

**EXH. RAM-12T
DOCKETS UE-170033/UG-170034
2017 PSE GENERAL RATE CASE
WITNESS: DR. ROGER A. MORIN**

**BEFORE THE
WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION**

**WASHINGTON UTILITIES AND
TRANSPORTATION COMMISSION,**

Complainant,

v.

PUGET SOUND ENERGY,

Respondent.

**Docket UE-170033
Docket UG-170034**

**PREFILED REBUTTAL TESTIMONY
(NONCONFIDENTIAL) OF
DR. ROGER A. MORIN
ON BEHALF OF PUGET SOUND ENERGY**

AUGUST 9, 2017

PUGET SOUND ENERGY

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

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Exh. RAM-13 Puget Sound Energy Response to Public Counsel Data Request No. 333

1 **PUGET SOUND ENERGY**

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

5 **I. INTRODUCTION**

6 **Q. Are you the same Dr. Roger A. Morin who submitted prefiled direct**
7 **testimony on January 13, 2017, on behalf of Puget Sound Energy in this**
8 **proceeding?**

9 A. Yes. I filed prefiled direct testimony, Exh. RAM-1T, and supporting exhibits,
10 Exh. RAM-2 through Exh. RAM-15, on January 13, 2017.

11 **Q. What is the purpose of your rebuttal testimony?**

12 A. I have been asked by Puget Sound Energy (“PSE”) to respond to each of the
13 following cost of capital testimonies:

- 14 (i) the Prefiled Direct Testimony of Dr. J. Randall
15 Wooldridge, Exh. JRW-1T, on behalf of the Public Counsel
16 Section of the Washington Attorney General’s Office
17 (“Public Counsel”),
- 18 (ii) the Prefiled Testimony of David C. Parcell, Exh. DCP-1T,
19 on behalf of the Staff of Washington Utilities and
20 Transportation Commission (“Commission Staff”); and
- 21 (iii) the Prefiled Response Testimony of Mr. Michael P.
22 Gorman, Exh. MPG-1T, on behalf of the Industrial
23 Customers of Northwest Utilities (“ICNU”).

1 **Q. What return on common equity are these witnesses recommending for PSE?**

2 A. The return on common equity recommendations for PSE from two of the three
3 witnesses are as follows:

4 Mr. Parcell 8.85 percent to 9.50 percent

5 Dr. Woolridge 7.70 percent to 8.90 percent

6 Mr. Parcell's upper range (9.5 percent) is within reasonable striking distance of
7 my own return on equity recommendation (9.8 percent) adopted by PSE in this
8 proceeding. This rebuttal testimony addresses infirmities in Mr. Parcell's results
9 that, when corrected, would increase his range of reasonableness to between 9.0
10 and 10.0 percent, which encompasses my own return on equity recommendation
11 of 9.8 percent.

12 Dr. Woolridge's return on equity recommendation (8.85 percent), however, is
13 more extreme and outside reasonable limits of probability. Therefore, the majority
14 of this rebuttal testimony addresses Dr. Woolridge's testimony and
15 methodologies.

16 Mr. Gorman did not offer an independent return on equity recommendation for
17 PSE and instead opted to limit his testimony to criticizing my direct testimony.
18 This rebuttal testimony responds accordingly to demonstrate that his criticisms are
19 lacking in merit and should be disregarded by the Washington Utilities and
20 Transportation Commission (the "Commission").

21 Finally, Mr. Gorman's testimony argues for a downward adjustment to PSE's
22 return on equity in the event that the revenue decoupling mechanism continues.

1 This testimony contradicts Mr. Gorman’s prior testimony in PSE’s decoupling
2 remand proceeding before this Commission that the risk reducing effect of
3 decoupling is reflected adequately in the data derived from the companies in their
4 respective proxy groups. The Commission should, once again, expressly reject
5 any recommendation for a downward adjustment to return on equity due to the
6 existence of a revenue decoupling mechanism.

7 II. REBUTTAL OF DR. WOOLRIDGE

8 **Q. Please summarize Dr. Woolridge’s return on equity recommendation.**

9 A. Dr. Woolridge recommends a return on equity for PSE of only 8.85 percent.

10 In determining the cost of equity, Dr. Woolridge applies a Discounted Cash Flow
11 (“DCF”) analysis to three proxy groups of utilities: (i) a group of electric utilities,
12 (ii) Dr. Morin’s group of electric utilities, and (iii) a small group of eight natural
13 gas utilities. Dr. Woolridge’s DCF analyses produce results of 8.65 percent,
14 8.85 percent, and 8.90 percent, respectively, for the three groups.¹

15 Dr. Woolridge also performs a Capital Asset Pricing Model (“CAPM”) analysis,
16 although he does not rely on the results of this analysis in spite of devoting
17 several pages of his testimony to the CAPM and its proper inputs. The CAPM
18 analysis, summarized on Table 3 of page 53 of his testimony, produces a result of
19 7.70 percent, 7.70 percent, and 7.90 percent for the three peer groups,

¹ See, e.g., Woolridge, Exh. JRW-1T, at page 43, Table 2.

1 respectively. Based on his three DCF results, Dr. Woolridge concludes that PSE's
2 return on equity is only 8.85 percent.

3 **Q. What is your general reaction to Dr. Woolridge's return on equity**
4 **recommendation?**

5 A. Before engaging in a more technical critique of Dr. Woolridge's testimony, I offer
6 my general reaction that there are three major infirmities in Dr. Woolridge's
7 testimony. First, Dr. Woolridge's recommended return on equity of only
8 8.85 percent for PSE lies well outside the zone of reasonableness and outside the
9 zone of currently allowed returns on equity authorized by state utility
10 commissions in 2017, which averages 9.9 percent. If adopted by the Commission,
11 Dr. Woolridge's recommended return on equity would result in PSE having one
12 of the lowest, if not the lowest, allowed return on equity for any investor-owned
13 utility in the country. Moreover, Dr. Woolridge's recommended return on equity
14 lies well below the zone of the allowed and expected returns on equity of his own
15 proxy group of electric utilities. None of the utilities in Dr. Woolridge's proxy
16 group of comparable electric utilities has an allowed return on equity anywhere
17 near his recommended 8.85 percent for PSE. There would likely be adverse
18 consequences to PSE's credit ratings, financial integrity, and ability to raise
19 capital if the Commission were to adopt Dr. Woolridge's recommendation, and
20 these adverse consequences would eventually harm PSE's customers over time.
21 These facts provide clear proof that Dr. Woolridge's return on equity
22 recommendation for PSE is far too low.

1 The second major structural flaw of Dr. Woolridge's testimony is that his
2 recommended return on equity of 8.85 percent rests exclusively on results derived
3 from questionable inputs and methodologies selected for his DCF analyses.
4 Additionally, his CAPM analysis, on which he places little, if any, weight, is
5 flawed, as discussed below.

6 The third major flaw is that Dr. Woolridge's final choice of DCF growth rates, the
7 crux of his recommendation, is arbitrary, contradictory, inconsistent with several
8 statements in his testimony, and cannot be replicated.

9 **Q. Is Dr. Woolridge's low recommended return on equity for PSE appropriate**
10 **at this time?**

11 A. No. Dr. Woolridge's recommended ROE of only 8.85 percent, which would be
12 among the lowest, if not the lowest, allowed return on equity for an investor-
13 owned utility in the country, is untimely and contrary to customers' best interests.
14 PSE's management is committed to maintaining an investment grade
15 creditworthiness so that it will be able to provide reliable and reasonably-priced
16 energy service. Approval of the a return on equity of 9.8 percent for PSE would
17 buttress these goals and provide benefits to PSE customers.

18 Maintaining an investment-grade bond rating will have beneficial long-term cost
19 implications for PSE and its customers as PSE refinances existing debt, issues
20 new capital, and enters into new contractual arrangements. PSE's customers have
21 a vested interest in a strong financial position for the utility, and the interests of
22 customers and shareholders are aligned and are not mutually exclusive. Both

1 benefit from a financially sound utility, and Dr. Woolridge's very low
2 recommended return on equity for PSE, if granted, would be detrimental to the
3 maintenance of an investment-grade goal and contrary to customers' interests.

4 **Q. What are the basic conclusions of your rebuttal to Dr. Woolridge's return on**
5 **equity testimony?**

6 A. Dr. Woolridge's return on equity recommendation of 8.85 percent rests entirely
7 on arbitrary DCF growth rates that have been plucked out of thin air and should
8 be given little, if any, weight in the Commission's considerations.

9 **Q. Do you have any other general comment on Dr. Woolridge's testimony?**

10 A. Yes, I do. Dr. Woolridge is quite inconsistent on the use of the median value
11 rather than the mean value when computing averages of the various data sets.
12 Throughout his testimony, Dr. Woolridge sometimes chooses the mean,
13 sometimes the median, sometimes both. For example, Dr. Woolridge reports both
14 mean and median results on page 1 of Exh. JRW-6, but he only reports mean
15 results on page 2 of the same exhibit. Elsewhere, such as Exh. JRW-12,
16 Dr. Woolridge reports both median and median results but then appears to rely on
17 the mean of the median results.
18 Dr. Woolridge inappropriate uses median results as a measure of central tendency
19 when estimating the cost of capital. The median is defined as the *single* number in
20 a series of numbers that divides the highest half of the numbers from the lowest
21 half of the numbers in the series. For example, if you had a series of numbers 8, 9,

1 10, 11, 12, the median of that series would be 10 because there are two values
2 greater than 10 and two that are less than 10. The mean (simple average) of that
3 same series is also 10. However, consider the following series of numbers: 8, 9,
4 10, 13, 15. The median of this series remains 10, but the mean is now 11. The
5 median discards all information contained in the data series except one number.
6 Proponents of using the median argue that use of the median attenuates the impact
7 of outliers. In return on equity calculations, however, it is impossible to know *a*
8 *priori* what values, if any, are outliers. Therefore, it is preferable to use all the
9 values in a data series, which is what the mean does, instead of relying on a single
10 number as the median does. In short, Dr. Woolridge should have consistently
11 relied on means rather than medians. It may be that Dr. Woolridge's use of
12 median values is somewhat result-oriented because median values may result in
13 lower estimates of central tendency.

14 **Q. Please summarize your specific criticisms of Dr. Woolridge's return on**
15 **equity testimony.**

16 A. On technical and methodological grounds, I have eight specific criticisms
17 regarding Dr. Woolridge's return on equity testimony:

18 1. **Return Recommendation Well Out of The Mainstream.**

19 Dr. Woolridge's recommended return is outside the zone of currently
20 allowed rates of return for electric utilities in the United States and for his
21 own primary sample of electric utilities. The average allowed return on
22 equity authorized by state utility commissions for electric utilities in 2017

1 is 9.9 percent. The Commission's currently allowed return on equity for
2 PSE is 9.8 percent, the same as my own recommendation. For
3 Dr. Woolridge's own proxy group of comparable electric utilities, the
4 currently allowed return on equity averages 10.0 percent, and Value Line
5 estimates expected average returns on equity of 10.7 percent. These
6 allowed and expected returns on equity exceed Dr. Woolridge's low
7 8.85 percent recommended return for PSE by a significant margin.

8 2. **Understated Dividend Yield.** Dr. Woolridge's dividend yield component
9 is understated because it is not consistent with the annual form of the DCF
10 model. It is inappropriate to increase the dividend yield by adding one-half
11 the future growth rate to the spot dividend yield. The appropriate manner
12 of computing the expected dividend yield when using the plain vanilla
13 annual DCF model is to add the full growth rate rather than one-half the
14 growth rate. This adjustment also allows for the failure of the annual DCF
15 model to allow for the quarterly timing of dividend payments. In short,
16 Dr. Woolridge's DCF results are understated by some 10 basis points
17 (i.e., 0.1 percent) alone related to this single flaw.

18 3. **DCF Historical Growth Rates.** Dr. Woolridge examines thirteen growth
19 proxies for the growth component of the DCF model, six of which are
20 historical growth rates in earnings, dividends, and book value, despite
21 substantial changes occurring in the energy utility industry that have made
22 history questionable. Moreover, historical growth rates are somewhat

1 redundant since historical growth patterns are already reflected in
2 analysts' growth forecasts, which he also uses. Finally, the stock price
3 Dr. Woolridge uses in his DCF analysis is predicated on analysts' growth
4 forecasts and not on historical growth rates.

5 4. **Sustainable Growth Methodology.** The sustainable growth methodology
6 employed by Dr. Woolridge for estimating the growth component in the
7 DCF formula is logically inconsistent because one is forced to assume the
8 answer to implement the method. Moreover, Dr. Woolridge's sustainable
9 growth methodology fails to account for external stock financing.

10 5. **Analysts' Growth Forecasts.** Dr. Woolridge decries the use of analyst
11 growth forecasts and criticizes my direct testimony's use of such forecasts.
12 Yet, inexplicably, Dr. Woolridge ends up relying exclusively on such
13 forecasts in deriving his DCF growth rates and final recommendation.

14 6. **CAPM Market Risk Premium.** Dr. Woolridge's estimate of the market
15 risk premium for his CAPM analyses is far too low because: (i) he has
16 erroneously included the results of studies which employ geometric means
17 instead of the correct arithmetic means; (ii) he arbitrary selects the
18 literature on which he relies; and (iii) he has misrepresented the literature
19 on the subject.

20 7. **CAPM and the Empirical CAPM.** The plain vanilla version of the
21 CAPM used by Dr. Woolridge understates returns of equity for low-beta
22 securities, such as PSE.

Table 1. Authorized And Expected Returns

| | Company | VL Allowed ROE | VL Expected ROE |
|----|--|---------------------------|----------------------------|
| 1 | ALLETE, Inc. (NYSE-ALE) | 10.38% | 9.0% |
| 2 | Alliant Energy Corporation (NYSE-LNT) | 10.50% | 13.0% |
| 3 | Ameren Corporation (NYSE-AEE) | 9.60% | 10.0% |
| 4 | American Electric Power Co. (NYSE-AEP) | 10.30% | 11.0% |
| 5 | Avista Corporation (NYSE-AVA) | 9.50% | 8.0% |
| 6 | CMS Energy Corporation (NYSE-CMS) | 10.10% | 13.5% |
| 7 | Consolidated Edison, Inc. (NYSE-ED) | 9.00% | 8.5% |
| 8 | Dominion Resources, Inc. (NYSE-D) | 10.90% | 19.0% |
| 9 | DTE Energy Company (NYSE-DTE) | 10.10% | 10.5% |
| 10 | Duke Energy Corporation (NYSE-DUK) | 10.10% | 8.5% |
| 11 | Edison International (NYSE-EIX) | 10.45% | 11.0% |
| 12 | El Paso Electric Company (NYSE-EE) | 9.48% | 9.5% |
| 13 | Entergy Corporation (NYSE-ETR) | 10.00% | 10.0% |
| 14 | Eversource Energy (NYSE-ES) | 9.40% | 10.0% |
| 15 | FirstEnergy Corporation (NYSE-FE) | 9.75% | 12.5% |
| 16 | Hawaiian Electric Industries (NYSE-HEC) | 9.50% | 9.0% |
| 17 | IDACORP, Inc. (NYSE-IDA) | 10.00% | 9.0% |
| 18 | MGE Energy, Inc. (NYSE-MGEE) | 10.20% | 11.0% |
| 19 | NorthWestern Corporation (NYSE-NWE) | 9.80% | 9.5% |
| 20 | OGE Energy Corp. (NYSE-OGE) | 9.70% | 12.0% |
| 21 | Otter Tail Corporation (NDQ-OTTR) | na | 10.0% |
| 22 | PG&E Corporation (NYSE-PCG) | 10.40% | 10.0% |
| 23 | Pinnacle West Capital Corp. (NYSE-PNW) | 10.00% | 10.0% |
| 24 | PNM Resources, Inc. (NYSE-PNM) | 10.00% | 9.5% |
| 25 | Portland General Electric Company (NYSE-POR) | 9.60% | 9.5% |
| 26 | PPL Corporation (NYSE-PPL) | na | 13.5% |
| 27 | SCANA Corporation (NYSE-SCG) | 10.25% | 10.0% |
| 28 | Southern Company (NYSE-SO) | 12.50% | 12.0% |
| 29 | WEC Energy Group (NYSE-WEC) | 9.50% | 11.0% |
| 30 | Xcel Energy Inc. (NYSE-XEL) | 9.80% | 11.0% |
| | AVERAGE | 10.03% | 10.70% |

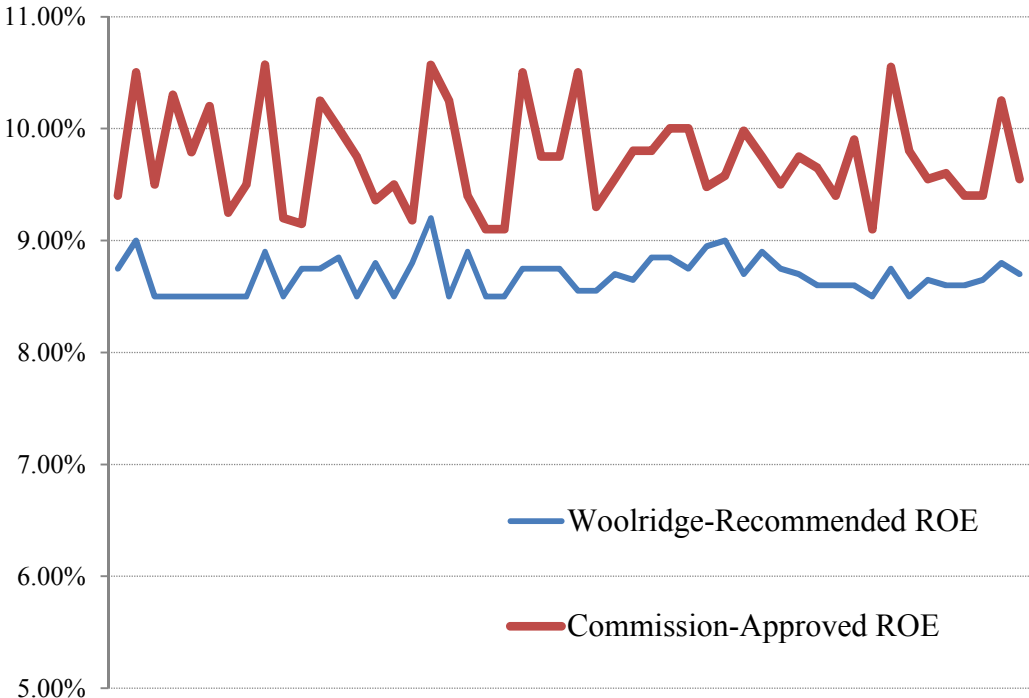
Source: Value Line 7/2017

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These allowed and expected returns on equity substantially exceed Dr. Woolridge’s recommended return on equity for PSE of only 8.85 percent. Indeed, Dr. Woolridge’s recommended returns on equity consistently understate the returns on equity by state utility commissions by at least 1 percent, as shown on Figure 1 below.

Figure 1. Dr. Woolridge’s Consistent Understatement of Utility Returns on Equity



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Adjustment of Dr. Woolridge’s consistent understatement would (i) raise the top end of this range from 8.9 percent to 9.9 percent and (ii) increase his recommended return on equity for PSE from 8.85 percent to 9.85 percent. This adjusted return on equity of 9.85 percent is nearly identical to the return on equity of 9.8 percent proposed by PSE in this proceeding.

1 In short, Dr. Woolridge's recommendation is well outside the mainstream of the
2 allowed rates of return that were current during the period in which Dr. Woolridge
3 performed his analysis and lies outside the zone of recently authorized returns for
4 electric and combination electric and gas utilities and for Dr. Woolridge's own
5 sample of companies.

6 **B. Dr. Woolridge's DCF Results Should be Given Very Little, If Any,**
7 **Weight Because Dr. Woolridge Has Relied on Erroneous Data Inputs**

8 **1. Dr. Woolridge Understates Dividend Yield by Using a Spot**
9 **Dividend Yield Inflated By One-Half of the Expected Dividend**
10 **Growth**

11 **Q. Does Dr. Woolridge's use an appropriate dividend yield component in his**
12 **DCF analyses?**

13 A. No. Dr. Woolridge uses an inappropriate dividend yield calculation in his DCF
14 analyses² because he multiplied the spot dividend yield by one plus one half the
15 expected growth rate ($1 + 0.5g$) rather than the conventional one plus the expected
16 growth rate ($1 + g$). This procedure understates the return expected by the
17 investor.

18 **Q. Why is Dr. Woolridge's adjustment to the dividend yield component in his**
19 **DCF analyses in appropriate?**

20 A. The fundamental assumption of the plain vanilla annual DCF model used by
21 Dr. Woolridge is that dividends are received annually at the end of each year and

² See Woolridge, Exh. JRW-1T, at page 35, lines 11;13; see also Woolridge, Exh. JRW-12, at page 1.

1 that the first dividend is to be received one year from now. Thus, the appropriate
2 dividend to use in a DCF model is the full prospective dividend (i.e., $1 + g$) to be
3 received at the end of the year. Instead, Dr. Woolridge calculates the first
4 dividend by multiplying the current dividend by only one plus one-half the growth
5 rate (i.e., $1 + 0.5g$) instead of multiplying by one plus the growth rate. Since the
6 appropriate dividend to use in a DCF model is the prospective dividend one year
7 from now rather than the dividend one-half year from now, Dr. Woolridge's
8 approach understates the proper dividend yield.

9 Use of this adjustment factor creates a downward bias in Dr. Woolridge's
10 dividend yield component, and underestimates the cost of equity. For example, for
11 a spot dividend yield of 4 percent and a growth rate of 5 percent, Dr. Woolridge's
12 estimated dividend yield is 4.1 percent,³ whereas the correct dividend yield to
13 employ is 4.2 percent,⁴ which is 10 basis points higher.

14 Moreover, the basic annual DCF model ignores the time value of quarterly
15 dividend payments and assumes dividends are paid once a year at the end of the
16 year. Multiplying the spot dividend yield by $(1 + g)$ is actually a conservative
17 attempt to capture the reality of quarterly dividend payments and understates the
18 expected return on equity. Use of this method is conservative because the annual
19 DCF model ignores the more frequent compounding of quarterly dividends.

³ $4\% \times (1 + (0.05 \times 0.5)) = 4.1\%$.

⁴ $4\% \times (1 + .05) = 4.2\%$.

1 **2. Dr. Woolridge Erroneously Relies on Historical Growth Rates**
2 **in His DCF Analysis**

3 **Q. What growth rates did Dr. Woolridge employ in his DCF analyses?**

4 A. Dr. Woolridge employs a veritable smorgasbord of thirteen growth rates as
5 proxies for the DCF growth component for each of his three peer groups.

6 For example, Table 2 below provides the thirteen growth rates used by

7 Dr. Woolridge for his DCF analyses for his proxy group of electric utilities.

**Table 2. Dr. Woolridge's DCF Growth Rates
for His Proxy Group of Electric Utilities**

| | | |
|----|---------------------------------|-------------|
| 1 | 10-yr historical Earnings | 6.1% |
| 2 | 10-yr historical Dividend | 2.9% |
| 3 | 10-yr historical Book Value | 5.7% |
| 4 | 5-yr historical Earnings | 6.1% |
| 5 | 5-yr historical Dividend | 4.1% |
| 6 | 5-yr historical Book Value | 5.4% |
| 7 | Value Line Projected earnings | 4.9% |
| 8 | Value Line Projected dividend | 3.9% |
| 9 | Value Line projected Book Value | 4.8% |
| 10 | Value Line Internal Growth | 4.8% |
| 11 | First Call analysts' forecasts | 3.1% |
| 12 | Zacks analysts' forecasts | 4.6% |
| 13 | Reuters analysts' forecasts | 4.5% |
| | AVERAGE | 4.7% |

8 **Source:** Woolridge, Exh. JRW-12, at pages 3-5.

1 **Q. Does Dr. Woolridge rely on historical growth rates in his DCF analyses?**

2 A. It is unclear whether Dr. Woolridge relies on historical growth rates in his
3 DCF analyses. The first six of the thirteen growth rates calculated by
4 Dr. Woolridge and provided in Table 2 above are historical growth rates.
5 Although Dr. Woolridge reports median historical growth rates for his electric
6 proxy group that range from 4.0 percent to 5.5 percent, with an average of the
7 medians of 4.3 percent.⁵ Notwithstanding this low historical growth rate,
8 Dr. Woolridge recommends using a growth rate of 5.25 percent for his electric
9 proxy group,⁶ so that it is difficult to discern to what extent he places reliance, if
10 any, on historical growth rates. To the extent that Dr. Woolridge did rely on
11 historical growth rates, he did so in error.

Table 3. Dr. Woolridge DCF Growth Rate Indicators

| Growth Rate Indicator | Electric Group | Morin Group | Gas Group |
|---|-----------------------|--------------------|------------------|
| Historic Value Line Growth in EPS, DPS, and BVPS | 4.3% | 4.9% | 5.4% |
| Projected Value Line Growth in EPS, DPS, and BVPS | 4.8% | 5.1% | 5.4% |
| Sustainable Growth ROE * Retention Rate | 3.9% | 4.2% | 4.2% |
| Projected EPS Growth from Yahoo, Zacks, and Reuters - Mean/Median | 4.5%/5.4% | 5.5%/5.6% | 6.1%/6.5% |
| Woolridge Final Choice of Growth Rates | 5.25% | 5.5% | 6.0% |

12 **Source:** Woolridge, Exh. JRW-12, at page 6

⁵ Woolridge, Exh. JRW-1T, at page 40, lines 10-12.

⁶ Woolridge, Exh. JRW-1T, at page 42, lines 12-15.

1 Under circumstances of stability, it is reasonable to assume that historical growth
2 rates in dividends and earnings influence investors' assessment of the long-run
3 growth rate of future dividends and earnings. However, because of substantial
4 changes in the energy industry, historical growth rates have little relevance as
5 proxies for future long-term growth. Historical growth rates are downward-biased
6 by the sluggish earnings performance in the last few decades, due to the structural
7 transformation of the energy utility business from a regulated monopoly to a more
8 competitive environment. Moreover, historical growth rates are largely redundant
9 because such historical growth patterns are already incorporated in analysts'
10 growth forecasts that should be used in the DCF model.

11 One would expect that averages of analysts' earnings growth forecasts, such as
12 those contained in IBES, First Call, Reuters, or Zacks, are more reliable estimates
13 of the investors' consensus expectations than either historical growth rates or one
14 particular firm's dividend growth forecast. As discussed in my direct testimony
15 and later in my rebuttal, the empirical finance literature⁷ has demonstrated that
16 consensus analysts' growth forecasts (i) are reflected in stock prices, (ii) possess a
17 high explanatory power of equity values, and (iii) are used by investors.

18 Moreover, it is necessary to use earnings forecasts rather than dividend forecasts
19 because of the extreme scarcity of dividend forecasts compared to the availability
20 of earnings forecasts. Given the paucity of dividend forecasts, use of dividend
21 forecasts produces unreliable DCF results.

⁷ See footnote 30, *supra*.

1 Finally, and incidentally, it is curious that Dr. Woolridge devotes considerable
2 testimony in denouncing the use of historical data when estimating the market risk
3 premium component of the CAPM, and argues why historical market risk
4 premiums are irrelevant for estimating future market risk premiums, but yet is
5 willing to incorporate no less than six historical growth proxies into his DCF
6 analyses. Nowhere does Dr. Woolridge explain this inconsistency.

7 **Q. What do you conclude from Dr. Woolridge’s use of historical growth rates?**

8 A. The Commission should reject historical growth rates as proxies for expected
9 growth in the DCF calculation. In fairness to Dr. Woolridge, however, it is not
10 clear from his testimony to what extent, if any, he relied on historical growth rates
11 in deriving his DCF estimates.⁸

12 **3. Dr. Woolridge Inappropriately Relies on the Sustainable**
13 **Growth Methodology in the DCF Analysis Whereby He is**
14 **Forced to Assume the Answer to Implement the Methodology**

15 **Q. Please comment on Dr. Woolridge’s sustainable growth estimate in the DCF**
16 **model.**

17 A. In order to estimate the growth component of the DCF model, Dr. Woolridge
18 relies partially on the so-called “sustainable growth” method, sometimes referred
19 to as the “internal growth” approach, where the growth rate is based on the
20 following equation:

⁸ Dr. Woolridge does suggest that he gave primary weight to the projected earnings per share growth rates of Wall Street analysts in using a growth rate of 5.25 percent for his electric proxy group. Woolridge, Exh. JRW-1T, at page 42, lines 12-13.

1
$$g = b \times r$$

2 Where: b = the percentage of earnings retained
3 r = the expected rate of return on book equity

4 Dr. Woolridge's use of the sustainable growth technique is erroneous for five
5 reasons:

- 6 (i) the sustainable growth methodology fails to account for the
7 impact of external stock financing on growth, thus
8 understating growth rates;
- 9 (ii) the sustainable growth methodology is logically circular
10 because it requires an estimate of the expected rate of
11 return on equity to estimate the cost of equity using the
12 DCF model;
- 13 (iii) the sustainable growth methodology is inconsistent with the
14 academic empirical evidence;
- 15 (iv) the potential lack of representativeness of Value Line's
16 forecasts as proxies for the market consensus; and
- 17 (v) a technical error.

18 **Q. Does Dr. Woolridge's sustainable growth methodology account for external**
19 **stock financing?**

20 A. No. Dr. Woolridge's sustainable growth methodology fails to account for external
21 stock financing. Utilities engage in two kinds of operations: (i) internal
22 investment decisions on which utilities earn the rate of return 'r', and (ii) external
23 financing activities on which utilities earn the rate of return 's'. Therefore, if a
24 utility is expected to finance stock at the rate 's', the growth component should
25 reflect book value per share results from both types of operations, a reflected in
26 the following formula:

1
$$g = (b \times r) + (s \times v)$$

2 Where: b = the percentage of earnings retained
3 r = the expected rate of return on book equity
4 s = funds raised from the sale of stock as a fraction
5 of existing common equity
6 v = fraction of the funds raised from sale of stock
7 that accrues to shareholders at the start of the
8 period

9 Dr. Woolridge’s sustainable growth methodology (i.e., $b \times r$) fails to recognize
10 growth stemming from external stock financing (i.e., $s \times v$). The expectation of
11 continuous stock financing at the rate ‘s’ changes the expected rate of growth
12 from $(b \times r)$ to $(b \times r) + (s \times v)$. By omitting the latter component of growth,
13 Dr. Woolridge understates the growth of his three utility samples from this
14 particular method.

15 **Q. Is the sustainable growth methodology used by Dr. Woolridge logically**
16 **consistent?**

17 A. No. Dr. Woolridge’s sustainable growth methodology is not logically consistent
18 and contains a logical contradiction. The contradiction arises because the method
19 requires an explicit assumption on the return on equity expected from the retained
20 earnings that produce future growth.

21 Dr. Woolridge bases his return on equity estimate on Value Line’s forecast
22 returns on equity for the 2020-2022 period.⁹ However, the returns on equity used

⁹ Woolridge, Exh. JRW-12, at page 4 (column titled “*Value Line Sustainable Growth Return on Equity*”).

1 by Dr. Woolridge in calculating the sustainable growth rate do not match
2 Dr. Woolridge's own return on equity recommendation.

3 For his first group of electric utilities, the average and median expected return on
4 equity of 10.8 percent and 10.0 percent used in Dr. Woolridge's sustainable
5 growth computation¹⁰ substantially exceeds Dr. Woolridge's recommended
6 8.85 percent. Dr. Woolridge's analysis thus assumes that the earned returns on
7 equity of the electric utilities in Dr. Woolridge's proxy group would exceed, in
8 perpetuity, what Dr. Woolridge has determined to be their returns on equity. In
9 other words, Dr. Woolridge is assuming that these electric utilities will earn actual
10 returns on equity that are higher than the allowed returns on equity authorized by
11 state utility regulators and reflected in rates.

12 Although the scenario implicit in Dr. Woolridge's sustainable growth method
13 may be imaginable for an unregulated company, it is implausible to assume for a
14 regulated company whose rates are continually re-set by state utility regulators at
15 a level designed to permit the utility to earn a return equal to its cost of capital.
16 The only way that the electric utilities in Dr. Woolridge's proxy group could
17 plausibly earn returns on equity in a range between 10.0 and 10.8 percent is if
18 state regulators set rates based on allowed returns of equity of between 10.0 and
19 10.8 percent. The only logical conclusion to be drawn from the data in
20 Dr. Woolridge's sustainable growth analysis is that the allowed returns on equity

¹⁰ Woolridge, Exh. JRW-12, at page 4 (column titled "*Value Line Sustainable Growth Return on Equity*").

1 for the electric utilities in Dr. Woolridge's proxy group are within the range of
2 between 10.0 and 10.8 percent.

3 The logical flaw discussed above compromises the integrity of Dr. Woolridge's
4 sustainable growth methodology, and should be a sufficient basis for rejecting the
5 results produced by this methodology. In essence, by using an assumed return on
6 equity as an input for a formula to calculate a different return on equity,
7 Dr. Woolridge would require the Commission to make two inconsistent findings
8 regarding the appropriate return on equity for PSE. It is perplexing how
9 Dr. Woolridge would assume that his proxy group of comparable electric utilities
10 would be expected to earn between 10.0 and 10.8 percent forever, but
11 Dr. Woolridge recommends a return of equity of only 8.85 percent for PSE.

12 **Q. Is the sustainable growth methodology used by Dr. Woolridge consistent with**
13 **empirical evidence?**

14 A. No. The third difficulty with the sustainable growth methodology is that the
15 empirical finance literature demonstrates this particular method of determining
16 growth (i) is a very poor explanatory variable of market value and (ii) is not as
17 significantly correlated to measures of value, such as stock price and
18 price/earnings ratios.

1 **Q. Are the return on equity and retention ratio forecasts reported by Value Line**
2 **representative of the market consensus?**

3 A. No. The fourth difficulty with Dr. Woolridge's internal growth rates is that
4 exclusive reliance on Value Line forecasts of returns on equity and retention
5 ratios runs the risk that such forecasts are not representative of investors'
6 consensus forecast.

7 **Q. Please discuss the fifth problem with Dr. Woolridge's sustainable growth**
8 **methodology estimates.**

9 A. The fifth difficulty with Dr. Woolridge's sustainable growth methodology is that
10 the forecasts of the expected return on equity published by Value Line are based
11 on end-of-period book equity rather than on average book equity. The following
12 formula adjusts the reported end-of-year values so that they are based on average
13 common equity, which is the common regulatory practice:¹¹

$$r_a = r_t \frac{2B_t}{B_t + B_{t-1}}$$

14 Where: r_a = return on average equity
15 r_t = return on year-end equity as reported
16 B_t = reported year-end book equity of the current
17 year
18 B_{t-1} = reported year-end book equity of the previous
19 year

¹¹ See Roger A. Morin, *The New Regulatory Finance*, at chapter 9 (2006).

1 The result of this error is that Dr. Woolridge's DCF estimates are understated by
2 some 10-20 basis points (i.e., 0.1 to 0.2 percent), depending on the magnitude of
3 the book value growth rate.

4 **Q. What do you conclude from Dr. Woolridge's use of sustainable growth rates?**

5 A. The Commission should reject sustainable growth rates as proxies for expected
6 growth in the DCF calculation. In fairness to Dr. Woolridge, however, it is not
7 clear from his testimony to what extent, if any, he relied on sustainable growth
8 rates in deriving his DCF estimates.¹² Indeed, Dr. Woolridge's sustainable growth
9 rate of 3.9 percent for his proxy group of electric utilities is substantially lower
10 than Dr. Woolridge's recommended growth rate of 5.25 percent for the same
11 proxy group.

12 **4. Dr. Woolridge Uses an Ambiguous and Arbitrary Growth**
13 **Rates in His DCF Analyses**

14 **Q. Please comment on Dr. Woolridge's growth proxies.**

15 A. As previously shown on Table 2, the average and median of the thirteen growth
16 rates used by Dr. Woolridge for the electric utilities in his proxy group are 4.7 and
17 4.8 percent, respectively. Dr. Woolridge's recommended growth rate for the
18 electric utilities in his proxy group, however, is 5.25 percent. It is not clear as to
19 why Dr. Woolridge chose 5.25 percent as the recommended growth rate when

¹² As previously mentioned, Dr. Woolridge appears to give primary weight to the projected earnings per share growth rates of Wall Street analysts. *See* Woolridge, Exh. JRW-1T, at page 42, lines 12-13.

1 twelve of the thirteen growth rates reported by Dr. Woolridge for that proxy group
2 are significantly less than 5.25 percent.

3 The same is true for Dr. Woolridge's other two proxy groups. Table 3, repeated
4 below, replicates Dr. Woolridge's growth rates for his three proxy groups of
5 utilities and adds Dr. Woolridge's recommended growth rates for each of the
6 proxy groups.

Table 3. Dr. Woolridge DCF Growth Rate Indicators

| Growth Rate Indicator | Electric Group | Morin Group | Gas Group |
|---|-----------------------|--------------------|------------------|
| Historic Value Line Growth in EPS, DPS, and BVPS | 4.3% | 4.9% | 5.4% |
| Projected Value Line Growth in EPS, DPS, and BVPS | 4.8% | 5.1% | 5.4% |
| Sustainable Growth ROE * Retention Rate | 3.9% | 4.2% | 4.2% |
| Projected EPS Growth from Yahoo, Zacks, and Reuters - Mean/Median | 4.5%/5.4% | 5.5%/5.6% | 6.1%/6.5% |
| Woolridge Final Choice of Growth Rates | 5.25% | 5.5% | 6.0% |

7 **Source:** Woolridge, Exh. JRW-12, at page 6

8 As is evident from Table 3, there is little, if any, connection between the
9 estimated growth rates and Dr. Woolridge's final recommended growth rate for
10 each proxy group. For example, for the proxy group of electric utilities, the
11 estimated growth rates are 4.3 percent, 4.8 percent, 3.9 percent, and between 4.5
12 and 5.4 percent from the various growth rate indicators. From these four
13 indicators, Dr. Woolridge somehow selects 5.25 percent as the recommended
14 growth rate for his DCF estimate for the group. There is no rationale provided for
15 this arbitrary choice of growth rates.

1 In contradiction to his own position on this issue, his final choice of growth rates
2 for the Morin Electric Utilities and Gas Groups is almost identical to his own
3 estimates of analysts growth forecasts which Dr. Woolridge severely criticizes
4 throughout his testimony.

5 **Q. Were you able to replicate Dr. Woolridge's recommended growth estimates**
6 **from the data?**

7 A. No. I was unable to replicate Dr. Woolridge's recommended growth rates from
8 the data for any of the three proxy groups. There is simply no way to connect the
9 thirteen growth indicators with Dr. Woolridge's final recommended growth rates
10 shown on Table 3.

11 The choice of optimal growth rate proxy should be guided by objective scientific
12 research and be easily reproducible, unlike Dr. Woolridge's growth proxies.

13 Dr. Woolridge's "shotgun" approach to growth rates is unreliable and arbitrary
14 and should be rejected by the Commission. Since his final recommendation is
15 based primarily on the results of his flawed DCF analysis, it should be treated
16 with extreme caution by the Commission.

17 **Q. What do you conclude from Dr. Woolridge's growth rate analysis?**

18 A. It is unreliable, impossible to replicate scientifically, contradictory, and should be
19 given very little, if any, weight. It is ironic that Dr. Woolridge ends up selecting
20 growth rates that are very close to analyst growth forecasts in his final choice of

1 DCF growth rates while at the same time he severely criticizes my own use of
2 analyst growth forecast.

3 **C. Dr. Woolridge's CAPM Results Should be Given Very Little, If Any,**
4 **Weight Because Mr. Hill Has Relied on Erroneous Data Inputs.**

5 **Q. Does Dr. Woolridge perform a CAPM analysis?**

6 A. Yes. Dr. Woolridge performs a CAPM analysis. Dr. Woolridge uses a risk-free
7 rate of 4.0 percent,¹³ betas of 0.68 for the electric and Morin proxy groups and
8 0.70 for the gas proxy group,¹⁴ and a market risk premium of only 5.5 percent.¹⁵

9 Dr. Woolridge does not appear to rely on the CAPM to arrive at his return on
10 recommendation, presumably because his CAPM analyses suggest that (i) the
11 returns on equity for the two proxy groups of electric utilities are only 7.6 percent
12 and (ii) the return on equity for the proxy groups of gas utilities is only slightly
13 higher at 7.9 percent.¹⁶ These results are a mere 360 to 390 basis points
14 (3.6 percent to 3.9 percent) above Dr. Woolridge's own risk-free of 4.0 percent.
15 I am not aware that such an anemic risk premium would induce investors to
16 purchase utility common stocks. Indeed, it appears that Dr. Woolridge implicitly
17 agrees with this conclusion because he appears to ignore the estimates produced
18 by his CAPM analysis.

¹³ Woolridge, Exh. JRW-1T, at page 46, lines 1-19.

¹⁴ Woolridge, Exh. JRW-1T, at page 46, line 20, through page 47, line 16.

¹⁵ Woolridge, Exh. JRW-1T, at page 47, line 17, through page 51, line 19.

¹⁶ Woolridge, Exh. JRW-13, at page 1.

1 **1. Dr. Woolridge Should Have Relied on Projected Long-Term**
2 **Treasury Interest Rates in Selecting a Risk-Free Rate for His**
3 **CAPM Analyses**

4 **Q. Is Dr. Woolridge’s risk-free rate estimate of 4.0 percent reasonable for the**
5 **CAPM analysis?**

6 A. No. Dr. Woolridge’s risk-free rate assumption of 4.0 percent is too low for
7 purposes of applying the CAPM. Interest rate forecasts are much higher. All the
8 economic forecasts of which I am aware call for a substantial increase in interest
9 rates. As shown in my prefiled direct testimony in this proceeding, each of the
10 Congressional Budget Office, the U.S. Department of Labor, the U.S. Energy
11 Information Administration, Global Insight, and Value Line projects higher long-
12 term Treasury interest rates, with an average of 4.4 percent¹⁷.

13 Dr. Woolridge should have similarly relied on projected long-term Treasury
14 interest rates for the simple reason that investors price securities on the basis of
15 long-term expectations, including interest rates. Cost of capital estimates,
16 including CAPM estimates, are prospective (i.e. forward-looking) in nature and
17 must take into account current market expectations for the future. Dr. Woolridge
18 significantly understates his CAPM projections by using a risk-free rate that is
19 40 basis points (4.4% - 4.0% = 0.4%) lower than projected.

¹⁷ Morin, Exh. RAM-1T, at page 37 (Table 2).

1 **2. Dr. Woolridge Should Have Relied on Mean Estimates of**
2 **Value Line Betas Rather than on Median Estimates of Value**
3 **Line Betas**

4 **Q. Dr. Morin, do you agree with Dr. Woolridge's beta estimate in the CAPM**
5 **analysis?**

6 A. No, I do not. As discussed earlier, Dr. Woolridge should have relied on mean
7 estimates of Value Line betas rather than on median estimates.

8 **3. CAPM Market Risk Premium**

9 **Q. How does Dr. Woolridge estimate the market risk premium component of**
10 **the CAPM?**

11 A. In order to determine the market risk premium component of the CAPM,
12 Dr. Woolridge compiles a list of selected empirical studies of equity risk
13 premiums published in academic and trade publications. The average market risk
14 premium from all these studies is 4.66 percent.¹⁸ If the studies prior to 2010 are
15 discarded, the average market risk premium is 4.86 percent. Because several more
16 recent studies have noted an increase in the market risk premium, Dr. Woolridge
17 uses 5.50 percent as his final estimate of the market risk premium for his CAPM
18 analyses.

¹⁸ Woolridge, Exh. JRW-13, at page 5.

1 **Q. Were you able to replicate Dr. Woolridge's market risk premium of**
2 **5.50 percent?**

3 A. No. I was unable to replicate Dr. Woolridge's recommended market risk premium
4 of 5.50 percent. Moreover, Dr. Woolridge's market risk premium estimate of
5 5.5 percent is too low, especially following the unprecedented financial crisis of
6 2008-2009 and the upward repricing of risk by investors as a result of the crisis
7 noted by the more recent studies cited by Dr. Woolridge.¹⁹ Finally, this estimate is
8 somewhat removed from the conventional wisdom on the subject.

9 **Q. What is the prevalent academic consensus on the magnitude of the market**
10 **risk premium?**

11 A. In their widely-used authoritative textbook, following a comprehensive review of
12 the rich and fertile market risk premium literature, Richard Brealey, Stewart
13 Myers, and Franklin Allen state as follows:

14 Brealey, Myers, and Allen have no official position on the issue,
15 but we believe that a range of 5 to 8 percent is reasonable for the
16 risk premium in the United States.²⁰

17 My own survey of the market risk premium literature is also quite consistent with
18 this range.²¹

¹⁹ Woolridge, Exh. JRW-1T, at page 51, lines 16-17.

²⁰ Richard A. Brealey, *et al.*, *Principles of Corporate Finance*, at page 180 (9th ed. 2008).

²¹ See Roger A. Morin, *The New Regulatory Finance*, at chapter 5 (2006).

1 **Q. What is fundamentally wrong with Dr. Woolridge's market risk premium**
2 **estimate of 5.5 percent?**

3 A. The fundamental flaw of a market risk premium estimate of 5.5 percent is that it is
4 based on a summary of historical results from a selected variety of academic and
5 trade studies based on an entirely different set of capital market conditions. Those
6 capital market conditions are not representative of current market conditions or of
7 what is likely to occur prospectively, especially following the unprecedented
8 financial crisis of 2008-2009 and the unstable world economy situation.

9 **Q. Does Dr. Woolridge's market risk premium estimate of 5.5 percent contain**
10 **other infirmities?**

11 A. Yes. In addition to ignoring current or prospective market conditions,
12 Dr. Woolridge's market risk premium estimate of 5.5 percent contains several
13 other infirmities. First, several market risk premium studies imply considerably
14 larger estimates that are not reported by Dr. Woolridge. Second, many of the
15 historical studies selected by Dr. Woolridge rely on geometric average returns
16 rather than arithmetic average returns. Third, many of the historical studies
17 selected by Dr. Woolridge rely on the total return component of bond returns
18 rather than on the income component. Fourth, Dr. Woolridge's market risk
19 premium estimate of 5.5 percent is inconsistent with the market risk premiums
20 implied in regulatory decisions. I shall now discuss each of these flaws in turn.

1 **a. Dr. Woolridge Selectively Cites to Academic Studies in**
2 **an Attempt to Justify His Unreasonably Low Market**
3 **Risk Premium of 5.5 Percent**

4 **Q. Are there studies of market risk premiums that imply considerably larger**
5 **estimates Dr. Woolridge either misrepresents or ignores?**

6 A. Yes. Several studies suggest market risk premiums in the range between 6 and
7 8 percent and much higher than Dr. Woolridge's recommended market risk
8 premium of 5.5 percent.

9 Dr. Woolridge cites a 2006 study by Elroy Dimson, Paul Marsh, and Mike
10 Staunton.²² These authors report returns over the period 1900 to 2005 for twelve
11 countries, representing 90 percent of today's world market capitalization. They
12 report (i) an average risk premium over long-term bond returns of 6.5 percent for
13 the U.S. and (ii) the market risk premium was generally higher for the second half
14 of the 20th Century than for the first half of the 20th Century. For example, the
15 market risk premium for the U.S. was 5.0 percent in the first half of the 20th
16 Century, and the market risk premium for the U.S. was 7.5 percent in the second
17 half of the 20th Century. The market risk premium of 7.5 percent for the U.S. in
18 the second half of the 20th Century is well in excess of the median historical
19 market risk premium of 5.14 percent reported by Dr. Woolridge.²³ Richard

²² Woolridge, Exh. JRW-13, at page 5 (citing Elroy Dimson, *et al.*, Risk and Return in the 20th and 21st centuries," *Business Strategy Review* 11(2): 1-18 (2000)).

²³ Woolridge, Exh. JRW-13, at page 5.

1 Brealey, Stewart Myers, and Franklin Allen updated the Dimson study and found
2 an average market risk premium of 6.5 percent for the U.S.²⁴

3 Another study of market risk premiums not mentioned by Dr. Woolridge was
4 published by Rajnish Mehra, which concludes that the market risk premium over
5 the 1889-2000 period is likely to be similar to its historical estimate of between
6 6.0 and 8.0 percent.²⁵ The Mehra study predated the unprecedented 2008-2009
7 financial crisis, which has undoubtedly increased the market risk premium.

8 Another study not cited by Dr. Woolridge measured the market risk premium by
9 subtracting the risk-free rate from the expected future long-term returns on the
10 overall equity market. This study by Robert Harris and Felicia Marston²⁶ resulted
11 in a market risk premium of 6.5 percent, which is reasonably close to the market
12 risk premium of 7.0 percent used in my testimony and far removed from
13 Dr. Woolridge's market risk premium of 5.5 percent.

14 Yet another study by George Constantinides²⁷ presented in his presidential
15 address to the American Finance Association in 2001 found market risk premium
16 estimates of 8.0 percent over the 1926-2000 period and 6.0 percent over the 1951-
17 2000 period. Again, these estimates predate the unprecedented 2008-2009
18 financial crisis, which has undoubtedly increased the market risk premium.

²⁴ Richard A. Brealey, *et al.*, *Principles of Corporate Finance* (9th ed. 2006).

²⁵ Rajnish Mehra, "The Equity Risk Premium: Why Is It a Puzzle?" 59 *Financial Analysts' Journal* 54-69 (2003).

²⁶ Robert S. Harris & Felicia C. Marston, "Estimating Shareholder Risk Premia Using Analysts' Growth Forecasts," 21 *Financial Management* 63-70 (1992).

²⁷ George M. Constantinides, "Rational Asset Prices," 57 *Journal of Finance* 1567-91 (2002).

1 If there is any bias in the earnings growth estimates provided by sell-side security
2 analysts (a topic addressed later in this testimony), the use of independent
3 analysts, such as widely known Value Line, can give an unbiased estimate of
4 expected market returns and ultimately the expected market risk premium. Each
5 week, Value Line publishes the dividend yield for the 1,700 stocks that it follows.
6 It also estimates the three- to five-year appreciation potential of a portfolio
7 containing all of these stocks. As of July 2017, Value Line is expecting an
8 average annual appreciation of 7.7 percent for its universe of 1,700 stocks.
9 Adding the average dividend yield of 2.0 percent to the growth estimate of
10 7.7 percent yields a total annual estimated return of 9.7 percent. Subtracting the
11 current long-term U.S. Treasury 30-year bond rate of about 3.0 percent would
12 yield an expected market risk premium of 6.7 percent, which is within a
13 reasonable range of market risk premium of 7.0 percent used in my testimony and
14 well above Dr. Woolridge's market risk premium estimate of 5.5 percent. This
15 approach was not discussed by Dr. Woolridge.

16 Finally, a study by Steven Kaplan and Richard Ruback²⁸ based on investment
17 studies of companies involved in management buyouts and leveraged
18 recapitalization found a median market risk premium estimate of 7.8 percent
19 based on a careful analysis of actual major investment decisions rather than on
20 realized market returns. This estimate again far exceeds Dr. Woolridge's market
21 risk premium estimate of 5.5 percent.

²⁸ Steven N. Kaplan & Richard S. Ruback, "The Valuation of Cash Flow Forecasts: An Empirical Analysis," *50 Journal of Finance* 1059-93 (1995).

1 **Q. Can you comment on the study by Rajnish Mehra and Edward Prescott**
2 **study cited by Dr. Woolridge?**

3 A. Yes. Dr. Woolridge refers to a “famous” study by Rajnish Mehra and Edward
4 Prescott in which the authors first questioned the magnitude of historic equity risk
5 premiums relative to fundamentals.²⁹ Dr. Woolridge, however, fails to
6 acknowledge a more recent study by the same authors that squarely contradicts
7 Dr. Woolridge’s view that historical market risk premiums are unrepresentative
8 and somehow irrelevant:

9 Even if the conditional equity premium given current market
10 conditions is small, and there appears to be general consensus that
11 it is, this in itself does not imply that it was obvious either that the
12 historical premium was too high or that the equity premium has
13 diminished.

14 In the absence of this [knowledge of the future], and based on
15 what we currently know, we can make the following claim: over
16 the long horizon the equity premium is likely to be similar to
17 what it has been in the past and the returns to investment in
18 equity will continue to substantially dominate that in T -bills for
19 investors with a long planning horizon.³⁰

20 Dr. Woolridge should heed these authors’ more recent advice on the magnitude of
21 the market risk premium, which is likely to be similar to historical averages in the
22 range of 6.0 and 7.0 percent.

²⁹ Woolridge, Exh. JRW-1T, at page 49, lines 4-7 (referring to Rajnish Mehra & Edward C. Prescott, “The Equity Premium: A Puzzle,” 15 *Journal of Monetary Economics* 145-161 (1985)).

³⁰ Rajnish Mehra & Edward C. Prescott (2003), “The Equity Premium in Retrospect,” in George M. Constantinides, *et al.* (eds.), *Handbook of the Economics of Finance*, 926 (2003).

1 **Q. Do you have any comment on the historical studies cited by Dr. Woolridge?**

2 A. Yes. Dr. Woolridge cites several studies based on very long time data series,³¹
3 including historical data prior to 1900, some even dating back to 1872.³² An
4 obvious question is whether data on capital market behavior from the
5 19th Century is relevant for estimating return in the 21st Century. The major
6 concern with data for a period beginning in 1872 is the reliability of the data. The
7 stock market of the 1800s was severely limited, embryonic in scope, with very
8 few issues trading, and few industries represented. Dividend data were
9 unavailable over most of this early period and stock prices were based on wide
10 bid-ask spreads rather than on actual transaction prices. The difficulties inherent
11 in stock market data prior to the Great Depression are discussed in an article by
12 G. William Schwert.³³

13 **Q. Can you comment on the survey-based techniques used to quantify the**
14 **market risk premium?**

15 A. Surveys of academics and investment professionals, for example the Welch
16 survey cited by Dr. Woolridge,³⁴ provide another technique of estimating the
17 market risk premium. Although this technique has the benefit of being forward-

³¹ Woolridge, Exh. JRW-13, at page 5.

³² See, e.g., Ivo Welch & Amit Goyal, "A Comprehensive Look at The Empirical Performance of Equity Premium Prediction," 21 *Review of Financial Studies* 1455-1508 (2008).

³³ G. William Schwert, "Indexes of U.S. Stock Prices from 1802 to 1987," 63 *Journal of Business* 399-426 (1990).

³⁴ Woolridge, Exh. JRW-13, at page 5 (citing Ivo Welch, "The Consensus Estimate for the Equity Premium by Academic Financial Economists in December 2007" (2008), available at <http://ssrn.com/abstract=1084918>).

1 looking, it is subject to the well-known shortcomings of survey techniques. There
2 are several reasons to place little weight on survey results relative to the results
3 from other approaches. First, return definitions and risk premium definitions
4 differ widely. Second, survey responses are subject to bias. Third, subjective
5 assessments about long-term market behavior may well place undue weight on
6 recent events and immediate prospects. Fourth, the results of such surveys are
7 notoriously volatile from year to year.

8 **b. Dr. Woolridge's Market Risk Premium Estimate of**
9 **5.5 Percent Inappropriately Relies on Geometric Mean**
10 **Market Risk Premiums**

11 **Q. Is it appropriate to use geometric averages in measuring historical market**
12 **risk premium?**

13 A. No. It is inappropriate to use geometric averages in measuring historical market
14 risk premium. Amidst the myriad studies cited by Dr. Woolridge,³⁵ some studies
15 report arithmetic mean returns over a given period, and some studies rely on
16 geometric mean returns over that same period. Only arithmetic means are
17 appropriate for forecasting and estimating the cost of capital, while geometric
18 means are not.³⁶ Indeed, the Duff & Phelps publications alluded to by

³⁵ Woolridge, Exh. JRW-13, at page 5.

³⁶ See Roger A. Morin, *The New Regulatory Finance*, chapter 4 (2006); Richard A. Brealey, *et al.*, *Principles of Corporate Finance* (9th ed. 2008).

1 Dr. Woolridge's testimony³⁷ contain a detailed and rigorous discussion of the
2 impropriety of using geometric averages in estimating the cost of capital.

3 There is no theoretical or empirical justification for the use of geometric mean
4 rates of return. Briefly, the disparity between the arithmetic average return and the
5 geometric average return raises the question as to what purposes should these
6 different return measures be used. The answer is that the geometric average return
7 should be used for measuring historical returns that are compounded over
8 multiple time periods. The arithmetic average return should be used for future-
9 oriented analysis, where the use of expected values is appropriate. It is
10 inappropriate to average the arithmetic and geometric average return; they
11 measure different quantities in different ways.³⁸

12 **Q. What is the effect of Dr. Woolridge's reference to the geometric mean**
13 **market risk premium instead of the arithmetic mean market risk premium?**

14 A. Several of the market risk premium studies referenced by Dr. Woolridge³⁹ report
15 the geometric mean market risk premium rather than the arithmetic mean market
16 risk premium, thus significantly understating the market risk premium by some
17 150 basis points (i.e., 1.50 percent). The 150 basis points is the historical

³⁷ Woolridge, Exh. JRW-1T, at page 48, footnote 36 (citing Roger Ibbotson, *et al*, Duff & Phelps, *2016 SBBI Yearbook Stocks, Bonds, Bills, and Inflation* (Sept. 6, 2016)).

³⁸ Please see Roger A. Morin, *The New Regulatory Finance*, at chapter 4 (2006) for a complete discussion regarding the theoretical underpinnings, empirical validation, and the consensus of academics on why geometric means are inappropriate for forecasting and estimating the cost of capital.

³⁹ Woolridge, Exh. JRW-13, at page 5, column G.

1 difference between the geometric and arithmetic mean typically reported in
2 historical studies, for example in the aforementioned Duff & Phelps Valuation
3 Yearbooks.

4 Since at least half of the studies rely on geometric means, the net impact is that
5 Dr. Woolridge has understated the market risk premium by 75 basis points
6 (i.e., 0.75 percent) from these studies. In other words, Dr. Woolridge's market
7 risk premium of 5.50 percent is understated by 75 basis points from this
8 correction alone and becomes 6.25 percent instead of 5.50 percent. The impact on
9 PSE's cost of equity CAPM estimate is 53 basis points (0.53 percent) using
10 Dr. Woolridge's average beta for his three groups of utilities of 0.70:

$$\beta_{PSE} \times (\text{Arithmetic Mean} - \text{Geometric Mean})$$

$$0.70 \times (6.25\% - 5.50\%) = 0.70 \times 0.75\% = 0.53\%.$$

13 **Q. Is Dr. Woolridge correct that arithmetic mean returns are biased and should**
14 **be disregarded?**

15 A. No. Dr. Woolridge erroneously argues that arithmetic mean return measures are
16 biased and should be disregarded.⁴⁰ Dr. Woolridge's arguments reflect a
17 fundamental misunderstanding of how geometric and arithmetic means are used
18 in financial analysis. Geometric means are properly used in evaluating historic
19 performance of stocks or portfolios of stocks, whereas determining investor

⁴⁰ Woolridge, Exh. JRW-1T, at page 67, line 15, through page 69, line 28.

1 expectations, which define the cost of equity capital, requires use of arithmetic
2 means.⁴¹

3 **Q. Please explain how the issue of what is the proper “mean” arises in the**
4 **context of analyzing the cost of equity.**

5 A. The issue arises in applying methods that derive estimates of a utility’s cost of
6 equity from historical relationships between bond yields and earned returns on
7 equity for individual companies or portfolios of several companies. Those
8 methods produce series of numbers representing the annual difference between
9 bond yields and stock returns over long historical periods. The question is how to
10 translate those series into a single number which can be added to a current bond
11 yield to estimate the current cost of equity for a stock or a portfolio. Calculating
12 geometric and arithmetic means are two ways of converting series of numbers to a
13 single, representative figure.

14 **Q. If both are “representative” of the series, what is the difference between the**
15 **two?**

16 A. Each represents different information about the series. The geometric mean of a
17 series of numbers is the value which, if compounded over the period examined,
18 would have made the starting value to grow to the ending value. The arithmetic
19 mean is simply the average of the numbers in the series. Where there is any

⁴¹ Please see Roger A. Morin, *The New Regulatory Finance*, at chapter 4 (2006), which explains this issue in detail, provides illustrative mathematical examples, and cites authoritative financial texts, all of which confirm the need to use arithmetic means, and not geometric means, to properly estimate a utility’s return on equity.

1 annual variation (volatility) in a series of numbers, the arithmetic mean of the
2 series, which reflects volatility, will always exceed the geometric mean, which
3 ignores volatility. Because investors require higher expected returns to invest in a
4 company whose earnings are volatile than one whose earnings are stable, the
5 geometric mean is not useful in estimating the expected rate of return which
6 investors require to make an investment. My direct testimony provided a
7 numerical example to illustrate the difference between geometric and arithmetic
8 means.⁴²

9 The following table compares the geometric and arithmetic mean returns of a
10 hypothetical Stock A, whose yearly returns over a ten-year period are very
11 volatile, with those of a hypothetical Stock B, whose yearly returns are perfectly
12 stable during that period. Consistent with the point that geometric returns ignore
13 volatility, the geometric mean returns for the two series are identical (11.6 percent
14 in both cases), whereas the arithmetic mean return of the volatile stock
15 (26.7 percent) is much higher than the arithmetic mean return of the stable stock
16 (11.6 percent):

⁴² Morin, Exh. RAM-1T, at page 43, line 13, through page 45, line 3.

Table 4. Geometric vs. Arithmetic returns

| Year | Stock A | Stock B |
|-----------------------------------|----------------|----------------|
| 2002 | 50.0% | 11.6% |
| 2003 | -54.7% | 11.6% |
| 2004 | 98.5% | 11.6% |
| 2005 | 42.2% | 11.6% |
| 2006 | -32.3% | 11.6% |
| 2007 | -39.2% | 11.6% |
| 2008 | 153.2% | 11.6% |
| 2009 | -10.0% | 11.6% |
| 2010 | 38.9% | 11.6% |
| 2011 | 20.0% | 11.6% |
| Arithmetic Mean Return | 26.7% | 11.6% |
| Geometric Mean Return | 11.6% | 11.6% |

1 If Dr. Woolridge were correct in arguing for the use of geometric means,
2 investors would require the same expected return to invest in both of these stocks,
3 even though the volatility of returns in Stock A is very high while Stock B
4 exhibits perfectly stable returns. That is clearly contrary to the most basic
5 financial theory, that is, the higher the risk the higher the expected return.

1 **Q. Does Dr. Woolridge provide an example that attempts to show that geometric**
2 **means accurately compute the return that an investor might realize from**
3 **investing in a volatile portfolio?**

4 A. Yes. Dr. Woolridge offers a numerical example aimed at justifying the use of the
5 geometric mean.⁴³ As demonstrated below, Dr. Woolridge's numerical example
6 fails miserably.

7 Dr. Woolridge's example posits a scenario where the return on a portfolio
8 declines by 50 percent in one year and doubles the next. The investor in that
9 portfolio will realize a return equal to the geometric mean of the two returns (i.e.,
10 zero percent). However, that example addresses achieved returns, not expected
11 returns. Based on experience, an investor may expect returns to vary between -
12 50 percent and +100 percent but will be uncertain in any future year what the
13 outcome will be. Assuming a 50 percent chance of either outcome, the investor's
14 expected return in any single year will be the arithmetic mean, or average, of the
15 two possible outcomes (i.e., 25 percent $((-50\% + 100\%) \div 2)$). Thus, the required
16 expected return, or return on equity, is equal to the arithmetic mean return of
17 25 percent, even though, in hindsight, the achieved return could turn out to be
18 zero percent. Stated in everyday practical terms, it seems unlikely that an investor
19 viewing the volatile returns on an investment of -50 percent in year one and
20 +100 percent in year two would conclude that the expected return in year three is
21 zero as Dr. Woolridge would suggest.

⁴³ Woolridge, Exh. JRW-1T, at page 68, lines 5-15.

1 **d. Regulatory Decisions**

2 **Q. Is Dr. Woolridge's market risk premium estimate of 5.5 percent consistent**
3 **with regulatory decisions of state utility commissions?**

4 A. No. Dr. Woolridge's market risk premium estimate of 5.5 percent is inconsistent
5 with regulatory decisions of state utility commissions. It is useful to examine the
6 market risk premium estimates implicit in allowed returns on equity implicit in
7 decisions by state utility commissions. The CAPM framework can be used to
8 quantify the market risk premium implicit in the allowed returns on equity.
9 According to the CAPM, the risk premium is equal to beta times the market risk
10 premium:

11
$$\text{Risk Premium} = \beta \times (R_M - R_F)$$

12
$$\text{Risk Premium} = \beta \times \text{Market Risk Premium}$$

13 Solving for Market Risk Premium, we obtain:

14
$$\text{Market Risk Premium} = \text{Risk Premium} \div \beta$$

15 I have examined the market risk premiums implied in several hundred regulatory
16 decisions for electric utilities in the United States over the period 1986-2015.

17 Using one were to use an average allowed risk premium of 5.6 percent in these
18 decisions and a beta of 0.70 for electric utilities, the implied market risk premium
19 is 8.0 percent (i.e., $5.6\% \div 0.70 = 8.0\%$), again a long way from Dr. Woolridge's
20 market risk premium of 5.5 percent.

1 **Q. What can the Commission conclude from Dr. Woolridge's market risk**
2 **premium estimate of 5.5 percent?**

3 A. The Commission can conclude that Dr. Woolridge's market risk premium
4 estimate of 5.5 percent is understated, relies in part on technical errors, and is
5 inconsistent with regulatory decisions. All in all, I echo the official position of
6 Richard Brealey, Stewart Myers, and Franklin Allen that a market risk premium
7 in the range of 5.0 percent and 8.0 percent is reasonable for the market risk
8 premium in the United States, with the upper end of the range highly likely at this
9 time, as Dr. Woolridge himself points out.

10 **4. Dr. Woolridge Erroneously Relies Exclusively on the Plain**
11 **Vanilla Version of the CAPM**

12 **Q. Do you agree with Dr. Woolridge's exclusive use of plain vanilla version of**
13 **the CAPM to estimate returns on equity?**

14 A. No. The plain vanilla version of the CAPM should be supplemented by the more
15 refined version of the CAPM in estimating returns on equity. There have been
16 countless empirical tests of the CAPM to determine to what extent security
17 returns and betas are related in the manner predicted by the CAPM. The results of
18 the tests support the idea that beta is related to security returns, that the risk-return
19 tradeoff is positive, and that the relationship is linear. The contradictory finding is
20 that the risk-return tradeoff is not as steeply sloped as the predicted CAPM. That
21 is, low-beta securities earn returns somewhat higher than the CAPM would
22 predict, and high-beta securities earn less than predicted. In other words, a
23 CAPM-based estimate of the cost of capital underestimates the return required

1 from low-beta securities and overstates the return from high-beta securities, based
2 on the empirical evidence.

3 The empirical form of the CAPM that I used in my direct testimony refines the
4 standard form of the CAPM to account for this phenomenon. As discussed in the
5 Seventh Exhibit to the Prefiled Direct Testimony of Dr. Roger A. Morin,
6 Exh. RAM-8, my own empirical investigation of the relationship between return
7 and Value Line adjusted betas is quite consistent with the general findings of the
8 literature.

9 The downward-bias inherent in the CAPM is particularly significant for low-beta
10 securities, such as the three groups of utilities used by Dr. Woolridge.

11 Dr. Woolridge's CAPM estimates of equity costs are understated by about
12 50 basis points (i.e., 0.5 percent) from this bias alone.

13 **D. Dr. Woolridge's Criticisms of My Direct Testimony are Unfounded,**
14 **are Without Merit, and Should be Ignored by the Commission**

15 **1. Dr. Woolridge's Denunciation of Analysts' Growth Forecasts**
16 **as Unreasonable Proxies for the DCF Growth Rate is Without**
17 **Foundation and is Inconsistent with the Empirical Finance**
18 **Literature on the Subject**

19 **Q. Please comment on Dr. Woolridge's criticism of your DCF analysis.**

20 A. Dr. Woolridge criticizes the use of the analysts' earnings growth forecast as a
21 proxy for the growth component and claims that my DCF analyses have ignored

1 historical and projected growth rates in dividends and book value.⁴⁵

2 Dr. Woolridge argues as follows:

3 It is highly unlikely that investors today would rely exclusively on
4 the EPS growth rate forecasts of Wall Street analysts and ignore
5 other growth rate measures in arriving at their expected growth
6 rates for equity investments.⁴⁶

7 Yet, that is exactly what Dr. Woolridge appears to do in adopting growth rates of
8 5.25 percent for the electric proxy group, 5.5 percent for the Morin proxy group,
9 and 6.0 percent for the gas proxy group. I find Dr. Woolridge's criticism
10 surprising, given that he himself ends up relying almost exclusively on Value
11 Line forecasts and analysts' growth forecasts contained in the Yahoo, Reuters,
12 and Zacks Web sites. Dr. Woolridge also relies on Value Line forecasts in his
13 sustainable growth approach to specifying the growth component of the DCF
14 model. Dr. Woolridge cannot have it both ways with the use of forecasts.

15 This rebuttal testimony has previously discussed the impropriety of relying on
16 dividend growth because of the paucity of such forecasts, and I do not repeat that
17 discussion here. Similarly, my direct testimony discussed the merits of using
18 consensus analysts' earnings growth forecasts in the DCF model and the
19 supportive empirical literature,⁴⁷ and I do not repeat that discussion here.

⁴⁵ Woolridge, Exh. JRW-1T, at page 63, line 10, through page 64, line 8.

⁴⁶ Woolridge, Exh. JRW-1T, at page 63, lines 15-17.

⁴⁷ See, e.g., Morin, Exh. RAM-1T, at page 22, lines 1-20.

1 **Q. What does the published academic literature say on the subject of analysts’**
2 **growth rate forecasts in the DCF model?**

3 A. Published studies in the academic literature demonstrate that (i) analysts’ growth
4 rate forecasts are reasonable indicators of investor expectations and (ii) investors
5 rely on such forecasts.

6 **Q. How do you respond to Dr. Woolridge’s criticisms that your DCF analysis**
7 **because it relies on overly-optimistic earnings growth projections?**

8 A. Dr. Woolridge erroneously denounces the use of financial analysts’ earnings
9 forecasts on the grounds that such forecasts are overly-optimistic.⁴⁸ Using
10 virtually all publicly available analyst earnings forecasts for a large sample of
11 companies (over 23,000 individual forecasts by 100 analyst firms), Thomas Lys
12 and Sungkyu Sohn show that stock returns respond to individual analyst earnings
13 forecasts, even when they are closely preceded by earnings forecasts made by
14 other analysts or by corporate accounting disclosures.⁴⁹ Using actual and IBES
15 data from 1982 - 1995, John Easterwood and Stacey Nutt regressed the analysts’
16 forecast errors against either historical earnings changes or analysts’ forecasting

⁴⁸ Woolridge, Exh. JRW-1T, at page 39, lines 13-17, and at page 64, lines 2-8.

⁴⁹ Thomas Lys & Sungkyu Sohn, “The Association between Revisions of Financial Analysts’ Earnings Forecasts and Security-Price Changes,” 13 *Journal of Accounting and Economics* 341-63 (1990).

1 errors in the prior years. Results show that analysts tend to under-react to negative
2 earnings information, but overreact to positive earnings information.⁵⁰

3 More recent studies provide evidence that analysts make biased forecasts and
4 misinterpret the impact of new information. For example, several studies in the
5 early 1990s suggest that analysts either systematically underreact or overreact to
6 new information. Easterwood and Nutt discriminate between these different
7 reactions and reported that analysts underreact to negative information, but
8 overreact to positive information.⁵¹

9 The recent studies do not necessarily contradict the earlier literature. The earlier
10 research focused on whether analysts' earnings forecasts are better at forecasting
11 future earnings than historical averages, whereas the recent literature investigates
12 whether the analysts' earnings forecasts are unbiased estimates of future earnings.

13 One way to assess the concern that analysts' forecasts may be biased upward is to
14 incorporate into the analysis the growth forecasts of independent research firms,
15 such as Value Line, in addition to the analyst consensus forecast. Unlike
16 investment banking firms and stock brokerage firms, independent research firms
17 such as Value Line have no incentive to distort earnings growth estimates in order
18 to bolster interest in common stocks.

⁵⁰ John C. Easterwood & Stacey R. Nutt, "Inefficiency in Analysts' Earnings Forecasts: Systematic Misreaction or Systematic Optimism?" *54 Journal of Finance* 1777-97 (1999).

⁵¹ *Id.*

1 Dr. Woolridge argues that analysts tend to forecast earnings growth rates that exceed
2 those actually achieved and that this optimism biases the DCF results upward.⁵² The
3 magnitude of the optimism bias for large rate-regulated companies in stable
4 segments of an industry is likely to be very small. Empirically, the severity of the
5 optimism problem is unclear for regulated utilities, if a problem exists at all. It is
6 interesting to note that Value Line forecasts for utility companies made by
7 independent analysts with no incentive for over- or understating growth forecasts are
8 not materially different from those published by analysts in security firms with
9 incentives not based on forecast accuracy, and may in fact be more robust.

10 **Q. Is there any empirical evidence documenting the importance of earnings in**
11 **evaluating investors' expectations in the investment community?**

12 A. There is an abundance of evidence attesting to the importance of earnings in
13 assessing investors' expectations. First, the sheer volume of earnings forecasts
14 available from the investment community relative to the scarcity of dividend
15 forecasts attests to their importance. To illustrate, Value Line, Zacks Investment,
16 First Call Thompson, Reuters, Yahoo Finance, and Multex provide
17 comprehensive compilations of investors' earnings forecasts, to name some. The
18 fact that these investment information providers focus on growth in earnings
19 rather than growth in dividends indicates that the investment community regards
20 earnings growth as a superior indicator of future long-term growth. Second, Value

⁵² Woolridge, Exh. JRW-1T, at page 39, lines 13-17, and at page 64, lines 2-8.

1 Line's principal investment rating assigned to individual stocks, Timeliness Rank,
2 is based primarily on earnings, accounting for 65 percent of the ranking.

3 Dr. Woolridge also laments the fact that I did not rely on dividend growth
4 forecasts. The reason is that as a practical matter, while there is an abundance of
5 earnings growth forecasts, there are very few forecasts of dividend growth.
6 Moreover, earnings growth provides a more meaningful guide to investors' long-
7 term growth expectations. Indeed, it is growth in earnings that will support future
8 dividends and share prices.

9 **Q. Please discuss the use of analysts' forecasts in applying the DCF model to**
10 **utilities.**

11 A. The best proxy for the growth component of the DCF model is analysts' long-
12 term earnings growth forecasts. These forecasts are made by large reputable
13 organizations, and the data are readily available to investors and are representative
14 of the consensus view of investors.

15 Published studies in the academic literature demonstrate that growth forecasts
16 made by security analysts are reasonable indicators of investor expectations, and
17 that investors rely on analysts' forecasts. John Cragg and Burton Malkiel present
18 detailed empirical evidence that the average analysts' expectation is more similar
19 to expectations being reflected in the marketplace than are historical growth rates
20 and represents the best possible source of DCF growth rates. Cragg and Malkiel
21 show that historical growth rates do not contain any information that is not

1 already impounded in analysts' growth forecasts.⁵³ A study by James Vander
2 Weide and Willard Carleton confirms the superiority of analysts' forecasts over
3 historical growth extrapolations.⁵⁴ A study by Stephen Timme and Peter Eiseman
4 produced similar results.⁵⁵

5 **Q. What can the Commission conclude from Dr. Woolridge's denunciation of**
6 **analysts' growth forecasts?**

7 A. Dr. Woolridge's denunciation of analysts' growth forecasts as unreasonable
8 proxies for the DCF growth rate is without foundation and is inconsistent with the
9 empirical finance literature on the subject. It is paradoxical that Dr. Woolridge
10 employs analysts' earnings forecasts from the Yahoo, Reuters, and Zacks
11 websites for three of his thirteen growth proxies for the DCF growth rate⁵⁶ and
12 again relies on analysts' forecasts in his implementation of the "building block"
13 approach to estimate the market risk premium in a CAPM analysis,⁵⁷ yet criticizes
14 my use of earnings growth forecast from similar sources. Furthermore, as
15 previously discussed, it is ironic that Dr. Woolridge ends up selecting growth
16 rates for his proxy groups that are close to analyst growth forecasts in his final

⁵³ John G. Cragg & Burton G. Malkiel, *Expectations and the Structure of Share Prices* (1982)

⁵⁴ James H. Vander Weide & Willard T. Carleton, "Investor Growth Expectations: Analysts vs. History," 14 *Journal of Portfolio Management* 78-82 (1988).

⁵⁵ Stephen G. Timme & Peter C. Eisemann, "On the Use of Consensus Forecasts of Growth in the Constant Growth Model: The Case of Electric Utilities," 18 *Financial Management* 23-35 (1989).

⁵⁶ See Woolridge, Exh. JRW-13, at page 5.

⁵⁷ See Woolridge, Exh. JRW-1T, at page 50, lines 12-16; see also Woolridge, Exh. JRW-13, at page 5.

1 choice of DCF growth rates. Dr. Woolridge does not explain this inconsistency in
2 his approach.

3 **2. Contrary to the Erroneous Assertions of Dr. Woolridge, the**
4 **Empirical CAPM Has Been Theoretically and Empirically**
5 **Validated Refereed Journals**

6 **Q. Please comment on Dr. Woolridge’s assessment of the empirical CAPM**
7 **presented in your direct testimony.**

8 A. Dr. Woolridge argues that the empirical CAPM “has not been theoretically or
9 empirically validated in any refereed journals.”⁵⁸ One of the most well-known
10 results in finance and discussed in most finance textbooks is that the CAPM-based
11 estimate of cost of capital underestimates the return required from low-beta
12 securities and overstates the return required from high-beta securities, based on
13 the empirical evidence. The empirical CAPM adjusts for this tendency, as
14 discussed in the Seventh Exhibit to the Prefiled Direct Testimony of Dr. Roger A.
15 Morin, Exh. RAM-8.

16 My own empirical investigation of the relationship between return and Value Line
17 adjusted betas is quite consistent with the general findings of the literature
18 referred to in the Seventh Exhibit to the Prefiled Direct Testimony of
19 Dr. Roger A. Morin, Exh. RAM-8. A plain vanilla CAPM will understate the
20 return required for low-beta securities and overstate the return required for high-

⁵⁸ Woolridge, Exh. JRW-1T, at page 65, lines 9-10.

1 beta securities. The empirical CAPM refines the plain vanilla CAPM to account
2 for this phenomenon.

3 **3. Dr. Woolridge Incorrectly Asserts that Little Weight Should be**
4 **Placed on Interest Rate Forecasts in Projecting the Risk-Free**
5 **Rate for CAPM Analyses**

6 **Q. Is Dr. Woolridge correct that little weight should be placed on interest rate**
7 **forecasts in projecting the risk-free rate for CAPM analyses?**

8 A. No. Dr. Woolridge erroneously argues that investors place little weight on interest
9 rate forecasts because they are often wrong, and therefore should not be used as
10 proxies for the risk-free rate in implementing the CAPM. Dr. Woolridge does not
11 offer any supportive evidence for that statement. I have three reactions to this
12 point of view.

13 First, on page 46 lines 8-9 of his testimony, Dr. Woolridge himself contradicts his
14 position and recognizes the possibility of higher interest rates by using 4.0 percent
15 as the risk-free rate in his CAPM analysis which is significantly higher than the
16 current level of interest rates.

17 Second, investors' required returns can and do shift over time with changes in
18 capital market conditions, hence the importance of considering interest rate
19 forecasts. The fact that organizations such as Value Line, IHS (Global Insight),
20 and EIA devote considerable expertise and resources to developing an informed
21 view of the future, and the fact that investors are willing to purchase such
22 expensive services confirms the importance of economic/financial forecasts in the
23 minds of investors.

1 Third, the CAPM is a prospective (i.e., forward-looking) model, and the use of
2 projected long-term Treasury interest rates is entirely appropriate because
3 investors price securities on the basis of long-term expectations, including interest
4 rates. Capital cost estimates are forward-looking and must take into account
5 current market expectations for the future. In short, interest rate forecasts are
6 appropriate proxies for the risk-free rate in any risk premium analysis such as the
7 CAPM.

8 **4. Dr. Woolridge's Criticisms of My Market Risk Premium Are**
9 **Without Merit and Should be Disregarded**

10 **Q. Is Dr. Woolridge correct in arguing that the use of annual bond income**
11 **return is erroneous?**

12 A. No. Dr. Woolridge incorrectly argues that the use of annual bond income return is
13 erroneous.⁵⁹ The proper way to estimate the market risk premium from historical
14 data is to use the income return, not total returns, on government bonds. The
15 income return on government bonds is a more reliable estimate of the historical
16 market risk premium because the income component of total bond return (i.e., the
17 coupon rate) is a better estimate of expected return than the total return (i.e., the
18 coupon rate + capital gain). In other words, bond investors focus on income rather
19 than realized capital gains/losses.

20 Dr. Woolridge also argues on that there are myriad problems in relying on
21 historical returns, including the so-called survivorship bias, the arithmetic vs

⁵⁹ See Woolridge, Exh. JRW-1T, at page 66, lines 15-20.

1 geometric mean issue, and the time horizon issue.⁶⁰ I have previously addressed
2 the issue of the arithmetic vs geometric mean and demonstrated that only the
3 arithmetic mean is relevant when measuring the current cost of capital.

4 **Q. Is Dr. Woolridge correct that historical market risk premium studies are**
5 **upward-biased by the so-called “survivorship bias”?**

6 A. Dr. Woolridge argues that historical estimates are inappropriate because the stock
7 market index used in such studies includes only companies that have survived,
8 and as a result the average realized excess return is overestimated.⁶¹ However, a
9 study by Philippe Jorion and William Goetzmann not discussed by Dr. Woolridge
10 finds that the “survivorship bias” is only 29 basis points (i.e., 0.29 percent).⁶² A
11 more recent working paper by Elroy Dimson, Paul Marsh, and Mike Staunton find
12 a survivorship bias of only 10 basis points (i.e., 0.1 percent).⁶³

13 **Q. Is time horizon an issue when using historical return?**

14 A. No. Time horizon is not an issue when using historical return so long as long time
15 periods are used. Historical risk premium studies have been around for a long
16 time and are standard tools used in estimating market risk premiums. Duff &
17 Phelps have been tracking realized rates of return on various classes of securities

⁶⁰ See Woolridge, Exh. JRW-1T, at page 67, lines 1-13.

⁶¹ See Woolridge, Exh. JRW-1T, at page 67, lines 7-9.

⁶² Philippe Jorion & William N. Goetzmann, “Global Stock Markets in the Twentieth Century,” 54: *Journal of Finance* 953-80 (1999).

⁶³ Elroy Dimson, *et al.*, “The Worldwide Equity Premium: A Smaller Puzzle,” in Rajnish Mehra (ed.), *Handbook of the Equity Risk Premium* 467–514 (2008).

1 for many years, now including data over the period from 1926 to 2016. This long
2 period of time encompasses many different market economic circumstances
3 (expansions, depressions, recessions, war, prosperity, financial crises, etc.). As
4 stated in my book:

5 over long periods investor expectations and realizations converge.
6 Otherwise, investors would never commit investment capital.
7 Investors' expectations are eventually revised to match historical
8 realizations, as market prices adjust to bring anticipated and actual
9 investment results into conformity.⁶⁴

10 The long-term estimate of realized returns is therefore a plausible estimate of
11 expected future returns that is easily verifiable.

12 **Q. Did you rely on Duff & Phelps' estimate of the market risk premium?**

13 A. No. Dr. Woolridge correctly points out that I have not relied on Duff & Phelps's
14 in-house market risk premium recommendation of 5.5 percent.⁶⁵ Because Duff &
15 Phelps do not rely on historical studies of the market risk premium to arrive at
16 their in-house market risk premium recommendation, I have chosen instead to
17 rely on verifiable historical data rather than on speculative expected market risk
18 premium data.

⁶⁴ Roger A. Morin, *The New Regulatory Finance* 116 (2006)

⁶⁵ Woolridge, Exh. JRW-1T, at page 71, lines 7-13.

1 **5. Dr. Woolridge Incorrectly Argues that My Allowed Risk**
2 **Premium Study is a Gauge of Commission Behavior and Not**
3 **Investor Behavior**

4 **Q. Is Dr. Woolridge correct in arguing that your allowed risk premium study is**
5 **a gauge of commission behavior and not investor behavior?**

6 A. No. Dr. Woolridge is incorrect in arguing that my allowed risk premium study is a
7 gauge of commission behavior and not investor behavior.⁶⁶ This variation of the
8 risk premium approach is reasonable because allowed risk premiums are
9 presumably based on the results of market-based methodologies (DCF, CAPM,
10 Risk Premium, *etc.*) presented to regulators in rate hearings and on the actions of
11 objective unbiased investors in a competitive marketplace.

12 **6. Market-to-Book Ratios are Largely Irrelevant in Establishing**
13 **Rates of Regulated Utilities, and Dr. Woolridge's Views on the**
14 **Role of Market-to-Book Ratios in Regulation are Misguided**

15 **Q. Please discuss Dr. Woolridge's views on market-to-book (M/B) ratios.**

16 A. Dr. Woolridge's testimony variously argues that because current market-to-book
17 ratios for electric utilities tend to exceeds 1.0, allowed returns by regulators
18 exceed the cost of equity capital for utilities.⁶⁷ In other words, Dr. Woolridge is
19 implying that the state utility commissions should lower the allowed return on
20 equity so that the stock price will decline to book value.

⁶⁶ Woolridge, Exh. JRW-1T, at page 73, line 17, through page 75, line 3.

⁶⁷ Woolridge, Exh. JRW-1T, at page 26, line 6, through page 27, line 2; *see also id.* at page 74, line 20, through page 75, line 3.

1 I presume from these statements that Dr. Woolridge finds it desirable that stock
2 prices drop from the current market-to-book value in excess of 1.0 for most
3 electric and gas utilities, to the desired market-to-book ratio range of near 1.0.

4 There are several reasons why market-to-book ratios are largely irrelevant in
5 establishing rates of regulated utilities, and Dr. Woolridge's views on the role of
6 market-to-book ratios in regulation are misguided.

7 First, Dr. Woolridge's position implies that regulators should set a return on
8 equity to produce a market-to-book ratio of near 1.0. This is erroneous. The stock
9 price is set by the market, not by regulators. The market-to-book ratio is the *result*
10 of regulation, not its starting point. The regime of regulation envisioned by
11 Dr. Woolridge (i.e., that the regulator will set an allowed rate of return so as to
12 produce a market-to-book ratio of close to 1.0) presumes that investors commit
13 capital to a utility with a market-to-book in excess of 1.0, knowing full well that
14 they will be inflicted with a capital loss by regulators. Such behavior on the part
15 of investors is certainly not a realistic or accurate view of investment or
16 regulation.

17 Second, the traditional market-to-book ratio does not reflect the replacement cost
18 of a company's assets. Consistent with *Bluefield* and *Hope*, the fundamental goal
19 of regulation should be to set the expected economic profit for a public utility
20 equal to the level of profits expected to be earned by firms of comparable risk, in
21 short, to emulate the competitive result, so as to assure the firm's credit and to
22 attract needed capital. For unregulated firms, the natural forces of competition

1 will ensure that in the long-run the market value of these firm's securities equals
2 the replacement cost of their assets. This suggests that a fair and reasonable price
3 for a public utility's common stock is one that produces equality between the
4 market price of its common equity and the replacement cost of its physical assets.
5 The latter circumstance will not necessarily occur when the market-to-book ratio
6 is near 1.0. Only when the market value of the firm's common equity equals the
7 value of the firm's equity at replacement cost will equality hold.

8 In an inflationary period, the replacement cost of a firm's assets may increase
9 more rapidly than its book equity. To avoid the resulting economic confiscation of
10 shareholders' investment in real terms, the allowed rate of return should produce a
11 market-to-book ratio which provides a Q-ratio of 1 or a Q-ratio equal to that of
12 comparable firms.⁶⁸ It is quite likely that market-to-book ratios will exceed 1.0 if
13 inflation increases the replacement cost of a firm's assets at a faster pace than
14 book equity. This explains in part why utility market-to-book ratios have
15 remained well above 1.0 over the past two decades.

16 Stock prices above book value are common for utility stocks, and indeed for all of
17 the major market indexes. It is obvious that investors and regulators through their
18 rate case decisions do not subscribe to Dr. Woolridge's position that utilities that
19 have market prices above book value are over-earning. Otherwise, regulators

⁶⁸ The relationship between the market value of a firm's securities and the replacement cost of its assets is embodied in the Q-ratio. The Q-ratio is defined as the market value of a firm's securities divided by the replacement cost of its assets. If $Q > 1.0$, a firm has an incentive to invest because the value of the firm's securities exceeds the replacement cost of assets, that is, the firm's return on its investments exceeds its cost of capital. Conversely, if $Q < 1.0$, a firm has a disincentive to invest in new plant. In final long-run equilibrium, the Q-ratio is driven to 1.0.

1 would not grant rate increases for any utility whose stock price was above book
2 value, and investors would never bid up the price of stock above book value.

3 Finally, Dr. Woolridge's views on the role of market-to-book ratio are certainly
4 not corroborated by the historical facts. Utility market-to-book ratios have been
5 consistently above 1.0 for over three decades.

6 **E. Dr. Woolridge's Return on Equity Recommendation Should be**
7 **Treated with Extreme Caution by the Commission**

8 **Q. What return on equity does Dr. Woolridge recommend for PSE?**

9 A. Dr. Woolridge recommends a return on equity of only 8.85 percent for PSE.

10 **Q. What can the Commission conclude from Dr. Woolridge's testimony?**

11 A. In summary, there is a fatal Achilles heel in Dr. Woolridge's return on equity
12 recommendation. The DCF growth rates that constitute the crux of his return on
13 equity recommendation cannot be replicated, do not match his numerous growth
14 estimates, and are arbitrary. Therefore, Dr. Woolridge's return on equity
15 recommendation should be treated with extreme caution by the Commission.

16 **Q. What returns are investors expecting for Dr. Woolridge's proxy groups of**
17 **Utilities?**

18 A. Dr. Woolridge's own evidence demonstrates that investors are expecting an
19 average return on equity of 10.8 percent for the electric proxy group, an average

1 return on equity of 11.2 percent for the Morin Proxy group, and an average return
2 on equity of 10.3 percent for the gas proxy group.⁶⁹

3 **Q. What is the average allowed return on equity for Dr. Woolridge's proxy**
4 **group of electric utilities?**

5 A. As shown in Table 1 above, the average allowed return on equity for
6 Dr. Woolridge's proxy group of electric utilities is 10.0 percent.

7 **Q. What is the average allowed return on equity for electric utilities in recent**
8 **orders of state utility commissions?**

9 A. The average allowed return on equity for electric utilities in recent orders of state
10 utility commissions is 9.9 percent.

11 **Q. What is PSE's currently allowed return on equity?**

12 A. PSE's currently allowed return on equity is 9.8 percent.

13 **Q. What ROE do you recommend?**

14 A. I recommend a return on equity of 9.8 percent for PSE, the same return as is
15 currently authorized by the Commission.

16 **Q. Has Dr. Woolridge presented any arguments in his testimony that would**
17 **cause you to alter any of your recommendations and methodologies?**

18 A. No, he has not.

⁶⁹ See Woolridge, Exh. JRW-12, at page 4 (column with the heading "Return on Equity").

1 **Q. Please summarize your specific concerns with Mr. Parcell's testimony.**

2 A. Although I agree with several of Mr. Parcell's methodologies, I have the
3 following comments:

4 1. **Mr. Parcell understates dividend yield by using a spot dividend yield**

5 **inflated by one-half of the expected dividend growth.** Mr. Parcell's

6 dividend yield component is understated because it is not consistent with
7 the annual form of the DCF model. It is inappropriate to increase the

8 dividend yield by adding one-half of the future growth rate ($1 + \frac{1}{2}g$) to

9 the spot dividend yield. The appropriate manner of computing the

10 expected dividend yield when using the basic annual DCF model is to add

11 the full growth rate rather than one-half of the growth rate. This

12 adjustment also allows for the failure of the annual DCF model to allow

13 for the quarterly timing of dividend payments. As previously discussed in

14 Section II.B.1., this error understates the DCF results by some 10 basis

15 points (i.e., 0.1 percent).

16 2. **Mr. Parcell uses the retention growth method, a method that should**

17 **be given little, if any, weight.** The retention growth method for estimating

18 the growth component of the DCF calculation is suspect because one is

19 forced to assume the answer to implement the method. From Mr. Parcell's

20 own evidence, investors expect substantially higher returns for utilities

21 than what he recommends.

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3. **Mr. Parcell’s historical growth rates should be given little, if any weight.** Investors are expecting substantially higher growth rates than Mr. Parcell’s growth rates for the sample companies. Using analysts’ consensus growth forecasts increases the DCF estimate of the cost of common equity by 130 basis points (1.30 percent).
4. **Mr. Parcell’s CAPM results should be given very little, if any, weight.** CAPM results should be accorded little, if any, weight.
5. **Mr. Parcell’s risk-free rate proxy in his CAPM analysis is inappropriate.** Mr. Parcell should have relied on projected interest rates rather than on historical spot rates in selecting a risk-free rate proxy in his CAPM analysis. Yields on long-term Treasury securities are expected to increase. Using the appropriate risk-free rate, Mr. Parcell’s CAPM estimates must be raised by 20 basis points (i.e., 0.2 percent) for this correction alone.
6. **Mr. Parcell’s market risk premium of 5.8 percent understates the market risk premium.** There are conceptual blemishes in Mr. Parcell’s three market risk premium proxies.
7. **Unfounded criticisms.** Mr. Parcell’s criticisms of my direct testimony are unfounded.

1 **A. Mr. Parcell's DCF Results Should be Given Very Little, If Any,**
2 **Weight Because Mr. Parcell Has Relied on Erroneous Data Inputs**

3 **1. Mr. Parcell Understates Dividend Yield by Using a Spot**
4 **Dividend Yield Inflated By One-Half of the Expected Dividend**
5 **Growth**

6 **Q. Please discuss Mr. Parcell's dividend yield component in the DCF model.**

7 A. The annual DCF model states very clearly that the expected rate of return on a
8 stock is equal to the expected dividend at the end of the year divided by the
9 current price of the stock, plus the expected growth rate. Thus, the appropriate
10 dividend to use in a DCF model is the full prospective dividend to be received at
11 the end of the year. As discussed earlier in in Section II.B.1. of this rebuttal
12 testimony, Mr. Parcell's mathematical adjustment fails to measure the full
13 dividend flow expected by the investor and underestimates the cost of equity by
14 approximately 10 basis points (i.e., 0.1 percent).

15 **2. Mr. Parcell Uses the Retention Growth Method, a Method that**
16 **Should Be Given Little, If Any, Weight**

17 **Q. Please describe Mr. Parcell's methodology for specifying the growth**
18 **component of the DCF model.**

19 A. Mr. Parcell employs five proxies as a proxy for the expected growth component
20 of the DCF model: (i) historical earnings retention ratio, (ii) projected earnings
21 retention ratio, (iii) five-year historical growth rates in dividends, earnings, and

1 book value, (iv) projected growth rates in dividends, earnings, and book value,
2 and (v) analysts' forecasts of EPS growth as reported in First Call.⁷⁰

3 **Q. Can you comment on Mr. Parcell's earnings retention growth estimate in the**
4 **DCF model?**

5 A. The retention growth methodology used by Mr. Parcell is similar to the
6 sustainable growth methodology used by Dr. Woolridge. As discussed earlier in
7 rebuttal of Dr. Woolridge's sustainable growth methodology in Section II.B.3. of
8 this rebuttal testimony, the retention growth method has several conceptual and
9 empirical infirmities, and the results of this method should be given little, if any,
10 weight.

11 **3. Mr. Parcell's Historical Growth Rates Should Be Given Little,**
12 **If Any, Weight**

13 **Q. Are historical growth rates of electric utilities reliable proxies for expected**
14 **future growth?**

15 A. No. Historical growth rates of electric utilities are not reliable proxies for
16 expected future growth. Mr. Parcell uses historical growth rates in dividends,
17 earnings, and book value as proxies for expected growth.⁷¹

18 If historical growth rates are to be representative of long-term future growth rates,
19 they must not be biased by non-recurring events. This is certainly the case for
20 utilities, where growing competition, declining customer usage, increased reliance

⁷⁰ See Parcell, Exh. DCP-1T, at page 32, line 19, through page 33, line 16.

⁷¹ See Parcell, Exh. DCP-9, at page 3 (first three columns).

1 on renewables, acquisitions, restructurings and write-off activities have exerted a
2 dilutive effect on historical earnings and dividends. In such cases, it is obvious
3 that analysts' growth forecasts provide a more realistic and representative growth
4 proxy for what is likely to happen in the future than historical growth.

5 In any event, historical growth rates are somewhat redundant given that analysts
6 formulate their growth expectations based in part on historical patterns.

7 In conclusion, Mr. Parcell's historical growth rates should be given considerably
8 less, if any, weight.

9 **Q. What does the published academic literature say on the subject of growth**
10 **rates in the DCF model?**

11 A. As discussed in Section II.D.1. of this rebuttal testimony, published studies in the
12 academic literature demonstrate that (i) analysts' growth rate forecasts are
13 reasonable indicators of investor expectations and (ii) investors rely on such
14 forecasts.

15 **Q. Are investors expecting growth rates equal to Mr. Parcell's range?**

16 A. No. The best evidence shows that investors are expecting growth rates higher than
17 Mr. Parcell has found. For his proxy group of utilities, Mr. Parcell has found
18 mean growth rates ranging from 3.2 percent to 5.8 percent, with a mean of only

1 4.7 percent.⁷² For my proxy group of utilities, Mr. Parcell has found mean growth
2 rates ranging from 3.2 percent to 5.4 percent, with a mean of only 4.7 percent.⁷³

3 As addressed in Section II.B.2. of this rebuttal testimony, historical growth rates
4 should be given considerably less weight, which leaves us with (i) the mean Value
5 Line growth forecast (i.e., the 2020-2022 projections of earnings per share,
6 dividends per share, and book value per share) growth and (ii) the mean
7 consensus analyst forecast (i.e., the five-year projections of earnings per share
8 growth per First Call).

9 For Mr. Parcell's proxy group, the mean Value Line growth forecast is
10 4.8 percent, and the mean consensus analyst forecast is 5.8 percent.⁷⁴ These
11 growth forecasts produce a range of between 4.8 percent and 5.8 percent for the
12 group, with a midpoint of 5.3 percent. The midpoint of 5.3 percent is 60 basis
13 points (i.e., 0.6 percent) above Mr. Parcell's mean estimate of 4.7 percent.

14 For my proxy group, the mean Value Line growth forecast is 5.0 percent, and the
15 mean consensus analyst forecast is 5.4 percent.⁷⁵ These growth forecasts produce
16 a range of between 5.0 percent and 5.4 percent for the group, with a midpoint of
17 5.2 percent. The midpoint of 5.2 percent is 50 basis points (i.e., 0.5 percent) above
18 Mr. Parcell's mean estimate of 4.7 percent.

⁷² See Parcell, Exh. DCP-11, at page 4.

⁷³ See Parcell, Exh. DCP-11, at page 4.

⁷⁴ Parcell, Exh. DCP-11, at page 4.

⁷⁵ Parcell, Exh. DCP-11, at page 4.

1 This understatement alone causes Mr. Parcell's DCF cost of equity estimates for
2 this first group of companies to be downward-biased by 50 to 60 basis points
3 (i.e., between 0.5 and 0.6 percent), even without factoring in the appropriate
4 expected dividend yield component which is understated by 10 basis points
5 (0.1 percent). To different degrees, the same is true for Mr. Parcell's DCF
6 estimates for the second group of companies, which are also downward-biased by
7 similar amounts.

8 **Q. Please comment on Mr. Parcell's criticism of your DCF analysis.**

9 A. Mr. Parcell takes issue with the fact that my direct testimony has used only one
10 indicator of growth in the DCF analysis—analyst growth projections—and did not
11 include historical and projected growth rates in dividends and book value.⁷⁶

12 Because earnings growth drives dividend growth and because of the scarcity of
13 dividend forecasts, I have ignored dividend growth and focused on earnings
14 instead. After all, it is earnings that are the driving force behind dividends.

15 Section II.D.1. of this rebuttal testimony discusses the merits of using consensus
16 analysts' earnings growth forecasts in the DCF model and the supportive
17 empirical literature, and I do not repeat the discussion here. Briefly, historical
18 growth patterns are already embedded in analyst growth forecasts, and the finance
19 literature strongly supports the use of such forecasts.

⁷⁶ See Parcell, Exh. DCP-1T, at page 47, lines 13-15.

1 **B. Mr. Parcell's CAPM Results Should Be Given Very Little, If Any,**
2 **Weight**

3 **Q. How much weight should be accorded to the CAPM results under current**
4 **market circumstances?**

5 A. Mr. Parcell appears to largely ignore his CAPM estimates in making his final
6 return on equity recommended for PSE. To the extent that Mr. Parcell has
7 accorded any weight to his CAPM results (and it does not appear that he did), he
8 should have derived a much higher estimate. If the Commission were to accord
9 any weight to Mr. Parcell's CAPM results, the following comments on
10 Mr. Parcell's CAPM analysis are germane.

11 **1. Mr. Parcell's Risk-Free Rate Proxy in His CAPM Analysis**
12 **Should Be Predicated on Interest Rate Forecasts**

13 **Q. Does Mr. Parcell use an appropriate risk-free rate proxy in his CAPM**
14 **analysis?**

15 A. No. Mr. Parcell's risk-free rate proxy in his CAPM analysis is not appropriate for
16 this proceeding. As a proxy for the risk-free rate, Mr. Parcell uses 2.73 percent,
17 which is the average yield on 20-year Treasury bonds for the three-month period
18 March 2017 to May 2017.⁷⁷ For the reasons discussed in Section II.C.2. of this
19 rebuttal testimony, Mr. Parcell should have used the consensus interest rate
20 forecast of 4.40 percent. This correction alone would raise his CAPM estimates
21 by 1.67 percent ($4.40\% - 2.73\% = 1.67\%$).

⁷⁷ Parcell, Exh. DCP-1T, at page 38, lines 7-10.

1 **2. Mr. Parcell's Beta Estimate in His CAPM Analysis Is**
2 **Reasonable**

3 **Q. Does Mr. Parcell use an appropriate beta estimate in his CAPM analysis?**

4 A. Yes. Mr. Parcell used the most recent Value Line betas for each company in the
5 proxy groups, which is appropriate.⁷⁸

6 **3. Mr. Parcell's Market Risk Premium of 5.8 Percent Understates**
7 **the Market Risk Premium**

8 **Q. How does Mr. Parcell estimate the market risk premium component of his**
9 **CAPM analysis?**

10 A. In order to determine the market risk premium component of his CAPM analysis,
11 Mr. Parcell relies on three estimates. First, Mr. Parcell examines the difference
12 between the accounting returns on book equity for the S&P 500 Index companies
13 group over the 1978-2016 period and the contemporaneous level of 20-year
14 Treasury bond yields.⁷⁹ The average spread (i.e., the market risk premium) is
15 7.0 percent.⁸⁰ Second, Mr. Parcell relies on a long-term historical market risk
16 premium of 6.0 percent tabulated by Duff & Phelps for the 1926-2016 period
17 based on arithmetic averages.⁸¹ Third, Mr. Parcell relies on the long-term
18 historical market risk premium of 4.5 percent reported in the same publication for
19 the same period but this time based on geometric averages.⁸² From these three

⁷⁸ Parcell, Exh. DCP-1T, at page 38, lines 7-10; *see also* Parcell, Exh. DCP-11.

⁷⁹ Parcell, Exh. DCP-1T, at page 39, lines 3-9.

⁸⁰ Parcell, Exh. DCP-1T, at page 39, lines 3-9.

⁸¹ Parcell, Exh. DCP-1T, at page 39, lines 10-15.

⁸² Parcell, Exh. DCP-1T, at page 39, lines 10-15.

1 estimates, Mr. Parcell concludes that the market risk premium is 5.8 percent (i.e.,
2 the average of these three market risk premium estimates).⁸³

3 **Q. Is Mr. Parcell's first market risk premium of 7.0 percent reasonable?**

4 A. Yes. Mr. Parcell's first market risk premium of 7.0 percent is reasonable and is
5 identical to the market risk premium used in my CAPM analysis.

6 **Q. Is Mr. Parcell's second market risk premium of 6.0 percent reasonable?**

7 A. No. Mr. Parcell's second market risk premium estimate of 6.0 percent is
8 understated. For his second market risk premium estimate, Mr. Parcell used total
9 returns (i.e., dividends/interest plus capital gains/losses) for the S&P 500 group as
10 well as for long-term government bonds, as tabulated by Duff & Phelps using
11 arithmetic means. As I discussed in my direct testimony and in Section II.C.3. of
12 this rebuttal testimony, the more accurate way to estimate the market risk
13 premium from historical data is to use the *income* return, not *total* returns, on
14 government bonds.⁸⁴ The long-term market risk premium based on *income* returns
15 is 6.6 percent, which is 60 basis points (i.e., 0.6 percent) higher than the
16 6.0 percent estimate based on total bond returns reported by Mr. Parcell.

17 **Q. Is Mr. Parcell's third market risk premium of 4.5 percent reasonable?**

18 A. No. Mr. Parcell's third market risk premium of 4.5 percent is not reasonable
19 whatsoever. For his third market risk premium, Mr. Parcell uses the

⁸³ Parcell, Exh. DCP-1T, at page 39, line 16, through page 40, line 2.

⁸⁴ Parcell, Exh. DCP-1T, at page 39, lines 10-15.

1 aforementioned Duff & Phelps historical market risk premium, only this time
2 relying on the geometric average of historical returns instead of the arithmetic
3 average of historical returns.⁸⁵

4 **Q. Is it appropriate to use geometric averages in measuring expected return?**

5 A. No. As discussed in Section II.C.3.B. of this rebuttal testimony, arithmetic means
6 are appropriate for forecasting and estimating the cost of capital, whereas
7 geometric means are not.

8 **Q. What market risk premium estimate should Mr. Parcell have used in his**
9 **CAPM analysis.**

10 A. The average of Mr. Parcell's first market risk premium estimate of 7.0 percent
11 and his amended second market risk premium estimate of 6.6 percent (and
12 ignoring the estimate based on geometric returns) results in a market risk
13 premium of 6.8 percent. Therefore, Mr. Parcell should have relied on a market
14 risk premium of no less than 6.8 percent for his CAPM analyses.

15 **Q. What is the effect of Mr. Parcell's use of the corrected market risk premium**
16 **of 6.8 percent on his CAPM results?**

17 A. Mr. Parcell's use of an unreasonable market risk premium of 5.8 percent instead
18 of a reasonable market risk premium of 6.8 percent understates his CAPM

⁸⁵ Parcell, Exh. DCP-1T, at page 39, lines 10-15.

1 estimates by 74 basis points (i.e., 0.74 percent) alone. Using Mr. Parcell's beta of
2 0.74 for PSE, the understatement is calculated as follows:

$$\beta_{PSE} \times (\text{Arithmetic Mean} - \text{Geometric Mean})$$

$$0.74 \times (6.8\% - 5.8\%) = 0.74 \times (1.0\%) = 0.74\%$$

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5 **C. Mr. Parcell's Criticisms of My Direct Testimony are Unfounded, are**
6 **Without Merit, and Should be Ignored by the Commission**

7 **1. Mr. Parcell's Assertions that the Empirical CAPM Inflates**
8 **CAPM Result for Selected Companies or Industries are**
9 **Erroneous**

10 **Q. Is Mr. Parcell correct that the empirical CAPM inflates the CAPM result for**
11 **the selected company or industry?**

12 A. No. The empirical CAPM does not inflate the CAPM result for the selected
13 company or industry. For companies with betas less than one, the CAPM
14 understates the return; for companies with betas greater than one, the CAPM
15 overstates the return. Please see the Seventh Exhibit to the Prefiled Direct
16 Testimony of Dr. Roger A. Morin, Exh. RAM-8, for a discussion of the
17 conceptual and empirical foundations of the empirical CAPM.

1 **2. Risk Premium Methodology**

2 **Q. How do you respond to Mr. Parcell’s disagreement with the risk premium**
3 **methodology because economic conditions today are different and risk**
4 **premiums are unstable from year to year?**

5 A. Mr. Parcell critiques the risk premium method on two grounds: (i) the method
6 assumes that past is prologue, and (ii) the method assumes that the risk premium
7 is constant over time whereas in fact the risk premium results are dominated by
8 the influence of capital gains in many years.⁸⁶

9 The first criticism is unwarranted. I employed returns realized over long time
10 periods rather than returns realized over more recent time periods. Realized
11 returns can be substantially different from prospective returns anticipated by
12 investors, especially when measured over short time periods. A risk premium
13 study should consider the longest possible period for which data are available.
14 Short-run periods during which investors earned a lower risk premium than they
15 expected are offset by short-run periods during which investors earned a higher
16 risk premium than they expected. Only over long time periods will investor return
17 expectations and realizations converge, or else, investors would never commit any
18 funds.

19 I have ignored realized risk premiums measured over short time periods because
20 they are heavily dependent on short-term market movements. Instead, I have
21 relied on results over periods of enough length to smooth out short-term

⁸⁶ Parcell, Exh. DCP-1T, at page 51, line 18, through page 52, line 8.

1 aberrations, and to encompass several business and interest rate cycles. By using
2 the entire study period to estimate the appropriate market risk premium,
3 subjective judgment is minimized and many diverse regimes of inflation, interest
4 rate cycles, and economic cycles spanned.

5 Mr. Parcell's second concern is also unwarranted. The influence of unexpected
6 capital losses offsets the influence of unexpected capital gains. To the extent that
7 the estimated historical equity risk premium follows what is known in statistics as
8 a random walk, one should expect the equity risk premium to remain at its
9 historical mean. Thus, the best estimate of the future risk premium is the historical
10 mean. As explained in my direct testimony, there is no evidence that the market
11 risk premium in common stocks has changed over time (i.e., no significant serial
12 correlation in the Duff & Phelps historical return data). Therefore, it is reasonable
13 to assume that these quantities will remain stable in the future.

14 **3. Mr. Parcell Fails to Recognize that the Average Allowed**
15 **Return on Equity Authorized by State Utility Commissions for**
16 **Electric Utilities in 2017 is 9.9 percent**

17 **Q. Is Mr. Parcell correct that allowed returns on equity authorized by state**
18 **utility commission has not been as large as your recommended return on**
19 **equity of 9.8 percent since 2013?**

20 **A.** No. Mr. Parcell is incorrect in his assertion that allowed returns on equity
21 authorized by state utility commission has not been as large as your recommended

1 return on equity of 9.8 percent since 2013.⁸⁷ Indeed, the average allowed return on
2 equity authorized by state utility commissions for electric utilities in 2017 is
3 9.9 percent, which is slightly higher than my recommended return on equity of
4 9.8 percent for PSE.

5 **4. Mr. Parcell Incorrectly Asserts that It is Inappropriate to Take**
6 **into Account Size Differences of Companies When**
7 **Determining the Return of Equity**

8 **Q. Is Mr. Parcell correct in asserting that it is inappropriate to take into account**
9 **size differences of companies when determining the return on equity?**

10 A. No. Mr. Parcell incorrectly asserts that it is inappropriate to take into account size
11 differences of companies when determining the return on equity.⁸⁸ Frankly, I was
12 surprised by this assertion because the size phenomenon effect is well-known and
13 well documented in the financial literature. Investment risk increases as company
14 size diminishes, all else remaining constant. Small companies have very different
15 returns than large ones and on average those returns have been higher. Small
16 companies earn many different returns than large ones, and on average the actual
17 returns of small companies have been higher, as is well documented in the
18 financial literature. Indeed, the Duff & Phelps Valuation book cited by
19 Mr. Parcell his testimony also devote a full two chapters and two appendices
20 documenting and quantifying the size effect.⁸⁹

⁸⁷ Parcell, Exh. DCP-1T, at page 53, lines 6-7.

⁸⁸ Parcell, Exh. DCP-1T, at page 53, line 9, through page 55, line 5.

⁸⁹ See also Roger A. Morin, *The New Regulatory Finance*, at chapter 6 (2006).

1 The greater risk of small stocks does not fully account for their higher returns
2 over many historical periods. The average small stock premium is well in excess
3 of that of the average stock, more than could be expected by risk differences
4 alone, suggesting that the cost of equity for small stocks is considerably larger
5 than for large capitalization stocks. In addition to earning higher average rates of
6 return, small stocks also have a higher volatility, as measured by the standard
7 deviation of returns.

8 **Q. What do you think of Mr. Parcell's evidence that size adjustments are**
9 **unwarranted in regulatory proceedings?**

10 A. I respectfully submit that Mr. Parcell's table on page 54 of his testimony should
11 be discarded entirely for several reasons. The major flaw of the table is that risk
12 has not been held constant to isolate the size effect. Therefore, it is impossible to
13 disentangle the impact of risk from the impact of size, unlike most studies in the
14 literature. For example, electric utilities are seen to benefit from higher allowed
15 returns on equity than water utilities on the upper table located on Mr. Parcell's
16 table, but the reason is simply that electric utilities are riskier than water utilities,
17 not because of any size differences. When trying to quantify the size effect,
18 risk (i.e., beta) has to be held constant. Otherwise, one commingles and confounds
19 the size and risk impacts.

20 There are other statistical flaws as well. Mr. Parcell does not allow for the fact
21 that the beta estimates of smaller companies are understated and subject to the
22 well-known thin-trading bias. Moreover, Mr. Parcell's study is limited to a very

1 small sample of companies so that from a statistical perspective there are very few
2 degrees of freedom, that is, very few industries represented, only utilities. By
3 analogy, if one were trying to determine how many people have blond hair and
4 then selects a sample of people with predominantly blond hair, the exercise
5 becomes statistically meaningless. The same is true here.

6 In short, the Commission should give Mr. Parcell's size study little, if any,
7 weight.

8 **D. Mr. Parcell's Return on Equity Recommendation is Understated**

9 **Q. What do you conclude from Mr. Parcell's return on equity recommendation?**

10 A. Mr. Parcell's recommended return on equity is understated.

11 Recognition of the proper functional form of the DCF model (10 basis points or
12 0.1 percent), the use of analysts' growth forecasts in the DCF analysis (60 basis
13 points or 0.6 percent), the use of a forecast risk-free rate in the CAPM analysis
14 (167 basis points or 1.67 percent), and the appropriate market risk premium in the
15 CAPM analysis (74 basis points or 0.74 percent), would suggest much higher
16 returns on equity that are quite close to my own recommended return on equity of
17 9.8 percent. Moreover, Mr. Parcell did not account for PSE's higher relative risks,
18 as discussed in my direct testimony.

19 I have replicated below the final results of Mr. Parcell's three return on equity
20 analyses from page 45 of his testimony:

Table 5. Mr. Parcell's Original Results

| | Midpoint | Range |
|------|-----------------|--------------|
| DCF | 8.85% | 8.7% – 9.0% |
| CAPM | 6.75% | 6.5% – 7.0% |
| CE | 9.50% | 9.0% – 10.0% |

1 I summarize below the final results of Mr. Parcell's three return on equity
2 analyses amended for the aforementioned understatements: a total of 70 basis
3 points (i.e., 0.7 percent) for the DCF results and a total of 241 basis points
4 (i.e., 2.41 percent) for the CAPM results. The amended results produce a range of
5 between 9.0 and 10.0 percent, which encompasses my own return on equity
6 recommendation of 9.8 percent.

Table 6. Mr. Parcell's Amended Results

| | Midpoint | Range |
|------|-----------------|--------------|
| DCF | 9.55% | 9.4% – 9.7% |
| CAPM | 9.15% | 8.9% – 9.4% |
| CE | 9.50% | 9.0% – 10.0% |

7 **IV. RESPONSE TO MR. GORMAN'S COMMENTS**

8 **Q. Did Mr. Gorman present any evidence on PSE's return on equity on behalf**
9 **of ICNU?**

10 A. No. Contrary to his practice in past PSE proceedings, Mr. Gorman did not
11 perform any return on equity analyses in this proceeding and limited his testimony
12 to criticisms of my direct testimony. Therefore, this section of rebuttal testimony
13 is similarly limited and responds to Mr. Gorman's unfounded comments
14 regarding my direct testimony.

1 **A. Mr. Gorman's Argument that It is Unreasonable to Use Value Line**
2 **Growth Rates in a DCF Analysis is Both Astonishing and Incorrect**

3 **Q. Is Mr. Gorman correct that Value Line growth forecasts should not be used**
4 **in a DCF analysis?**

5 A. No. Mr. Gorman's argument that it is unreasonable to use Value Line growth
6 rates in a DCF analysis⁹⁰ is both astonishing and incorrect. Value Line is one of
7 the most widely-known and widely disseminated investment information service
8 used by investors. Value Line data appear in virtually all the rate cases in which I
9 have participated over the years, and are relied upon by most rate of return
10 witnesses, including Commission Staff witnesses.

11 Moreover, Mr. Gorman himself has consistently relied on Value Line growth
12 projections in past cases. For example, in a recent case in the State of Missouri
13 (Case No. WR-2015-0301), Mr. Gorman filed rate of return testimony and states
14 as following in explaining his DCF analyses on page 34 lines 8-11:

15 The data used to estimate the long-term sustainable growth rate is
16 based on the Company's current market-to-book ratio and on
17 *Value Line's three- to five-year projections of earnings, dividends,*
18 *earned returns on book equity, and stock issuances.*

19 The same statement appears on page 28, lines 4-6, of Mr. Gorman's 2014 return
20 on equity testimony filed before this Commission in a Pacific Power and Light
21 case in Docket No. UE-140762. I have no doubt that Mr. Gorman would have
22 continued to rely on Value Line projections had he presented his own return on
23 equity analyses in this proceeding.

⁹⁰ Gorman, Exh. MPG-1T, at page 13, lines 10-11.

1 **Q. Please comment on Mr. Gorman’s criticism of your DCF growth rates**
2 **because they exceed the long-term growth of the macroeconomy.**

3 A. First, Mr. Gorman states: “[a]s explained in detail earlier in my testimony, the
4 GDP growth rate can be used as a proxy for a long-term sustainable growth
5 rate....”⁹¹ I was unable to find this explanation and was confused by this
6 statement because Mr. Gorman did not present any return on equity evidence in
7 this proceeding.

8 Mr. Gorman criticizes my use of analysts’ growth rates on the grounds that they
9 exceed the long-term sustainable growth rate of the economy.⁹² Mr. Gorman
10 contends that projected growth in Gross Domestic Product (GDP) constitutes a
11 high-end, sustainable growth rate for a utility over an indefinite period of time.
12 However, Mr. Gorman’s position is directly contradicted by his position in recent
13 2015 Missouri American Water Company testimony in Case No. WR-2015-0301,
14 in which Mr. Gorman states, at page 31, lines 12-16, as follows:

15 As predictors of future returns, security analysts’ growth estimates
16 have been shown to be more accurate than growth rates derived
17 from historical data. That is, assuming the market generally makes
18 rational investment decisions, analysts’ growth projections are
19 more likely to influence investors’ decisions which are captured in
20 observable stock prices than growth rates derived only from
21 historical data.

22 Further, Mr. Gorman has not provided any empirical evidence that earnings per
23 share would grow at the average growth of the economy, or GDP growth, and I

⁹¹ Gorman, Exh. MPG-1T, at page 13, lines 21-23.

⁹² Gorman, Exh. MPG-1T, at page 13 line 23, through page 14, line 2.

1 am un aware of any financial literature that would support such an assertion. To
2 the best of my knowledge, there is no empirical support for the notion that the
3 earnings and dividends of utility companies, in general, or electric utilities, in
4 particular, or indeed any specific company or industry, track GDP growth. Nor
5 am I aware of any evidence that the investment community looks to GDP growth
6 over the next century when evaluating utility investments. However, based upon
7 the previously cited wealth of empirical and academic literature which supports
8 the superiority of analyst's forecasts as measures of investor expectations for the
9 use of such forecasts in the DCF model, current earnings growth forecasts are the
10 appropriate growth rates to us in a DCF analysis. As discussed earlier in my
11 rebuttal and in my direct testimony, there is considerable empirical evidence in
12 the academic literature that support the superiority of analysts' forecasts of
13 earnings per share as measures of investor expectations. Besides, to the extent that
14 economic trends influence growth, they are already captured in analysts' growth
15 estimates for electric utilities.

16 Be that as it may, analyst growth rates are the growth rates impounded in stock
17 prices, whether I or Mr. Gorman agree or disagree with the use of such growth
18 rates.

1 **B. Mr. Gorman's Exclusive Reliance on the Forecast Long-Term**
2 **Interest Rates Published in The Blue Chip Financial Forecasts is**
3 **Misplaced**

4 **Q. How do you respond to Mr. Gorman's criticisms of your long-term interest**
5 **rate forecast because it is higher than the forecast published in The Blue**
6 **Chip Financial Forecasts?**

7 A. Mr. Gorman argues that a projected risk-free rate of 4.4 percent exceeds the
8 consensus forecast published in The Blue Chip Financial Forecasts.⁹³ I have two
9 responses. First, The Blue Chip Financial Forecasts is not necessarily the
10 consensus and is but one forecast and is certainly not representative of the
11 consensus as shown on Table 7 below, which displays the interest rate forecast
12 from several well-known authoritative sources.

Table 7. Forecast Yields on 30-year U.S. Treasury Bonds

| | US 30-Yr Treas. L/T Yield Forecast |
|--|---|
| Congressional Budget Office | 4.1% |
| Bureau of Labor Statistics | 4.8% |
| U.S. Energy Information Administration | 4.3% |
| IHS (Global Insight) | 4.6% |
| Value Line Economic Forecast | 4.7% |
| Economic Report of the President | 4.2% |
| AVERAGE | 4.4% |

13 The average forecast of these six authoritative resources is 4.4 percent, and there
14 is little variability among the forecasts. Clearly, The Blue Chip Financial

⁹³ Gorman, Exh. MPG-1T, at page 16, lines 1-7.

1 Forecasts forecast of 3.7 percent appears as an outlier. Second, The Blue Chip
2 Financial Forecasts are for only the next five- and ten-year periods, whereas the
3 interest rate forecasts shown on Table 7 are based on much longer time periods,
4 which is quite consistent with the DCF model long-term horizon requirements and
5 with what investors can reasonably expect to occur over the very long-run horizon
6 of the DCF model.

7 **C. Mr. Gorman's Purported Concerns with My Empirical CAPM**
8 **Analysis Arise from His Confusing the Adjustment of Beta with the**
9 **Empirical CAPM**

10 **Q. Do you have any comments regarding Mr. Gorman's concerns with your**
11 **empirical CAPM analysis?**

12 A. Yes. Mr. Gorman's purported concerns with my empirical CAPM analysis arise
13 from his confusing the adjustment of beta with the empirical CAPM. As
14 previously discussed in the Seventh Exhibit to the Prefiled Direct Testimony of
15 Dr. Roger A. Morin, Exh. RAM-8, there is considerable academic and regulatory
16 support for the use of the empirical CAPM. As explained in my direct testimony⁹⁴
17 and supporting exhibit,⁹⁵ it is essential to take into account the reality that the
18 empirical Security Market Line described by the traditional CAPM is not as
19 steeply sloped as the predicted Security Market Line. The empirical CAPM is
20 thus a return adjustment which accounts for this reality and is not an adjustment to
21 beta which is an x-axis adjustment accounting for regression bias. Hence, the use

⁹⁴ Morin, Exh. RAM-1T, at page 54, line 11, through page 56, line 8.

⁹⁵ See Morin, Exh. RAM-8.

1 of adjusted betas is not equivalent to the empirical CAPM. Mr. Gorman's
2 criticisms are unfounded.

3 Mr. Gorman also erroneously argues that there is no evidence supporting the
4 empirical CAPM that rely on Value Line adjusted betas.⁹⁶ I provided a substantial
5 bibliography of evidence supporting the empirical CAPM in PSE's Response to
6 Public Counsel Data Request No. 333, which is also provided as the First Exhibit
7 to the Prefiled Rebuttal Testimony of Dr. Roger A. Morin, Exh. RAM-13.

8 **D. Mr. Gorman Erroneously Argues that the Inverse Relationship**
9 **Between Equity Risk Premiums and Interest Rates is Not Supported**
10 **by Academic Research**

11 **Q. Is Mr. Gorman correct that the inverse relationship between equity risk**
12 **premiums and interest rates is not supported by academic research?**

13 A. No. Mr. Gorman erroneously argues that the inverse relationship between equity
14 risk premiums and interest rates is not supported by academic research.⁹⁷ My first
15 reaction was to simply point to the graph on page 53 of my direct testimony,
16 which shows a very clear significant negative relationship.

17 Contrary to Mr. Gorman's contention that the finance literature does not fully
18 endorse the notion that the risk premium shrinks as interest rates decline, there is an
19 abundance of studies that support the notion. Published studies demonstrate that,

⁹⁶ Gorman, Exh. MPG-1T, at page 2, lines 8-9.

⁹⁷ Gorman, Exh. MPG-1T, at page 23, lines 1-15.

1 beginning in 1980, risk premiums varied inversely with the level of interest rates,
2 rising when rates fell and declining when interest rates rose.⁹⁸

3 Regulators have recognized this tendency as well. The California Public Utility
4 Commission recognizes that the cost of equity does not move in tandem with
5 interest rates, and its long-standing practice has been to adjust the cost of equity
6 by one-half to two-thirds of the change in bond yields.

7 The reason for this relationship is that when interest rates rise, bondholders, whose
8 interest rates are fixed, often suffered a decrease in the market value of their bonds,
9 experiencing a capital loss. This is referred to as interest rate risk. Stockholders, on
10 the other hand, are more concerned with the firm's earning power.

11 In order to avoid interest rate risk in an environment of rising interest rates, investors
12 tend to become more willing to undertake equity investments which, although
13 subject to some fear of loss of earning power, are less sensitive to the fear of interest
14 rate risk. The resulting increase in the supply of funds available for such equity
15 investments causes a downward pressure on the market price for equity.

16 So, generally it is observed that if bondholders' fear of interest rate risk exceeds
17 shareholders' fear of loss of earning power, the risk differential will narrow and

⁹⁸ See, e.g., Willard T. Carleton, *et al.*, "Inflation Risk and Regulatory Lag," 38 *The Journal of Finance* 419-43 (1983); Eugene F. Brigham, *et al.*, "The Risk Premium Approach to Measuring a Utility's Cost of Equity," 14 *Financial Management* 33-45 (1985); Robert S. Harris, "Using Analysts' Growth Forecasts to Estimate Shareholder Required Rates of Return," 15 *Financial Management* 58-67 (1986); Robert S. Harris & Felicia C. Marston, "Estimating Shareholder Risk Premia Using Analysts' Growth Forecasts," 21 *Financial Management* 63-70 (1992); and Farris M. Maddox, *et al.*, "An Empirical Study of Ex Ante Risk Premiums for the Electric Utility Industry," 24 *Financial Management* 89-95 (1995).

1 hence the risk premium will shrink. This is particularly true in high inflation
2 environments. Interest rates rise as a result of accelerating inflation, and the interest
3 rate risk of bonds intensifies more than the earnings risk of common stocks, which
4 are partially hedged from the ravages of inflation. This phenomenon has been
5 termed as a “lock-in” premium. Conversely in low interest rate environments, as is
6 the case currently, when bondholders’ interest rate fears subside and shareholders’
7 loss of earning power dominate, the risk differential will widen and hence the risk
8 premium will increase.

9 These empirical studies show that equity risk premiums have consistently
10 increased as interest rates have declined. This result is a simple reflection of the
11 fact that required rates of return in the stock market are not entirely dependent on
12 changes in interest rates. Because utilities have to compete with other companies
13 and with other types of equity investments for money, the return on equity for
14 utilities does not change by as much as the observed changes in interest rates. The
15 use of an unadjusted simple average of long-term equity risk premiums with
16 current interest rates would be simply wrong. Such an approach would
17 consistently understate the required return on equity.

18 In short, the empirical evidence from the published academic literature
19 demonstrates that the risk premium varies inversely with the level of interest
20 rates, contrary to Mr. Gorman’s view. The relationship remains true today, as
21 evidenced by the graph provided on page 53 of my direct testimony.

1 **E. The Commission Should Expressly Reject Mr. Gorman's**
2 **Recommendation to Adjust PSE's Return on Equity Downward in the**
3 **Event Revenue Decoupling Continues**

4 **Q. Do you agree with Mr. Gorman's recommendation that the Commission**
5 **should adjust PSE's return on equity downward in the event revenue**
6 **decoupling is continued?**

7 A. No. Mr. Gorman recommends that the Commission adjust PSE's return on equity
8 downward in order to account for PSE's revenue decoupling mechanism because
9 he argues that such a mechanism reduces PSE's risk.⁹⁹ Although risk-mitigating
10 mechanisms, such as PSE's revenue decoupling mechanism, may reduce risk on
11 an absolute basis, they do not necessarily do so on a relative basis (i.e., compared
12 to other utilities). For example, a fuel adjustment clause may reduce absolute risk,
13 but it does not reduce relative risk because most electric utilities in the industry
14 have similar mechanisms.

15 Adjustment clauses, revenue decoupling mechanisms, and other risk mitigators
16 (such as return on equity incentives, riders, trackers, forward test years, and cost
17 recovery mechanisms) authorized by regulatory utility commissions are
18 widespread in the utility business and are already largely embedded in financial
19 data, such as stock prices, bond ratings, and business risk scores. Moreover, it is
20 important to note that investors generally do not associate specific increments to
21 their return requirements with specific rate structures. Rather, investors tend to

⁹⁹ Gorman, Exh. MPG-1T, at page 30, lines 10-20.

1 look at the totality of risk-mitigating mechanisms in place relative to those in
2 place at comparable companies when assessing risk.

3 Although adjustment clauses, riders, and cost tracking mechanisms may mitigate
4 (on an absolute basis but not on a relative basis) a portion of the risk and
5 uncertainty related to the day-to-day management of PSE's operations, there are
6 other significant factors to consider that work in the reverse direction for PSE. For
7 example, PSE's has a substantial capital spending program to refurbish an aging
8 infrastructure, is experiencing declining per customer usage, and must comply
9 with increasingly stringent environmental and renewables target. These additional
10 factors largely offset the presence of the aforementioned risk-mitigating
11 mechanisms. Mr. Gorman chose not to discuss such factors in his testimony, nor
12 did Mr. Gorman offer any opinion as to the magnitude of the downward return on
13 equity adjustment that he would recommend.

14 **Q. What is your view regarding the impact of decoupling on PSE's risk profile?**

15 A. My own view is that any risk-mitigating impact that the revenue decoupling
16 mechanism could have on the PSE's risk profile is reflected in the capital market
17 data of the comparable companies and that the risk impact of these mechanisms is
18 offset by several factors that work in the reverse direction. The market-derived
19 cost of common equity for other utility companies already incorporates the results
20 of decoupling and/or similar mechanisms so that no further adjustment is
21 appropriate or reasonable in determining the cost of common equity for PSE.
22 Decoupling and other similar risk-mitigating mechanisms have become the norm

1 for regulated utilities across the U.S. In short, a downward adjustment to the
2 return on equity, as recommended by Mr. Gorman, would, if applied, constitute
3 double-counting.

4 **Q. Is there any empirical evidence on the impact of risk mitigators?**

5 A. Yes. A comprehensive study by the Brattle Group¹⁰⁰ investigated the impact of a
6 particular risk-mitigating mechanism, namely, revenue decoupling, on risk and
7 the cost of capital and found that its effect on risk and cost of capital, if any, is
8 undetectable statistically.

9 **Q. Are you aware of any state utility commission orders reducing the allowed
10 return on equity to account for the presence of a revenue decoupling
11 mechanisms in recent years?**

12 A. No. To the best of my knowledge, no state utility commission has issued an order
13 in the last six years that applied a downward adjustment reducing the allowed
14 return on equity to account for the presence of a revenue decoupling mechanism,
15 presumably because such mechanisms are now firmly recognized in the utility
16 industry.

¹⁰⁰ See Michael J. Vilbert, *et al.*, The Brattle Group, *The Impact of Decoupling on the Cost of Capital: An Empirical Investigation* (2014), available at http://www.brattle.com/system/publications/pdfs/000/004/995/original/Effect_of_Electric_Decoupling_on_the_Cost_of_Capital.pdf?1395776507.

1 **Q. Has this Commission expressed an opinion regarding attempts to account**
2 **separately in its return on equity determinations for specific risks or risk**
3 **mitigating factors, such as PSE’s revenue decoupling mechanism?**

4 A. Yes. In Dockets UE-121697, *et al.*, the Commission expressly indicated that it has
5 never tried to account separately in its return on equity determinations for specific
6 risks or risk mitigating factors, including, specifically, PSE’s revenue decoupling
7 mechanism:

8 We believe it is correct that cost of capital analysis cannot be
9 expected to produce results that support measurement of
10 decrements to [return on equity] ostensibly due to approval of one
11 risk mitigation mechanism or another. Nor would cost of capital
12 analysis be adequate to the task of identifying increments to [return
13 on equity] that might be considered due to some measure of
14 additional risk a company takes on at some point in time. The
15 Commission has never tried to account separately in its [return on
16 equity] determinations for specific risks or risk mitigating factors,
17 nor should it. Circumstances in the industry today and modern
18 regulatory practice that have led to a proliferation of risk reducing
19 mechanisms being in place for utilities throughout the United
20 States make it particularly inappropriate and unnecessary to
21 consider such an undertaking. The effects of these risk mitigating
22 factors was by 2013, and is today, built into the data experts draw
23 from the samples of companies they select as proxies.

24 In sum, we find persuasive the expert opinions of Dr. Morin and
25 Mr. Gorman and find that the risk reducing effect of decoupling is
26 reflected adequately in the data derived from the companies in
27 their respective proxy groups. We reject the idea of a separate
28 decrement to [returns on equity] to account for the same risk
29 reduction. We also find persuasive the point that cost of capital
30 analysis cannot achieve the level of granularity necessary to
31 support a discrete adjustment to [return on equity] to account for
32 particularized risks—up or down....¹⁰¹

¹⁰¹ *WUTC v. Puget Sound Energy*, Dockets UE-121697, *et al.*, Order 15 at ¶¶ 155-56 (June 29, 2015).

1 Moreover, the Commission’s order noted that “Mr. Gorman agrees with Dr.
2 Morin that the impact of decoupling on risk was adequately reflected in the peer
3 group data and analyses on which the experts relied in evaluating ROE for early
4 2013 for their remand phase testimony.”¹⁰² In other words, Mr. Gorman argued
5 before this Commission that downward adjustments to returns on equity
6 downward to reflect revenue decoupling is unwarranted when the impact of
7 revenue decoupling on risk is adequately reflected in the proxy group of
8 comparable utilities. In this proceeding the impact of revenue decoupling on risk
9 is adequately reflected in the proxy group of comparable utilities, yet Mr. Gorman
10 argues for a downward adjustment to the allowed return on equity of PSE. The
11 Commission should, once again, expressly reject any recommendation for a
12 downward adjustment to return on equity due to the existence of a revenue
13 decoupling mechanism.

14 V. CONCLUSION

15 **Q. Please summarize your results and recommended return on equity for PSE.**

16 A. To arrive at my final recommendation, I performed each of the following
17 analyses:

- 18 (i) a DCF analysis on a group of investment-grade dividend
19 paying combination gas and electric utilities using Value
20 Line’s growth forecasts;

¹⁰² *Id.* at ¶ 150.

- 1 (ii) a DCF analysis on a group of investment-grade dividend
 2 paying combination gas and electric utilities using analysts’
 3 growth forecasts;
- 4 (iii) a traditional CAPM using current market data;
- 5 (iv) an empirical approximation of the CAPM using current
 6 market data;
- 7 (v) historical risk premium data from electric utility industry
 8 aggregate data, using the current yield on long-term
 9 U.S. Treasury bonds; and
- 10 (vi) allowed risk premium data from electric utility industry
 11 aggregate data, using the current yield on long-term
 12 U.S. Treasury bonds.

13 Table 8 below summarizes my return on equity estimates for PSE.

Table 8. Summary of Dr. Morin’s Return on Equity Estimates

| Study | ROE |
|--|-------------|
| DCF - Electric Utilities Value Line Growth | 9.8% |
| DCF - Electric Utilities Analysts Growth | 9.4% |
| Traditional CAPM | 9.3% |
| Empirical CAPM | 9.8% |
| Historical Risk Premium Electric | 10.5% |
| Allowed Risk Premium | 10.7% |
| Average | 9.9% |
| Median | 9.8% |
| Truncated Mean | 9.9% |

14 The average estimate is 9.9 percent, the median result is 9.8 percent, and
 15 truncated mean¹⁰³ is 9.9 percent.

¹⁰³ The truncated mean is obtained by removing the high and low results and the average of the remaining observations.

1 **Q. Has the testimony of Dr. Woolridge, Mr. Parcell, or Mr. Gorman caused you**
2 **to revise your analyses or change your recommended return on equity of**
3 **9.8 percent for PSE?**

4 A. None of the testimony of Dr. Woolridge, Mr. Parcell, or Mr. Gorman has caused
5 me to revise my analyses or change my recommended return on equity of
6 9.8 percent for PSE. The return on equity of 9.8 percent requested by PSE in this
7 proceeding is a fair and reasonable estimate, and the Commission should adopt
8 this recommended return on equity in establishing rates for PSE in this
9 proceeding.

10 **Q. Does this conclude your rebuttal testimony?**

11 A. Yes.