Moreover, utility asset

21   investments generally have very long-term useful lives and should

22   correspondingly be matched with very long-term maturity financing instruments.

Prefiled Direct Testimony
(Nonconfidential) of
Dr. Roger A. Morin

REVISED
FEBRUARY 5, 2015

Exhibit No. ___(RAM-1T)
Page 31 of 68

1   While long-term Treasury bonds are potentially subject to interest rate risk, this is

2   only true if the bonds are sold prior to maturity. A substantial fraction of bond

3   market participants, usually institutional investors with long-term liabilities (e.g.,

4   pension funds and insurance companies), in fact hold bonds until they mature, and

5   therefore are not subject to interest rate risk. Moreover, institutional bondholders

6   neutralize the impact of interest rate changes by matching the maturity of a bond

7   portfolio with the investment planning period, or by engaging in hedging

8   transactions in the financial futures markets. The merits and mechanics of such

9   immunization strategies are well documented by both academicians and

10   practitioners.

11   Another reason for utilizing the longest maturity Treasury bond possible is that

12   common equity has an infinite life span, and the inflation expectations embodied

13   in its market-required rate of return will therefore be equal to the inflation rate

14   anticipated to prevail over the very long term. The same expectation should be

15   embodied in the risk-free rate used in applying the CAPM model. It stands to

16   reason that the yields on 30-year Treasury bonds will more closely incorporate

17   within their yields the inflation expectations that influence the prices of common

18   stocks than do short-term Treasury bills or intermediate term U.S. Treasury notes.

19   Among U.S. Treasury securities, 30-year Treasury bonds have the longest term to

20   maturity and the yields on such securities should be used as proxies for the risk-

21   free rate in applying the CAPM. Therefore, I have relied on the yield on 30-year

22   Treasury bonds in implementing the CAPM and risk premium methods.

1 **Q.** **Are there other reasons why you reject short-term interest rates as proxies**

2 **for the risk-free rate in implementing the CAPM?**

3 A. Yes. Short-term rates are volatile, fluctuate widely, and are subject to more

4 random disturbances than are long-term rates. Short-term rates are largely

5 administered rates. For example, Treasury bills are used by the Federal Reserve

6 as a policy vehicle to stimulate the economy and to control the money supply, and

7 are used by foreign governments, companies, and individuals as a temporary safe-

8 house for money.

9 As a practical matter, it makes no sense to match the return on common stock to

10 the yield on 90-day Treasury Bills. This is because short-term rates, such as the

11 yield on 90-day Treasury Bills, fluctuate widely, leading to volatile and unreliable

12 equity return estimates. Moreover, yields on 90-day Treasury Bills typically do

13 not match the equity investor's planning horizon. Equity investors generally have

14 an investment horizon far in excess of 90 days.

15 As a conceptual matter, short-term Treasury Bill yields reflect the impact of

16 factors different from those influencing the yields on long-term securities such as

17 common stock. For example, the premium for expected inflation embedded into

18 90-day Treasury Bills is likely to be far different than the inflationary premium

19 embedded into long-term securities yields. On grounds of stability and

20 consistency, the yields on long-term Treasury bonds match more closely with

21 common stock returns.

1 **Q.** **Why did you ignore the current or then-current level of interest rates in**

2 **developing the proxy for the risk-free rate in a CAPM analysis?**

3 A. The CAPM is a forward-looking model based on expectations of the future. As a

4 result, in order to produce a meaningful estimate of investors' required rate of

5 return, the CAPM must be applied using data that reflects the expectations of

6 actual investors in the market. While investors examine history as a guide to the

7 future, it is the expectations of future events that influence security values and the

8 cost of capital.

9 **Q.** **How did you select the beta for the CAPM analyses?**

10 A. A major thrust of modern financial theory as embodied in the CAPM is that

11 perfectly diversified investors can eliminate the company-specific component of

12 risk, and that only market risk remains. The latter is technically known as "beta"

13 (β), or "systematic risk". The beta coefficient measures change in a security's

14 return relative to that of the market. The beta coefficient states the extent and

15 direction of movement in the rate of return on a stock relative to the movement in

16 the rate of return on the market as a whole. It indicates the change in the rate of

17 return on a stock associated with a one percentage point change in the rate of

18 return on the market, and thus measures the degree to which a particular stock

19 shares the risk of the market as a whole. Modern financial theory has established

20 that beta incorporates several economic characteristics of a corporation that are

21 reflected in investors' return requirements. PSE is not publicly traded, and

22 therefore, proxies must be used.

1   **Q.   Can you describe the historical MRP study used in the CAPM analysis?**

2   A.   Yes. The historical MRP estimate is based on the results obtained in the

3   Morningstar (formerly Ibbotson Associates) study, Ibbotson SBBI 2014 Classic

4   Yearbook, which compiles historical returns from 1926 to 2013. This well-

5   known study shows that a very broad market sample of common stocks

6   outperformed long-term U.S. Government bonds by 6.2%. The historical MRP

7   over the income component of long-term Government bonds rather than over the

8   total return is 7.0%. Morningstar recommends the use of the latter as a more

9   reliable estimate of the historical MRP, and I concur with this viewpoint. The

10   historical MRP should be computed using the income component of bond returns

11   because the intent, even using historical data, is to identify an expected MRP.

12   This is because the income component of total bond return (i.e., the coupon rate)

13   is a far better estimate of expected return than the total return (i.e., the coupon rate

14   + capital gain), because both realized capital gains and realized losses are largely

15   unanticipated by bond investors. The long-horizon (1926-2013) MRP (based on

16   income returns, as required) is specifically calculated to be 7.0% rather than 6.2%.

17   **Q.   On what maturity bond does the Morningstar historical risk premium data**

18   **rely?**

19   A.   Because 30-year bonds were not always traded or even available throughout the

20   entire 1926-2013 period covered in the Morningstar Study of historical returns,

21   the latter study relied on bond return data based on 20-year Treasury bonds.

22   Given that the normal yield curve is virtually flat above maturities of 20 years

---

1   over most of the period covered in the Morningstar study, the difference in yield

2   is not material.

3   **Q.   Why did you use long time periods in arriving at the historical MRP**

4   **estimate?**

5   A.   Because realized returns can be substantially different from prospective returns

6   anticipated by investors when measured over short time periods, it is important to

7   employ returns realized over long time periods rather than returns realized over

8   more recent time periods when estimating the MRP with historical returns.

9   Therefore, a risk premium study should consider the longest possible period for

10   which data are available. Short-run periods during which investors earned a

11   lower risk premium than they expected are offset by short-run periods during

12   which investors earned a higher risk premium than they expected. Only over long

13   time periods will investor return expectations and realizations converge.

14   I have therefore ignored realized risk premiums measured over short time periods.

15   Instead, I relied on results over periods of enough length to smooth out short-term

16   aberrations, and to encompass several business and interest rate cycles. The use

17   of the entire study period in estimating the appropriate MRP minimizes subjective

18   judgment and encompasses many diverse regimes of inflation, interest rate cycles,

19   and economic cycles.

20   To the extent that the estimated historical equity risk premium follows what is

21   known in statistics as a random walk, one should expect the equity risk premium

22   to remain at its historical mean. Since I found no evidence that the MRP in

23   common stocks has changed over time, that is, no significant serial correlation in

1   the Morningstar study prior to that time, it is reasonable to assume that these

2   quantities will remain stable in the future.

3   **Q.   Should studies of historical risk premiums rely on arithmetic average returns**

4   **or on geometric average returns?**

5   A.   Whenever relying on historical risk premiums, only arithmetic average returns

6   over long periods are appropriate for forecasting and estimating the cost of

7   capital, and geometric average returns are not.[6]

8   **Q.   Please explain how the issue of what is the proper "mean" arises in the**

9   **context of analyzing the cost of equity?**

10   A.   The issue arises in applying methods that derive estimates of a utility's cost of

11   equity from historical relationships between bond yields and earned returns on

12   equity for individual companies or portfolios of several companies. Those

13   methods produce series of numbers representing the annual difference between

14   bond yields and stock returns over long historical periods. The question is how to

15   translate those series into a single number that can be added to a current bond

16   yield to estimate the current cost of equity for a stock or a portfolio. Calculating

17   geometric and arithmetic means are two ways of converting series of numbers to a

18   single, representative figure.

---

[6]   See Roger A. Morin, *Regulatory Finance: Utilities' Cost of Capital*, chapter 11
(1994); Roger A. Morin, *The New Regulatory Finance: Utilities' Cost of Capital*, chapter
4 (2006); Richard A Brealey, et al., *Principles of Corporate Finance* (8th ed. 2006).

1   **Q.   If both are "representative" of the series, what is the difference between the**

2   **two?**

3   A.   Each represents different information about the series. The geometric mean of a

4   series of numbers is the value which, if compounded over the period examined,

5   would have made the starting value to grow to the ending value. The arithmetic

6   mean is simply the average of the numbers in the series. Where there is any

7   annual variation (volatility) in a series of numbers, the arithmetic mean of the

8   series, which reflects volatility, will always exceed the geometric mean, which

9   ignores volatility. Because investors require higher expected returns to invest in a

10   company whose earnings are volatile than one whose earnings are stable, the

11   geometric mean is not useful in estimating the expected rate of return which

12   investors require to make an investment.

13   **Q.   Can you provide a numerical example to illustrate this difference between**

14   **geometric and arithmetic means?**

15   A.   Yes. Table 3 below compares the geometric and arithmetic mean returns of a

16   hypothetical Stock A, whose yearly returns over a ten-year period are very

17   volatile, with those of a hypothetical Stock B, whose yearly returns are perfectly

18   stable during that period. Consistent with the point that geometric returns ignore

19   volatility, the geometric mean returns for the two series are identical (11.6% in

20   both cases), whereas the arithmetic mean return of the volatile stock (26.7%) is

21   much higher than the arithmetic mean return of the stable stock (11.6%):

1

Table 3. Geometric vs. Arithmetic Returns

Year	Stock A	Stock B
2004	50.0%	11.6%
2005	-54.7%	11.6%
2006	98.5%	11.6%
2007	42.2%	11.6%
2008	-32.3%	11.6%
2009	-39.2%	11.6%
2010	153.2%	11.6%
2011	-10.0%	11.6%
2012	38.9%	11.6%
2013	20.0%	11.6%
Arithmetic Mean Return	**26.7%**	**11.6%**
Geometric Mean Return	**11.6%**	**11.6%**

2   If relying on geometric means, investors would require the same expected return

3   to invest in both of these stocks, even though the volatility of returns in Stock A is

4   very high while Stock B exhibits perfectly stable returns. That is clearly contrary

5   to the most basic financial theory, that is, the higher the risk the higher the

6   expected return.

7   Chapter 4 Appendix A of my book *The New Regulatory Finance* contains a

8   detailed and rigorous discussion of the impropriety of using geometric averages in

9   estimating the cost of capital. Briefly, the disparity between the arithmetic

10   average return and the geometric average return raises the question as to what

11   purposes should these different return measures be used. The answer is that the

12   geometric average return should be used for measuring historical returns that are

1   compounded over multiple time periods. The arithmetic average return should be

2   used for future-oriented analysis, where the use of expected values is appropriate.

3   It is inappropriate to average the arithmetic and geometric average return; they

4   measure different quantities in different ways.

b.   Overview of the Empirical CAPM Methodology

6   **Q.   Can you describe the application of the empirical version of the CAPM?**

7   A.   There have been countless empirical tests of the CAPM to determine to what

8   extent security returns and betas are related in the manner predicted by the

9   CAPM. This literature is summarized in Chapter 6 of my latest book, The New

10   Regulatory Finance. The results of the tests support the idea that beta is related to

11   security returns, that the risk-return tradeoff is positive, and that the relationship is

12   linear. The contradictory finding is that the risk-return tradeoff is not as steeply

13   sloped as the predicted CAPM. That is, empirical research has long shown that

14   low-beta securities earn returns somewhat higher than the CAPM would predict,

15   and high-beta securities earn less than predicted.

16   A CAPM-based estimate of cost of capital underestimates the return required

17   from low-beta securities and overstates the return required from high beta

18   securities, based on the empirical evidence. This is one of the most well-known

19   results in finance, and it is displayed graphically below.

CAPM: Predicted vs Observed Returns
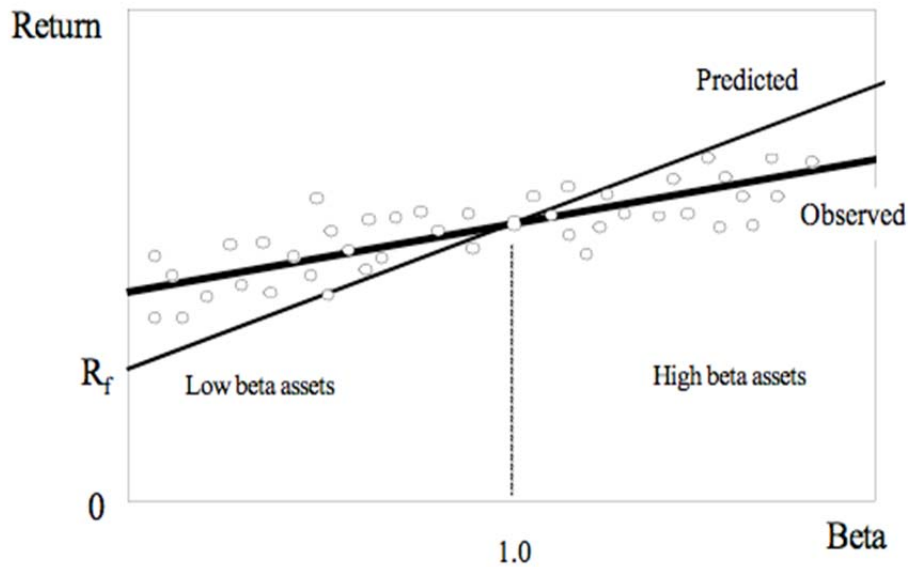
A number of variations on the original CAPM theory have been proposed to

explain this finding. The Empirical CAPM makes use of these empirical findings.

The Empirical CAPM estimates the cost of capital with the equation:

$$K = R_F + \alpha + \beta \times (MRP - \alpha)$$

where the symbol alpha, α, represents the "constant" of the risk-return line, MRP

is the market risk premium ($R_M - R_F$), and the other symbols are defined as usual.

Inserting the long-term risk-free rate as a proxy for the risk-free rate, an alpha in

the range of 1% - 2%, and reasonable values of beta and the MRP in the above

equation produces results that are indistinguishable from the following more

tractable Empirical CAPM expression:

1            $K = R_F + 0.25(R_M - R_F) + 0.75\beta(R_M - R_F)$

2   An alpha range of 1% - 2% is somewhat lower than that estimated empirically.

3   The use of a lower value for alpha leads to a lower estimate of the cost of capital

4   for low-beta stocks such as regulated utilities. This is because the use of a long-

5   term risk-free rate rather than a short-term risk-free rate already incorporates

6   some of the desired effect of using the Empirical CAPM. In other words, the

7   long-term risk-free rate version of the CAPM has a higher intercept and a flatter

8   slope than the short-term risk-free version which has been tested. This is also

9   because the use of adjusted betas rather than the use of raw betas also incorporates

10   some of the desired effect of using the Empirical CAPM.[7] Thus, it is reasonable

11   to apply a conservative alpha adjustment.

12   Exhibit No. ___(RAM-3) contains a full discussion of the Empirical CAPM,

13   including its theoretical and empirical underpinnings. In short, the following

14   equation provides a viable approximation to the observed relationship between

15   risk and return, and provides the following cost of equity capital estimate:

16           $K = R_F + 0.25(RM - RF) + 0.75\beta(RM - RF)$

---

[7]   The regression tendency of betas to converge to 1.0 over time is very well known and widely discussed in the financial literature. As a result of this beta drift, several commercial beta producers adjust their forecasted betas toward 1.00 in an effort to improve their forecasts. Value Line, Bloomberg, and Merrill Lynch betas are adjusted for their long term tendency to regress toward 1.0 by giving approximately 66% weight to the measured raw beta and approximately 33% weight to the prior value of 1.0 for each stock:

$$\beta_{adjusted} = 0.33 + 0.66\beta_{raw.}$$

1 **Q.   Is the use of the Empirical CAPM consistent with the use of adjusted betas?**

2 A.   Yes, it is. Some have argued that the use of the Empirical CAPM is inconsistent

3   with the use of adjusted betas, such as those supplied by Value Line, Bloomberg,

4   and Morningstar. This is because the reason for using the Empirical CAPM is to

5   allow for the tendency of betas to regress toward the mean value of 1.00 over

6   time, and, since Value Line betas are already adjusted for such trend, an Empirical

7   CAPM analysis results in double-counting. This argument is erroneous.

8   Fundamentally, the Empirical CAPM is not an adjustment, increase or decrease in

9   beta. The observed return on high beta securities is actually lower than that

10   produced by the CAPM estimate. The Empirical CAPM is a formal recognition

11   that the observed risk-return tradeoff is flatter than predicted by the CAPM based

12   on myriad empirical evidence. The Empirical CAPM and the use of adjusted

13   betas comprise two separate features of asset pricing. Even if a company's beta is

14   estimated accurately, the CAPM still understates the return for low-beta stocks.

15   Even if the Empirical CAPM is used, the return for low-beta securities is

16   understated if the betas are understated. Referring back to the previous graph, the

17   Empirical CAPM is a return (vertical axis) adjustment and not a beta (horizontal

18   axis) adjustment. Both adjustments are necessary. Moreover, the use of adjusted

19   betas compensates for interest rate sensitivity of utility stocks not captured by

20   unadjusted betas.

---

1 **2.   CAPM Estimates for PSE for the First Half of 2013**

2 **Q.   What is the estimate of the risk-free rate in applying the CAPM for PSE for**

3   **the first half of 2013?**

4 A.   All the noted interest rate forecasts that I am aware of point to significantly higher

5   interest rates over the next several years. Table 4 below reports the forecast

6   yields on 30-year U.S. Treasury bonds from three prominent sources: Global

7   Insight, Value Line, and Consensus Economics Inc.

8   **Table 4. 30-Year Treasury Yield Forecasts for First Half of 2013**

	2014	2015	2016	2017
Global Insight	4.1	4.6	5.3	5.4
Value Line	3.4	4.0	4.5	
Consensus Economics Inc.	3.4	4.4	5.1	5.4
AVERAGE	**3.6**	**4.3**	**5.0**	**5.4**

9   Global Insight forecasts a yield of 4.1% in 2014, 4.6% in 2015, 5.3% in 2016, and

10   5.4 in 2017 and thereafter. Value Line's quarterly economic review for

11   November 2012 forecasts a yield of 3.4% in 2014, 4.0% in 2015, and 4.5 in 2016.

12   Consensus Economics Inc.'s October 2012 edition forecasts a yield of 3.4% in

13   2014 rising to 5.4% in 2017.[8] The average 30-year long-term bond yield forecast

14   from the three sources is 3.6% in 2014, 4.3% in 2015, 5.0% in 2016, and 5.4% in

15   2017. The average over the 2015-2017 period is 4.6%, which also matches the

16   Global Insight 2015 forecast. The rising yield forecasts are also consistent with

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[8]   Global Insight forecasts are for 30-year bonds, while both Value Line and Consensus Economics forecasts are for 10-year bonds. 50 basis points were added to the 10-year forecasts based on the historical 50 basis points spread between 10 and 30-year yields.

---

1   the sharply upward-sloping yield curve observed at this time. Based on this

2   consistent evidence, a long-term bond yield forecast of 4.6% is a reasonable

3   estimate of the expected risk-free rate for purposes of the CAPM/Empirical

4   CAPM analyses for PSE for the first half of 2013.

5   **Q.**   **How did you select the beta for the CAPM analysis for PSE for the first half**

6   **of 2013?**

7   A.   I relied on a sample of widely-traded investment-grade dividend-paying

8   combination electric and gas utilities covered by Value Line that have (i) at least

9   50% of their revenues from regulated utility operations, and (ii) a market

10   capitalization that is more than $1 billion. The average beta for this group is 0.72,

11   as shown on page 1, column 2, line 30, of Exhibit No. ___(RAM-6). Based on

12   this result, I used a beta 0.72 in the CAPM and Empirical CAPM analyses for

13   PSE for the second half of 2014.

14   **Q.**   **What MRP did you use in the CAPM analysis for PSE for the first half of**

15   **2013?**

16   A.   I used an MRP of 7.2% in the CAPM and Empirical CAPM analyses for PSE for

17   the first half of 2013. This estimate was based on the results of both forward-

18   looking and historical studies of long-term risk premiums, as shown on page 1,

19   column 2, line 8 of Exhibit No. ___(RAM-7).

1   **Q.   Can you describe the historical MRP estimate used in the CAPM analysis for**

2   **PSE for the first half of 2013?**

3   A.   The historical MRP estimate used in the CAPM analysis for PSE for the first half

4   of 2013 is based on the results obtained in the Morningstar (formerly Ibbotson

5   Associates) study, Stocks, Bonds, Bills, and Inflation, 2012 Yearbook, which

6   compiles historical returns from 1926 to 2011. This well-known study shows that

7   the historical MRP over the income component of long-term Government bonds

8   rather than over the total return is 6.6%, as shown on page 1, column 2, line 7 of

9   Exhibit No. ___(RAM-7).

10   **Q.   Can you describe the prospective MRP study used in the CAPM analysis for**

11   **PSE for the first half of 2013?**

12   A.   For the prospective MRP study used in the CAPM analysis for PSE for the first

13   half of 2013, I applied a prospective DCF analysis to the aggregate equity market

14   using Value Line's VLIA software. The computations are shown in Exhibit

15   No. ___(RAM-7). The dividend yield on the S&P 500 Index is 0.45%, as shown

16   on page 1, column 2, line 1 of Exhibit No. ___(RAM-7), and the average

17   projected long-term analyst growth rate is 11.7%, obtained from Yahoo Finance,

18   as shown on page 1, column 2, line 2 of Exhibit No. ___(RAM-7). Adding the

19   expected dividend yield to the growth component produces an expected quarterly

20   market return on aggregate equities of 12.4%, as shown on page 1, column 2,

21   line 4 of Exhibit No. ___(RAM-7). Subtracting the risk-free rate of 4.6% from

22   the latter, the implied risk premium is 7.8% over long-term U.S. Treasury bonds,

23   as shown on page 1, column 2, line 6 of Exhibit No. ___(RAM-7). This estimate

1   is slightly higher than the historical estimate of 6.6%, as shown on page 1,

2   column 2, line 7 of Exhibit No. ___(RAM-7). This is not surprising given the

3   repricing of risk in the investment community that followed the financial crisis of

4   2008-2009, and the continuing volatility in financial markets that have caused an

5   upward shift in investors' risk aversion.

6   The average of the historical MRP of 6.6%, as shown on page 1, column 2, line 7

7   of Exhibit No. ___(RAM-7), and the prospective MRP of 7.8%, as shown on

8   page 1, column 2, line 6 of Exhibit No. ___(RAM-7), is 7.2%, as shown on

9   page 1, column 2, line 8 of Exhibit No. ___(RAM-7), and is my final estimate of

10   the MRP for purposes of implementing the CAPM.

11   **Q.   Is the MRP estimate of 7.2% consistent with the academic literature on the**

12   **subject?**

13   A.   Yes, it is, although in the upper portion of the range. In their authoritative

14   corporate finance textbook, Professors Brealey, Myers, and Allen[9] conclude from

15   their review of the fertile literature on the MRP that a range of 5% to 8% is

16   reasonable for the MRP in the United States. My own survey of the MRP

17   literature, which appears in Chapter 5 of my most recent textbook, *The New*

18   *Regulatory Finance*, is also quite consistent with this range.

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[9]   Richard A. Brealey, Stewart C. Myers, and Paul Allen, *Principles of Corporate Finance*, 8th Edition, Irwin McGraw-Hill, 2006.

1   **a.   Traditional CAPM Results for PSE for the First Half of**
2   **2013**

3   **Q.   What is the risk premium estimate of PSE's cost of equity using the**

4   **traditional CAPM approach for the first half of 2013?**

5   A.   Inserting a risk-free rate of 4.6%, a beta of 0.72, and a MRP of 7.2% into the

6   traditional CAPM equation yields an estimate of the cost of common equity for

7   PSE for the first half of 2013 of 9.8%:

8                $$K = R_F + \beta \times MRP$$

9                $$4.6\% + 0.72 \times 7.2\% = 9.8\%.$$

10   **b.   Empirical CAPM Results for PSE for the First Half of**
11   **2013**

12   **Q.   What is the risk premium estimate of PSE's cost of equity using the**

13   **Empirical CAPM approach for the first half of 2013?**

14   A.   Inserting a risk-free rate of 4.6%, a beta of 0.72, and a MRP of 7.2% into the

15   Empirical CAPM equation yields an estimate of the cost of common equity for

16   PSE for the first half of 2013 of 10.3%:

17            $$K = R_F + 0.25(R_M - R_F) + 0.75\beta(R_M - R_F)$$

18            $$4.6\% + (0.25 \times 7.2\%) + (0.75 \times 0.72 \times 7.2\%) = 10.3\%$$

1   **c.   Summary of CAPM Results for PSE for the First Half**
2   **of 2013**

3 **Q.   Please summarize the CAPM estimates for PSE for the first half of 2013.**

4 A.   Table 5 below summarizes the common equity estimates obtained from the

5   CAPM studies for PSE for the first half of 2013.

6   **Table 5. CAPM Results for PSE for the First Half of 2013**

CAPM Method	ROE
Traditional CAPM	9.8%
Empirical CAPM	10.3%

7   **3.   CAPM Estimates for PSE for the Second Half of 2014**

8 **Q.   What is the estimate of the risk-free rate in applying the CAPM for PSE for**

9   **the second half of 2014?**

10 A.   As noted above, all the noted interest rate forecasts that I am aware of point to

11   significantly higher interest rates over the next several years. Table 6 below

12   reports the forecast yields on 30-year U.S. Treasury bonds from various

13   prominent sources, including Global Insight, Value Line, Congressional Business

14   Office (CBO), and EIA Energy Outlook.[10] The forecasts are remarkably

15   consistent, pointing to a 5.0% yield on U.S. Treasury Bonds in the next several

16   years. It is also noteworthy that the historical return on long-term Treasury bonds

17   has averaged 5.1% over the long period 1926-2013.

---

[10]   Global Insight forecasts are for 30-year bonds, while both Value Line, EIA, and
CBO forecasts are for 10-year bonds. 50 basis points were added to the 10-year forecasts
based on the historical 50 basis points spread between 10 and 30-year yields.

Table 6. 30-Year Treasury Bond Yield Forecasts for Second Half of 2014

	2015	2016	2017	2018	2020	long-term
Global Insight	4.2	4.5	4.6	4.6	4.6	4.6
Value Line	3.8	4.3	4.8	4.8		
CBO	4.2	4.8	5.2	5.5	5.5	5.5
EIA Energy Outlook	3.4	4.4	5.1	5.4	4.6	5.0
AVERAGE	**3.9**	**4.5**	**4.9**	**5.1**	**4.9**	**5.0**

Global Insight forecasts a yield of 4.2% in 2015, 4.5% in 2016, 4.6% in 2017 and 2018, and leveling to 4.6% thereafter. Value Line's quarterly economic review of August 2014 forecasts a yield of 3.8% in 2015, 4.3% in 2016, 4.8% in 2017, and 4.8 in 2018. The CBO February 2014 edition forecasts a yield of 5.5% in the next several years. The EIA Annual Outlook 2014 forecasts steadily rising yields to 5.0% for the long-term. The average 30 year long-term bond yield forecast for the next several years from the four sources is 5.0%. The rising yield forecasts are also quite consistent with the sharply upward-sloping yield curve observed at this time. Based on this consistent evidence, I used a long-term bond yield forecast of 5.0% as a reasonable estimate of the expected risk-free rate for purposes of the CAPM/ Empirical CAPM analyses for PSE for the second half of 2014.

Q. **How did you select the beta for the CAPM analysis for PSE for the second half of 2014?**

A. In the discussion of DCF estimates of the cost of common equity earlier, I examined a sample of widely-traded investment-grade dividend-paying combination gas and electric utilities covered by Value Line. The average beta

1   for this group is 0.74, as shown on page 1, column 2, line 27 of Exhibit

2   No. ___(RAM-12). Based on this result, I used a beta of 0.74 in the CAPM and

3   Empirical CAPM analyses for PSE for the second half of 2014.

4   **Q.   What MRP did you use in the CAPM analysis for PSE for the second half of**

5   **2014?**

6   A.   I used an MRP estimate of 7.2% in the CAPM and Empirical CAPM analyses for

7   PSE for the second half of 2014. This estimate was based on the results of both

8   forward-looking and historical studies of long-term risk premiums, as shown on

9   page 1, column 2, line 7 of Exhibit No. ___(RAM-13).

10 **Q.   Can you describe the prospective MRP study used in the CAPM analysis for**

11 **PSE for the second half of 2014?**

12 A.   For the prospective MRP study used in the CAPM analysis for PSE for the second

13 half of 2014, I applied a prospective DCF analysis to the aggregate equity market.

14 The computations are shown in Exhibit No. ___(RAM-13). The dividend yield

15 on the S&P 500 Index is 2.1%, as shown on page 1, column 2, line 1 of Exhibit

16 No. ___(RAM-13), and the average projected long-term analyst growth rate is

17 10.1%, obtained from Yahoo Finance, as shown on page 1, column 2, line 2 of

18 Exhibit No. ___(RAM-13). Adding the expected dividend yield to the growth

19 component produces an expected market return on aggregate equities of 12.4%, as

20 shown on page 1, column 2, line 3 of Exhibit No. ___(RAM-13). Subtracting the

21 risk-free rate of 5.0% from the latter, the implied risk premium is 7.4% over long-

22 term U.S. Treasury bonds. This estimate is slightly higher than the historical

23 estimate of 7.0%, as shown on page 1, column 2, line 6 of Exhibit No. ___(RAM-

1   13). This is not surprising given the repricing of risk in the investment

2   community that followed the financial crisis of 2008-2009, and the continuing

3   volatility in financial markets that have caused an upward shift in investors' risk

4   aversion.

5   The average of the historical MRP of 7.0%, as shown on page 1, column 2, line 6

6   of Exhibit No. ___(RAM-13), and the prospective MRP of 7.4%, as shown on

7   page 1, column 2, line 5 of Exhibit No. ___(RAM-13), is 7.2%, as shown on

8   page 1, column 2, line 7 of Exhibit No. ___(RAM-13), and is my final estimate of

9   the MRP for purposes of implementing the CAPM.

10   **Q.   Dr. Morin, is the MRP estimate of 7.2% consistent with the academic**

11   **literature on the subject?**

12   A.   Yes, it is, although in the upper portion of the range. In their authoritative

13   corporate finance textbook, Professors Brealey, Myers, and Allen[11] conclude from

14   their review of the fertile literature on the MRP that a range of 5% to 8% is

15   reasonable for the MRP in the United States. My own survey of the MRP

16   literature, which appears in Chapter 5 of my most recent textbook, *The New*

17   *Regulatory Finance*, is also quite consistent with this range.

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[11]   Richard A. Brealey, Stewart C. Myers, and Paul Allen, *Principles of Corporate Finance*, 8th Edition, Irwin McGraw-Hill, 2006.

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1   **a.**   **Traditional CAPM Results for PSE for the Second Half**
2   **of 2014**

3 **Q.**   **What is the risk premium estimate of PSE's cost of equity using the**

4   **traditional CAPM approach for the second half of 2014?**

5 A.   Inserting a risk-free rate of 5.0%, a beta of 0.74, and a MRP of 7.2% into the

6   traditional CAPM equation yields an estimate of the cost of common equity for

7   PSE for the second half of 2014 of 10.3%:

8 $$K = R_F + \beta \times MRP$$

9 $$5.0\% + 0.74 \times 7.2\% = 10.3\%.$$

10   **b.**   **Empirical CAPM Results for PSE for the Second Half**
11   **of 2014**

12 **Q.**   **What is the risk premium estimate of PSE's cost of equity using the**

13   **Empirical CAPM approach for the second half of 2014?**

14 A.   Inserting a risk-free rate of 5.0%, a beta of 0.74, and a MRP of 7.2% into the

15   Empirical CAPM equation yields an estimate of the cost of common equity for

16   PSE for the second half of 2014 of 10.8%:

17 $$K = R_F + 0.25(R_M - R_F) + 0.75\beta(R_M - R_F)$$

18 $$5.0\% + (0.25 \times 7.2\%) + (0.75 \times 0.74 \times 7.2\%) = 10.8\%$$

Prefiled Direct Testimony   Exhibit No. ___(RAM-1T)
(Nonconfidential) of Dr. Roger A. Morin

1   **c.**   **Summary of CAPM Results for PSE for the Second**
2   **Half of 2014**

3 **Q.**   **Please summarize the CAPM estimates for PSE for the second half of 2014.**

4 A.   Table 7 below summarizes the common equity estimates obtained from the

5   CAPM studies for PSE for the second half of 2014.

6   **Table 7. CAPM Results for PSE for the Second Half of 2014**

CAPM Method	ROE
Traditional CAPM	10.3%
Empirical CAPM	10.8%

7 **C.**   **Risk Premium Estimates**

8   **1.**   **Historical Risk Premium Estimates**

9   **a.**   **Historical Risk Premium Estimates for PSE for the**
10   **First Half of 2013**

11 **Q.**   **Please describe the historical risk premium analysis of the utility industry**

12   **using Treasury bond yields for the first half of 2013.**

13 A.   For the first half of 2013, I estimated a historical risk premium for the utility

14   industry using an annual time series analysis applied to the utility industry as a

15   whole over the 1931-2011 period, using Standard and Poor's Utility Index as an

16   industry proxy. Please see Exhibit No. ___(RAM-8) for this analysis. The risk

17   premium was estimated by computing the actual realized return on equity capital

18   for the S&P Utility Index for each year, using the actual stock prices and

19   dividends of the index, and then subtracting the long-term Treasury bond return

20   for that year.

1   As shown on page 2, column 7, line 83 of Exhibit No. ___(RAM-8), the average

2   risk premium over the period was 5.2% over long-term Treasury bond yields.

3   Given the risk-free rate of 4.6%, as shown on page 1, column 2, line 5 of Exhibit

4   No. ___(RAM-7), and using the historical estimate of 5.2%, as shown on page 2,

5   column 7, line 83 of Exhibit No. ___(RAM-8), the implied cost of equity is

6   4.6% + 5.2% = 9.8%.

7   **Q.   Are risk premium studies widely used?**

8   A.   Yes, they are. Risk premium analyses are widely used by analysts, investors,

9   economists, and expert witnesses. Most college-level corporate finance and/or

10   investment management texts, including *Investments* by Bodie, Kane, and

11   Marcus,[12] which is a recommended textbook for CFA (Chartered Financial

12   Analyst) certification and examination, contain detailed conceptual and empirical

13   discussion of the risk premium approach. Risk premium analysis is typically

14   recommended as one of the three leading methods of estimating the cost of

15   capital. Professor Brigham's best-selling corporate finance textbook, for

16   example, *Corporate Finance: A Focused Approach*,[13] recommends the use of risk

17   premium studies, among others. Techniques of risk premium analysis are

18   widespread in investment community reports. Professional certified financial

19   analysts are certainly well versed in the use of this method. The only difference is

20   that I rely on long-term Treasury yields instead of the yields on A-rated utility

21   bonds.

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[12]   McGraw-Hill Irwin, 2002.

[13]   Fourth edition, South-Western, 2011.

1 **Q.**   **Are you concerned about the realism of the assumptions that underlie the**

2   **historical risk premium method?**

3 A.   No, I am not, for they are no more restrictive than the assumptions that underlie

4   the DCF or the CAPM methodologies. Although it is true that the method looks

5   backward in time and assumes that the risk premium is constant over time, these

6   assumptions are not necessarily restrictive. By employing returns realized over

7   long time periods rather than returns realized over more recent time periods,

8   investor return expectations and realizations converge. Realized returns can be

9   substantially different from prospective returns anticipated by investors,

10   especially when measured over short time periods. By ensuring that the risk

11   premium study encompasses the longest possible period for which data are

12   available, short-run periods during which investors earned a lower risk premium

13   than they expected are offset by short-run periods during which investors earned a

14   higher risk premium than they expected. Only over long time periods will

15   investor return expectations and realizations converge, or else, investors would be

16   reluctant to invest money.

17   **b.   Historical Risk Premium Estimates for PSE for the**
18   **Second Half of 2014**

19 **Q.**   **Please describe the historical risk premium analysis of the utility industry**

20   **using Treasury bond yields for the second half of 2014.**

21 A.   Similar to the analysis for the first half of 2013 described above, I estimated a

22   historical risk premium for the utility industry using an annual time series analysis

23   applied to the utility industry as a whole over the 1931-2013 period, using

---

1   Standard and Poor's Utility Index as an industry proxy. Please see Exhibit

2   No. ___(RAM-14) for this analysis. The risk premium was estimated by

3   computing the actual realized return on equity capital for the S&P Utility Index

4   for each year, using the actual stock prices and dividends of the index, and then

5   subtracting the long-term Treasury bond return for that year.

6   As shown on page 2, column 7, line 85 of Exhibit No. ___(RAM-14), the average

7   risk premium over the period was 5.5% over long-term Treasury bond yields.

8   Given the risk-free rate of 5.0%, as shown on page 1, column 2, line 4 of Exhibit

9   No. ___(RAM-13), and using the historical estimate of 5.5%, as shown on page 2,

10   column 7, line 85 of Exhibit No. ___(RAM-14), the implied cost of equity is

11   5.0% + 5.3% = 10.3%.

12   **2.   Allowed Risk Premiums**

13   **a.   Allowed Risk Premium Estimates for PSE for the First**
14   **Half of 2013**

15   **Q.   Please describe the analysis of allowed risk premiums in the utility industry**

16   **for the first half of 2013.**

17   A.   For the first half of 2013, I examined the historical risk premiums implied in the

18   ROEs allowed by regulatory commissions for electric utilities over the 1986-2011

19   period for which data were available, relative to the contemporaneous level of the

20   long-term Treasury bond yield. Please see Exhibit No. ___(RAM-9) for this

21   analysis. This variation of the risk premium approach is reasonable because

22   allowed risk premiums are presumably based on the results of market-based

23   methodologies (DCF, CAPM, risk premium, etc.) presented to regulators in rate

1   hearings and on the actions of objective unbiased investors in a competitive

2   marketplace. Historical allowed ROE data are readily available over long periods

3   on a quarterly basis from Regulatory Research Associates (now SNL) and easily

4   verifiable from SNL publications and past commission decision archives.

5   The average ROE spread over long-term Treasury yields was 5.4% over the entire

6   1986-2011 period for which data were available from SNL. It is interesting to

7   note that this estimate is identical to the previous estimate of 5.4% obtained from

8   the historical risk premium analysis. Figure 1 below shows the year-by-year

9   allowed risk premium. The escalating trend of the risk premium in response to

10   lower interest rates and rising competition is noteworthy.

11   **Figure 1. Allowed Risk Premiums 1986-2012**

12
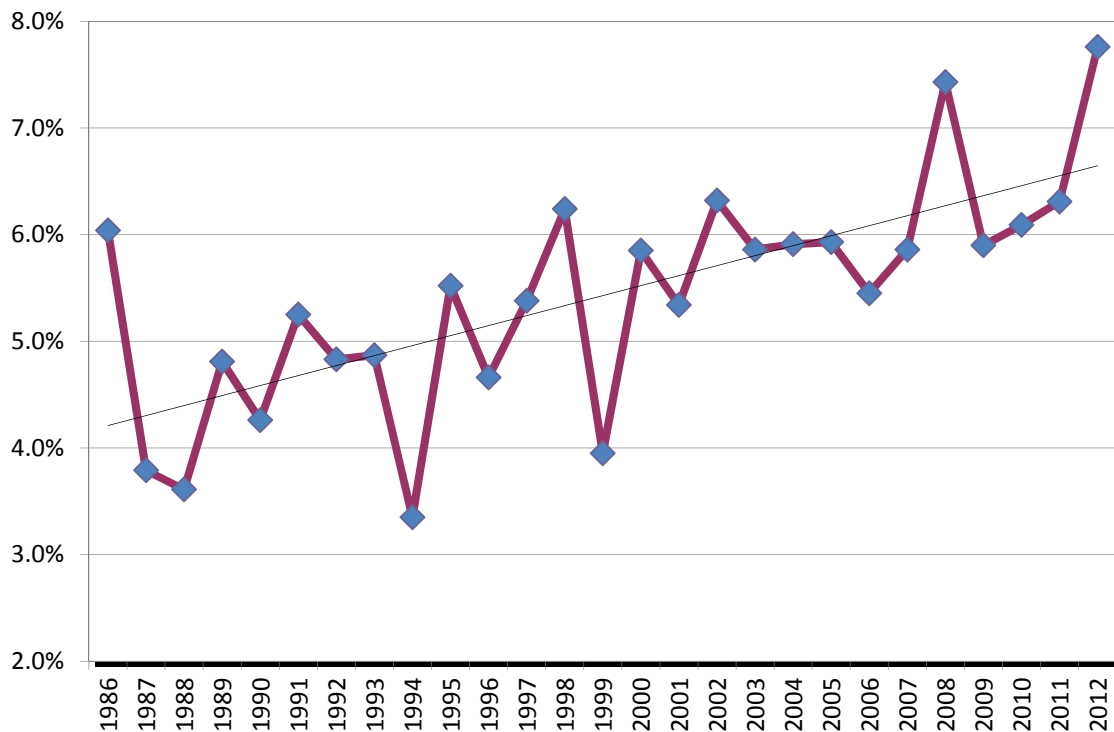
1   The following statistical relationship between the risk premium ("RP") and

2   interest rates ("YIELD") emerges over the period:

3   RP = 8.5100 - 0.5153 YIELD $R^2 = 0.71$

4   The relationship is highly statistically significant[14] as indicated by the very high

5   R^2. Figure 2 below shows a clear inverse relationship between the allowed risk

6   premium and interest rates as revealed in past ROE decisions.

Figure 2. Risk Premium vs Treasury Bond Yields 1986-2012

8
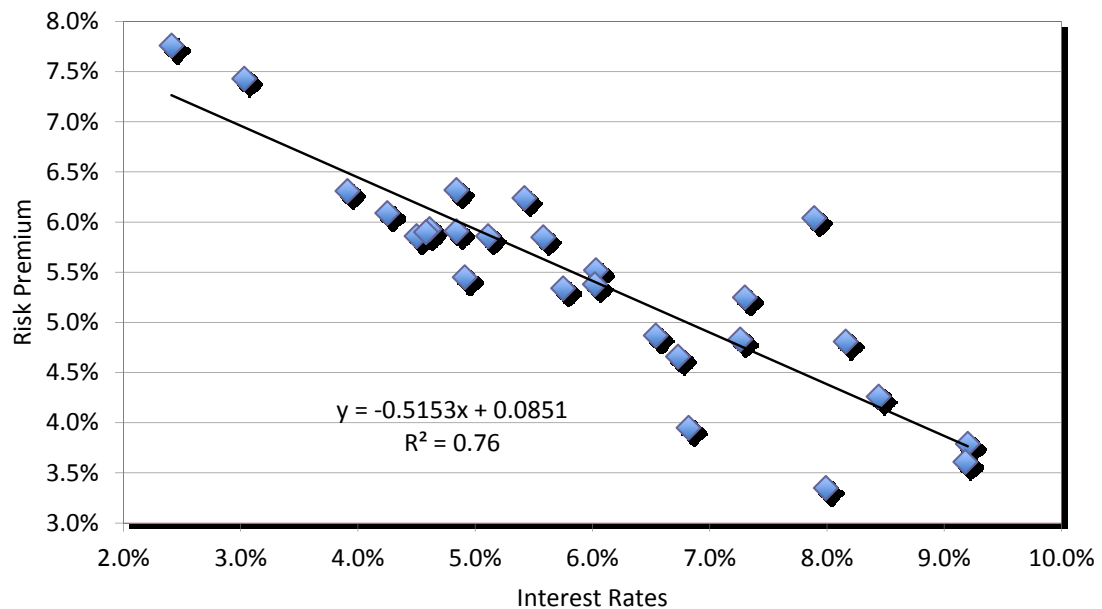
9   Inserting the current long-term Treasury bond yield of 4.6% in the above equation

10   suggests a risk premium estimate of 6.1%, implying a cost of equity of 10.7%.

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[14]   The coefficient of determination R^2, sometimes called the "goodness of fit
measure," is a measure of the degree of explanatory power of a statistical relationship. It
is simply the ratio of the explained portion to the total sum of squares. The higher R^2 the
higher is the degree of the overall fit of the estimated regression equation to the sample
data.

---

1 **Q. Do investors take into account allowed returns in formulating their return**

2 **expectations?**

3 A. Yes, they do. Investors do indeed take into account returns granted by various

4 regulators in formulating their risk and return expectations, as evidenced by the

5 availability of commercial publications disseminating such data, including Value

6 Line and SNL (formerly Regulatory Research Associates). Allowed returns,

7 while certainly not a precise indication of a particular company's cost of equity

8 capital, are nevertheless important determinants of investor growth perceptions

9 and investor expected returns.

10 **b. Allowed Risk Premium Estimates for PSE for the**
11 **Second Half of 2014**

12 **Q. Please describe the analysis of allowed risk premiums in the utility industry**

13 **for the second half of 2014.**

14 A. For the second half of 2014, I examined the historical risk premiums implied in

15 the ROEs allowed by regulatory commissions for electric utilities over the 1986-

16 2014 period for which data were available, relative to the contemporaneous level

17 of the long-term Treasury bond yield. Please see Exhibit No. ___(RAM-15) for

18 this analysis. This variation of the risk premium approach is reasonable because

19 allowed risk premiums are presumably based on the results of market-based

20 methodologies (DCF, CAPM, risk premium, etc.) presented to regulators in rate

21 hearings and on the actions of objective unbiased investors in a competitive

22 marketplace. Historical allowed ROE data are readily available over long periods

1   on a quarterly basis from Regulatory Research Associates (now SNL) and easily

2   verifiable from SNL publications and past commission decision archives.

3   The average ROE spread over long-term Treasury yields was 5.6% over the entire

4   1986-2014 period for which data were available from SNL. It is interesting to

5   note that this estimate is nearly identical to the previous estimate of 5.5% obtained

6   from the historical risk premium analysis. Figure 3 below shows the year-by-year

7   allowed risk premium. The escalating trend of the risk premium in response to

8   lower interest rates and rising competition is noteworthy.

9   **Figure 3. Allowed Risk Premiums 1986-2014**
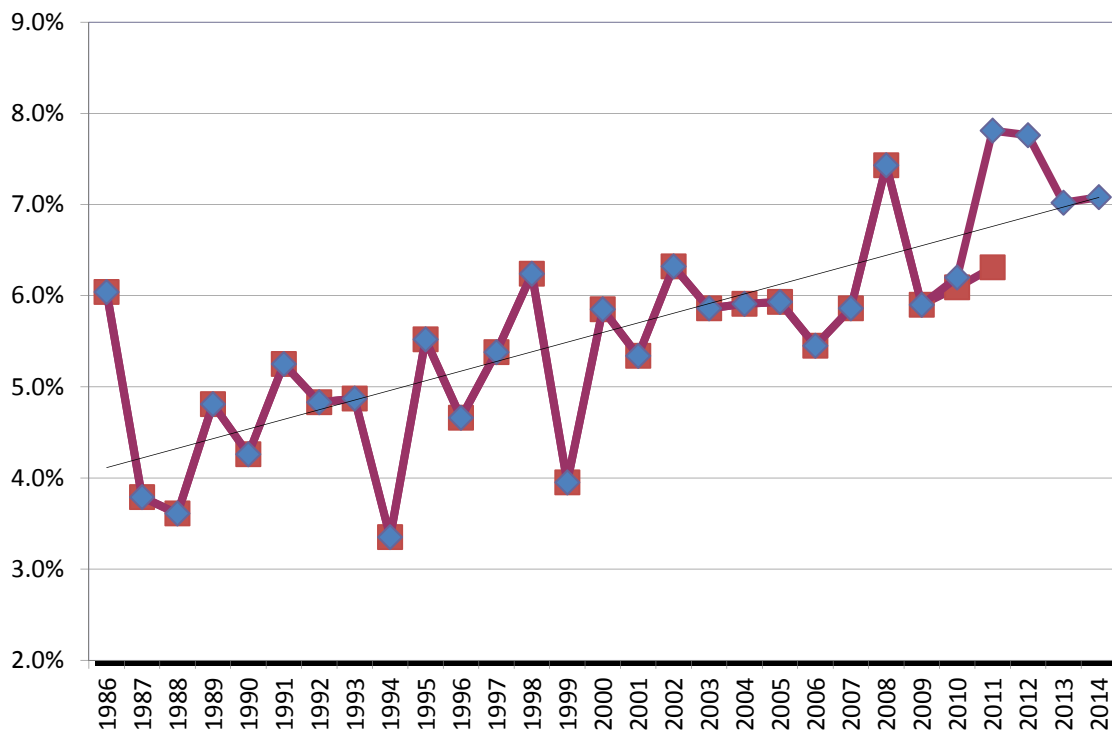
11   A careful review of these ROE decisions relative to interest rate trends reveals a

12   narrowing of the risk premium in times of rising interest rates, and a widening of

13   the premium as interest rates fall. The following statistical relationship between

1   the risk premium ("RP") and interest rates ("YIELD") emerges over the 1986-

2   2014 period:

3     $$RP = 8.700 - 0.5427 \text{ YIELD} \qquad R^2 = 0.81$$

4   Again, the relationship is highly statistically significant as indicated by the very

5   high R^2. Figure 4 below shows a clear inverse relationship between the allowed

6   risk premium and interest rates as revealed in past ROE decisions.

7   **Figure 4. Risk Premium vs Treasury Bond Yields 1986-2014**

8
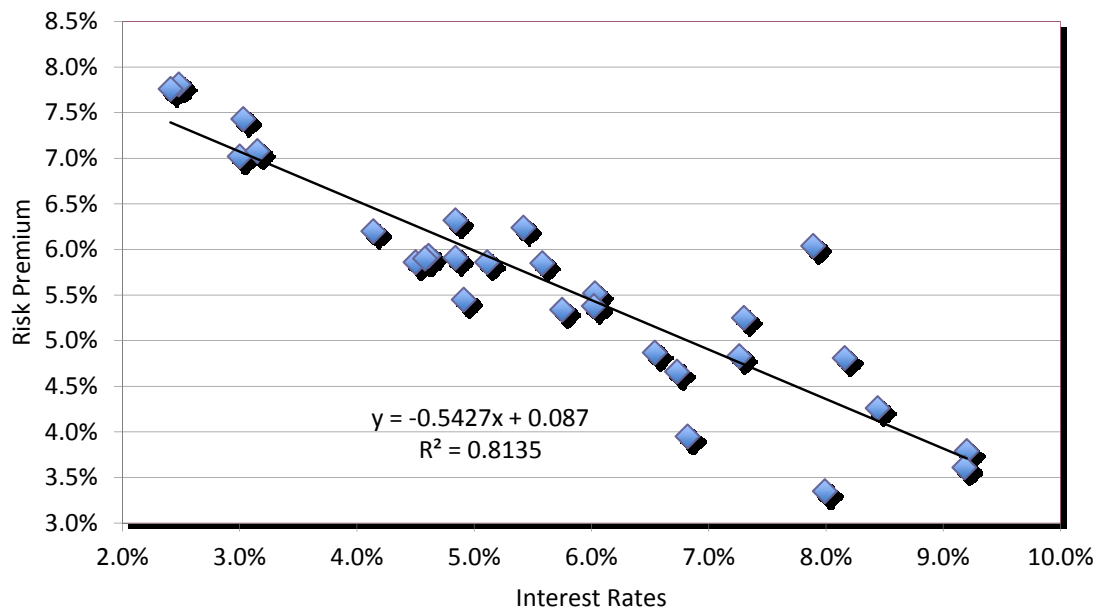
9   Inserting the current long-term Treasury bond yield of 5.0% in the above equation

10   suggests a risk premium estimate of 6.0%, implying a cost of equity of 11.0%.

1   **3.   Summary of Risk Premium Estimates for PSE for the First**
2   **Half of 2013**

3   **a.   Summary of Risk Premium Estimates for PSE for the**
4   **First Half of 2013**

5   **Q.   Please summarize the risk premium estimates for PSE for the first half of**

6   **2013.**

7   A.   Table 8 below summarizes the risk premium estimates for PSE for the first half of

8   2013.

9   **Table 8. Risk Premium Estimates for PSE for the First Half of 2013**

Risk Premium Method	ROE
Historical Risk Premium Electric	9.8%
Allowed Risk Premium	10.7%

10   **b.   Summary of Risk Premium Estimates for PSE for the**
11   **Second Half of 2014**

12   **Q.   Please summarize the risk premium estimates for PSE for the second half of**

13   **2014.**

14   A.   Table 9 below summarizes the risk premium estimates for PSE for the second half

15   of 2014.

16   **Table 9. Risk Premium Estimates for PSE for the Second Half of 2014**

Risk Premium Method	ROE
Historical Risk Premium Electric	10.5%
Allowed Risk Premium	11.0%

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1   **IV.   CONCLUSION**

2   **Q.   What do you conclude from the analyses of PSE's cost of equity in the first**

3   **half of 2013?**

4   A.   Table 10 below provides the ROE estimates for PSE for the first half of 2013.

5   **Table 10. Summary of ROE Estimates for PSE**
6   **for the First Half of 2013**

Study	ROE
Traditional CAPM	9.8%
Empirical CAPM	10.3%
Hist. Risk Premium Electric Utility Industry	9.8%
Allowed Risk Premium	10.7%
DCF Electric Utilities Value Line Growth	9.8%
DCF Electric Utilities Analyst Growth	10.1%

7   The estimates range from 9.8% to 10.7%, with a midpoint of 10.3%. The average

8   estimate is 10.1%, and both the median and truncated mean are 10.0%.

9   **Q.   What do you conclude from the analyses of PSE's cost of equity in the second**

10   **half of 2014?**

11   A.   Table 11 below provides the ROE estimates for PSE for the second half of 2014.

12   **Table 11. Summary of ROE Estimates for PSE**
13   **for the Second Half of 2014**

Study	ROE
Traditional CAPM	10.3%
Empirical CAPM	10.8%
Hist. Risk Premium Electric Utility Industry	10.5%
Allowed Risk Premium	11.0%
DCF Electric Utilities Value Line Growth	9.4%
DCF Electric Utilities Analyst Growth	9.6%

1   The estimates range from 9.4% to 11.0%, with a midpoint of 10.2%. The average

2   and the truncated mean estimate are both 10.3%, and the median estimate is

3   10.4%.

4 **Q.   Based on the analyses of PSE's cost of equity in the first half of 2013 and the**

5   **second half of 2014, was the ROE of 9.8% authorized by the Commission in**

6   **Order 08 in Dockets UE-111048 and UG-111049 within the range of**

7   **reasonableness when the Commission issued its Order 07 in these**

8   **proceedings and does it remain within the range of reasonableness through**

9   **the rate plan period?**

10 A.   Yes. The ROE of 9.8% authorized by the Commission in Order 08 in Dockets

11   UE-111048 and UG-111049 was within the range of reasonableness when the

12   Commission issued its Order 07 in these proceedings and remain within the range

13   of reasonableness through the rate plan period, albeit near the bottom of the range.

1   **Q.**   **Are there additional ROE benchmarks that the Commission should take into**

2   **account?**

3   A.   Yes, there are two additional benchmarks the Commission should take into

4   account in assessing the reasonableness of the ROE of 9.8%. First, the current

5   issue of AUS Utility Reports publishes the currently outstanding allowed ROEs

6   for the electric utilities in the peer group. As shown in Table 12 below, the

7   average authorized ROE for these companies is 10.2%, which is almost identical

8   to the midpoint of my recommended range (10.3%) and exceeds PSE's currently

9   authorized ROE of 9.8%.

10
11

**Table 12. Value Line Electric Utilities
Authorized Returns**

Company Name	Authorized ROE
Alliant Energy	10.34%
Ameren Corp.	9.49%
Avista Corp.	9.86%
Black Hills	10.72%
CenterPoint Energy	9.96%
CMS Energy Corp.	10.30%
Consol. Edison	9.93%
Dominion Resources	10.52%
DTE Energy	10.75%
Duke Energy	10.46%
Exelon Corp.	8.72%
Integrys Energy	10.03%
MGE Energy	10.30%
Northeast Utilities	9.38%
NorthWestern Corp.	10.83%

1 | **Table 12. Value Line Electric Utilities**
2 | **Authorized Returns (contd.)**

Company Name	Authorized ROE
OGE Energy	9.98%
Pepco Holdings	9.74%
PG&E Corp.	10.40%
Public Serv. Enterprise	10.30%
SCANA Corp.	10.72%
Sempra Energy	11.48%
TECO Energy	11.00%
UIL Holdings	9.15%
Vectren Corp.	10.43%
Wisconsin Energy	10.43%
Xcel Energy Inc.	10.48%
AVERAGE	**10.22%**

3   Second, the current issue of Regulatory Research's quarterly review of authorized

4   ROEs reports the ROE decisions rendered so far in 2014. The average authorized

5   ROE in recent decisions is 10.0%, which exceeds the ROE of 9.8% approved by

6   the Commission in 2012 and affirmed in 2013, and is again within my

7   recommended ROEs for PSE in the reasonable ranges of

8   (i)   9.8% to 10.7%, with a midpoint of 10.3%, for the first half
9   of 2013; and

10   (ii)   9.4% to 11.0%, with a midpoint of 10.2%, for the second
11   half of 2014.

1   **Q.**   **Is your ROE recommendation affected by PSE's revenue decoupling**

2   **mechanism?**

3   A.   No. I did not adjust my recommended ROE to account for the impact of a

4   revenue decoupling mechanism on PSE's business risks because my

5   recommended market-derived ROE for PSE is estimated from market information

6   on the cost of common equity for other comparable electric utilities. To the

7   extent that the market-derived cost of common equity for other utility companies

8   already incorporates the impacts of these or similar mechanisms, no further

9   adjustment is appropriate or reasonable in determining the cost of common equity

10   for PSE. To do so would constitute double-counting. Please see the Prefiled

11   Direct Testimony of Mr. Michael J. Vilbert, Exhibit No. ___(MJV-1T), for a

12   further discussion of the relationship between ROE and revenue decoupling

13   mechanisms.

14 **Q.**   **Does this conclude your direct testimony?**

15 A.   Yes, it does.