BEFORE THE WASHINGTON

UTILITIES & TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

V.

PUGET SOUND ENERGY, INC.

Dockets UE-121697 and UG-121705

AND

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

V.

PUGET SOUND ENERGY, INC.

Dockets UE-130137 and UG-130138

DIRECT TESTIMONY OF STEPHEN G. HILL (SGH-2T)

ON BEHALF OF

PUBLIC COUNSEL

DECEMBER 3, 2014

DIRECT TESTIMONY OF STEPHEN G. HILL (SGH-2T)
DOCKETS UE-121697, UG-121705, UE-130137 & UG-130138

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DIRECT TESTIMONY OF STEPHEN G. HILL (SGH-2T)
DOCKETS UE-121697, UG-121705, UE-130137 & UG-130138

Stephen G. Hill's Exhibit List

Exhibit No. SGH-3	Sustainable Growth
Exhibit No. SGH-4	PSE Electric Utility Sample Group Selection
Exhibit No. SGH-5	PSE DCF Growth Rate Parameters
Exhibit No. SGH-6	PSE DCF Growth Rates
Exhibit No. SGH-7	PSE Proof
Exhibit No. SGH-8	PSE Stock Price, Dividends, Yields
Exhibit No. SGH-9	PSE DCF Cost of Equity Capital
Exhibit No. SGH-10	PSE Mechanical DCF Cost of Equity Capital
Exhibit No. SGH-11	PSE CAPM Cost of Equity Capital
Exhibit No. SGH-12	PSE Earnings-Price Ratio Proof
Exhibit No. SGH-13	PSE Modified Earnings-Price Analysis
Exhibit No. SGH-14	PSE Market-To-Book Ratio Analysis
Exhibit No. SGH-15	PSE Dr. Morin's 2013 DCF Analyses
Exhibit No. SGH-16	The Brattle Group Report (March 20, 2014)
Exhibit No. SGH-17	PSE Cost of Equity Impact of a 41 to 49 Basis Point Reduction in After-tax weighted average cost of capital
Exhibit No. SGH-18	CA/HECO-IR-57, Docket No. 2013-0141
Exhibit No. SGH-19	PSE Combined Electric and Gas Operations Multiple Regression Analysis of Historical Net Revenues
Exhibit No. SGH-20	Qualifications of Stephen G. Hill

I. INTRODUCTION / SUMMARY

Q: Please state your name and business address.

A: My name is Stephen G. Hill. My business address is P.O. Box 587, Hurricane, West Virginia 25526 [hillassociates@gmail.com].

Q: By whom are you employed and in what capacity?

A: I am Principal of Hill Associates, a consulting firm specializing in financial and economic issues in regulated industries.

Q: On behalf of whom are you testifying?

A: I am testifying on behalf of the Public Counsel Section of the Washington Attorney General's Office (Public Counsel).

Q: Briefly, what is your educational background?

A: After graduating with a Bachelor of Science degree in Chemical Engineering from Auburn University in Auburn, Alabama, I was awarded a scholarship to attend Tulane Graduate School of Business Administration at Tulane University in New Orleans, Louisiana. There I received a Master's Degree in Business Administration. Subsequently, I was awarded the professional designation of "Certified Rate of Return Analyst," by the Society of Utility and Regulatory Financial Analysts. This designation is based upon education, experience and the successful completion of a comprehensive examination. I have also served on the Board of Directors and am currently Vice President of that national organization. A more detailed account of my educational background and occupational experience appears in Exhibit No. SGH-20.

Q: Have you testified before this or other regulatory commissions?

A: Yes, I have testified previously in this regulatory jurisdiction and, over the past 30 years, I have testified on cost of capital, corporate finance and capital market issues in more than 300 regulatory proceedings before the following regulatory bodies: the West Virginia Public Service Commission, the Connecticut Department of Public Utility Control, the Oklahoma State Corporation Commission, the Public Utilities Commission of the State of California, the Pennsylvania Public Utilities Commission, the Maryland Public Service Commission, the Public Utilities Commission of the State of Minnesota, the Ohio Public Utilities Commission, the Insurance Commissioner of the State of Texas, the North Carolina Insurance Commissioner, the Rhode Island Public Utilities Commission, the City Council of Austin, Texas, the Texas Railroad Commission, the Arizona Corporation Commission, the South Carolina Public Service Commission, the Public Utilities Commission of the State of Hawaii, the New Mexico Corporation Commission, the Texas Public Service Commission, the Georgia Public Service Commission, the Public Service Commission of Utah, the Kentucky Public Utilities Commission, the Illinois Commerce Commission, the Kansas Corporation Commission, the Indiana Utility Regulatory Commission, the Virginia Corporation Commission, the Montana Public Service Commission, the Public Service Commission of the State of Maine, the Public Service Commission of Wisconsin, the Vermont Public Service Board, the Federal Communications Commission and the Federal Energy Regulatory Commission. I have also testified before the West Virginia Air Pollution Control Commission regarding appropriate pollution control technology and its financial impact on the company under review and have been an advisor to the Arizona Corporation Commission on matters of utility finance.

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

A**:** In the initial phase of this proceeding, this Commission set rates for Puget Sound Energy (Puget, PSE, the Company) employing an expedited rate filing in lieu of a traditional general rate case proceeding. As such, the Commission elected to set rates for Puget relying on the cost of capital and capital structure deemed appropriate in the Company's most recent full rate case[1] and also allowed the Company to implement a decoupling ratemaking regime along with an attrition adjustment. The initial Order in this proceeding[2] was appealed to Superior Court. On the issue of the appropriate cost of equity, the case was remanded back to this Commission for further hearing.

Therefore, as set out by the Commission in Orders 10 and 11 in these proceedings, the purpose of these proceedings is to estimate the cost of equity capital of Puget Sound Energy during the first half of 2013, prior to the original Final Order[3] issued June 25, 2013. The evidence I present here will be that which would be presented in a "contested general rate proceeding"[4] regarding the cost of common equity capital for Puget Sound Energy at the time prior to the original decision in these proceedings. In addition, although I did not perform a separate

[1] *Washington Utilities and Transportation Comm'n v. Puget Sound Energy, Inc.,* Dockets UE-110488 & UG-110489 (PSE 2011 GRC).
[2] Order 07.
[3] Order 07.
[4] Order 10, ¶ 25.

cost of capital analysis to determine a current cost of equity capital, I do reference cost of capital analyses I have undertaken recently in this jurisdiction and analyze other capital cost indications as a check on the reasonableness of my recommended return of equity (ROE) for the rate plan at issue in this proceeding.

Just as it would in a contested rate proceeding, my testimony in these proceedings will address the market-based cost of equity capital as determined through standard economic models (DCF, CAPM, etc.) and will also review other factors that impact the cost of equity. Chief among those other factors is decoupling, a rate design methodology that reduces the Company's revenue volatility and operating risk. As discussed in more detail in the body of my testimony, this Commission and the Commission Staff have recognized that decoupling lowers utility risk. A reduction in risk must be recognized in the allowed return on common equity (or in a reduced common equity ratio), or ratepayers will be disadvantaged through providing a return that exceeds the Company's actual cost of common equity capital.

The Company has estimated its 2013 cost of equity capital to be in a range of 9.8 percent to 10.7 percent, with a mid-point of 10.3 percent.[5] The Company also testifies that there is no reduction to the cost of common equity due to decoupling.[6] Based on that testimony, the Company's position here is that the Commission's reliance on the 9.8 percent return on equity, awarded in Puget's last fully-adjudicated rate proceeding in 2011[7], continues to be reasonable

[5] Prefiled Direct Testimony of Dr. Roger A. Morin, Exhibit No. RAM-1T, p. 2.
[6] Prefiled Direct Testimony of Dr. Michael J. Vilbert, Exhibit No. MJV-1T, p. 5.
[7] *PSE 2011 GRC*, Order 08.

because it falls within the Company's estimated zone of reasonableness in this case. Public Counsel has requested that I review the rate of return and decoupling/capital cost impact evidence submitted by the Company and, in addition, undertake my own analysis of Puget's 2013 market-based cost of common equity, an appropriate ratemaking capital structure, and a quantification of the impact of decoupling on the cost of common equity capital.

Q: Have you prepared exhibits in support or your testimony?

A: Yes. Attached to this testimony are 18 exhibits (Exhibit Nos. SGH-3 through SGH-20) that provide the analytical support for the conclusions reached regarding the historical, but forward-looking 2013 cost of equity for Puget Sound Energy's utility operations and the quantification of the risk reduction afforded by PSE's electric and gas full decoupling mechanisms, which are discussed in the body of this testimony. These exhibits were prepared by me and are correct to the best of my knowledge and belief.

Q: Please summarize your findings.

A: My testimony is organized into four sections. First, I discuss the cost of capital standard as a measure of the return to be allowed for regulated industries, and review the economic environment existing in the first half of 2013 in which the equity return estimate is made.

Second, I evaluate the cost of equity capital for similar-risk operations using Discounted Cash Flow (DCF), Capital Asset Pricing Model (CAPM), Modified Earnings-Price Ratio (MEPR), and Market-to-Book Ratio (MTB) analyses. In this section of my testimony, I also confirm that the cost of equity I estimate for the historical period at issue in these proceedings (2013) remains appropriate currently and for the rate-effective period.

Third, I discuss the shortcomings contained in the cost of capital analysis presented by Puget witness Dr. Roger Morin. Dr. Morin's cost of capital analysis is somewhat overstated in several instances and results in an equity cost estimate that exceeds the actual market-based cost of equity capital. Ultimately, Dr. Morin's testimony does *not* support the Company's contention that a 9.8 percent return on equity is within a zone of reasonableness for Puget, either currently or at mid-year 2013.

Fourth, I estimate the cost of equity impact of the decoupling rate design that this Commission has allowed for Puget. I analyze the impact of decoupling in two ways—through the impact on the market-based cost of capital and through an analysis of the actual historical net revenue volatility of Puget's utility operations. In the initial portion of my decoupling analysis, I review the testimony of Company witness Dr. Vilbert who has presented analyses of the impact of decoupling on the market-based cost of capital and, through his firm, the Brattle Group (Brattle), which has recently published a study of decoupling on the cost of common equity capital for electric utilities.[8] This body of work by Dr. Vilbert shows, via the preponderance of the evidence in his studies, that decoupling lowers the cost of capital for utility operations. While Dr. Vilbert

[8] Michael J. Vilbert, Joseph B. Wharton, Charles Gibbons, Melanie Rosenberg, and Yang Wei Neo, *The Impact of Revenue Decoupling on the Cost of Capital for Electric Utilities: An Empirical Investigation*, Prepared for The Energy Foundation, March 20, 2014. (A copy of this study is attached as Exhibit No. SGH-16.) The study was published by the Brattle Group and prepared for the Energy Foundation. The term published here does not denote publication in a scientific journal for peer-review.

testifies that his studies show that the cost of capital is *not* affected by decoupling, that conclusion is based on his application of an unnecessarily strict statistical threshold. As noted in the testimony of Public Counsel and ICNU witness Dr. Christopher Adolph, using a more reasonable statistical confidence level, the results of Dr. Vilbert's studies show that decoupling does, indeed, lower the cost of capital—and that the effect is substantial.

In the second portion of my decoupling analysis, I study the actual historical volatility of the Company's net revenues. In a decoupling ratemaking regime, where the company is made whole for its promised regulatory revenues per customer no matter what its unit sales are, the volatility of corporate revenues normally due to changes in the service territory economy or weather (or any other exogenous factor) will be significantly reduced. Through a statistical examination of the Company's actual electric and gas utility operating results over the past fifteen years I have quantified the cost of equity impact of the reduced revenue volatility risk estimated to be imparted by decoupling.

I have estimated the equity capital cost of utility operations similar in operating (business) risk to the Washington operations of Puget to be within the range of 8.50 percent to 9.50 percent, with a midpoint of 9.00 percent. Absent decoupling, the Company's cost of equity capital should be set at the mid-point of that range because its bond ratings are equivalent to that of the sample group of companies used to estimate the market-based cost of equity. However, because the Company has been allowed a decoupling rate design with a true-up that will improve its ability to realize its allowed revenue requirement, and because decoupling lowers the Company's risk and cost of capital, a 35 basis point reduction in the cost of common equity capital would be reasonable in mid-year 2013. Therefore, the cost of equity capital for Puget at mid-year 2013 (the time of Order 07 in these proceedings) is 8.65 percent.

Q: Why should the cost of capital serve as a basis for the proper allowed rate of return?

A: The Supreme Court of the United States has established, as a guide to assessing an appropriate level of profitability for regulated operations, that investors in such firms are to be given an opportunity to earn returns that are sufficient to attract capital and are comparable to returns investors would expect in the unregulated sector for assuming the same degree of risk. The *Bluefield* and *Hope* cases provide the seminal decisions.[9] These criteria were restated in the *Permian Basin Area Rate Cases*.[10] However, the Court also makes quite clear in *Hope* that regulation does not guarantee profitability and, in *Permian Basin* that, while investor interests (profitability) are certainly pertinent to setting adequate rates, those interests do not exhaust the relevant considerations.

As a starting point in the rate-setting process, then, the cost of capital of a regulated firm represents the return investors could expect from other investments, while assuming no more and no less risk. Since financial theory holds that investors will not provide capital for a particular investment unless that investment is expected to yield their opportunity cost of capital, the

[9] *Bluefield Water Works v. PSC*, 262 US 679 (1923); *FPC v. Hope Natural Gas Company*, 320 US 591 (1944).
[10] *Permian Basin Area Rate Case,* 390 US 747 (1968).

correspondence of the cost of capital with the Court's guidelines for appropriate earnings is clear.

Q: The requirement in these proceedings, i.e., to estimate the forward-looking cost of equity capital during a historical time period, is unusual. How were you able to undertake such an analysis?

A: As long as the cost of capital analyst has available to them market data (e.g., bond yields, stock prices, growth rate projections) that are contemporaneous with the targeted time period (in this case, "early 2013"), the analysis is relatively unremarkable and proceeds as it normally would in a fully-developed rate proceeding. If there is a difficulty in this process, it is that the cost of capital is based on expectations and one important part of those expectations is related to the anticipated change in interest rates. Interest rates in 2013 were expected to increase and that fact would have been incorporated into market prices and any unbiased estimate of the cost of equity capital. One difficulty with "back-casting" a cost of equity analysis is that the analysts now know interest rates did not increase in 2014 and, in fact, have declined a bit since the original hearing in these proceedings. However, the target period 2013 analysis must ignore that subsequent reality and estimate the cost of equity as if those results did not exist. That is the manner in which I have prepared the target period cost of equity capital estimate presented in Section III of my testimony.

II. ECONOMIC ENVIRONMENT

Q: Why is it necessary to review the economic environment in which an equity cost estimate is made?

A: The cost of equity capital is an expectational, or *ex ante*, concept. In seeking to estimate the cost of equity capital of a firm, it is necessary to gauge investor expectations with regard to the relative risk and return of that firm, as well as that for the particular risk-class of investments in which that firm resides. Because this exercise is, necessarily, based on understanding and accurately assessing investor expectations, a review of the larger economic environment within which the investor makes his or her decision is most important. Investor expectations regarding the strength of the U.S. economy, the direction of interest rates and the level of inflation (factors that are determinative of capital costs) are key building blocks in the investment decision. The analyst and the regulatory body should review those factors in order to assess accurately investors' required return—the cost of equity capital to the regulated firm.

Q: What were the cost of capital implications of the capital market environment in the first half of 2013?

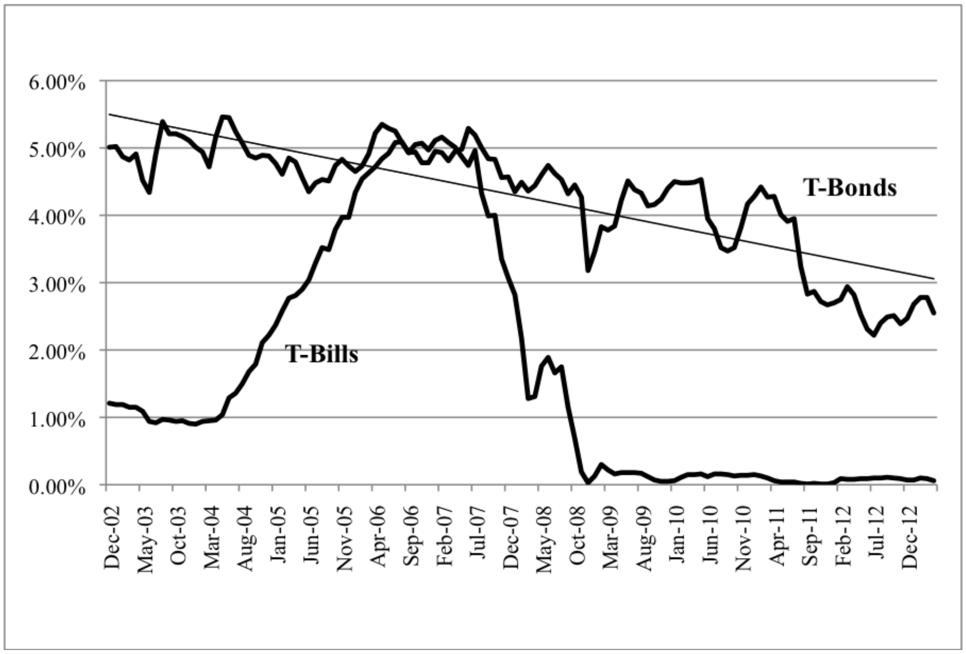
A: The changes in U.S. government interest rates over the ten years prior to 2013 provide a useful description of the state of the economy because those interest rates have a fundamental impact on economic activity. The Federal Reserve (Fed) acts to exert control on the economy through its ability to withhold or inject money into the economy and in so doing control short-term Treasury yields. When the economy is "overheated" and inflation is above acceptable levels due to a rapidly growing economy and commodity shortages, the Fed will raise short-term rates, which acts to retard economic growth. As shown in Chart I below, during the 2004-2007 period the Fed raised short-term interest rates to levels equivalent to long-term Treasury rates (long-term Treasury yields are usually 2 percent higher than short-term debt yields). That action worked to reduce economic growth and alleviate inflation concerns and, as a result, the Fed began to lower short-term interest rates.

The financial crisis, initiated by a collapse in the real estate market in 2008, required the Fed to reduce short-term debt rates in order to attempt to keep the U.S. economy from falling into a severe recession. The financial crisis did cause a recession in the U.S., but the Fed's actions to inject money into the economy, through not only lowering short-term rates, but also through buying back outstanding long-term U.S. debt (propping up those prices and keeping yields relatively low), mitigated the economic downturn.

Therefore, as shown in Chart I below, over the past decade there have been wide fluctuations in *short-term* interest rate levels as the Fed raised and lowered the Federal Funds rate to slow down and encourage (respectively) economic growth. However, *long-term* interest rates (20-year T-bonds) have ranged from 3.5 percent to 5 percent over most of that time period, with a slow and relatively steady downward trend. As a result of the 2008/09 economic downturn and the Fed's open-market purchase of long-term Treasury bonds, those yields dipped in 2013, below the lower end of that historical range.

Chart I

Long- and Short-term U.S. Treasury Interest Rates



Absent the 2012 downturn in T-Bond yields due to international sovereign banking concerns, the trend in 20-year T-Bond yields, as shown in Chart I, above, indicates, in mid-year 2013, a "normalized" long-term risk-free yield expectation of approximately 3.0 percent, based on the long-term trend shown. Also, during the first half of 2013, the yield difference between 30-year T-Bonds and 20-year T-Bonds has been approximately 40 basis points, indicating a current "normalized" long-term risk-free rate of 3.40 percent. Therefore, this fundamental building block of capital costs (long-term T-bond yields) provides an indication that in the current economic environment, capital costs are lower in 2013 than they were prior to the economic troubles of late 2008 and early 2009.

Q: Did bond yields decline between the time of Puget's 2011 rate proceeding and the 2013 period targeted in these proceedings?

A: Yes. The Order in that prior rate proceeding[11] was issued in May of 2012 and the cost of capital evidence presented by the witnesses in that proceeding (Olson, Elgin and Gorman) was based on market data ranging from October 2010 through April 2011 (Olson), and September 2011 through November 2011 (Elgin and Gorman). Therefore, although the Order in PSE's most recent general rate case proceeding was issued in 2012, the cost of capital data on which the Commission's ROE determination was based came from early and late 2011.

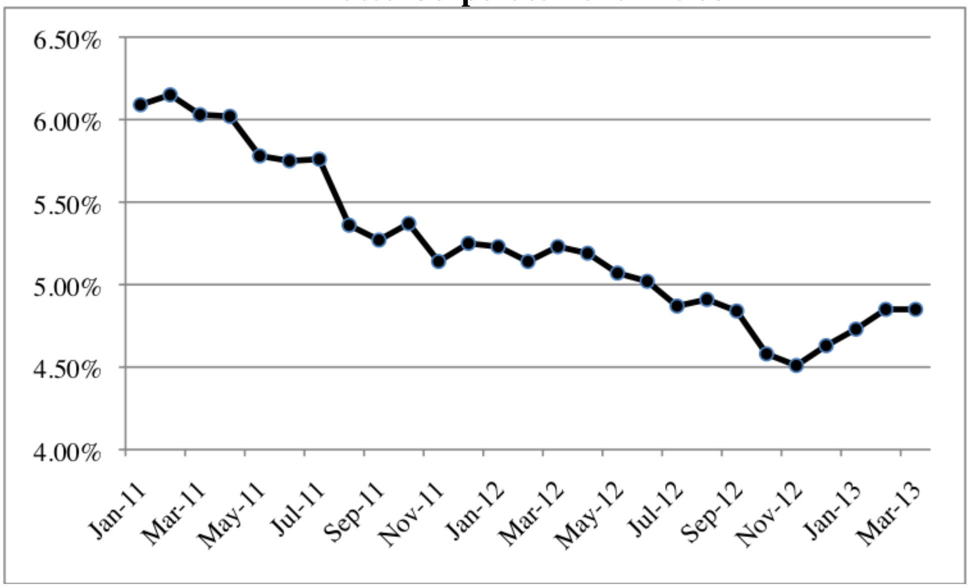
Based on the level of corporate bond yields, the 2013 cost of capital was lower than it was during 2011 (the time period in which the market based cost of capital analyses were undertaken for PSE's last rate proceeding). Bond yields are indicators of capital cost movements and are often used directly to estimate the cost of equity capital in rate proceedings in Risk Premium analyses, where an equity risk premium is added to current bond yields. Therefore, bond yields changes are indicative of changes in the cost of equity capital.

As shown in Chart II below, based on BBB-rated corporate debt yields published by the Federal Reserve (Fed) in its Statistical Release H.15, capital costs declined between 2011 and 2013.

[11] *PSE 2011 GRC*, Order 08.

Chart II

BBB-Rated Corporate Bond Yields



Data from the Federal Reserve Statistical Release H.15, Historical Data.

Corporate bond yields in the first part of 2013 were about 125 basis points below the levels that existed during the early part of 2011 and roughly 50 basis points below the level that existed during the latter portion of 2011 (when Staff and ICNU testimony was prepared). The available capital market evidence contained in corporate bond yields, therefore, indicates that capital costs in the targeted 2013 time period are definitely lower than they were when the cost of capital estimates presented in PSE’s last rate case were prepared. Those data indicate that, assuming a 9.8 percent ROE was appropriate in 2011, a lower cost of equity capital would be appropriate in 2013.

Q: As of the early part of 2013, what were the expectations with regard to the economy and interest rates?

A: As The Value Line Investment Survey notes in its May 2013 Quarterly Review, the then-current expectation for the U.S. economy was that recovery from the economic recession would be likely to continue at a moderate pace, which would allow core inflation to remain moderate. Moreover, the Fed is expected to keep interest rates low for at least the next two years:

> **Economic Growth:** As we peer over the current quarter, we see a sequester-induced "spring swoon." Our sense is that the biggest impact of the spending cuts will be felt in the present period. The inconsistent pattern of the economic issuances is partly a function of the massive cuts in defense spending…. Many expect that as the deficit has fallen more than expected, Washington is less likely to see the full sequester go into effect. Still, growth may falter in the period, likely easing into the 1%-2% range [Chart omitted]. Thereafter, we think fundamentals will improve further, particularly in housing, car sales, and employment [Chart omitted], and that the Fed, armed with a benign inflation outlook, will have plenty of flexibility and [will] stay supportive. But possible headwinds remain, in particular on the fiscal side, where the automatic spending cuts will exact a toll in the near term, as well expiring stimulus, and the further reduction in discretionary spending….
>
> **Inflation:** Here, unlike the spotty situation chronicled above, the news has been consistently favorable, with consumer prices under tight control and showing few signs of deviating from that orderly path. In fact, such stability has been the rule for the past half decade—a period of occasionally heightened turbulence in other areas….
>
> **Interest Rates:** The central bank has given itself plenty of room to maneuver. In fact, the Federal Open Market Committee's policy statement on May 1st noted: "The Committee is prepared to increase or reduce the pace of its purchases to maintain appropriate policy accommodation as the outlook for the labor market or inflation changes." This is the dual mandate of the Fed…. In all, the Federal Reserve is holding its federal funds target at 0% to 0.25%, and plans to keep such rates in this historically low range

> for as long as the jobless rate holds above 6.5%. We believe that will be the case until at least 2015 [Chart omitted]. After than, a slow rise in short- and long-term interest rates is likely, as the seemingly sustainable expansion becomes better able to evolve on its own, and the inevitable creep higher in inflation becomes a reality.[12]

In the 2013 Quarterly Economic Review, cited above, Value Line projects long-term Treasury bond rates will average 3.1 percent through 2013 and 4.0 percent in 2015.[13] According to Value Line's Selection and Opinion, 30-year Treasury bond yields averaged 3.19 percent over the six weeks ending in June, 2013.[14] Therefore, the indicated expectation with regard to long-term interest rates is that they are expected to move somewhat higher in the future, provided the economic recovery continues to advance at a moderate pace. Simply put, due to the moderate pace of the economy and relatively low core inflation, capital costs are low and are expected to remain low until the economy shows more rapid growth, which Value Line now expects to occur in the 2016-2018 period.

III. METHODS OF EQUITY COST EVALUATION

A. Discounted Cash Flow.

Q: Please describe the discounted cash flow (DCF) model you used to arrive at an estimate of the cost of common equity capital for the Company in this proceeding.

A: The DCF model relies on the equivalence of the market price of the stock (P) with the present value of the cash flows investors expect from the stock, and assumes

[12] The Value Line Investment Survey, *Selection & Opinion*, at 944 (May 24, 2013).
[13] *Id.* at 943.
[14] The Value Line Investment Survey, *Selection & Opinion*, "Selected Yields," (May 17 through June 21, 2013).

that the percentage rate, which discounts the future cash flows (dividends) to the present value (the stock price), equals the cost of capital. The total return to the investor, which equals the required return according to this theory, is the sum of the dividend yield and the expected growth rate in the dividend.

The theory is represented by the equation,

$$k = D/P + g, \qquad (1)$$

where “k” is the equity capitalization rate (cost of equity, required return), “D/P” is the dividend yield (dividend divided by the stock price), and “g” is the expected sustainable growth rate.

Q: What growth rate (g) did you adopt in developing your DCF cost of common equity for the Company’s Washington operations?

A: The growth rate variable in the traditional DCF model is quantified, theoretically, as the dividend growth rate investors expect to continue into the indefinite future. The DCF model is actually derived by 1) considering the dividend a growing perpetuity, that is, a payment to the stockholder which grows at a constant rate indefinitely, and 2) calculating the present value (the current stock price) of that perpetuity. The model also assumes that the company whose equity cost is to be measured exists in a steady state environment, i.e., the payout ratio and the expected return are constant and the earnings, dividends, book value and stock price all grow at the same rate, forever.

While that assumption appears to be somewhat unrealistic because, in the short term, growth rates in dividends, earnings and book value can be quite different, over the long term it has proven to be true. For example, according to Value Line's published year-by-year retrospective of the Dow Jones Industrials Index (DJI) from 1920 through 2005, the average earnings, dividend, and book value growth rates for the companies in the DJI over that time period were 5.3 percent, 4.9 percent and 5.2 percent.[15] For utility companies, over the long term, average growth rates in earnings, dividends and book value are even closer. Moody's Public Utility Manual reports that, between 1947 and 1999, average growth in earnings, dividend and book value growth of Moody's Electric Utilities was 3.34 percent, 3.22 percent and 3.66 percent, respectively.[16] Therefore, the fundamental DCF assumption that earnings, dividends and book value are expected to grow, over the long-term, at the same sustainable rate of growth is reasonable and is an accurate representation of how firms actually grow over time.

However, even though in the long-term the fundamental assumptions of the DCF have proven to be sound, as with all mathematical models of real-world phenomena, the DCF theory does not precisely "track" reality in the shorter term. Payout ratios and expected equity returns as well as earnings and dividend growth rates do change at different rates over the short-term. Therefore, in order to properly apply the DCF model to any real-world situation and, in this case, to find the long-term sustainable growth rate called for in the DCF theory, it is essential to understand the determinants of long-run expected dividend growth.

[15] www.valueline.com, Dow Jones Long Term Chart (PDF).
[16] Moody's ceased publication of its Public Utility Manual in 2001.

Q: Can you provide an example to illustrate the determinants of the long-run sustainable growth called for in the DCF model?

A: Yes, in Exhibit No. SGH-3, I provide an example of the determinants of a sustainable growth rate on which to base a reliable DCF estimate. In addition, in Exhibit No. SGH-3, I show how reliance on earnings or dividend growth rates alone, absent an examination of the underlying determinants of long-run dividend growth, can produce inaccurate DCF results.

Q: How have you developed an estimate of the expected long-term growth in your application of the DCF model?

A: I have calculated both the historical and projected sustainable growth rates for a sample of utility firms with similar risk to the Company, and I have incorporated other growth rate indicators into the analysis as well. To estimate an appropriate DCF growth rate, I have also relied on published data regarding both historical and projected growth rates in earnings, dividends, and book value for the sample group of utility companies. Recall that DCF theory assumes that earnings, dividends and book value all grow at the same rate. Through an examination of all of those data, which are available to and used by investors, I estimate investors' long-term growth rate expectations. To that long-term growth rate estimate, I add any additional growth that is attributable to investors' expectations regarding the on-going sale of stock for each of the companies under review.

Q: Why have you analyzed the market data of several companies that are similar in risk to Puget?

A: I have used the "similar sample group" approach to cost of capital analysis because it yields a more accurate determination of the cost of equity capital than does the analysis of the data of one individual company. Any form of analysis, in which the result is an estimate, such as growth in the DCF model, is subject to measurement error, i.e., error induced by the measurement of a particular parameter or by variations in the estimate of the technique chosen. When the technique is applied to only one observation (e.g., estimating the DCF growth rate for a single company), the estimate is referred to, statistically, as having "zero degrees of freedom." This means, simply, that there is no way of knowing if any observed change in the growth rate estimate is due to measurement error or to an actual change in the cost of capital. The degrees of freedom can be increased and exposure to measurement error reduced by applying any given estimation technique to a sample of companies rather than to one single company. Therefore, by analyzing a group of firms with similar characteristics, the estimated value (the growth rate and the resultant cost of capital) is more likely to equal the "true" value for that type of operation.

Q: How were the companies selected to be included in the analysis?

A: For the similar-risk sample for Puget's electric and gas utility operations, all of the electric and combination electric and gas utility firms followed by Value Line were screened. Companies were selected from that group that had a continuous financial history, a senior bond rating between "BBB" and "A" (or "Baa2" and "A2"), and had 70 percent or more of revenues generated by utility operations. Companies that did not have generation assets, or were in the process of merging or being acquired, or companies that had recently omitted dividends or had unstable book values were omitted from the sample. The data for the electric utility sample group were obtained from the most recent editions of Value Line Investment Survey, *Ratings and Reports,* available at the time of this analysis (May 3, May 24, and June 21, 2013), and A.U.S. Utility Reports, May 2013.

The integrated electric and combination electric and gas companies included in the similar-risk sample group for purposes of estimating the current cost of equity capital are: Southern Company (SO), ALLETE (ALE), Alliant Energy (LNT), American Electric Power (AEP), Cleco Corp. (CNL), Entergy (ETR), Westar Energy (WR), Wisconsin Energy (WEC), Edison International (EIX), IDACORP (IDA), Northwestern Corp. (NWE), PG&E Corporation (PCG), Pinnacle West Capital Corporation (PNW), Portland General (POR) and Xcel Energy (XLS). The statistical data for each of the Value Line electrics, the selection criteria, and the companies selected are shown in Exhibit No. SGH-4.[17]

Q: How have you calculated the DCF growth rates for the sample of comparable companies?

A: Exhibit No. SGH-5, pages 1 through 5, shows the retention ratios, equity returns, sustainable growth rates, book values per share and number of shares outstanding for the comparable sample companies for the past five years. Also included in the information presented in Exhibit No. SGH-5 are Value Line's projected 2013, 2014 and 2016-2018 values for equity return, retention ratio, book value growth

[17] In the Exhibits accompanying this Testimony, the sample group companies are referenced by their stock ticker symbols, which are shown here in parenthesis after the company name.

rates and number of shares outstanding.

In evaluating these data, I first calculate the five-year average sustainable growth rate, which is the product of the earned return on equity (r) and the ratio of earnings retained within the firm (b). For example, Exhibit No. SGH-5, page 1, shows that the five-year average sustainable growth rate of Southern Company (SO) is 3.28 percent. The simple five-year average sustainable growth value is used as a benchmark against which I measure the company's most recent growth rate trends. Recent growth rate trends are more investor influencing than are simple historical averages.

Continuing to focus on Southern Company, we see that sustainable growth has been higher in recent years during the historical period indicating increasing growth. By the 2016-2018 period, Value Line projects Southern Company's sustainable growth will increase from the recent five-year average, to 3.46 percent. These forward-looking data indicate that investors can expect Southern Company to grow at a rate slightly higher than the growth rate that has existed, on average, over the past five years, but, overall, they point to relative growth rate stability for Southern Company.

Another factor to consider is that Southern Company's book value growth is expected to increase at a 4.5 percent level over the next five years, which is lower than the 5.5 percent growth rate level that existed over the past five years. This information indicates an expectation for somewhat lower growth in the future. Also, as shown on Exhibit No. SGH-6, page 2, Southern Company's dividend growth rate, which was 4.0 percent historically, is projected at a 4.0

percent rate of growth in the future. Southern Company's dividend growth shows very stable growth expectations.

Projected earnings growth rate data available from Value Line indicate that investors can expect slightly higher growth rate in the future (4.5 percent), compared to the sustainable growth rate projections, and higher than historical earnings growth (3.0 percent). IBES and Zack's (investor advisory services that poll sell-side institutional analysts for growth earnings rate projections) also project slightly higher earnings growth rates for Southern Company—4.84 percent and 4.76 percent, respectively—over the next five years.

Southern Company's projected sustainable growth is expected to approach 3.5 percent, dividends are expected to increase at a 4.0 percent annual rate, and book value growth to increase at 4.5 percent. Per share earnings growth is expected to range from 4.5 percent to 4.8 percent, and Value Line's average earnings, dividends and book value growth projection for Southern Company is 4.33 percent. A long-term growth rate of 4.25 percent is a reasonable long-term growth rate expectation for Southern Company.

Q: Is the internal or "b times r" growth rate the final growth rate used in the DCF analysis?

A: No. An investor's long-term growth rate analysis does not end upon the determination of an internal growth rate. Investor expectations regarding growth from external sources (sales of stock) must also be considered and examined. For Southern Company, page 1 of Exhibit No. SGH-5, shows that the number of outstanding shares increased at a 2.80 percent rate over the most recent five-year period (prior to June of 2013). In addition, Value Line expects the number of shares outstanding to increase at a much lower rate through the 2016-2018 period, bringing the share growth rate to a 0.84 percent rate by that time. Weighing both historical and projected data, an expectation of share growth of 1.5 percent is reasonable for this company.

Because Southern Company was trading (in May and June 2013) at a market price greater than book value, issuing additional shares would increase investors' growth rate expectations. Multiplying the expected growth rate in shares outstanding by (1-(Book Value/Market Value))[18] increases the investor-expected growth rate for Southern Company by seventy-eight basis points (0.77 percent). Therefore, the combined internal and external growth rate for Southern Company is 5.02 percent (4.25 percent internal growth and 0.77 percent external growth, see page 1 of Exhibit No. SGH-6. Exhibit No. SGH-6, page 1, shows the internal, external and resultant overall growth rates for each of the electric and combination electric and gas utility companies analyzed.

I have included the details of my growth rate analyses for Southern Company as an example of the methodology I use in determining the DCF growth rate for each company in the electric industry sample. A description of the growth rate analyses of each of the companies included in my sample group is set out in Exhibit No. SGH-7.

[18] Professor Myron Gordon is the originator of the DCF in regulation. This is Gordon's formula for "v" the accretion rate related to new stock issues. B=book value, M=market value. (M. J. Gordon, *The Cost of Capital to a Public Utility*, 30-33, MSU Public Utilities Studies, (East Lansing, Michigan, 1974).

Q: Have you checked the reasonableness of your growth rate estimates against other, publicly available growth rate data?

A: The reasonableness of the growth rate estimates for each company are checked against other publicly available sources in Exhibit No. SGH-6, page 2, which shows the DCF growth rates used in this analysis as well as 5-year historic and projected earnings, dividends, and book value growth rates from Value Line, earnings growth rate projections from Zacks or IBES, the average of Value Line and Zacks or IBES growth rates, and the 5-year historical compound growth rates for earnings, dividends and book value for each company under study.

For the electric and gas utility sample group, Exhibit No. SGH-6, page 2 shows that my DCF growth rate estimate for all the electric utility companies included in my analysis is 4.87 percent. This figure exceeds Value Line's projected average growth rate in earnings, dividends and book value for those same companies (4.23 percent), but is below the five-year historical average earnings, dividend and book value growth rate reported by Value Line for those companies (5.07 percent). My growth rate estimate for the similar-risk utility companies under review is above the IBES analysts' earnings growth rate projections—4.40 percent and similar to the average projected earnings growth estimate of those polled by Zack's (4.94 percent). Also, my growth rate estimate is similar to the projected dividend growth rate of the sample companies, 4.70 percent. Therefore, my average DCF growth rate is similar to or somewhat exceeds the growth rate data available to investors, and is likely to provide a reasonable assessment of investors' long-term sustainable growth rate expectations for the electric utility companies under review.

Q: Some analysts rely heavily, if not exclusively, on analysts' earnings growth projections as the growth rate in the DCF; you have not done so. Can you explain why?

A: In my view, earnings growth rate projections are widely available, are used by investors, and, for those reasons, deserve consideration in an informed, accurate assessment of the investor expected growth rate to be included in a DCF model. However, projected earnings growth rates should not be used as the *only* source of a DCF growth estimate because projected earnings growth rates are influential in, but not solely determinative of, investor expectations. That is true for several reasons.

First, it is important to realize that, as I discuss in Exhibit No. SGH-3, projected earnings growth rates may over- or understate the growth that can be sustained over time by the companies under review. This is important because long-term sustainable growth is required in an accurate DCF assessment of the cost of equity capital. The efficacy of projected earnings growth rates in any specific DCF analysis can only be determined through a study of the underlying fundamentals of growth—something that those who rely exclusively on analysts' earnings growth rate projections fail to do.

Second, the studies that support the use of analysts' earnings projections measure the ability of analysts' estimates to predict stock prices versus simple historical averages of other parameters. In that sort of simplistic comparison, analysts' projections perform better. However, I am not aware of any cost of capital analyst who relies exclusively on historical average growth rates, nor is it reasonable to believe that any astute investor would do so. Therefore, while studies do indicate that analysts' earnings growth estimates are better indicators of stock prices than simple historical averages of other growth rate parameters, those studies do not provide any basis for exclusive reliance on earnings growth projections in a DCF analysis.

Third, the sell-side institutional analysts that are polled by IBES, Zacks and similar services offer relatively "rosy" expectations for the stock they follow. Simply put, some analysts overstate growth expectations to make the stocks they want to sell look more attractive. Although claims are often made that the opinions of sell-side analysts are not affected by the profits made by the other parts of the business that actually trade those securities, the "Cinderella effect" (analysts' overstating stock expectations) is not a new phenomenon, and is recognized in academia. As the authors of a widely-used finance textbook note regarding the use of projected earnings growth rates in a DCF analysis:

> Estimates of this kind are only as good as the long-term forecasts on which they are based. For example, several studies have observed that security analysts are subject to behavioral biases and their forecasts tend to be over-optimistic [footnote omitted]. If so, such DCF estimates of the cost of equity should be regarded as upper estimates of the true figure. [footnote omitted]. *See, for example,* A. Dugar and S. Nathan, "The Effect of Investment Banking Relationships on Financial Analysts' Earnings Investment Recommendations." [19]

[19] *Contemporary Accounting Research* 12 (1995), pp. 131-160. Brealey, Meyers, Allen, *Principles of Corporate Finance, 8th Ed.*, McGraw-Hill Irwin, Boston, MA, (2006), p. 67.

As Chan and Lakonishok note in "The Level and Persistence of Growth Rates," published in the *Journal of Finance* (Vol. LVIII, No. 2, April 2003, p. 643), "[t]here is no persistence in long-term earnings growth beyond chance, and there is low predictability even with a wide variety of predictor variables. Specifically, IBES growth forecasts are overly optimistic and add little predictive power." This concern regarding investors' use of analysts' growth estimates is also underscored by an investor service sponsored by the *Wall Street Journal*:

> You should be careful when looking at analyst recommendations for several reasons. First of all, many analysts suffer from a conflict of interest between the firm that employs them and the company whose stock they track. Often times, an analyst will be responsible for issuing reports on a company that is a current or potential client of their employer (usually an investment bank). Since they know that their employer would like to keep the client's business, the analyst may be tempted to issue a rosier outlook for the stock than what it really deserves.[20]

Also, as reported in an April 2010 article in McKinsey Quarterly, entitled "Equity Analysts: Still too bullish," over the past 25 years the equity analysts polled by IBES have projected long-term earnings growth of 10 percent to 12 percent for unregulated companies, whereas actual (realized) growth has been about 6.0 percent.[21]

Fourth, much of the academic work touted as support for reliance on earnings growth is based on data from the IBES database (now owned by Thomson); however, academic research recently published in the *Journal of*

[20] Investorguide.com, "University," Analysts and Earnings Estimates, www.investorguide.com/igustockanalyst.html.
[21] McKinsey & Company is a global management-consulting firm.

Finance indicates that there have been non-random, systematic errors in that database, which call into question the reliability of research (such as the research on the reliability of analysts' earnings estimates) based on those data. The researchers document that the historical contents of the IBES data base have been "quite unstable over time," and state:

> Data are the bedrock of empirical research in finance. When there are questions about the accuracy or completeness of a data source, researchers routinely go to great lengths to investigate measurement error, selection bias, or reliability. But what if the very contents of a historical database were to change, in error, over time? Such changes to the historical record would have important implications for empirical research. They could undermine the principle of replicability, which in the absence of controlled experiments is the foundation of empirical research in finance. They could result in over- or underestimates of the magnitude of empirical effects, leading researchers down blind alleys. Also to the extent that financial-market participants use academic research for trading purposes, they could lead to resource allocation…. We document that the historical contents of the I/B/E/S recommendations database have been quite unstable over time.[22]

Therefore, even the research that purports to show analysts' earnings growth rates are "superior" to simple historical average growth rates is called into question due to the above-cited flaws in the historical IBES database.

In summary, exclusive reliance on projected earnings growth for determining a DCF growth rate in a cost of capital analysis is not a reliable method of analysis and is likely to lead to an equity cost estimate that overstates

[22] Lungqvist, Malloy, Marston, "Rewriting History," *The Journal of Finance*, Vol. 64, No. 4, August 2009, pp. 1935-1960.

the actual market-determined cost of equity capital.

Q: Does this conclude the growth rate portion of your DCF?

A: Yes.

Q: How have you calculated the DCF dividend yields?

A: The current dividend yields for each of the sample group companies are shown in Exhibit No. SGH-8. The per share dividend is that projected over the next year by Value Line, and the stock price is the daily closing average stock price for each company over the recent six-week period ending June 21, 2013. Exhibit No. SGH-8 shows that the average dividend yield of the similar-risk sample group of integrated electric and gas companies is 3.83 percent.

Q: What is the cost of equity capital estimate for the electric utility sample group utilizing the DCF model?

A: Exhibit No. SGH-9 combines the long-term sustainable growth rate for each of the companies in the sample group with the expected dividend yield. The result is an average DCF equity cost estimate of 8.69 percent.

Q: Have you prepared another type of DCF analysis in this proceeding?

A: Yes. In an effort to minimize the impact of judgment on the outcome of the cost of equity estimate for Puget, in addition to a traditional DCF analysis, I also employed a "mechanical" DCF analysis.

This type of DCF analysis utilizes dividend yield and growth rate data provided in investor-service publications as the basis for determining a DCF equity cost estimate. Published data for all the electric and gas utilities in the sample group are utilized. All growth-rate data are projected. That is, both dividend yields and growth rates are projected for the future (as called for in theory). The projected year-ahead dividend yield for each company is published in The Value Line Investment Survey. In addition, Value Line also publishes projected earnings, dividend, and book value for each of the electric and gas utilities it follows. In addition to those growth rates, projected earnings growth rates for each company published by IBES and Zack's are also used to determine an average projected DCF growth rate for each company.

Exhibit No. SGH-10 shows that the projected year-ahead dividend yield for each electric company is added to the average of all available projected growth rates (Value Line's earnings, dividends, book value, as well as Zack's and IBES earnings growth rate projections). The only growth rates that are not included in the analysis are those that are non-positive (i.e., zero or negative), because it is reasonable to believe that investors do not expect zero or negative long-term growth in a viable investment.

However, it is not appropriate to remove only the lowest growth rate estimates because that would skew the results upward. Therefore, in Exhibit No. SGH-10 I analyzed the average growth rates for all of the companies in the sample, found their standard deviation and searched for outliers which were beyond two standard deviation units above and below the mean. In this instance there was one company with an average projected growth rate above the two standard deviation threshold and one company with an average growth rate below the threshold.

The result of the mechanical DCF shown in Exhibit No. SGH-10, based on the electric and gas utility sample and forward-looking dividend yield and growth rate projections is an average DCF equity cost estimate of 8.33 percent. Eliminating the high and low growth rate outliers produces an average mechanical DCF equity cost estimate of 8.30 percent.

B. Capital Asset Pricing Model.

Q: Please describe the Capital Asset Pricing Model (CAPM) you used to arrive at an estimate for the cost rate of equity capital for Puget in this proceeding.

A: The CAPM states that the expected rate of return on a security is determined by a risk-free rate of return plus a risk premium, which is proportional to the non-diversifiable (systematic) risk of a security. Systematic risk refers to the risk associated with movements in the macro-economy (the economic "system") and thus, cannot be eliminated through diversification by holding a portfolio of securities. The beta coefficient (β) is a statistical measure that attempts to quantify the non-diversifiable risk of the return on a particular security against the returns inherent in general stock market fluctuations. The formula is expressed as follows:

$$k = r_f + \beta(r_m - r_f), \qquad (2)$$

where "k" is the cost of equity capital of an individual security, "r_f" is the risk-free rate of return, "β" is the beta coefficient (a measure of relative volatility), "r_m" is the average market return and "$r_m - r_f$" is the market risk premium.

Q: What have you chosen for a risk-free rate of return in your CAPM analysis?

A: As the CAPM is designed, the risk-free rate is that rate of return investors can realize with certainty. The nearest analog in the investment spectrum is the 13-week U. S. Treasury bill. However, T-Bills can be heavily influenced by Federal Reserve policy, as they have been over the past three years. While longer-term Treasury bonds have equivalent default risk to T-Bills, those longer-term government securities carry maturity risk that the T-Bills do not have. When investors tie up their money for longer periods of time, as they do when purchasing a long-term Treasury, they must be compensated for future investment opportunities forgone as well as the potential for future changes in inflation. Investors are compensated for this increased investment risk by receiving a higher yield on T-Bonds. When T-Bills and T-Bonds exhibit a "normal" (historical average) spread of about 1.5 percent to 2 percent, the results of a CAPM analysis that matches a higher market risk premium with lower T-Bill yields or a lower market risk premium with higher T-Bond yields, are very similar.

As noted in the previous discussion of the macro-economy, in an attempt to fend off a recession and to inject liquidity into the financial system, the Fed acted vigorously over the past four years to lower short-term interest rates. Recently, T-Bills have produced an average yield just above zero. Also, as noted in my discussion of the current economic environment, the long-term trend of T-Bond pricing would indicate a current yield of approximately 3.4 percent. Therefore, for purposes of a forward-looking CAPM analysis in this proceeding I will use 3.4 percent as the long-term risk-free rate.

Q: What market risk premium have you used in your CAPM analysis?

A: In their 2011 edition of *Stocks, Bonds, Bills and Inflation*, Morningstar indicates that the average market risk premium between stocks and T-Bills over the 1926–2010 time period is 6.0 percent (based on an arithmetic average), and 4.4 percent (based on a geometric average). Those long-term average values are widely used as an estimate of the forward-looking market risk premium in the CAPM analysis.

As noted previously, immediately following the 2008/09 financial crisis and again last year, investor worries regarding the international financial system caused investors to be more concerned about default risk and seek the safety of risk-free investments. Because of that fact, the yields on long-term U.S. Treasury bonds declined more rapidly than the yields on corporate debt. For that reason, it is reasonable to rely on the upper end of the historical risk premium range (6.0 percent) published by Morningstar/Ibbotson in calculating a current cost of equity capital.

Q: What values have you chosen for the beta coefficients in the CAPM analysis?

A: With regard to the CAPM beta coefficient, Value Line reports beta coefficients for all the stocks it follows. Value Line's beta is derived from a regression analysis between weekly percentage changes in the market price of a stock and weekly percentage changes in the New York Stock Exchange Composite Index over a period of five years. The average beta coefficient of the sample of the electric utility companies in the May/June period of 2013 was 0.67.

Q: What is your cost of equity estimate for the sample of electric utility companies using the CAPM?

A: Exhibit No. SGH-11 shows that the combination of a 3.40 percent risk-free rate, with an average beta of 0.67 and a market risk premium of 6.0 percent is 7.42

percent. That result is considerably lower than the DCF results previously presented.

C. Modified Earnings-Price Ratio.

Q: Please describe the modified earnings-price ratio (MEPR) analysis you use to estimate the cost of equity capital.

A: The earnings-price ratio is the expected earnings per share divided by the current market price. In cost of capital analysis, the earnings-price ratio alone (which is only one portion of this MEPR analysis) can be useful in a corroborative sense, since it can be a good indicator of the proper range of equity costs when the market price of a stock is near its book value. When the market price of a stock is *above* its book value, the earnings-price ratio *understates* the cost of equity capital Exhibit No. SGH-12 contains mathematical proof for this concept. The opposite is also true, i.e.; the earnings-price ratio *overstates* the cost of equity capital when the market price of a stock is *below* book value.

Under the target market conditions of 2013, the electric and gas utilities under study have an average market-to-book ratio of 1.58 and, therefore, the average earnings-price ratio, alone, will understate the cost of equity for the sample group. However, the earnings-price ratio is not used alone as an indicator of equity capital cost rates. Because of the relationship among the earnings-price ratio, the market-to-book ratio and the investor-expected return on equity, described mathematically in Exhibit No. SGH-12, the earnings-price ratio is modified by averaging projected equity returns with the current earnings-price ratio for the companies under study. It is that modified analysis that will assist in estimating an appropriate range of equity capital costs in this proceeding.

Q: What is the relationship between the earnings-price ratio, the expected return on equity, and the market-to-book ratio?

A: When the expected return (ROE) approximates the cost of equity, the market price of the utility approximates its book value and the earnings-price ratio provides an accurate estimate of the cost of equity. As the investor-expected return on equity for a utility (ROE) begins to exceed the investor-required return (the cost of equity capital), the market price of the firm will tend to exceed its book value. Also as explained above, in that instance the earnings-price ratio understates the cost of equity capital.

Conversely, in situations where the expected equity return is below what investors require, market prices fall below book value. Further, when market-to-book ratios are below 1.0, the earnings-price ratio overstates the cost of equity capital. Thus, the expected rate of return on equity and the earnings-price ratio tend to move in a countervailing fashion around a central locus, and that central locus is the cost of equity capital. Therefore, the average of the expected book return and the earnings price ratio provides a reasonable estimate of the cost of equity capital.

These relationships represent general rather than precisely quantifiable tendencies but are useful in corroborating other cost of capital methodologies. The Federal Energy Regulatory Commission, in its generic rate of return hearings, found this technique useful and indicated that under the circumstances of market-to-book ratios exceeding unity, the cost of equity is bounded above by the expected equity return and below by the earnings-price ratio.[23] The mid-point of these two parameters, therefore, produces an estimate of the cost of equity capital which, when market-to-book ratios are different from unity, is considerably more accurate than the earnings-price ratio alone.

Q: Is there theoretical support for the use of an earnings-price ratio in conjunction with an expected return on equity as an indicator of the cost of equity capital?

A: Yes. Elton and Gruber, *Modern Portfolio Theory and Investment Analysis* (New York University, Wiley & Sons, New York, 1995, pp. 401-404) provide support for reliance on the modified earnings price ratio analysis.

The Elton and Gruber text posits the following formula,

$$k = (1-b)E/(1-cb)P, \text{ where} \tag{3}$$

"k" is the cost of equity capital, "b" is the retention ratio, "E" is earnings, "P" is market price, and "c" is the ratio of the expected return on equity to the cost of equity capital (ROE/k). This formula shows that when ROE = k, "c" equals 1.0, and the cost of equity capital equals the earnings-price ratio. Moreover, in that case, ROE is greater than "k" (as it is in today's market), "c" is greater than 1.0, and the earnings-price ratio will understate the cost of equity. Also, the more that ROE exceeds "k," the more the earnings price ratio will understate "k." In other words, those two parameters, the earnings-price ratio and the expected return on

[23] E.g., 50 *Fed Reg*, 1985, p. 21822; 51; *Fed Reg*, 1986, pp. 361, 362; 37 FERC ¶¶ 61,287.

equity (ROE), orbit around the cost of equity capital, with the cost of equity as the locus, and fluctuate so that their mid-point approximates the cost of equity capital.

Assuming an industry average retention ratio of about 30 percent (i.e., 70 percent of earnings are paid out as dividends), the stochastic relationship between the expected return (ROE) and the earnings price ratio can be determined from Equation (5), above, as shown in Table I below. Most importantly, Equation (3) shows that the average of the EPR and ROE (which is my MEPR analysis) will approximate "k," the cost of equity capital.

Table I

SUPPORT FOR THE MODIFIED EARNINGS PRICE RATIO ANALYSIS

Cost of Equity	Retention Ratio	ROE	ROE/k	Earn-Price Ratio	M.E.P.R. (ROE+EPR)/2
[1]	[2]	[3]	[4]=[3]/[1]	[5]	[6]=([3]+[5])/2
10.00%	35.00%	13.00%	1.3	8.38%	10.69%
10.00%	35.00%	12.00%	1.2	8.92%	10.46%
10.00%	35.00%	11.00%	1.1	9.46%	10.23%
10.00%	35.00%	10.00%	1.0	10.00%	10.00%
10.00%	35.00%	9.00%	0.9	10.54%	9.77%
10.00%	35.00%	8.00%	0.8	11.08%	9.54%
10.00%	35.00%	7.00%	0.7	11.62%	9.31%

[5] From Equation (3): E/P = k(1-cb)/(1-b)

As the data in Table I show, the average of the expected return (ROE) and the earnings price ratio (EPR) produces an MEPR estimate of the cost of common equity capital of sufficient accuracy to serve as a check of other analyses, which is how I use the model in my testimony.

Q: What are the results of your MEPR analysis for the sample group?

A: Exhibit No. SGH-13 shows the IBES projected 2014 per share earnings for each of the firms in the sample groups. Recent 2013 market prices (the same market prices used in the DCF analysis), and Value Line's projected return on equity for 2013 and 2016-2018 for each of the sample group companies are also shown.

The average earnings-price ratio for the electric and gas utility sample group, 6.69 percent, is below the cost of equity for those companies due to the fact that their average market-to-book ratio is currently well above unity (average M/B = 1.58). The sample companies' 2013 expected book equity return averages 9.73 percent. For the entire sample group, then, the mid-point of the earnings-price ratio and the current equity return is 8.21 percent.

Exhibit No. SGH-13 also shows that the average expected book equity return for the sample of electric utilities over the next three- to five-year period is 10.20 percent. The midpoint of that long-term projected return on book equity (10.20 percent) and the current earnings-price ratio (6.69 percent) is 8.45 percent. Both of those results are below the cost of equity estimate provided by the DCF, indicating the DCF result may be somewhat overstated.

D. Market-To-Book Ratio Analysis.

Q: Please describe your market-to-book (MTB) analysis of the cost of common equity capital for the sample group.

A: The Market-to-Book Ratio (MTB) technique of cost of equity analysis is a derivative of the DCF model that adjusts the capital cost derived for inequalities that exist in the market-to-book ratio. This method is derived algebraically from the DCF model and therefore, cannot be considered a strictly independent check of that method. However, the MTB analysis is useful in a corroborative sense. The MTB seeks to determine the cost of equity using market-determined parameters in a format different from that employed in the DCF analysis. In the DCF analysis, the available data is "smoothed" to identify investors' long-term sustainable expectations. The MTB analysis, while based on the DCF theory, relies instead on different point-in-time data projected one year and five years into the future and thus, offers a practical corroborative check on the traditional DCF. The MTB formula is derived as follows:

Solving for "P" from Equation (1), the standard DCF model, we have

$$P = D/(k\text{-}g). \qquad (4)$$

But the dividend (D) is equal to the earnings (E) times the earnings payout ratio, or one minus the retention ratio (b), or

$$D = E(1\text{-}b). \qquad (5)$$

Substituting Equation (5) into Equation (4), we have

$$P = \frac{E(1\text{-}b)}{k\text{-}g}\ . \qquad (6)$$

The earnings (E) are equal to the return on equity (r) times the book value of that equity (B). Making that substitution into Equation (6), we have

$$P = \frac{rB(1\text{-}b)}{k\text{-}g}\ . \qquad (7)$$

Dividing both sides of Equation (7) by the book value (B) and noting from the discussion of the DCF model that g = br+sv,

$$\frac{P}{B} = \frac{r(1\text{-}b)}{k\text{-}br\text{-}sv}\ . \qquad (8)$$

Finally, solving Equation (8) for the cost of equity capital (k) yields the MTB formula:

$$k = \frac{r(1\text{-}b)}{P/B} + br + sv. \qquad (9)$$

Equation (9) indicates that the cost of equity capital equals the expected return on equity multiplied by the payout ratio, divided by the market-to-book ratio plus growth. Exhibit No. SGH-14 shows the results of applying Equation (9) to the defined parameters for the similar-risk electric utility firms in the comparable sample group. Page 1 of Exhibit No. SGH-14 utilizes target year (2013) data for the MTB analysis, while page 2 utilizes Value Line's 2016-2018 projections (published in 2013). The MTB cost of equity for the sample of electric utility firms, recognizing a current average market-to-book ratio of 1.58 is 8.63 percent using the target year (2013) data, and 8.73 percent using projected three- to five-year data available in 2013. Those point-in-time estimates approximate the DCF equity cost estimates derived previously.

E. Summary.

Q: Please summarize the results of your 2013 equity capital cost analyses for the sample group of similar-risk companies.

A: The results of the cost of equity analyses described herein are shown in Table II below.

Table II
2013 Cost of Equity Analyses

Method	Cost of Equity
Discounted Cash Flow	8.69%
Mechanical DCF	8.33%
Capital Asset Pricing Model	7.42%
Modified Earnings Price Ratio	8.21%/8.45%
Market-to-Book Ratio	8.63%/8.73%

The DCF, which is the most reliable indicator of the current cost of equity, indicates a cost of equity capital of 8.69 percent. The average of the corroborating analyses (Mechanical DCF, CAPM, MEPR, and MTB) indicates a cost of equity ranging from 8.15 percent to 8.23 percent. That information indicates that the 8.69 percent traditional DCF result may be somewhat overstated as an estimate of the target 2013 cost of common equity capital for Puget.

Given the results described and rounding to the nearest quarter percent, a reasonable point-estimate for the current cost of common equity capital for an electric utility with risk characteristics similar to Puget and sample group analyzed is 8.75 percent. As noted in the discussion of the economic environment, however, the expectation in May and June of 2013 with regard to the economy and interest rates is that with a continued economic expansion, interest rates will increase over the next two years.[24] Therefore, taking that expectation into account a reasonable range for setting equity capital cost rates ranges from 8.50 percent to 9.50 percent. The mid-point of that range is 9.00 percent.

According to the May 2013 edition of AUS Utility Reports, the average senior bond rating of the sample group of companies used to estimate the cost of common equity is “BBB+” (Standard & Poor’s) and “A3” (Moody’s). Puget Sound Energy’s senior bond rating is “A-“ from S&P and “A3” from Moody’s. Therefore, Puget Sound Energy’s senior bond rating is slightly higher than that of the sample group, but generally quite similar. In addition, the Company’s ratemaking common equity ratio (48 percent) is similar to the average common equity ratio of the sample group of companies (47.7 percent). For these reasons, absent any other adjustments for risk, a return on common equity at the mid-point established by the sample group would be appropriate.

[24] As note previously in this testimony, with the 20-20 hindsight afforded by this investigation, we know now that interest rates did not rise as predicted and it was not necessary to include those expectations in the equity cost estimate. However, we did not have that knowledge in 2013 and it is not applied after-the-fact here.

An allowed return on common equity of 9.0 percent would have been a reasonable allowed return for Puget's electric utility operations, absent the implementation of a decoupling rate design. However, as I will discuss in detail subsequently, decoupling does lower the Company's operating risk and with that additional risk reduction, Puget's allowed return should be reduced below the 9.0 percent mid-point of a reasonable range. With decoupling, the Company's allowed return on common equity at mid-year 2013 should be 8.65 percent--35 basis points below the market-based cost of equity.

Q: If the Commission reduced PSE's allowed profit from the 9.8 percent allowed in the Company's 2011 rate proceeding to your recommended 8.65 percent, which recognizes current capital costs and a decoupling risk reduction, would that reduce the Company's rates?

A: Yes. The difference in the cost of equity capital is 115 basis points (9.80 percent-8.65 percent). The common equity ratio is 48.00 percent. The combined gas and electric rate base for Puget (as of the last rate proceeding) is $4,214 Million (Electric: $2,622 Million; Gas: $1,592 Million). If the Commission lowered the Company's allowed ROE to 8.65 percent, PSE's ratepayers would save approximately $35.8 Million every year through the lower allowed profit. [9.80%-8.65% ROE x 48% Equity Ratio x $4,214 Mill. Rate Base ÷ (1-35% tax rate) = $35.8 Million annual rate reduction]

F. Other Cost of Equity Issues.

Q: In the initial portion of these proceedings your recommendation to this Commission was an ROE of 9.0 percent, which included a decoupling-related

decrement of 50 basis points. Can you briefly explain why your recommendation is different in the Remand portion of these proceedings?

A: Yes. My initial recommendation was not based on a detailed analysis of the cost of equity capital for Puget, but was based on the Commission's prior equity return allowance and the change in observable capital costs (bond yields) that had occurred since that prior rate proceeding. That analysis indicated a 30 basis point reduction in the cost of common equity for Puget from 9.80 percent to 9.50 percent. I then applied a decoupling decrement of 50 basis points from a prior study of PSE's historical revenue volatility to reach my recommended 9.00 percent. Finally, I noted that that result was within a reasonable range of equity costs based on my cost of capital testimony in another regulatory jurisdiction.

In this proceeding, I have analyzed Puget's 2013 cost of equity capital directly, using companies with revenues primarily derived from regulated electric and gas operations and with similar bond ratings. That analysis indicated an appropriate cost of equity of 9.0 percent for Puget, absent any consideration of the impact of decoupling on the Company's investment risk. My current, detailed analysis of the cost of equity impact of decoupling indicates that a reasonable and conservative estimate is 35 basis points. Hence, because decoupling has been granted Puget and the ROE allowed in these proceedings should recognize that fact, I recommend that the Company's ROE be set at 8.65 percent [9.0 percent less 35 basis points for decoupling].

Q: The Company has been granted a rate plan attrition adjustment as well as decoupling in this proceeding. Have you undertaken an analysis to quantify

the extent to which that aspect of the Commission's Order 7 has reduced the Company's risk?

A: I have not undertaken such an analysis in this proceeding. Nevertheless, my opinion about the rate plan (K-factor) has not changed since my initial testimony in this proceeding. Because the rate plan adopted by this Commission calls for automatic between-rate-case rate increases for the Company, it would provide additional protection for the Company's income stream not available under the traditional regulation that existed in Washington prior to the adoption of that rate plan. While I have not attempted to quantify the extent to which the K-factor would lower the Company's cost of capital, it is reasonable to believe that it would lower PSE's risk compared to traditional regulation. Therefore, due to this additional risk-reducing factor, the equity return I recommend, 8.65 percent, which includes no additional decrement for PSE"s K-factor rate plan, should be considered to be conservative in nature.

Q: Company witness Mr. Doyle identifies what he believes to be risk factors related to weather volatility and earnings sharing above the Company's allowed return. What are your comments?

A: Mr. Doyle testifies that weather-related volatility, which he estimates comprises much of Puget's overall revenue volatility, should not be considered when assessing the reduction in risk imparted by decoupling. His position is that because weather-related revenue fluctuations are normal and they are both above and below average, they do not add to operational risk. Mr. Doyle also opines that the 50/50 earnings sharing with ratepayers above the allowed ROE imparts additional risk to the Company that it would not have with a "dead band" above the allowed ROE within which the Company would retain all of its over-earnings. In my view, Mr. Doyle's claims regarding increased risks due to these measures are incorrect.

First, with regard to whether or not weather-related fluctuations should be removed from consideration in determining the impact of decoupling on the Company's cost of capital, the fact that weather impacts can be positive or negative or that such fluctuations are normal is not relevant to the determination of the cost of capital impact. The salient point is that revenue fluctuations due to weather in Puget's service territory, absent decoupling, add to the overall volatility of the Company's revenues. With decoupling, all revenue fluctuations due to weather—up and down—will be trued up after the fact and, therefore, decoupling will reduce the volatility that would have existed otherwise. Revenues will be more certain in that instance (with decoupling) and will, therefore, impart lower risk to investors.

With regard to the earnings sharing issue, it is important to recall that, in the Multiparty Settlement agreement, PSE proposed an earnings test *as part of* their amended decoupling petition.[25] That earnings test proposed by Puget would allow the Company to earn up to 25 basis points above its authorized return, and then, if earnings exceeded that amount, the Company and ratepayers would share "50-50" any earnings exceeding that limit. The Commission modified the earnings test in its Order approving decoupling and the rate plan and required the

[25] Order 07, ¶ 159.

Company share *any* over-earnings with customers "50-50," i.e., eliminating the 25 basis point "dead band" sought by the Company.[26]

Company witness Mr. Doyle recognized that the sharing mechanism instituted by the Commission is linked to decoupling. He notes at pages 18 and 19 of Exhibit No. DAD-4T that in setting the earnings sharing requirement, the Commission sought to provide an incentive for PSE to identify efficiencies in its cost structure, and believed that the 9.8 percent allowed return was "at the high end of a range of reasonableness." Therefore, the Commission instituted a sharing system in Order 07 in order to provide operating incentive to the Company and—after the Company earned its allowed return—some relief to ratepayers.

Finally, the sharing ordered by the Commission does not start until the Company has earned its allowed return. Therefore, assuming that return allowed is the return required by investors, the Company's risk is not raised by the sharing mechanism—the Company is earning its investor-required return prior to sharing any additional return above the cost of capital. Also, while it would certainly be true that the Company would be able to earn *more* money in excess of its allowed return if the Commission allowed a 25 basis points "dead band" requested by the Company, it is not clear that beginning the sharing after the allowed return is reached is unfair to the Company or works to unbalance the interests of the Company and its ratepayers established by the allowed return on equity.
Therefore, because the earnings sharing does not affect the Company's ability to

[26] *Id.*, ¶ 165.

earn its cost of capital, it should not affect the Company's overall investment risk. Therefore, the Company's testimony to re-institute the "dead band" prior to the net income sharing beyond the allowed ROE should be ignored.

Q: Mr. Doyle also discusses the Commission's comments in Order 07 indicating that decoupling could be studied after-the-fact or that evidence could be brought forward that markets do respond to decoupling as a rationale for not addressing the impact of decoupling at that time. What are your comments?

A: With regard to the last point first, as I show in Section V of this testimony, there is substantial evidence that markets do, indeed, respond to decoupling. The evidence shows that the cost of capital declines considerably when a revenue decoupling regime similar to that granted to the Company is employed by electric utilities. Additionally, I provide a direct analysis of Puget's actual historical net revenue volatility from 1999 forward, and through a determination of the degree to which decoupling is likely to reduce the average volatility over time, I am able to quantify, based on Puget's historical capital structure and rate base, the impact of decoupling on the cost of equity. Therefore, there is substantial evidence in the record of this proceeding from both market-based and income-statement based analyses that show decoupling lowers the cost of equity capital.

Q: Is it appropriate to undertake an after-the-fact analysis of the impact of decoupling on the cost of capital?

A: No. As noted, due to the substantial direct evidence regarding the impact of decoupling available to the Commission in this proceeding, there is no need to wait for an after-the-fact analysis of the Company's debt instruments to assess any impact on the cost of capital.[27]

The fundamental flaw in this "after the fact" approach, also recommended by Commission Staff in the initial phase of these proceedings, is that the determination of the cost of capital is forward-looking and expectational. The cost of capital must be determined at the time rates are set as an essential cost component to those rates. Cost of capital is not set for ratemaking purposes by looking back at what happened in the past. Substantial evidence now exists in the record of these proceedings to support the link between decoupling and lower equity capital costs. The Commission does not require, nor would it be reasonable to seek some other future signposts to confirm the evidence currently before it. Also, in response to Public Counsel Data Request No. 56, Puget indicates that determining the impact of decoupling on the cost of debt for electric utility companies "is likely to be impossible."

Failing to address cost of capital here has the effect of requiring ratepayers to provide a return in their cost of service that exceeds the Company's cost of capital, during a "wait and see" period that cannot be unwound. That would not provide the balancing of investor and consumer interests called for in *Hope* and *Bluefield*. Moreover, it is not clear what, if any, analytical guidelines would allow the Commission to discern from the tea-leaves of Puget's next bond issue's coupon yield what portion of the difference between that yield and the Company's embedded cost of debt might be attributable to decoupling or to the

[27] Order 07, ¶¶ 105-106 (postponing the analysis of the impact of decoupling on ROE).

increase/decline in capital costs generally, changes in utility financial risk, or any other of many factors.

Q: At page 9 of Order 10 in these proceedings, the Commission indicates that the parties should prepare cost of equity studies for the early 2013 period that would provide an update for the 9.8 percent determined in 2012 and be appropriate for "continued application through the rate plan period." Is the 9.0 percent cost of equity estimate you have provided (absent decoupling) appropriate for application through the rate plan period?

A: Yes. Equity capital cost estimates are forward-looking and must take into account current market expectations for the future. That is accomplished through the use of current market prices (which take into account the market's collective expectations), expected dividends, forward-looking growth rate expectations as well as projections about probable changes in the macro-economy, inflation and interest rates in the future. Therefore, my 2013 target period cost of equity estimate is appropriate for the future rate plan period.

In addition, my most recent cost of capital estimate prepared for the Public Counsel in the on-going PacifiCorp rate proceeding indicates that the current cost of equity capital is in the same range as that determined for the target 2013 time period in this case.[28] My PacifiCorp testimony was submitted on October 10, 2014, and studied fully-integrated gas and electric utilities with senior bond ratings between BBB and A (the same bond rating parameters used for the target

[28] *Washington Utilities & Transportation Commission v. PacifiCorp*, Docket UE-140762 et al, Direct Testimony of Stephen G. Hill, Exhibit No. SGH-1CT.

period sample selection for Puget). In fact, ten of the fifteen companies in the Puget sample were also in my PacifiCorp sample group. The reasonable range of the cost of equity capital determined in that recent PacifiCorp case was the same as determined from my analysis in this proceeding: 8.5 percent to 9.5 percent.

Also, the average 20-year "Baa" utility bond yield during the 2013 target period was 4.52 percent while the most recent data indicate that average "Baa" utility bond yields have not changed significantly and, in fact, have declined somewhat. According to Value Line's *Selection & Opinion* the average 20-year "Baa" utility bond yield over the most recent six week period (October 17 through November 21, 2014), was 4.42 percent--very similar to, but below, the level in 2013. In addition, long-term Treasury bond yields have not changed much between "early 2013" and "late 2014,"—3.19 percent and 3.03 percent, respectively.[29] Therefore, the cost of equity estimate I have provided in this Remand proceeding for the target time period ("early 2013") is reasonable for that time period and appropriate for the rate effective period as well. My analysis also indicates that the 9.8 percent ROE previously awarded to PSE by the Commission is higher than the uppermost end of a reasonable range and, thus, overstates the Company's 2013 and 2014 cost of equity.

IV. COMPANY COST OF CAPITAL ANALYSIS

Q: With what methods has Company witness Morin estimated the cost of equity capital in this proceeding?

[29] The Value Line Investment Survey, *Selection & Opinion*, "Selected Yields" (May 17, 2013, through June 21, 2013 and October 17, 2014 through November 21, 2014.

A: Dr. Morin has based his equity return recommendation for Puget's Washington operations, in part, on a DCF analysis of a sample group of electric utilities that have at least 50 percent of their operations generated by utility operations. Dr. Morin provides analyses that focus on the target period of the first half of 2013. In addition he provides a current (2014) cost of equity estimate. The methodology for both periods is the same and the results are slightly different. My comments here will focus on Dr. Morin's 2013 equity cost analyses.

In addition, Dr. Morin has relied on a CAPM analysis that utilizes a DCF estimate of the cost of equity of the companies in a market index as a basis for determining the market risk premium, along with a Risk Premium analysis based on allowed returns. With those methods, based on his judgment, Dr. Morin estimates the current cost of equity for Puget to be in the range of 9.8 percent to 10.7 percent, with a mid-point of 10.3 percent.

Dr. Morin's equity cost analyses suffer from flaws that cause his equity cost estimates to be overstated. I will discuss the shortcomings of each of Dr. Morin's cost of capital methods in the order in which they are presented in his Direct Testimony: DCF, CAPM, and Risk Premium.

A. Dr. Morin's DCF Analysis.

Q: What are your comments regarding Dr. Morin's DCF analysis?

A: Dr. Morin's 2013 DCF analyses of electric utility companies, shown in his Exhibit Nos. RAM-4 and RAM-5 overstates the 2013 cost of utility company common equity for several reasons. First, his DCF results rely exclusively on projected earnings growth. As I discussed in Section III of my testimony, sell-side analysts' projected earnings growth overstates actual long-term growth. Even though the overstatement with utility companies is less than that with unregulated firms, relying only on projected earnings growth will tend to provide a DCF cost of equity estimate that is overstated. As shown in my mechanical DCF analysis[30] the inclusion of Value Line's projected earnings, dividends and book value growth rates (all of which are published, available to investors and, we must assume, included in stock prices), along with analysts' sell-side earnings growth estimates, results in a DCF of approximately 8.3 percent, well below Dr. Morin's DCF estimates based only on projected earnings growth.

Second, Dr. Morin elects to omit companies that have negative earnings growth rate projections published by the sources on which he elects to rely. However, Dr. Morin does not address the issue of whether there are growth rate estimates that are too high, and by eliminating only the low earnings growth expectations from his analysis, Dr. Morin is skewing upward his ultimate DCF results, analyzing only the data that will produce higher DCF results.

It is certainly reasonable to believe that investors do not rely on negative earnings growth rate forecast in forming their long-term growth expectations for a utility investment—if they did, the market prices of the firms for which investor services project zero or negative earnings over the next five years would plummet. In fact, AUS Utility Reports (May 2013) indicates that the average market-to-book ratio of the three companies Dr. Morin leaves out of his 2013 DCF analysis (145.9 percent) is well within one standard deviation of and, thus,

[30] Exhibit No. SGH-10.

similar to the industry average market to book valuation (177.6 percent).[31] Those data show quite clearly that investors do not rely on single earnings growth rate estimates in assessing long-term expected growth and market returns. However, that is the assumption underlying Dr. Morin's use of projected earnings growth rates. It is clear from these data that investors rely on a great deal more information than the projected earnings growth rates of one investor service in determining their market-based return expectations.

Third, Dr. Morin's growth rate analyses contain a high statistical outlier that is not addressed or accounted for in his analysis. As shown on Dr. Morin's Exhibit No. RAM-4, his projected earnings growth rates contain a growth rate estimate of 11 percent for NV Energy. The average projected earnings growth rate for the entire sample group shown in Dr. Morin's[32] is 4.73 percent, with a standard deviation of 2.77 percent. Using a two standard deviation threshold to delineate earnings growth that would be considered a statistical outlier would put the lower bound at -0.80 percent (so the negative growth rates are properly excluded). However, the upper bound would be at 10.26 percent (4.73% + 2 x 2.77%). The 11 percent earnings growth rate estimate for NV Energy should be considered an outlier that would tend to skew Dr. Morin's DCF results upward. Eliminating NV Energy from Dr. Morin's growth rates in Exhibit No. RAM-4 would result in an average growth for his sample group of 5.27 percent, 23 basis points below the growth rate he used in his analysis.

[31] The three companies omitted from Dr. Morin's 2013 DCF analysis are: Ameren Corp., Exelon and Public Service Enterprise Group. See Morin's Exhibit Nos. RAM-4 and RAM-5.
[32] Exhibit No. RAM-4.

A similar analysis of outlying growth rates applied to the data in Dr. Morin's Exhibit No. RAM-5 determines that, in addition to the three low growth rate estimates, the high projected earnings growth rate estimate for NV Energy (15.1 percent in this instance) should also be eliminated. Eliminating that one high outlier, Dr. Morin's average projected growth rate for his sample is 4.90 percent, 41 basis points below the growth rate he used in his analysis.

Q: Are there other aspects of Dr. Morin's DCF analysis in this proceeding that cause his results to be overstated?

A: Dr. Morin's DCF analysis relies on dividend yields published in Value Line. I have no concerns, of course, with the use of Value Line as a source of information. In calculating his DCF dividend yields, however, Dr. Morin increases the dividend yield published by Value Line by one plus the DCF growth rate. The reason for that increase is to estimate the dividend for the next period, assumed to be one year in Dr. Morin's analysis. However, as Value Line explains to the investors that use its service in "A Subscribers' Guide," the dividend yield published by Value Line, is based on the "cash dividends *estimated to be declared in the next 12 months* divided by the recent [stock] price." Therefore, in adjusting the dividend yield published by Value Line for one year's expected growth, Dr. Morin is double-counting that growth—the dividend yield is already "adjusted" and requires no further increase.

As shown on Dr. Morin's Exhibit Nos. RAM-4 and RAM-5, his additional dividend growth adjustment (1+g) increases the DCF cost of equity capital from 22 to 24 basis points.

Q: Taking into account the high statistical outliers in Dr. Morin's growth rates and his dividend yield overstatement, what is the outcome of the Company's DCF analysis in this proceeding?

A: The results of Dr. Morin's 2013 DCF analyses using forward-looking dividend yields published contemporaneously with his analysis, along with his projected earnings are shown in Exhibit No. SGH-15.

Using Value Line's published year-ahead dividend yields with Dr. Morin's own growth rates produces a DCF result of 9.59 percent, based on Value Line earnings growth projections and 9.22 percent based on Zacks or Yahoo!Finance earnings growth projections.[33] The median of the forward-looking 2013 DCF results for Dr. Morin's sample group, which minimizes the impact of outliers, ranges from 9.35 percent to 9.44 percent.

While these DCF results remain somewhat overstated due to the exclusive reliance on only one growth rate measure, they are well below the 9.80 percent equity return awarded by this Commission in Puget's 2011 rate proceeding.

Q: In his Direct Testimony in this proceeding, has Dr. Morin provided any testimony regarding whether or not DCF equity cost estimates are reliable when utility stock prices are different from book value?

[33] Dr. Morin cites Zack's as the growth rate source on the first page of Exhibit No. RAM-5 and Yahoo!Finance as the source on the second page. The growth rates are the same on both pages. It is also noteworthy that, when asked in Public Counsel Data Request No. 048(a), to provide copies of the Zack's source documents from which the projected earnings growth rates were taken, Dr. Morin was unable to provide those data, stating that "Zacks does not provide archives of historical growth forecasts, only current estimates are provided."

A.: No. However, he did provide such testimony in this jurisdiction in his Rebuttal Testimony in Puget's 2008 rate proceeding.[34] Dr. Morin has testified previously before this Commission that when utility market prices are above book value the DCF understates the cost of equity capital.

Q: Has Dr. Morin's position on this issue been consistent over time?

A: No, Dr. Morin's first text on the cost of capital, *Utilities' Cost of Capital,* was published in 1984, and was conceived and written during a time period for utilities in which interest rates were very high and market prices were generally below book value. As shown in Chart III below, the market-to-book ratio of Moody's Electric Utilities was below 1.0 for the ten-year period from 1974 through 1984 and averaged only 0.75 of book value during that time.

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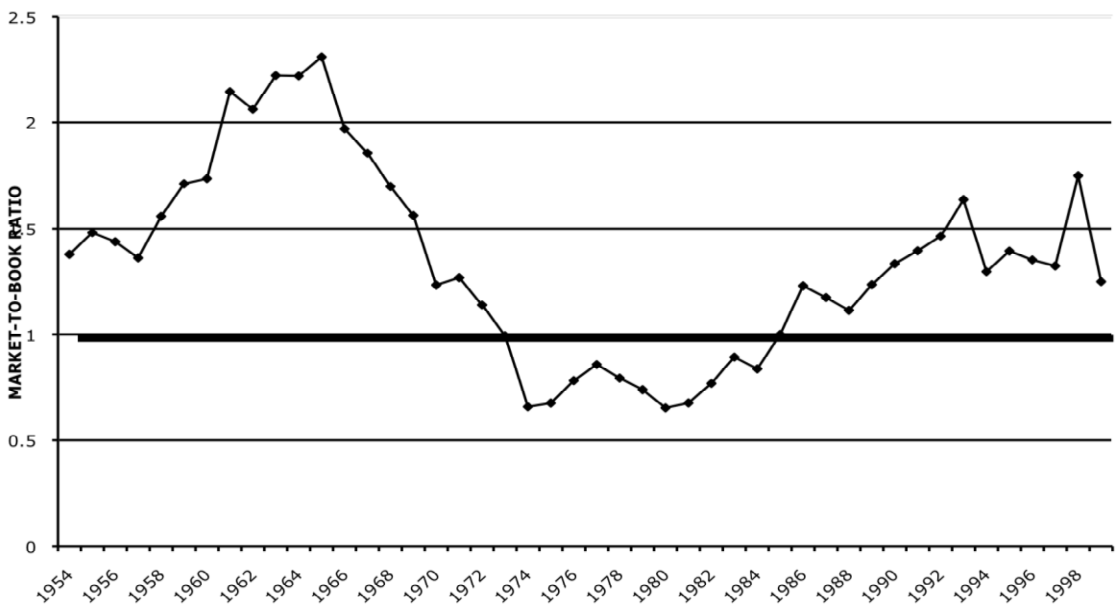
[34] *Washington Utility & Transportation Commission v. Puget Sound Energy*, Dockets UE-072300/UG-072301, Morin Rebuttal, Exhibit No. RAM-20T, pp. 9, 10.

Chart III
Market-to-Book Ratio
Moody's Electric Utilities



The logic on which Dr. Morin bases his current claim that the DCF *understates* the cost of equity when market prices exceed book value, also indicates that the DCF *overstates* the cost of equity when market prices are less than book value. However, there is no indication in Dr. Morin's 1984 text that the DCF overstates the cost of equity when utility market prices are below book value (as they were at that time). Not only does Dr. Morin's original text not support his current position that a market price below book value indicates that the DCF overstates the cost of equity, it actually adopts an opposing view. At page 98 of his 1984 text, Dr. Morin states that the application of the standard DCF model to a public utility whose market-to-book ratio was below one would result in a "downward-biased estimate of the cost of equity," i.e., the DCF would understate the cost of equity.

Therefore, in 1984, when utility stock prices had been below book value for a decade, Dr. Morin is on record stating that the DCF *understates* the cost of capital when market prices are *below* book value. Now that utility stock prices are generally above book value, Dr. Morin is on record stating that the DCF *understates* the cost of capital because market prices are *above* book value. Dr. Morin's published opinions regarding the accuracy of the DCF relative to current market-to-book values are inconsistent with his prior positions and that inconsistency undermines the reliability of Dr. Morin's position on this subject.

Q: What rationale does Dr. Morin use to support his current position that the DCF understates the cost of equity when utility stock prices exceed book value?

A: Dr. Morin, at pages 434 and 435 of his newest text, *New Regulatory Finance* (Public Utilities Reports, Vienna, VA, 2006), sets out the following numerical example:

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Table III

Dr. Morin's Market-to-Book Example

		Situation 1	Situation 2	Situation 3
1	Initial Purchase Price	$25.00	$50.00	$100.00
2	Initial Book Value	$50.00	$50.00	$50.00
3	Initial M/B	0.50	1.00	2.00
4	DCF Return 10% = 5% + 5%	10.00%	10.00%	10.00%
5	Dollar Return	$5.00	$5.00	$5.00
6	Dollar Dividends 5% Yield	$1.25	$2.50	$5.00
7	Dollar Growth 5% Growth	$3.75	$2.50	$0.00
8	Market Return	20.00%	10.00%	5.00%

Dr. Morin's explanation of the "impact" of market-to-book ratios on the DCF cost of equity in "Situation 3" (when market prices are above book value) proceeds as follows:

> [t]he DCF cost rate of 10%, made up of a 5% dividend yield and a 5% growth rate, is applied to the book value rate base of $50 to produce $5.00 of earnings. Of the $5.00 of earnings, the full $5.00 are required for dividends to produce a dividend yield of 5% on a stock price of $100.00, and no dollars are available for growth. The investor's return is therefore only 5% versus his required return of 10%. A DCF cost rate of 10%, which implies $10.00 of earnings, translates to only $5.00 of earnings on book value, or a 5% return.[35]

Dr. Morin elects not to discuss "Situation 1" in which market prices are below book value and the DCF, in theory, overstates the cost of equity. Of course, as I noted previously, during the time period when market prices were actually below book value, Dr. Morin expressed no concerns that the DCF

[35] Morin, R., *New Regulatory Finance,* Public Utilities Reports, Vienna, VA, (2006), p. 435.

overstated the cost of equity due to differences in market price and book value—and, in fact, expressed the opposite view.

Q: Does Dr. Morin's numerical example, set out above, support his thesis that the DCF is inaccurate when market prices are different from book value?

A: No. In attempting to show that the DCF estimates the cost of equity incorrectly when market prices are different from book value, Dr. Morin has created a hypothetical situation that cannot exist in reality and is contrary to one of the most fundamental precepts in finance.

In attempting to show that the DCF understates the cost of capital when market prices are above book value, Dr. Morin's "Situation 3" example posits a firm that has an allowed return of 10 percent (which is assumed to be determined by the DCF), a book value of $50, and for which investors are paying a stock price equal to twice book value ($100). That company will earn $5 on its rate base investment (10 percent allowed return x $50 rate base/book value), and that $5 return represents only a 5 percent return to the investors that paid $100 for the stock. Dr. Morin, through this example, ostensibly concludes that the DCF does not provide the investors' required 10 percent return (the investor-required return assumed to be provided by the DCF) when it is applied to a rate base (book value) that is smaller than the market price. This is an incorrect conclusion for two reasons.

First, if the investor's required return is actually 10 percent (which appears to be Dr. Morin's assumption) and the utility is expected to earn a 10 percent return on its book value of $50, or $5, then no investor would pay twice book value for that stock. Therefore, the situation on which Dr. Morin's DCF unreliability rationale is grounded cannot exist.

Imagine a stockbroker trying to sell a utility stock to an investor who requires a 10 percent return. "I've got a stock for you that's going to pay you $5 annually, but each share will cost you $100. Are you in?" No investor would knowingly pay $100 for a stock that will earn $5 when he or she requires a 10 percent return for that type of stock—a fact which Dr. Morin himself confirms:

> "Investors will not provide equity capital at the current market price if the earnable return on equity is below the level they require..."[36]

Yet, that is the logical construct on which Dr. Morin's "Situation 3" example rests.

Second, the only reason for an investor to pay $100 for a stock that will provide a $5 income stream is if that investor requires a 5 percent return for that type of stock. In Dr. Morin's "Situation 3" example if we take the 10 percent number to be the allowed return (the expected return on the $50 rate base), and the investor's cost of capital to be 5 percent (a DCF result derived from a 5 percent dividend yield and 0 percent growth), then his numerical example makes economic sense. If the investor's required return is 5 percent and the stock in question is expected to pay a 10 percent return on a $50 book value, then, *and only then*, is the $100 stock price rational.

Therefore, the only situation under which the numerical conditions set out in Dr. Morin's example can exist is one that conforms to the widely accepted

[36] Exhibit No. RAM-1T, p. 10, ll. 12-14.

relationship between market price, book value, ROE and the cost of capital.[37] Namely, when the expected return (r = 10% in "Situation 3," above) exceeds the investors' required return (K = 5% in "Situation 3," above) the market price (P = $100) will exceed the book value (B = $50).

In summary, Dr. Morin's numerical example, which purports to show that the DCF understates the cost of equity when market prices are above book value, does not accomplish that goal. Instead, under the only circumstance that is economically plausible, his example shows that when utility market prices are significantly above book value, the investors' required return (the cost of equity capital) is below the ROE expected to be earned by those companies.

Q: Did the originator of the DCF, Professor Myron Gordon, indicate that the DCF would provide equity cost estimates that were biased downward (upward) when utility market prices were above (below) book value?

A: No, he did not. Professor Gordon was certainly aware that utility market prices could differ from book value. Dr. Gordon did his developmental work on the DCF in the 1950s and 60s, during which time utility stock prices were well above book value (see Chart III). However, there is no discussion in Gordon's texts regarding differences between market price and book value having any impact on the ability of the DCF to estimate investors' expected return on common equity (the cost of equity capital). Professor Gordon does discuss the importance of the

[37] Gordon, M.J., *The Cost of Capital to a Public Utility*, MSU Public Utilities Studies, East Lansing, Michigan, (1974), pp., 63-64; Kolbe, Read, Hall, *The Cost of Capital: Estimating the Rate of Return for Public Utilities*, 25-33 (1986); Lawrence Booth, ("The Importance of Market-to-Book Ratios in Regulation," NRRI Quarterly Bulletin, Vol. 18, No. 4, at 415-16 (Winter 1997).

utility market price to book value ratio, noting that if market prices are well above book value, the expected accounting return (the return on book value) will exceed the cost of common equity.

The integrated electric and gas utilities used to estimate the cost of equity in my testimony have an expected return on book equity in 2013 of 9.73 percent.[38] The current average market-to-book ratio of those same companies is 1.58.[39] While those relationships do not pinpoint the cost of capital, according to the originator of the DCF, they indicate that a current cost of equity capital is well below 9.73 percent percent and well below the 9.8 percent equity return awarded in Puget's 2011 rate proceeding.

B. Dr. Morin's CAPM Analysis.

Q: What are your comments regarding Dr. Morin's Capital Asset Pricing Model?

A: Dr. Morin's CAPM cost of equity estimate is overstated for two reasons, 1) because his market risk premium estimate of 7.2 percent is somewhat overstated and 2) because Dr. Morin has elected to rely on forward interest rate projections instead of current Treasury bond yields as the risk-free rate of return in the CAPM.

As I noted in Section III of my testimony, over the past 85 years, the difference between the return on common stocks and the return on long-term Treasury bonds has ranged from 4 percent to 6 percent, depending on the

[38] See Exhibit No. SGH-13.
[39] See Exhibit No. SGH-6, p. 1.

averaging technique used to measure the difference, according to the data published by Morningstar (formerly Ibbotson Associates).

Importantly, much of the market risk premium discussion in the literature of financial economics over the past two decades has supported the notion that investor's market risk premium expectations are likely to be *below* those long-term historical averages (4 percent-6.0 percent) published by Morningstar. That theoretical discussion has, over time, worked its way into modern finance textbooks. In the 2006 edition of their widely-used finance textbook, Brealey, and Meyers [40] discuss the findings of many different studies regarding the market risk premium. Importantly, in prior editions of their textbooks Brealey, et al, cited the Morningstar historical data, now they do not. Instead they cite the risk premium work of Dimson, Staunton and Marsh, authors of "Triumph of the Optimists," a key publication in the newer review of market risk premiums, in which those authors review a longer-term data set than that used by Morningstar and conclude that market risk premiums expected in the future are below the historical averages published by Morningstar.[41]

Brealey and Meyers conclude, based on their review of the recent evidence regarding the market risk premium, that a reasonable range of arithmetic equity premiums above short-term Treasury Bills is 5 percent to 8 percent.[42] Because the long-term historical return difference between Treasury Bonds and

[40] Brealey, R., Meyers, S., Allen, F., *Principles of Corporate Finance, 8th Edition,* McGraw-Hill, Irwin, Boston MA, 2006.
[41] Dimson, E., Staunton, M., March, P., *Triumph Of The Optimists, 101 Years of Global Investment Returns,* Princeton University Press, Princeton, NJ, 2002.
[42] *Id*, p. 154. See also Dr. Morin's response to Public Counsel Data Request No. 45(a).

Treasury Bills has been about 1.5 percent, Brealey and Meyers' textbook indicates a long-term market risk premium relative to T-Bonds ranging from 3.5 percent to 6.5 percent [5% - 1.5% = 3.5%; 8% - 1.5% = 6.5%].[43] The 6.0 percent market risk premium I use in my CAPM analysis, based on Morningstar data, is near the upper end of that range. Dr. Morin's 7.2 percent is well beyond the upper end of that range.

Q: Doesn't Dr. Morin actually cite the same Brealey and Meyers' text as support for his market risk premium?

A: Yes, he does. However he fails to point out that the risk premium range published by Brealey and Meyers (5 percent to 8 percent) is relative to *short-term U.S. Treasury Bills*, not the long-term Treasury Bonds used by Dr. Morin. As I noted previously, adjusting the Brealey and Meyers range for the difference in yields, historically, between T-Bills and T-Bonds indicates a risk premium range relative to long-term T-Bonds ranging from 3.5 percent to 6.5 percent, and Dr. Morin's market risk premium is at the very topmost end of that range. I would also note that, with T-Bill yields averaging 0.04 percent in May and June of 2013, Brealey and Meyers' 5 percent to 8 percent market risk premium range implies a CAPM cost of equity for the stock market in general of 5.04 percent to 8.04 percent. By that measure, my 9.0 percent equity cost estimate for Puget, a lower-risk utility stock with a beta coefficient well below the 1.0 average for the market, is extremely conservative. In sum, Dr. Morin claims that the Brealey and Meyers'

[43] *Id.*, pp. 149, 222.

text indicates his 7.2 percent market risk premium is consistent with the financial literature, but the textbook he cites does not provide that support.

Q: Why is Dr. Morin basing his historical market risk premium on the difference between stock returns and bond yields rather than bond returns?

A: The rationale for Dr. Morin's method of comparing stock returns and bond yields is that there have been unanticipated gains with bond investments, and the historical yields (which are lower that historical bond returns) better represent investor expectations. However, there is no readily available analogue for stocks (i.e., there is no readily available stock "yield" parameter that can be said to measure forward-looking investor expectations). Therefore, Dr. Morin's analysis assumes that historical earned returns are representative of investor expectations for stocks, but not for bonds. If bonds have achieved higher returns than expected and risk premiums are constant (a fundamental assumption of this type of historical analysis), then it stands to reason that stock returns may also have been higher than expected. This would mean that an "apples-to-apples" comparison of stock and bond yields would produce an historical risk premium that was below that employed by Dr. Morin.

While Dr. Morin does not attempt to measure an historical expected yield for stocks, such measurements have been conducted by respected researchers. In 2003, Eugene Fama and Kenneth French published an article in *The Journal of Finance* focusing on the equity risk premium and measured (instead of the realized return) the expected return on the market less the expected return on bonds (the yield) over a long-term period, as well as several sub-periods. Their research, based on long-term historical expected returns of stocks and bonds, indicates that the *expected* (i.e., forward-looking) risk premium over the last half of the Twentieth Century is in the range of 2.6 percent to 4.3 percent.[44]

Therefore, Dr. Morin's preferred method of calculating the historical market risk premium mismatches earned returns for stocks with yields for bonds. The financial literature indicates that properly matching historical stock "yields" (investor-expected returns for stocks) with historical bond yields indicates maximum market risk premiums of about 4 percent (well below Dr. Morin's preferred 6.6 percent historical market risk premium estimate). In that regard, my use of historical earned stock returns and historical earned bond returns provides a reasonable market risk premium estimate of 6.0 percent.

Q: Why is Dr. Morin's estimate of the expected market return in his CAPM significantly higher than long-term historical averages?

A: Dr. Morin's forward-looking market risk premium is based on a single-stage DCF analysis of the S&P 500 Index, and projected earnings growth from one source is the only growth rate considered in that analysis. Dr. Morin estimates the DCF cost of equity of the S&P 500 to be 12.4 percent and, subtracting the risk-free rate he uses (4.2 percent) produces a risk premium of 7.8 percent. That estimate of the market risk premium is averaged with his yield-based historical estimate of 6.6 percent (discussed above) to produce the 7.2 percent market risk premium he uses in his CAPM analysis. As I've noted previously, the sell-side analysts' projected

[44] Fama, E., French, K., "The Equity Premium," *The Journal of Finance*, Vol. LVII, No. 2, April 2003, pp. 637-659.

earnings growth rates used by Dr. Morin in his DCF analysis of the S&P 500 have historically overstated the actual growth that investors have realized and would, therefore, overstate Dr. Morin's estimate of the cost of equity capital based on those growth rates and, in turn, serves to overstate his CAPM equity cost estimate as well.

Q: You noted that Dr. Morin uses a risk-free rate for long-term Treasury bonds of 4.6 percent. Is that based on bond yield forecasts?

A: Yes. As shown on page 44 of Exhibit No. RAM-1T, Table 4, Dr. Morin's CAPM risk free rate of 4.6 percent is based primarily on bond yield forecasts during the first half of 2013. As I noted in the discussion of the target period capital markets, the actual T-bond yield in May and June of 2013 was 3.19 percent. Therefore, the risk-free T-bond yield used by Dr. Morin is 140 basis points higher than the yield being accepted in the market in the first part of 2013. Also, in his response to Public Counsel Data Request No. 034, Dr. Morin indicates that he has changed his CAPM methodology from relying on current Treasury bond yields to one that now uses projected bond yields.

I do not disagree that one must attempt to normalize short-term bond yield fluctuations in order to provide a reliable estimate of the long-term cost of equity capital—I did that in my analysis by relying on a long-term trend in T-bond yields to arrive at a risk free rate of 3.4 percent (roughly 20 basis points above the 2013 market yield). However, interest rate forecasts are simply not very accurate indicators of the current cost of capital. For example, if the very sophisticated bond traders in the long-term U.S. Treasury market actually thought that T-bond yields would be 4.6 percent within two years, they would sell their bonds short (because prices would fall as yields rose) and wait for the money to roll in; but we don't see that behavior in the markets. Conversely, if T-bond investors, en masse, believed that interest rates would be 4.6 percent, wouldn't they bid down prices now to make that belief a reality? Yet, despite the widely disseminated forecasts cited by Dr. Morin, the T-bond yields remained low in 2013.

It is also important to note that, since the economic recession in 2008/09, Value Line has continually predicted interest rate increases based on a more rapidly growing economy and rising inflation (as have most of the interest rate prognosticators like the ones used by Dr. Morin). However, those forecasts have all been wrong—none of those predicted increases have materialized. For example, in February 2009 Value Line projected that long-term Treasury yields would average 6.3 percent in 2013.[45] The actual average yield on long-term Treasury bonds in 2013 ranged from 3.12 percent (20-year T-bonds) to 3.45 percent (30-year T-bonds), according to the Fed's Statistical Release H.15.

Also, in 2010, Value Line projected long-term T-bonds would yield 6.30 percent in 2014.[46] Thus far in 2014, the average long-term Treasury bonds yield has ranged from 3.27 percent (20-year T-bonds) to 3.53 percent (30-year T-bonds). On average, Value Line's T-Bond interest rate projections were roughly 250 to 300 basis points too high.

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[45] Value Line *Selection & Opinion*, February 2, 2009, p. 3679.
[46] Value Line *Selection & Opinion*, February 26, 2010, p. 3019.

Simply put, the more reliable risk-free rate of return for use in a CAPM analysis is the current T-bond yield, not an estimate of what it might be in two years. Forward bond yield estimates based on optimistic assumptions about a U.S. economic recovery have proven to be inaccurate in the recent past and should not now be the basis of estimating the target period cost of equity capital.

Q: If Dr. Morin utilized a 3.4 percent risk-free rate and a 6.6 percent historical market risk premium (his preferred historical measure) what would his CAPM produce?

A: With a beta coefficient of 0.72, a risk-free rate of 3.4 percent and a market risk premium of 6.6 percent, a CAPM analysis would indicate a target period (2013) cost of equity capital for Puget of 8.15 percent [3.4% + 0.72 x 6.6%]. Even using Dr. Morin's recommended market risk premium (7.2 percent) with a 2013 T-bond yield (3.4 percent) would provide a CAPM result of 8.58 percent [3.4% + 0.72 x 7.2%]. Clearly, the factor that causes Dr. Morin's CAPM results to be skewed upward is his use of interest rate projections. When based on current (target period 2013) T-bond yields, Dr. Morin's CAPM results are below 9.0 percent.

Q: What are you comments regarding Dr. Morin's use of the empirical CAPM—the ECAPM?

A: As Dr. Morin notes at page 40 of Exhibit No. RAM-1T, the "empirical" CAPM (ECAPM) is designed to account for the fact that the Capital Market Line is believed to have a lower slope than postulated theoretically. A lower slope for the Capital Market Line implies that the CAPM understates the equity cost rate for low beta stocks like utilities and over-estimates the equity cost rate for high beta stocks like "dot-com" companies. The flaw in the "empirical" CAPM analysis is that Dr. Morin uses "adjusted" betas in his ECAPM analysis, while the research on which the "low slope" theory is based uses betas that are not adjusted.

Beta estimates published by Value Line are adjusted for the theoretical tendency for beta coefficients to migrate toward the market average of 1.0. "Adjusted" betas are higher for low-beta stocks like utilities and lower for high-beta stocks like "dot-com" companies. In other words, when low betas are adjusted upward and high betas are adjusted downward, that has the same effect as lowering the slope of the Capital Market Line. Using "adjusted" betas along with an ECAPM analysis double-counts the effect of changing the slope of the Capital Market Line. All of the theoretical research Dr. Morin cites regarding the support for the ECAPM (except his own) is based on studies using "raw" or "unadjusted" betas.

Q: Doesn't Dr. Morin indicate in his testimony that the ECAPM "slope" adjustment is different from the beta "adjustment," and does not conflict?

A: Yes, that is his testimony. Dr. Morin is correct that the ECAPM "slope" adjustment and the "adjustment" of beta coefficients originate from different theoretical concepts. However (and this is the important point), both factors have the same effect. Raising low betas and lowering high betas (the result of "adjusting" raw betas), works to lower the effective slope of the Capital Market Line, which is also the result of the ECAPM. Therefore, Dr. Morin is incorrect to assume that using adjusted betas in an ECAPM calculation does not double-count the slope-lowering effect. Using adjusted betas in an ECAPM calculation results in an overstated cost of equity estimate, as recognized by the Tennessee Regulatory Authority:

> Although Dr. Morin explained his reasons for using E-CAPM, the panel did not find that E-CAPM was a universally accepted approach to determine the cost of equity….
> By placing a 75% weight on the adjusted beta of 0.77 for CGC and a 25% weight on the market beta of one, the E-CAPM arrives at an inflated beta for CGC of 0.8275. In other words a mean adjusted beta of 0.77 has become 0.8275 in the E-CPAM, thus inflating beta by 7.5%. Thus the panel concluded that the E-CAPM was merely another method to further inflate an already adjusted estimate for CGC and, therefore, rejected Dr. Morin's E-CAPM analysis.[47]

C. Dr. Morin's Risk Premium Analysis.

Q: Please describe the risk premium analyses used by Dr. Morin in his Direct Testimony in this proceeding.

A: Dr. Morin has performed two separate risk premium analyses based on historical data. The first risk premium analysis Dr. Morin utilizes includes an examination of the historical return difference between earned returns of electric companies and the yield on long-term treasury bonds. He performs this analysis over a period beginning in 1931 through 2012 for electric utilities for his target period (2013) equity cost estimate. In the second risk premium analysis, Dr. Morin compares the allowed returns for electric utilities with contemporaneous long-term U.S. Treasury Bond (T-Bond) yields from 1986 through 2012.

[47] Docket No. 04 -00034, Chattanooga Gas Company, before the Tennessee Regulatory Authority, Final Order, October 20, 2005, pp. 54, 55.

Dr. Morin estimates an investor-expected risk premium between long-term Treasury bonds and electric utility stocks of 5.2 percent using the long-term historical data and 5.4 percent using historical allowed utility returns. That historical return difference between allowed ROEs and Treasury bonds was then adjusted upward to 6.1 percent to account for what Dr. Morin perceives to be a negative correlation between interest rates and the cost of equity capital. To those risk premiums (5.2 percent and 6.1 percent), Dr. Morin added a projected Treasury bond yield of 4.6 percent to obtain equity cost estimates of 9.8 percent and 10.7 percent for the 2013 target period.

As noted previously, Dr. Morin's use of the projected T-bond yield, 4.6 percent, rather than a normalized current yield during the 2013 target period (3.4 percent) overstates the then-current cost of common equity by 120 basis points. For example, adding Dr. Morin's long-term historical return difference between utility stocks and Treasury bonds (5.2 percent) to a T-bond yield appropriate for the target period (3.4 percent) indicates a cost of common equity of 8.6 percent--a result very similar to my own DCF analysis.

Q: You noted that Dr. Morin places emphasis on a negative correlation between bond yields and risk premiums in reaching his Risk Premium equity cost estimate. Please comment on that issue.

A: Dr. Morin subtracts average bond yields from the equity returns allowed utility companies over the past 26 years (1986-2012).[48] Then, through a regression analysis, he posits a relationship between bond yields and risk premiums and uses

[48] Exhibit No. RAM-9.

that relationship, with the current cost of debt, to estimate the Company's cost of equity. Aside from the problems that exist generally with the data used in the analysis, as noted above, there are additional problems with this particular approach.

Although Dr. Morin's regression analysis shows a relatively strong correlation between risk premium and bond yields (a high r^2 value), that is not surprising because the resultant risk premium is a direct arithmetic function of the prevailing bond yield and a high correlation would be expected. Also, while Dr. Morin's review of allowed returns for utilities shows a negative correlation with bond yields, in my view, what Dr. Morin's risk premium regression analysis has actually captured is simply the tendency of regulatory allowed returns to move more slowly than aggregate bond yield changes—regulatory caution, if you will.

The downward trend in allowed ROEs has simply been slower than the downward trend in fundamental capital costs (bond yields). The same was true in 1974-1983, when interest rates were rising. There too, regulators' allowed returns lagged the interest rate changes, just as they have done since the mid-1980s when U.S. interest rates began their long-term decline. Therefore, Dr. Morin's regression analysis has simply captured regulators' cautionary approach to changing allowed returns rather than any fundamental stochastic relationship between investor-required risk premiums and bond yields.

Without the notion of a negative relationship between current bond yields and the risk premium investors require to invest in stocks rather than bonds, Dr. Morin's allowed-ROE risk premium results would be substantially different.

Adding his 5.4 percent average historical difference between allowed ROEs and contemporaneous interest rates to the 2013 normalized T-bond yield of 3.4 percent produces a risk premium equity cost estimate of 8.8 percent.

Q: Is there other more recent evidence that counters Dr. Morin's assumption that expected risk premiums vary inversely with interest rates?

A: Yes. There is an on-going survey by professors at Duke University regarding risk premiums and interest rates. Professors John Graham and Campbell Harvey, in conjunction with *CFO Magazine*, since 1999, have polled corporate financial officers regarding their expectations for the expected market risk premium. In addition to the fact that Graham and Harvey found risk premiums to range from 2.5 percent to 4.5 percent (well below long-term historical risk premiums), they also found that the expected risk premium varies *directly* with interest rates. That is, as interest rates decline, so too do expected risk premiums. Therefore, there is published evidence in the financial literature that counters Dr. Morin's regression analysis, which indicates risk premiums increase when interest rates decline.

Finally, in some respects, the notion of risk premiums varying inversely with interest rates is counter-intuitive. Let's assume that investors require a 5 percent premium to invest in utility stocks in today's capital market environment with utility bonds at 4.0 percent. Now, suppose some dramatic international event occurred that caused economic turmoil and sent utility bond yields to their 1982 levels of almost 16 percent. In that extremely unstable economic environment—in which investors have to be induced to invest in utility bonds by means of a 16 percent return—it is simply not logical to believe that the risk premium investors require for common stocks above the return for bonds in that environment would *decline*. Yet, that is the foundation of Dr. Morin's thesis here. With the added uncertainty and higher interest rates, it is reasonable to believe that investors would require increased risk premiums. That logic is confirmed in the Graham and Harvey studies cited above.

Q: When Dr. Morin's cost of capital analyses are modified to utilize more reliable inputs, what results do they produce, generally?

A: Table IV, below shows the results of Dr. Morin's cost of equity analyses, modified in the manner in which I have described in this portion of my testimony.

Table IV

Dr. Morin's Modified Cost of Equity Capital Results

Method	Cost of Equity
Discounted Cash Flow	9.22%-9.59%
Capital Asset Pricing Model	8.15%-8.58%
Risk Premium	8.6%-8.8%

The average of Dr. Morin's modified equity cost estimates ranges from 8.66 percent to 8.99 percent. Dr. Morin's adjusted cost of capital estimates indicate that the Commission's equity return award of 9.80 percent overstates the Company's actual cost of capital at the target time period (the first half of 2013), and is well outside a zone of reasonableness.

Q: Although Dr. Morin does not address the issue in his testimony, Company witness Dr. Vilbert discusses the number of regulatory mechanisms utilized by the companies in Dr. Morin's sample group. Dr. Vilbert implies that

because Dr. Morin's sample group companies utilize many regulatory adjustment mechanisms, there is no need to adjust the cost of equity estimate for the risk-reducing aspects of decoupling. What are your comments?

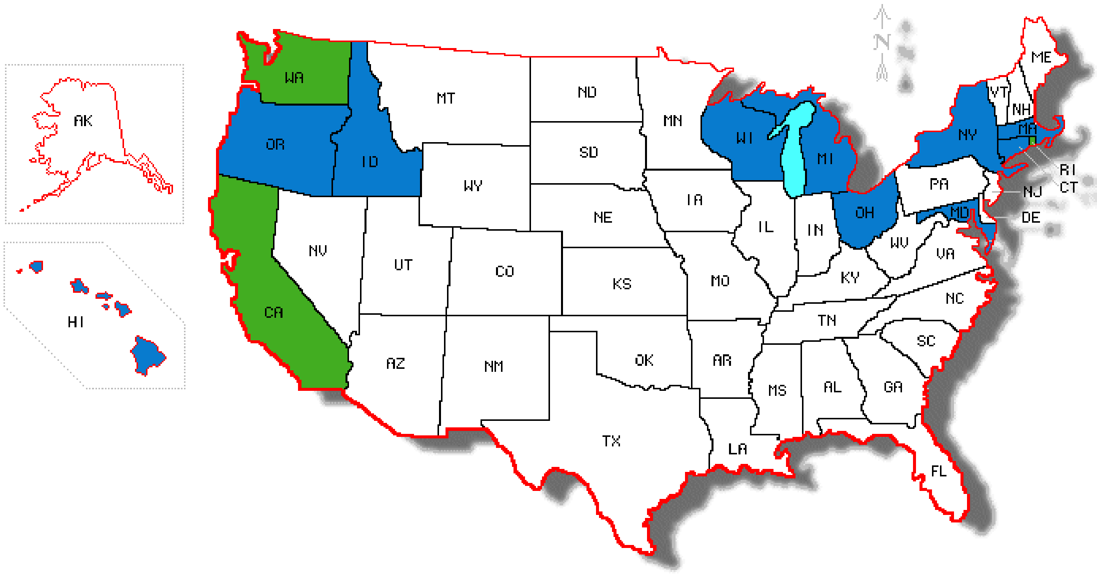
A: A decoupling adjustment is necessary in this proceeding because not all of the companies included in Dr. Morin's sample group have a similar make-whole revenue decoupling mechanism. In his testimony[49], Dr. Vilbert provides a laundry list of regulatory adjustment mechanisms in addition to the type of decoupling allowed Puget, implying that they all reduce risk to the same extent. Dr. Vilbert, however, provides no support, for example, that performance based ratemaking (one of the innovative ratemaking policies listed in Exhibit No. MJV-14), or any other of the ratemaking policies listed, lowers operating risk to the same degree as decoupling.

In addition the regulatory jurisdictions that allow the same sort of revenue decoupling with a true-up allowed Puget are limited. The March 2014 Brattle study of electric decoupling cited by Dr. Vilbert shows quite clearly which states employ revenue-based decoupling for electric utilities similar to that awarded PSE by this Commission and which do not, as seen in the map in Chart IV.

[49] Exhibit No MJV-14.

Chart IV

States With Electric Utility Decoupling[50]



Rather than being ubiquitous, this map, published by Brattle, shows that electric revenue decoupling with true-up (the decoupling mechanism awarded Puget) exists in only twelve states. In addition, the Edison Electric Institute, in a 2013 report on alternative regulation, indicates that an additional 15 states have revenue decoupling for gas utilities only.[51] Not all states have decoupling of the type allowed Puget and the majority of those that do have it, do so for either electric utilities or gas utilities but not for both. Decoupling is far from “the norm” that the Company representatives suggest it is.

[50] Source: “The Impact of Revenue Decoupling on the Cost of Capital for Electric Utilities: An Empirical Investigation,” The Brattle Group, March, 2014, p. 6 (Exhibit No SGH-16). The shaded states are states with decoupling. In colored versions, green connotes states with decoupling instituted outside the Brattle study period (Washington, California, and Rhode Island).

[51] The Edison Electric Institute, “Alternative Regulation for Evolving Utility Challenges: An Updated Survey,” January 2013, pp. 3-4.

As additional support for his position that Dr. Morin's equity cost estimates need no further adjustment related to decoupling, Dr. Vilbert offers Exhibit No. MJV-15, which shows the list of the electric utility holding companies used by Dr. Morin in his cost of equity analysis and designates those companies that have revenue decoupling with either electric or gas operations. Dr. Vilbert shows that 46 percent of the companies in Dr. Morin's sample group have some utility operations (either electric or gas) that are decoupled. Dr. Vilbert's analysis also indicates that more than half of Dr. Morin's sample group have zero decoupling and the cost of equity obtained from that sample would be too high to apply to a utility that has full decoupling, like Puget. Moreover, Dr. Vilbert's 46 percent number is overstated.

Q: Please explain why Dr. Vilbert's 46 percent is overstated.

A: In constructing the Brattle March 2014 report on electric decoupling, Dr. Vilbert was careful to construct a "decoupling index" for each of the 14 holding companies in his study group. That entailed measuring the revenues of the regulated subsidiaries operating under decoupling as a percentage of the total holding company revenues, creating an index or percentage of revenues impacted by decoupling for each company. For example, Duke Energy, Exelon and Northeast Utilities each had decoupling indexes of about 0.10 in the 2014 Brattle study.[52] That is, only about 10 percent of the revenues of those companies are affected by decoupling—90 percent unaffected. As can be seen in Dr. Vilbert's

[52] *Id.*, p. 12.

Exhibit No. MJV-15, each of those three holding companies (Duke, Exelon, and Northeast) is also included in Dr. Morin's cost of capital sample group.

However, Dr. Vilbert, in his testimony here, does not explain to the Commission that only 10 percent of the revenues of those companies are affected by decoupling. Instead, they are simply designated as having decoupling, which is true, but misleading as to any cost of capital impact it may have. The same would be true for any of the other firms that operate in states where only gas distribution or only electric operations are decoupled, i.e., only part of the revenue of those companies would be affected by decoupling. If any portion of a holding company's revenues are collected under a decoupling ratemaking scenario, that company would appear in Dr. Vilbert's list in Exhibit No. MJV-15 as fully-decoupled. Reality is more nuanced, and for many of the companies listed the actual percentage of decoupling affected revenues is significantly less than it appears to be in Dr. Vilbert's presentation. Therefore, from an investors' standpoint the actual proportion of those firms affected by decoupling is likely to be far less than indicated by Dr. Vilbert's "decoupled or not decoupled" grading system.

Q: Please summarize your concerns with Dr. Vilbert's analysis of Dr. Morin's sample group.

A: In summary, the evidence provided by Dr. Vilbert regarding the amount of revenue decoupling similar to that allowed Puget shows, on its face, that more than half of the companies in Dr. Morin's sample group have no decoupling whatsoever. The cost of capital of that part of the sample group would clearly not account for the lower risk of decoupling. Also, a closer look at the sample group indicates that Dr. Vilbert has counted holding companies as "decoupled" if any portion of the revenues of any of the regulated subsidiaries are subject to decoupling. Since only a portion of the holding company revenues for most of the companies are subject to decoupling, the impact of decoupling on the estimated cost of equity capital is likely to be substantially less than that indicated by Dr. Vilbert's calculations.

Dr. Vilbert's sample group analysis here discards the more detailed "decoupling index" analysis he used in his Brattle Group studies of decoupling. Accordingly, the evidence does not support a conclusion that the risk of decoupling is fully accounted for in Dr. Morin's sample, and his equity cost estimate for Puget should be adjusted downward to account for that risk difference.

Q: Does that conclude your discussion of Company witness Morin's cost of equity analysis, Mr. Hill?

A: Yes, it does.

V. IMPACT OF DECOUPLING ON THE COST OF EQUITY

A. Overview.

Q: Please summarize the issue that you are addressing in this portion of your testimony.

A: In a decoupling regulatory regime, a utility company's revenues are separated (decoupled) from unit sales. With decoupling, revenues no longer depend on the level of kWh or Mcf sales per customer, they are determined in the ratemaking process and customers' rates are adjusted (trued-up) so that the utility's per-customer revenue requirements are realized regardless of the level of unit sales. That situation does not exist in traditional regulation where the volatility inherent in utility revenues is unchecked.

Through decoupling, the operating risk associated with the volatility of the Company's revenue stream due to factors that cause customer usage to be different than expected (e.g., unusual climate conditions, weather events, economic downturns, conservation) will be shifted forward from the utility and its stockholders to customers. With decoupling, the ratepayer's rates will fluctuate and the utility will receive its expected revenues (without volatility).

In this portion of my testimony I present two different methods for quantifying the impact of decoupling on the cost of equity capital. First I present a market-based method based on the results of a study of the impact of decoupling on the cost of capital published by the Brattle Group. That study measures the changes in the cost of capital that correspond to changes in the level of decoupling in utility operations. The second method I present is based on an analysis of the Company's actual historical net revenue volatility and an assessment of the reduction in that volatility caused by decoupling.

Once the impact on the cost of capital has been determined, there are two ways to balance the interests of the Company and its ratepayers. In my view, the most direct avenue through which the regulator can compensate ratepayers for assuming the volatility risk shifted to them by decoupling is through adjusting the allowed return on equity. However, the cost of service is ultimately affected by the weighted average cost of equity, which is the allowed ROE multiplied by the percentage of common equity in the utility's capital structure. Therefore, it is also possible to address the reduced risks of decoupling by leaving the allowed ROE unchanged from the market-based cost of equity and lowering the ratemaking common equity ratio.[53] Therefore, in order to be commensurate with the lower risk associated with the implementation of decoupling, either PSE's return on equity should be reduced from the current (2013 target period) cost of equity for otherwise similar-risk companies that do not have decoupling, or the ratemaking common equity ratio should be lowered to achieve a similar balancing of stockholder and ratepayer interests.

Q: Has this Commission previously recognized that decoupling reduces a utility's risk and would reduce equity cost rates?

A: Yes. In its Order in PSE's 2011 general rate case, this Commission cited the policy set out previously in its Decoupling Policy Statement:

> By reducing the risk of volatility of revenue based on customer usage, both up and down, such a mechanism can serve to reduce risk to the company, and therefore to investors, which in turn should benefit customers by reducing a company's debt and equity costs. This reduction in costs would flow through to ratepayers in the form of rates that would be lower than they otherwise would be, as the rates would be set to reflect the assumption of more risk by ratepayers.[54]

[53] As discussed below, in the recent Avista 2014 General Rate Case before this Commission (Dockets UE-140188 & UG-140189), the Commission Staff witness recommended lowering the allowed common equity ratio to recognize the lower risk afforded the company by decoupling.
[54] *PSE 2011 GRC,* Order 08, ¶ 446.

In the cited statement, the Commission recognizes two key elements. First, decoupling reduces risk to the regulated utility, and that reduction in risk would reduce the Company's cost of debt and common equity. Second, the Commission notes, "the reduction in risk would flow through to ratepayers in the form of rates that would be lower than they otherwise would be [.]"[55]

In this proceeding, the Company has been allowed to implement a decoupling rate regime. That, according to the Commission's first tenet, would lower the Company's risk and would lower its cost of common equity capital. However, thus far, there is no second part—no reduction in the allowed return or lowering of the ratemaking cost of capital. To date, no compensation for ratepayers has been recognized in the Company's rates even though, as the Commission correctly notes, decoupling causes the "assumption of more risk by ratepayers."

The Commission's prior statements on decoupling, risk and the allowed return are clear. Decoupling lowers risk and the cost of capital. Therefore, an allowed return appropriate for a decoupling regime should be lower than that appropriate for traditional rate base/rate of return regulation.

Q: In the initial portion of this proceeding, did the Commission Staff testify that decoupling lowers a utility's risk and that lower risk calls for a reduced ROE?

[55] In Order 07, ¶103, the Commission stated: "It seems apparent that decoupling the recovery of fixed costs from throughput in the manner PSE and NWEC propose…reduces PSE's risk of fully and timely recovering its fixed costs." The Order goes on to state that on an adequate record, the Commission could find that an ROE adjustment "is warranted to compensate for the shift of risks from PSE to its ratepayers that *unquestionably* is a result of implementing decoupling." Order 07, ¶ 107 (emphasis added).

A: Yes. Staff witness Deborah Reynolds confirmed that lower volatility risk should translate to a lower allowed ROE or less common equity in the regulatory capital structure.

> Full decoupling should reduce substantially the utility's revenue risk by guaranteeing a specific amount of revenue per customer regardless of typical causes of fluctuations in revenue related to weather, economic conditions, or any other condition. Reduced revenue volatility reduces risk which should translate into lower capital costs, either as a lower required return on equity or the need for less equity in the utility's capital structure.[56]

While the Commission Staff also recommended a wait-and-see approach to estimating the degree to which decoupling lowers the cost of equity, I have previously addressed the shortcomings of that methodology. The time to recognize the impact of decoupling is when the cost of capital for the rate plan is determined, which is the focus of the instant proceeding.

Q: Has the Commission Staff addressed the issue of decoupling and risk subsequent to the time period when these proceedings were initially heard?

A: Yes. In the recently concluded Avista general rate case,[57] the Staff position was very clear that decoupling lowers a utility's operating risk, volatility risk is transferred from stockholder to ratepayers, and ratepayers should be compensated

[56] Dockets UE- 121697/UG-121705, Direct Testimony of Deborah Reynolds, Exhibit No. DJR-1T, p. 8, ll. 23-26 and p. 9, ll. 1-2.
[57] *Washington Utilities & Transportation Comm'n v. Avista Corporation, DBA Avista Utilities*, Dockets UE-140118 & UG-140189 (Avista 2014 GRC).

for assuming that risk through lower capital costs being included in rates. Staff testified:

> The Commission should adjust Avista's profit margin to reflect the fact that with full decoupling, shareholders no longer bear the risk of revenue variance due to changes in energy sales. That risk has been transferred to customers. Energy sales are affected by numerous events, e.g. temperature, economic conditions, and elasticity. Heretofore, the risks associated with these events have been borne by shareholders, and through the rate of return, ratepayers compensated shareholders for bearing that element of business risk.
>
> Under full decoupling, Avista will record its earnings based upon the number of customers served and use deferred accounting to capture the difference in actual revenue billed to customers through energy rates and the revenue allowed through the full decoupling mechanism. As stated in Avista's direct case, full decoupling "ensures" Avista will receive a specified level of revenues per customer. This increases the probability that its booked revenue is sufficient to earn a fair return, which transfers the risk of variations in energy sales to customers.[58]

In that proceeding, the Commission Staff recommended that the Commission recognize the lower risk imparted by decoupling by setting rates using a 42 percent ratemaking common equity ratio—considerably below Avista's requested 49 percent common equity ratio.[59] The Commission Staff recognized the reduced risk afforded the utility by decoupling and recommended that the cost of capital borne by the ratepayers be lowered due to that lower risk.

The Avista proceeding resulted in an all-party Settlement Stipulation in which the parties agreed that the stipulated revenue requirement reflected "a

[58] *Avista 2014 GRC*, Direct Testimony of Kenneth Elgin, Exhibit No. KLE-1T, pp. 52, 53.

[59] That capital structure equity ratio reduction recommended by Commission Staff (49 percent to 42 percent) would result in the approximately the same overall cost of capital if the capital structure common equity ratio remained at 49 percent and the allowed ROE were reduced by 50 basis points.

reduction in risk associated with the adoption of decoupling."[60] The Settlement Stipulation was approved and adopted by the Commission as being in the public interest.[61]

Q: Have other regulatory commissions lowered allowed returns to recognize the lower risks of a decoupling rate regime?

A: Yes. According to a December 2012 report by Pamela Morgan of Graceful Systems, the Commissions that have awarded an explicit reduction in the allowed return on common equity have done so within a range of 10 to 50 basis points.[62] However, as that same report points out, most of the decoupling decisions—even those where the parties in the proceeding recognize risk reduction from decoupling—do not include an explicit reduction to the allowed return:

> Just over half of the time a utility has adopted decoupling, it has been as the result of commission approval of multi-party settlement agreements. It is impossible to know what the settling parties discussed in the course of reaching a settlement but one can conclude that the level of benefits to the utility and customers satisfied all signing parties. Settlements resolved the issue in favor of no ROE reduction in Arkansas, Colorado, Georgia, Idaho, Indiana, Maryland (for Washington Gas Light), Michigan (for Upper Peninsula Power), New Jersey, New York, North Carolina, Ohio, Oregon, Utah, Washington, and Wisconsin. In virtually all these cases, the commission's consideration of the issue is limited to a determination whether the settlement in its entirety is in the public interest.
>
> The next most common reason for the lack of an [explicit] ROE reduction is Commission

[60] *Avista 2014 GRC*, Full Settlement Stipulation, p. 5.
[61] *Avista 2014 GRC*, Order 05, Final Order Rejecting Tariff Filing, Accepting With Conditions Full Settlement Stipulation (November 25, 2014), ¶ 74.
[62] Morgan, P., "A Decade of Decoupling for US Energy Utilities: Rate Impacts, Designs and Observations," Graceful Systems, LLC, December 2012, p. 14.

> rejection of making such an adjustment separately from all of the other considerations that result in an ROE decision. In Massachusetts, Connecticut and Hawaii, the Commissions found that decoupling reduces the utility's business risk but declined any specific quantification and considered this along with model results, comparisons to proxy companies, and other considerations such as management quality and public policy changes in choosing an ROE within the range to which experts had testified.[63]

The study also notes that, while decoupling causes rate adjustments that are both up and down, across all electric and gas utilities 63 percent of all adjustments to bring rates to authorized levels were surcharges and 37 percent were refunds. The surcharges to customers from decoupling outnumber the refunds two-to-one. Therefore, the shift in risk from the utility to the ratepayer afforded by decoupling, on average, causes rates to increase. That risk shift should be offset by a reduction in the allowed ROE.

It should also be noted that while the Graceful Systems report correctly states that the Hawaii Public Service Commission did not enumerate a specific quantification of decoupling, the cost of equity was reduced because of decoupling. As the Hawaiian Electric Company (HECO) recognized in its testimony in the recent HPUC decoupling investigation, the Hawaii Commission lowered the allowed return of HECO by 50 basis points to account for the institution of decoupling and revenue adjustment mechanisms in the adoption of a

[63] *Id*. pp. 14-15.

Clean Energy Initiative.[64] The decoupling mechanism utilized in Hawaii is revenue decoupling with a true-up similar to that employed by Puget.

The Hawaii Commission also recently concluded a proceeding re-examining its decoupling program.[65] Both HECO and the Hawaii Consumer Advocate were in favor of continuing decoupling. The Consumer Advocate was also in favor of continuing the 50 basis point reduction to the cost of equity capital, while HECO wanted the adjustment reversed. I appeared in the proceeding as a witness for the Consumer Advocate and Dr. Vilbert was a witness for HECO in that proceeding. The proceeding is currently in the briefing stage.

B. Market-Based Analysis Of The Impact of Decoupling.

Q: What is the basis of your market-based analysis of the impact of decoupling on the cost of equity capital?

A: The market-based analysis on which I rely is the study of the impact of decoupling on the cost of capital published by the Brattle Group in March 2014.[66] Dr. Vilbert mentions that study at page 29 of Exhibit No. MJV-1T. Although Dr. Vilbert included the study as part of his testimony in the recent Hawaiian Electric proceeding discussed above, he does not provide a copy of it in this proceeding. Therefore, I have attached a copy of the study to my testimony as Exhibit No.

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[64] Hawaii Public Utilities Commission, Docket No. 2013-0141, Instituting and Investigation to Reexamine the Existing Decoupling Mechanisms for Hawaiian Electric Company, Inc., Hawaii Electric Light Company, Inc., and Maui Electric Company, Limited; Hawaiian Electric Companies Initial Statement of Position with Respect to Schedule B Issues, Statement of Position for Schedule B, page 23.
[65] Hawaii Public Utilities Commission, Docket No. 2013-0141.
[66] Michael J. Vilbert, Joseph B. Wharton, Charles Gibbons, Melanie Rosenberg, and Yang Wei Neo, *The Impact of Revenue Decoupling on the Cost of Capital for Electric Utilities: An Empirical Investigation*, March 20, 2014. (Exhibit No. SGH-16).

SGH-16. As discussed subsequently, the study presents results that show decoupling has a downward impact on the cost of capital.

Q: Please briefly describe the methodology used in the 2014 Brattle study.

A: The study of the impact of decoupling on the cost of capital published in March 2014 by the Brattle Group (with Dr. Vilbert as the lead author), examines the change in the overall cost of capital of fourteen electric utility holding companies every quarter over the 2005 to 2012 time period. The type of decoupling studied was similar to that employed by Puget in Washington—revenue decoupling with a true-up. Straight fixed-variable (SFV) rate design and lost revenue adjustment mechanisms (LRAM) were specifically excluded from consideration in the study as having only "some similarity" to full revenue decoupling. As Brattle notes at page 1 of the study:

> "Decoupling," as used in this report, means decoupling through symmetric revenue true-up mechanisms. An overall base revenue target is established for a future period. A periodic adjustment of volumetric rates is instituted to true up actual revenues to target revenues, whether actual revenues are above or below the target. Two other alternative ratemaking policies have some similarities but are not included in this study. One is the lost revenue adjustment mechanism (LRAM) for recovering only base revenues lost from validated EE volumetric savings. A second policy is the straight fixed variable rate design that collects all or most fixed costs in non-volumetric charges.[67]

The amount of decoupling for each holding company was measured by the assets of each regulated subsidiary after that subsidiary instituted decoupling, creating a "decoupling index" measure for each holding company. The market-

[67] *Id.,* p. 1.

traded holding companies were selected so that the study would measure the cost of capital impact for those companies that had a change in decoupling policy, i.e., at the beginning of the period none of the regulated subsidiaries had decoupling and by the end of the study period (the end of 2012) all of the companies had at least some operations that were decoupled. The Brattle study examines the cost of capital impact during the quarter the regulatory decoupling order is issued as well as for the three prior quarters. The cost of equity is calculated using a single-stage DCF analysis. The March 2014 Brattle study of decoupling also includes variables in the regression analyses that account for differences in unregulated assets and changes in interest rates or economic conditions.

Q: Please summarize the results of the March 2014 Brattle Group decoupling study.

A: As shown on page 18 of the March 2014 Brattle Report[68], the analysis indicates that decoupling lowers utilities' *overall* cost of capital between 41 and 49 basis points. It should be noted that, because Dr. Vilbert uses market value weights to calculate the overall cost of capital for his utility sample, a reduction in the overall cost of capital of 41 to 49 basis points translates to a reduction in the cost of equity capital of 68 to 82 basis points.[69]

[68] *Id.*.
[69] Exhibit No. SGH-17.

The 2014 Brattle report, in its summary, also shows the "p value" for each of the regression iterations in the study.[70] Those "p values" range from 0.08 to 0.14—just below Dr. Vilbert's required threshold of 0.05 (a "p value" of 0.05 corresponds to a confidence level of 95 percent). Those results of the Brattle Report indicate that while we cannot be 95 percent confident that decoupling lowers the cost of capital for utilities, we can be 92 percent to 86 percent confident in that conclusion.

Q: Doesn't Dr. Vilbert rely on that study to support his position that decoupling does *not* lower the cost of capital?

A: Yes, he does. Dr. Vilbert testifies based on this study that there is no statistically reliable evidence that decoupling lowers the cost of equity capital.

Q: Why is your interpretation of the results of that study so different from Dr. Vilbert's?

A: Simply stated, the difference in the interpretation of the results of the March 2014 Brattle Group study of decoupling is due to Dr. Vilbert's decision to use a very high statistical threshold (a "confidence level" of 95 percent) in order to disprove his presumption that decoupling does not reduce the cost of capital. Therefore, even though the statistical results in the Brattle study show decoupling does lower the cost of capital within a confidence level of 92 percent to 86 percent, Dr. Vilbert dismisses the significance of those data because they do not meet his 95

[70] In the 2014 Brattle study, Dr. Vilbert and his associates ran four different regressions. The "base case" measured the cost of capital in the quarter coincident with the public announcement of decoupling (the regulatory order). The three other regressions focused on cost of capital measurements one, two, and three quarters prior to the public announcement, reasonably assuming that information regarding the advent of decoupling may have been incorporated into stock prices prior to the actual order being issued.

percent threshold. In other words, according to Dr. Vilbert's logic, one can't be 95 percent sure that the "null hypothesis" (i.e., that decoupling does *not* affect the cost of capital) is *not* true, therefore, the statistical results that show decoupling lowers the cost of capital must be rejected and the "null hypothesis" upheld.

Q: Why is the 95 percent confidence level used by Dr. Vilbert inappropriate in this instance?

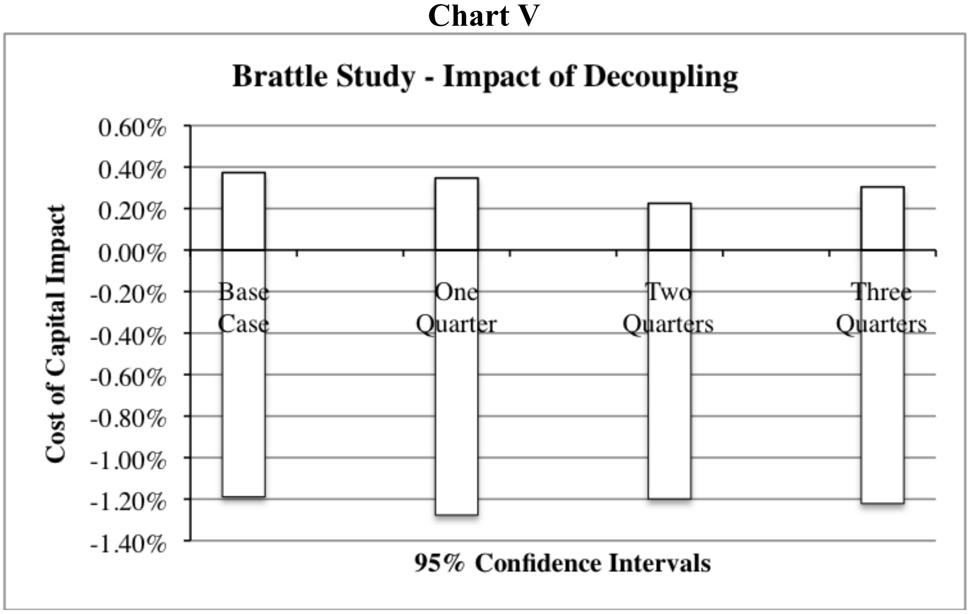
A: As discussed in more detail by Public Counsel and ICNU witness Dr. Christopher Adolph, the use of a 95 percent confidence interval is an unduly restrictive threshold of proof in determining the cost of capital in a regulatory proceeding, which skews the outcome of the analysis. As Dr. Adolph notes, from a statistical point of view, the data reflect a confidence level that is more than sufficient for it to be treated as reliable evidence in these proceedings.

Also, in my view, Dr. Vilbert's high confidence interval threshold is unreasonable because one of the key parameters in the study is an estimate of the cost of equity capital. As this Commission is well aware, the cost of capital cannot be determined with exactitude. It is not logical to hold the results of the Brattle Group decoupling study to a very high standard of statistical accuracy as does Dr. Vilbert, when that study is based on the determination the cost of equity capital. This is particularly true when only a slight relaxation of the statistical standard of "significance" indicates that decoupling does, indeed, reduce the cost of common equity capital for utilities and does so substantially.

Q: What is the full range of results from that March 2014 Brattle study that do fall within 95 percent confidence limits?

A: In response to a data request from the Consumer Advocate in the recent Hawaii decoupling proceeding, the Brattle group supplied the range of results for the decoupling variable of each of the four regressions that fall within a 95 percent confidence level in their March 2014 study.[71] Those data show that, for each of the four regressions in the March 2014 Brattle Group study of decoupling (the base case and one, two and three quarters prior to the regulatory order), we can conclude (with 95 percent confidence) that the overall cost of capital impact of decoupling ranges from approximately -1.2% to +0.3%. Those ranges are shown graphically in Chart V below.

Chart V



While it is certainly true that the ranges for the overall cost of capital change in the 2014 Brattle study are not entirely negative, it is also quite clear that mid-points of the coefficient for each of the Decoupling Index variables as well as

[71] See PSE's Response to Public Counsel Data Request attached to this testimony as Exhibit No. SGH-18.

the preponderance of the range of results are negative. Those data, therefore, indicate that is far more likely than not that the lower volatility occasioned by decoupling reduces the overall cost of capital and, to an even greater extent, the cost of equity capital. These 95 percent Confidence Interval results also show that Dr. Vilbert's conclusion that the March 2014 Brattle Report shows no reliable statistical evidence that decoupling lowers the cost of capital is not accurate, in my view.

Q: Doesn't Dr. Vilbert provide studies in his testimony in this proceeding that purport to update the published March 2014 Brattle report?

A: Yes. Dr. Vilbert provides two studies that purport to update the published study of the impact of decoupling on the cost of capital of electric utilities. However, one of the studies (the one that focuses on the 2013 target period), uses the identical time period (2005-2012) as the published study and thus cannot really be considered an "update." Dr. Vilbert provides another study of the impact of decoupling on the cost of capital of electric utilities that extends through 2014 and does add some additional time-period data to the published 2014 Brattle study. Dr. Vilbert also provides a study of the impact of decoupling on the cost of capital of gas holding companies, which updates other Brattle studies of gas utilities published in 2011. It does not appear that any of these additional studies have been published.

Q: Are the new regression studies provided by Dr. Vilbert in his testimony in this proceeding undertaken in the same manner as described in the March 2014 decoupling study published by Brattle?

A: No, they are not. As noted, Dr. Vilbert has provided two additional electric utility decoupling studies in his testimony in this proceeding and one additional study for gas utility holding companies. Those studies are constructed differently from the decoupling study published in March 2014 by the Brattle Group.

For example, in his electric utility decoupling study that ends in 2012 (which is the same end-point for the March 2014 published study), Dr. Vilbert elects to include straight fixed variable (SFV) rate design in the definition of decoupling. He specifically excluded that ratemaking method in the published Brattle study because it had only "some similarities" to full revenue decoupling. The inclusion of SFV in his electric decoupling studies presented in his testimony in this proceeding after its exclusion in the 2014 published report is unexplained.

Dr. Vilbert also changes the determination of the cost of common equity capital from a single-stage DCF that relies on analysts' projected earnings estimates (in the March 2014 published study) to a multi-stage DCF that uses long-term gross domestic product (GDP) growth as the final stage in the model. It has been my experience that the use of long-term GDP growth projections in a DCF analysis tends to damp down any fluctuations that might occur in quarter-to-quarter DCF estimates. That is because GDP growth rate estimates change only marginally over time compared to projected earnings growth. Therefore, in a study in which the object is to measure quarterly capital cost changes over time as other factors change (e.g., decoupling is added), the use of a multi-stage DCF versus a single stage DCF would tend to damp down or lessen any apparent changes in the resulting cost of capital.

As it turns out, Dr. Vilbert's inclusion of another rate mechanism in his definition of decoupling and his use of a multi-stage DCF appear to have worked to produce regression results that show a smaller impact on the cost of capital than that shown in the published March 2014 Brattle report. Dr. Vilbert's Exhibit No. MJV-13 shows that his "updated" study of electric utility decoupling from 2005 to 2012 indicates a 25 basis point reduction in the overall cost of capital. As I have noted previously, the Brattle study published in March 2014, which studies exactly the same period, finds that decoupling lowers the overall cost of capital approximately 45 basis points. The sample periods of those two studies are exactly the same; therefore, the differences in the result must be attributed to the changes in the methodology used by Dr. Vilbert in his testimony in this proceeding.

Finally, even though the results of Dr. Vilbert's new, amended regressions are lower, they show, at an 83 percent confidence level, that the overall cost of capital is reduced by 25 basis points. Again, because Dr. Vilbert used market-value capital structures in his calculations, the impact on the cost of equity would be considerably larger.[72] Therefore, even though the altered electric utility decoupling studies offered by Dr. Vilbert in this proceeding show a diminished impact from decoupling compared to the published Brattle Group study, they still show that the cost of equity capital is very likely to be substantially reduced by decoupling.

[72] Calculated in the same manner as shown on Exhibit No. SGH-17, the cost of equity impact of a reduction in the overall cost of capital would be 42 basis points.

Q: What are your comments regarding Dr. Vilbert's gas utility decoupling study?

A: Dr. Vilbert's gas holding company decoupling study produces the lowest cost of capital reduction of any of the studies he offers. His Exhibit No. MJV-10 indicates that the overall cost of capital declines approximately 9 basis points due to decoupling. Also, the general nature of the results is not as robust as the other studies of electric utilities. For the gas utility holding companies we can only be about 63 percent confident that decoupling lowers the cost of capital.

There are factors in Dr. Vilbert's analysis of the gas holding companies that could interfere with the indication that decoupling lowers the cost of capital. First, Dr. Vilbert makes a point of the fact that the results of his study on the gas holding companies deserves additional weight because they are "pure play" gas operations, making the analysis "very clean."[73] However, the May 2013 edition of AUS Utility reports indicates that, on average, only about two-thirds of the gas holding company revenues are generated by regulated operations and the remainder is from riskier, unregulated operations. Some of the holding companies in Dr. Vilbert's gas sample have much lower percentages of regulated operations (Vectren (33%), WGL (46%), and New Jersey Resources (28%)). Therefore, the cost of equity estimates for the holding companies will include unregulated as well as regulated operating risks.

Second, Dr. Vilbert elects to include SFV ratemaking as equivalent to full revenue decoupling in his gas holding company decoupling analysis. He elected

[73] *See* Prefiled Direct Testimony of Dr. Michael J. Vilbert, Exhibit No. MJV-1T, pp. 16, 17.

to exclude SFV rate design as dissimilar to full decoupling in his March 2014 Brattle Group study.

Third, as discussed above, Dr. Vilbert, in the March 2014 Brattle Report on electric decoupling, was careful to study a group of utilities that had no decoupling at the beginning of the study period in order to asses the cost of capital impact as decoupling was added—a "before and after" analysis. According to Dr. Vilbert's gas decoupling study workpapers, by contrast, two of the companies in his holding company group had the same amount of decoupling at the beginning of the study as they do at the end of the study. Therefore, any impact that would have been seen in the cost of capital of the group due to the "change" in decoupling will be lowered or diluted due to the inclusion of those companies whose decoupling indexes did not change.[74]

Fourth, the cost of capital estimates included in the gas utility decoupling study, according to Dr. Vilbert,[75] are taken from Brattle Group cost of capital expert testimony that relied on the market data of some, but not necessarily all, of the sample group of twelve gas holding companies. It is reasonable to believe that the cost of capital testimony was presented by the Brattle Group experts on behalf of the applicant utilities. As such, those equity cost estimates do not serve as independent, unbiased estimates of the cost of equity. Therefore, the reliability

[74] As Dr. Vilbert notes in response to Public Counsel Data Request No. 59(b), "The holding companies with changing decoupling index values are those that are likely to drive the statistical results of the impact of decoupling."

[75] Prefiled Direct Testimony of Dr. Michael J. Vilbert, Exhibit No. MJV-1T, p. 17.

of the results of Dr. Vilbert's gas holding company decoupling study is in question.

Q: Please summarize your conclusions regarding the four market-based studies of the impact of decoupling on the cost of capital referenced by Company witness Vilbert in this proceeding?

A: In my view, the Brattle Report on the cost of capital impact of decoupling published in March 2014 provides the most detailed and reliable analysis of the four studies cited by Dr. Vilbert. That published study reviews only the type of decoupling at issue in this proceeding (revenue decoupling with true-up), it begins the analysis with a group of companies that have no decoupling and add decoupling as the study progresses, and it attempts to control the regression analyses for changes in interest rates and for differences among the sample companies. The result of that analysis shows, with a confidence level of 92 percent to 86 percent that the overall cost of capital declines about 45 basis points (the cost of equity would decline by approximately 75 basis points).

The two additional electric utility analyses Dr. Vilbert provides also show that decoupling lowers the overall cost of capital by 25 basis points (the cost of equity would decline by approximately 40 basis points). These unpublished studies appear to be intended to cast doubt on the degree of cost of capital impact identified in the published March 2014 Brattle study. However, these analyses include consideration of straight fixed-variable rate design and do not examine only the impact of full revenue decoupling, as does the published March 2014 report. It is also not clear that those studies are designed to account for changes in interest rates over time as was the March 2014 report. Nevertheless, they provide further evidence supporting the conclusion that decoupling lowers the cost of capital for utilities.

Finally, the gas utility decoupling analysis shows that the overall cost of capital declines 9 basis points due to decoupling (the cost of equity would decline about 13 basis points). This analysis, I believe, is more problematic in that it includes the consideration of other types of revenue mechanisms (SFV), it includes companies that have the same amount of decoupling at the beginning of the study as they do at the end, and the cost of capital estimates are taken from the testimony of Brattle expert witnesses and was not calculated independently for the study as with the other studies.

Q: What is your conclusion with regard to the amount of utility equity cost reduction caused by decoupling, based on your review of the market-based analyses?

A: In my view, the market-based studies indicate that a reduction in the allowed ROE of 25 to 50 basis points to account for decoupling would be reasonable.

Q: In his Direct Testimony, Dr. Vilbert provides theoretical explanations why decoupling may not reduce the cost of capital, what are your comments?

A: At pages 9 through 15 of Exhibit No. MJV-1T, Dr. Vilbert provides what he believes to be two theoretical explanations why decoupling may not reduce the cost of capital. First, Dr. Vilbert hypothesizes that decoupling may only affect non-systematic or diversifiable risk. In other words, decoupling does lower risk as expected, but that risk reduction doesn't matter to investors because it can be diversified away. Second, Dr. Vilbert states that decoupling may simply offset the increased risk that arises from the implementation of energy efficiency programs undertaken by utilities. In my view, neither of these hypotheses are reasonable.

Dr. Vilbert's suggestion that decoupling impacts only diversifiable risk, if true, could provide a non-statistical rationale for his conclusion that decoupling does not lower the cost of capital. However, there is no basis in the financial literature of which I am aware (and none is cited by Dr. Vilbert) that supports the notion that reducing the total risk of an asset (e.g., lowering the revenue and net income volatility of a regulated utility) works to lower only risk that is diversifiable. If there were support for that notion, it would mean that revenue and net income volatility could be reduced to zero—the revenues and net income would be known with certainty—and that would not affect the cost of capital. That is clearly not a reasonable assumption as can be seen by the fact that investors require a lower return for debt capital (with a contractually guaranteed payout) than common equity capital (with a dividend that could be reduced or eliminated). The less volatile income stream (debt) is less risky and provides a lower return than does the more volatile income stream (equity). Dr. Vilbert's assumption that volatility risk "may" only affect risk that can be diversified and, thus, not the cost of capital does not comport with the obvious difference in investors required returns for debt and equity capital. Finally, when directly questioned in Public Counsel Data Request No. 055, regarding support for the contention that decoupling lowers only diversifiable risk, Dr. Vilbert responded that he "has not claimed that revenue decoupling only affects diversifiable risk," and, further, that that hypothesis was offered only as a possible explanation for the results of his decoupling study, which he claims shows no impact on the cost of capital.

With regard to Dr. Vilbert's other hypothesis that the lower risk from decoupling simply off-sets other risks attendant to energy efficiency programs, he has provided no evidence that energy efficiency programs for utilities increase utility investment risk. In response to discovery, he states that neither he nor the Brattle Group have performed any analysis of the degree to which energy efficiency programs increase utility investment risk.[76] He also states, in response to ICNU Data Request No. 02.19 that he is "not asserting that state energy efficiency policies increase risk for utilities."

While renewable energy requirements might require capital spending, that is certainly nothing new for a capital-intensive industry like gas or electric utilities. Moreover, with interest rates and capital costs generally being quite low, being required to build rate base in this economic environment would be far less stressful, fiscally, than it has been in the past. Also, it is difficult to believe that spending related to energy efficiency/conservation programs is more financially onerous (and therefore more risky) than building another base-load plant. Again, the Company offers no evidence that such is the case. Others, however such as the Northwest Power and Conservation Council, not only do not view energy

[76] PSE's Response to Public Counsel Data Request No. 51

efficiency as a riskier option but view it as a power company's "least risky" option:

> Across multiple scenarios considered in the development of the plan, one conclusion was constant: the most cost-effective and least risky resource for the region is improved efficiency of electricity use….Combined with investments in renewable generation as required by state renewable portfolio standards, improved efficiency will help delay investments in more expensive and less clean forms of electricity [.][77]

PSE's own 2013 Integrated Resource Plan states that "demand side resources … significantly reduce risk" and that "demand-side resources reduce both cost and market risk in portfolios." [78]

In summary, Dr. Vilbert is simply looking for a rationale to support his conclusion that his studies show no impact on the cost of capital from decoupling. As noted above, Dr. Vilbert's conclusion does not take into account the totality of the evidence from his own studies, which indicates that decoupling does, indeed, reduce utility capital costs. Dr. Vilbert's theoretical support for his flawed theoretical conclusion, while interesting, is ultimately irrelevant.

C. Revenue Volatility Analysis Of The Impact Of Decoupling.

Q: Please explain the basis of your analysis of net revenue volatility as a method to quantify the impact of decoupling on the cost of equity capital.

A: In this portion of my testimony, I analyze the reduction in revenue volatility that Puget's utility operations would realize through a decoupling mechanism and

[77] Northwest Power and Conservation Council, Sixth Northwest Conservation and Electric Power Plan, February 2010, p. 1.
[78] 2013 PSE IRP, p. 1-8 and p. 5-66.

provide an analytical framework through which that risk reduction can be assessed and the equity capital cost impact quantified.

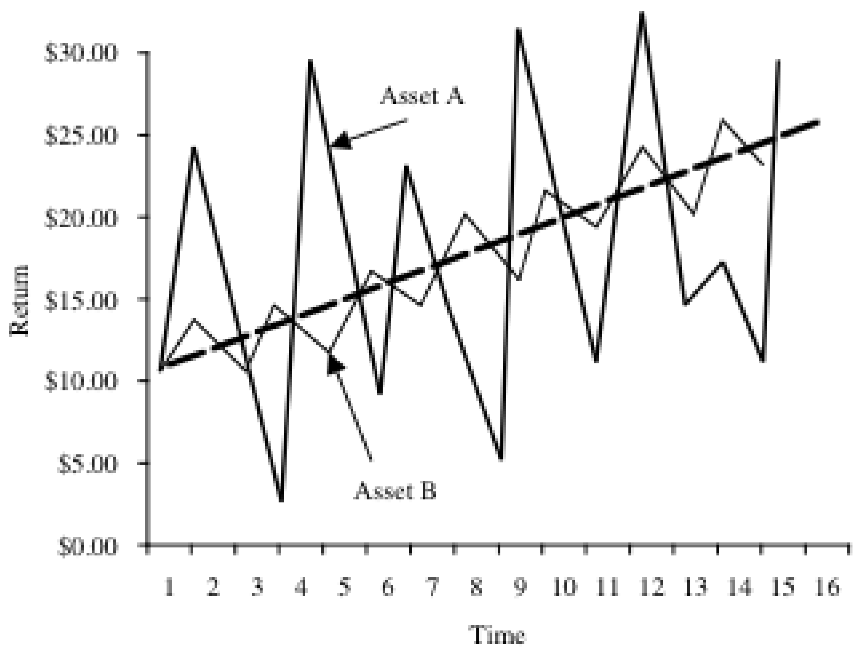
Q: Can you explain the relationship between volatility and investment risk?

A: Yes. An investor purchases a financial asset with the expectation that the asset will produce a future stream of income to the investor, generating an expected rate of return. The risk of investing in any asset is directly related to the possibility that actual, realized returns will deviate from expected returns. The greater the potential for actual returns to deviate from expected returns, the higher the risk. Conversely, the more certain an investor can be that the returns expected will be realized, the lower the risk.

One measure of the risk of a financial asset, then, is the volatility or variability of the income stream it generates. Chart VI, below, shows the income streams generated by two financial assets, “Asset A” and “Asset B.” Both of the assets have, over time, provided a trend of increasing returns. In fact, the trend line of the returns (shown as the dashed line in Chart VI) is exactly the same for both investments. Therefore, given that conditions in the future could be expected to resemble those of the past, investors would, on average, expect that the dollar returns produced by each investment to be the same in future periods. However, the risk of the two assets is not the same.

Chart VI

Volatility and Risk



Asset A has shown much wider swings in return, much greater volatility, than has Asset B. Therefore, even though Asset A has the same expected average future return stream as Asset B, there is a much lower probability that the actual return realized from an investment in Asset A will equal the expected return. Asset A, then, is a riskier investment than Asset B, which, in all probability, will provide a return to investors that more closely approximates the expected return.

Q: How does that apply to utility stocks?

A: When an investor purchases a share of utility stock, he or she is purchasing an expected future stream of dividends and growth in that dividend, or capital appreciation when the stock is sold. That dividend expectation is, in turn, dependent on the revenue and income earned by the utility, which is directly related to stability of the revenues of the utility as well as the dividend payout ratio determined by management. If the firm's revenues are steady and show little fluctuation, the dividend is more secure and the investor sees the utility as being less risky than an otherwise similar investment whose dividend is based on a more volatile revenue stream. The fact that the volatility of a financial asset is directly related to its investment risk is neither controversial nor difficult to comprehend, and that concept is fundamental to this method of assessing the risk impact of decoupling. A decoupling mechanism works to reduce the revenue stream volatility of the utility's operations and thus, it's operating risk.

In a decoupling ratemaking regime, there is no mechanism for discerning the source of the change in customer usage. The reduction in usage may come from conservation, or it may come from lower customer usage due to factors unrelated to conservation, e.g., economic downturns, price elasticity effects on demand, changes in the firm's customer mix, technological changes, or weather-related factors. Because there is no practical way to distinguish the various factors that may affect customer usage, all the factors that could impact unit sales are necessarily included in the decoupling/make-whole process. In effect, decoupling acts as a regulatory pass-through rate adjustment for factors that cause revenue volatility, much like a fuel-adjustment clause for variations in fuel costs. Therefore, the decoupling process can operate as a buffer for the utility, sheltering its stockholders from fluctuations in revenues and, ultimately, moderating swings in operating earnings and dividends from causes that might otherwise arise from adverse conditions. Therefore, the allowed return on equity for a utility that is entering a regulatory framework in which revenues are decoupled from volumetric sales must be lower than that appropriate for the same utility under traditional regulation. The question of import here is—how much lower?

An analytical process through which the impact of revenue decoupling on the return on equity for Puget's electric and gas operations in Washington can be assessed is presented below. However, it is intuitively obvious that the more the utility's revenue volatility is eliminated by decoupling, the greater the risk reduction caused by decoupling and the lower the allowed equity return should be. If, for example, operating costs were constant and 100 percent of the revenue variance of a utility were due to factors eliminated by decoupling, that ratemaking mechanism could effectively turn a utility equity investment into a bond-like financial instrument. In that extreme theoretical instance, the level of uncertainty regarding the expected return that normally accompanies a utility equity investment would be significantly reduced and a risk-adjusted equity return would fall toward a return appropriate for utility debt capital.

Q: Please explain how you quantify the impact of the change in revenue volatility afforded by a decoupling ratemaking regime.

A: Quantifying the change in operating risk of a utility operation due to a reduction in revenue volatility caused by a revenue decoupling mechanism is a two-step process. First, the degree to which fluctuations in utility revenues are dependent on operating factors such as the underlying growth in the economy or abnormal weather must be measured. Second, the trend in net revenue volatility that normally exists with the utility operation must be quantified. When the normal revenue volatility around a long-term trend is identified it is possible to assess the reduction in that volatility attributable to decoupling and to quantify the dollar (and rate of return) impact of that volatility reduction.

Measuring the degree to which fluctuations in utility revenues are dependent on changes in the operating environment is accomplished through regression analysis. In such an analysis, variables that represent economic conditions (Gross State Product ("GSP") for Washington, heating degree days) are regressed against the utility's net revenues over a relatively long time period.

The "net revenues" are the Company's revenues less the expenses for fuel and purchased power and purchased gas (which are tracked and are recovered under a separate regulatory plan). Because those revenues associated with the factors that are "tracked" and "trued-up" are already addressed through a regulatory mechanism, they are not included in the assessment of decoupling risk reduction. Through such a regression analysis, it can be determined to what degree net revenues volatility is determined by those exogenous variables (e.g., economic activity).

For Puget's operations, I studied the correlation between the Washington economy (Washington GSP), heating degree days (HDD) and combined gas and electric operation net revenues over the 1999 to 2013 time frame—a 15-year period.

Regressing those economic and weather variables against the annual net revenues from 1999 through 2013 indicates, as shown on page 1 of Exhibit No. SGH-19, those parameters account for 90 percent of the volatility in the Company's net revenues. That is, the r-squared value of the regression for

Puget's Washington utility operations is 0.903. Therefore, economic activity and weather are important factors in determining the Company's net revenues, and were statistically significant in determining the fluctuations in net revenues. The regression coefficient of GSP was statistically significant at above the 99 percent level (t-statistic > 3.5) and the chance that the correlation indicated is random is small, as indicated by the F-statistic (> 10; indicating probability < 0.01).

Q: Because the correlation between Puget's net revenue volatility and economic and weather parameters is so high, does that mean that nearly all of the Company's revenue volatility will be eliminated by decoupling?

A: No. Although these regressions show a high correlation between weather, economic activity and the Company's net revenues, it is reasonable to be cautious about assuming that a revenue decoupling regime will eliminate nearly all (90 percent) of the revenue volatility-related risks, for several reasons.

First, linear regressions are relatively simple approximations of reality and to the extent that changes in the Company's revenues have occurred in a more complex, non-linear fashion, they may not be fully captured in such an analysis. Moreover, because the economic growth data used in this analysis is only available annually, the analysis is based on a relatively small data set.

Second, this analysis of revenue volatility captures the total investment risk differences that may arise due to the implementation of a decoupling mechanism. However, according to theory supporting the CAPM and the capital market theory, investors are concerned with the non-diversifiable risk of an investment, not the total risk. Therefore, in theory, it is unlikely that investors will respond to the differences in total risk captured in this analysis because some portion of that risk could be diversified away.

The amount of diversifiable risk as a percentage of total risk for one company is not readily determinable, but because a portion of the volatility in the Company's net revenues is related to the economy and because it is reasonable to assume that economic growth deviates from the norm in a random fashion, we can conclude that some amounts of the Washington-specific economic-related risk evidenced here could not be diversified away and that risk would matter to investors. Given that the total risk can be said to be attributable to two different forms of risk, and the limited number of data points, a reasonable assumption is that the volatility reduction caused by decoupling will reduce the variance in Puget's net revenues by 50 percent rather than the 90 percent identified in the initial regression analysis.

Third, revenue-decoupling regimes exist in other regulatory jurisdictions in the U.S. in addition to Washington, and to the extent that utilities in those jurisdictions are included in the sample group, the expected volatility reduction should be further reduced to prevent double-counting that lower risk. Edison Electric Institute reports in a 2013 publication that 12 states employ revenue decoupling for electric utilities and approximately 22 states for gas utilities.[79] Therefore, some of the lower risk imparted by decoupling will be captured in the stock prices of those utilities that enjoy that regulatory scheme.

[79] Edison Electric Institute, "Alternative Regulation for Evolving Utility Challenges: An Updated Survey," 2013, p. 16.

In the cost of capital analysis presented in this testimony, based on their relative market weights 28.5 percent of the jurisdictions in the sample group of electric and gas companies have revenue decoupling with true-up, like Puget. To the extent that the companies used to estimate the cost of common equity have a decoupling regulatory regime, then, that risk would be included in the market-based cost of equity and a full decrement for decoupling depicted by these statistical analyses would, therefore, not be necessary. If decoupling reduces Puget's volatility by 50 percent, and, effectively, 28.5 percent of that volatility reduction is already accounted for in the cost of capital estimate, we can account for that fact by reducing the expected volatility reduction by 28 percent—from 50 percent to approximately 35 percent. [50% x 28% = 14.25%; 50% -14.25% = 35.75%] For purposes of analysis, then, I will assume that Puget's decoupling rate design will reduce the average variance in the Company's historical net revenues by 35 percent.

In sum, while the robust statistical results of the volatility analyses presented herein lend credence to their reliability, it is important to note that we are estimating the impact of revenue decoupling on volatility and risk, and that investors may not include all of that risk reduction in the price they are willing to provide for Puget. Also, a portion of the operations of the utilities I use in estimating the costs of equity are in regulatory jurisdictions that employ revenue decoupling. Therefore, in estimating the average dollar/cost of equity impact of revenue decoupling on Puget's operations, I utilize a conservative factor for the reduction in revenue volatility of 35 percent.

Q: How do you apply that estimated net revenue volatility reduction to Puget's actual historical net revenues?

A: A second regression analysis plays a part in quantifying the revenue stream volatility that has existed historically with Puget's utility operations. Chart VII, below, shows the revenue stream of a hypothetical utility operation over time. Also shown in Chart VII is the least-squares linear regression trend line, which represents the trend in revenues over that time period. In addition, the variance and standard deviation of the revenues around the trend line can be calculated. That process gives a quantitative measure of the volatility of the utility's revenues around the revenue trend or regression line. A similar graph of Puget's electric and gas net revenues over the 1999—2013 period is shown in Exhibit SGH-19, p. 2.

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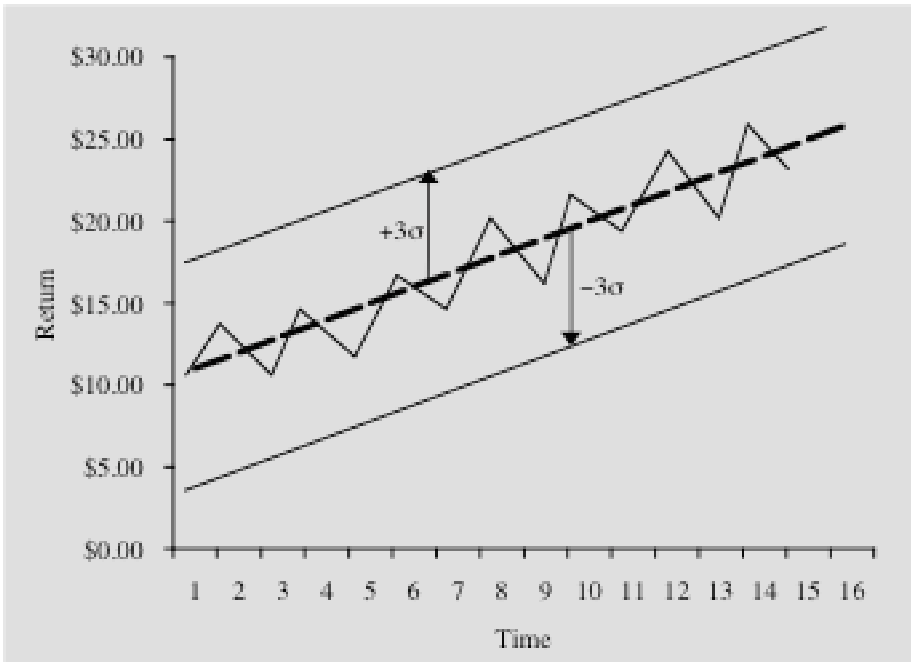
Chart VII

Linear Regression of Historical Revenues



Once the standard deviation of revenues about the trend line is determined, a zone of ±3 standard deviation units (s) above and below the revenue trend line can be established. With utility net revenues normally distributed about the revenue trend, a zone ± 3s above and below the revenue trend line establishes a range within which the utility’s net revenues will fall 99.9 percent of the time.

Page 3 of Exhibit No. SGH-19 shows the net revenue volatility that has existed for Puget’s electric and gas utility operations over the 1999-2013 period. As shown in page 1 of Exhibit No. SGH-19 about 90 percent of the electric operations’ net revenue volatility is explained by the changes in economic and weather conditions. In assessing the reduction in volatility and the reduction in the cost of capital due to decoupling, for reasons previously explained, I assume the reduction in volatility for electric operations will be about 35 percent and the reduction in utility net revenue volatility (rather than 90 percent). That is, my assumption is that decoupling will reduce net revenue volatility by less than half of the historical volatility experienced over the 1999-2013 period. This is a conservative adjustment, which could result in an understatement of the equity return decrement for decoupling that is necessary to balance the interests of investors and ratepayers. However, I believe, it fairly recognizes that the impact of decoupling will not completely eliminate volatility, any such analysis represents, at best, an approximation of reality and accounts for the fact that some of the jurisdictions in which the sample companies operate have similar decoupling programs.

In order to estimate the impact of the reduction in volatility, I assume that, over time, utility revenues will be randomly distributed. The distribution of net revenues about the historical trends can also be represented as the familiar bell-shaped curve shown below in Chart VIII.

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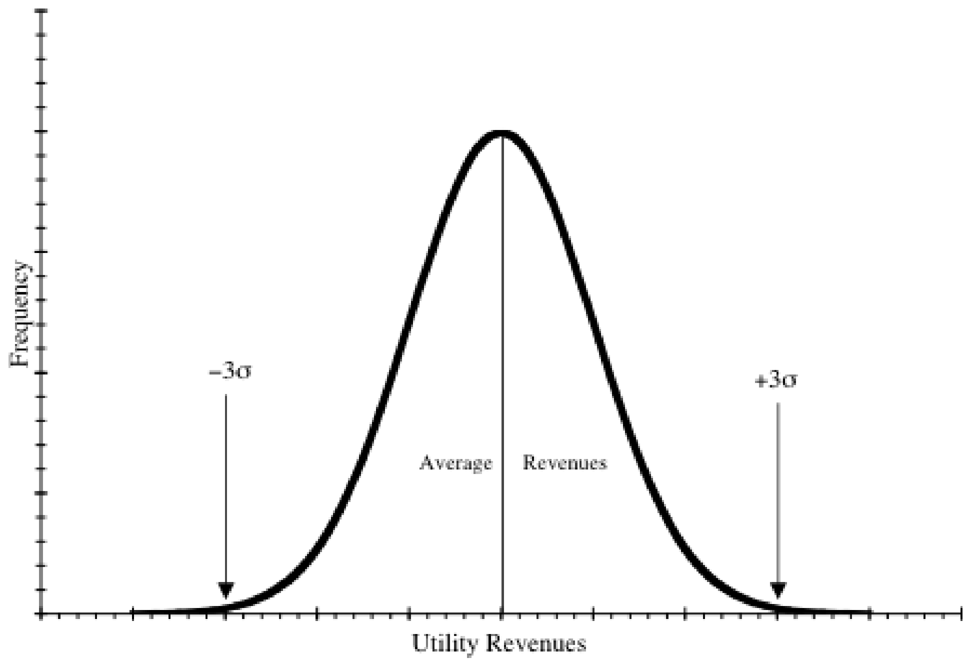
Chart VIII

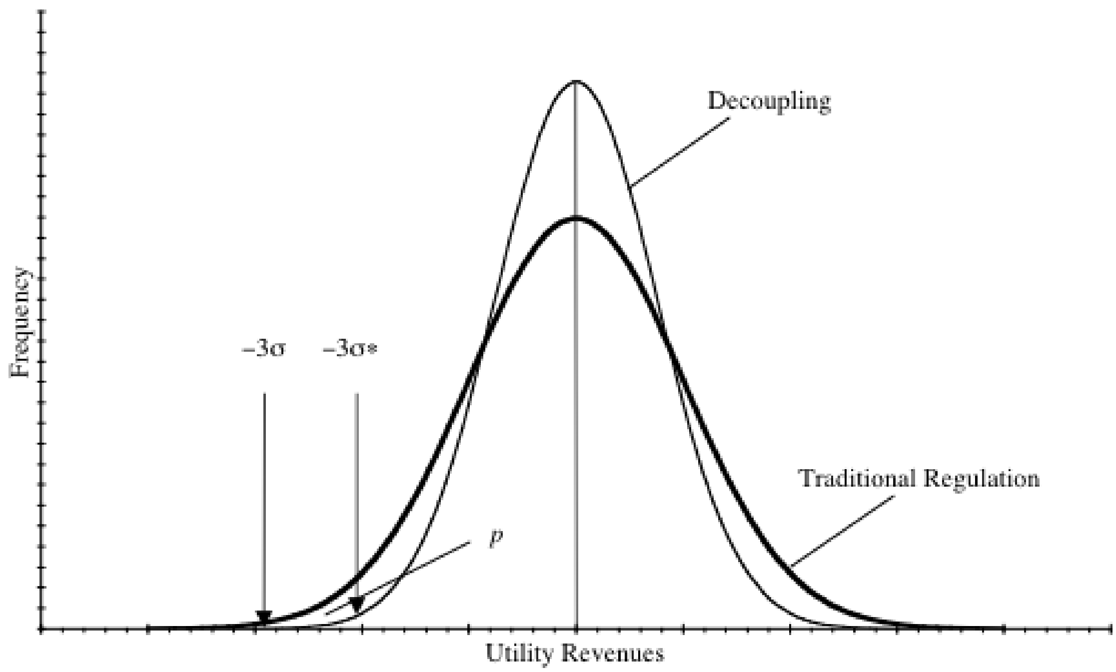
Revenue Distribution Under Traditional Regulation



When the volatility of the revenue stream is reduced, in this case by a decoupling mechanism, the variance of the revenues about the trend line shown previously in Chart VII is reduced and the width of the zone ±3s above and below the average trend line narrows. In other words, as the volatility of the utility's revenue stream is reduced, the possibility that the actual revenue or net income (which will fall within ±3s) will more closely approximate the expected net revenue (represented by the trend line) is increased and, therefore, the utility's operating risk is reduced. Further, as the volatility of the utility's revenues around the trend line is reduced, the shape of the "bell curve" graph of the revenue distribution changes. As shown in Chart IX, while still centered on the average expected revenue, the "bell" formed by the distribution of utility revenues under decoupling becomes taller and thinner.

Chart IX

Revenue Distribution Differential With Decoupling



It is through this change in the shape of the distribution of possible revenue outcomes, shown in Chart IX, which we are able to quantify the impact of decoupling on the cost of equity capital. When the variance of revenues about the trend line is reduced, the possibility of more extreme outcomes is reduced. To the investor, the risk-reducing aspect of this change is the elimination of the possibility of extreme negative revenue outcomes.

Under "traditional" regulation it is possible that the utility could experience revenues at the extreme lower left corner of the original revenue distribution (-3s). This would represent an adverse risk outcome to the investor. Under a less volatile decoupling scenario, however, the revenue distribution is narrower, the expected revenues more certain, and the most negative outcome (-

3s* on the new bell curve) is a *higher* net revenue value and, thus, represents less risk to the investor.

The pertinent difference in the probability outcomes under the "traditional" and decoupling scenario can be quantified as the difference in the area in the graph between the two curves, i.e., between -3s and -3s*. This area (designated as "*p*" in Chart IX) between the original distribution curve and the new (decoupling) curve represents the reduction in the probability of an extreme negative outcome that existed prior to the adoption of decoupling.

As shown in page 4 of Exhibit No. SGH-19 the probability differential ("*p*") represented by a 35 percent reduction in historical net electric revenue variance equals approximately 0.0065, which represents approximately 0.65 percent of net revenues. This analysis indicates that investors would be indifferent between "traditional" regulation and revenue decoupling if the equity return under decoupling produced a revenue requirement 0.65 percent less than that under "traditional" regulation. In order for the equity return interests of investors and ratepayers to be balanced under a revenue decoupling regulatory regime, then, the allowed return will have to be less than that allowed under traditional regulation. In this instance, the appropriate reduction in equity return is estimated as the equity return difference that would reduce average net revenues by 0.65 percent, based on Puget's electric and gas utility historical results over the past fifteen years.

Q: How have you quantified the impact on the cost of equity capital created by the reduction in volatility due to decoupling?

A: Exhibit No. SGH-19, page 4 shows the calculations necessary to quantify the risk-reduction impact of the revenue decoupling mechanism with regard to the Company's electric net revenues. As noted above, the probability of extreme negative outcomes in the Company's Washington electric utility net revenues is reduced by about 0.65 percent when the historical revenue variance is reduced by the 40 percent factor discussed previously. When this percentage is multiplied by the electric operations' average annual net revenue over the past twelve years ($1.529 Billion), the result is $9.938 Million annually. That is, due to the risk-reducing nature of revenue decoupling, investors would be indifferent between Puget's utility operations realizing an average of approximately $1.53 Billion in net revenues per year as it has under traditional regulation and receiving $9.3 Million less than that amount annually under a revenue decoupling regulatory framework.

This annual reduction in revenues for Puget's electric operations is translated in to an equity return differential by first estimating that during the 15-year study period, the Company's utility jurisdictional rate base averaged $4.569 Billion and its common equity ratio averaged 42.21 percent.[80] Given the historical record established by the Company, a 1 percent reduction in equity return over the historical period studied would, on average, have resulted in an annual return-related net revenue reduction of $29.67 Million (1% x 42.21%

[80] PSE's Response to Public Counsel Data Request No. 006.

(equity ratio) x $4.569 Billion (Rate Base) ÷ (1-35% tax rate)). Therefore, if an appropriate return adjustment for decoupling calls for a reduction of approximately $9.94 Million in annual revenues (as noted above and shown on Exhibit No. SGH-19, page 4), and a 1 percent reduction would have caused a revenue reduction of about $29.67 Million, then an equity return adjustment of 33.5 basis points for Puget's electric operations would be indicated under a decoupling regulatory regime (1% x 3.386 Mill/$6.29 Mill.).

Q: What is your recommended cost of equity reduction for Puget related to the Company's decoupling program?

A: Page 4 of Exhibit No. SGH-19 shows that appropriate decoupling-related equity return decrements for Puget's gas distribution operations in Washington is 33.5 basis points, based on analysis of the Company's operations over the past 15 years. As I have noted previously, the market-based analyses published by the Brattle Group and presented by Dr. Vilbert in this proceeding indicate that a decoupling adjustment to the cost of equity of 25 to 50 basis points is reasonable.

For purposes of analysis in this proceeding, I believe a reduction in the market-based cost of equity capital of 35 basis points is reasonable and would provide a reasonable balance between the interests of ratepayers and investors as Puget operates under a decoupling rate design regime. As determined in Section III of this testimony, the target period cost of common equity capital for Puget is 9.00 percent. When that cost of equity is adjusted to account for decoupling (reduced by 35 basis points) the appropriate return on equity is 8.65 percent.

Q: Is a reduction in the allowed return on common equity the only acceptable means to mitigate this risk shifting impact of a decoupling regulatory regime?

A: No. As I noted previously one other methodology that can be used to mitigate the impact of the risk-shifting to ratepayers caused by decoupling is to reduce the ratemaking common equity ratio and leave the market-based cost of common equity unchanged. In the instant proceeding, if we use the Company's 2011 rate case capital structure and cost rates[81] with a target period cost of equity adjusted for decoupling (8.65 percent), the after-tax overall return would be approximately 7.22 percent. [48% x 8.65% + 48% x 6.16% + 4% x 2.68% = 7.22%]

The same overall after-tax return (7.22 percent) can be achieved with a 9.0 percent return on equity, and a ratemaking common equity ratio of 43 percent, a 53 percent long-term debt ratio and a percentage of short-term debt of 4 percent. [43% x 9.00% + 53% x 6.16% + 4% x 2.68% = 7.22%] Either methodology—lowering the ROE or adjusting the ratemaking common equity ratio—will enable the necessary risk reduction required with the adoption of a decoupling ratemaking regime.

Q: Does this conclude your testimony, Mr. Hill?

A: Yes, it does.

[81]Prefiled Direct Testimony of Brandon J. Lohse, Exhibit No. BJL-1T, p. 2.