

**STATE OF NEW HAMPSHIRE**  
**BEFORE THE**  
**NEW HAMPSHIRE PUBLIC UTILITIES COMMISSION**

**DOCKET NO. DE 24-070**  
**REQUEST FOR CHANGE IN DISTRIBUTION RATES**

**REBUTTAL TESTIMONY OF**

**Vincent V. Rea**

*Cost of Capital*

**On behalf of Public Service Company of New Hampshire**

**d/b/a Eversource Energy**

**March 10, 2025**

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**STATE OF NEW HAMPSHIRE**  
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**REBUTTAL TESTIMONY OF VINCENT V. REA**  
**PETITION OF PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE**  
**d/b/a EVERSOURCE ENERGY**  
**REQUEST FOR CHANGE IN DISTRIBUTION RATES**

**March 10, 2025**

**Docket No. DE 24-070**

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1 **I. INTRODUCTION AND SUMMARY OF PRINCIPAL CONCLUSIONS**

2 **Q. Please state your name, business address and title.**

3 A. My name is Vincent V. Rea. My business address is 80 Blake Boulevard, #4572, Pinehurst,  
4 NC 28374. I currently serve as Managing Director of Regulatory Finance Associates, LLC,  
5 an independent financial and regulatory consulting firm serving the utility industry.

6 **Q. On whose behalf are you submitting this rebuttal testimony?**

7 A. I am submitting this rebuttal testimony on behalf of Public Service Company of New  
8 Hampshire d/b/a Eversource Energy (the "Company").

9 **Q. Are you the same Vincent V. Rea who submitted direct testimony in this proceeding?**

10 A. Yes.

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

12 A. The purpose of my rebuttal testimony is to respond to the direct testimony of Dr. J. Randall  
13 Woolridge, a witness appearing on behalf of the New Hampshire Department of Energy

1 (“DOE”), Aaron L. Rothschild, a witness appearing on behalf of the New Hampshire  
2 Office of the Consumer Advocate, Marc Vatter, who serves as Director of Economics and  
3 Finance for the New Hampshire Office of the Consumer Advocate, and Ms. Lisa V. Perry,  
4 who serves as Director, Utility Partnerships - Regulatory for Walmart Inc. (together, the  
5 “Opposing Witnesses”) in connection with the Company’s pending request for a base  
6 revenue adjustment. My rebuttal testimony is limited to a discussion of those issues, and  
7 the failure to address each and every issue in each piece of testimony does not imply  
8 agreement with the positions taken by any party with respect to other issues.

9 **Q. Are you sponsoring any attachments to your rebuttal testimony in this proceeding?**

10 A. Yes. I am sponsoring the attachments reflected in Table 1R below, which were prepared  
11 under my direction and supervision.

<b>Table 1R</b>	
<b>Attachments Supporting Rebuttal Testimony</b>	
<b>Attachment</b>	<b>Description</b>
Attachment ES-VVR-1R	Rebuttal Testimony of Vincent V. Rea
Attachment ES-VVR-2R	Updated Cost of Equity Model Results
Attachment ES-VVR-3R	DCF Method - Electric Group (Updated)
Attachment ES-VVR-4R	DCF Method - Gas LDC Group (Updated)
Attachment ES-VVR-5R	DCF Method - Non-Regulated Group (Updated)
Attachment ES-VVR-6R	Capital Asset Pricing Model (Updated)
Attachment ES-VVR-7R	Risk Premium Method (Updated)
Attachment ES-VVR-8R	Mr. Rothschild’s Estimates of Option-Implied Growth Estimates for the DCF Model
Attachment ES-VVR-9R	Mr. Rothschild’s Estimates of Option-Implied Betas for the CAPM

12

1 **Q. Please provide a summary of the principal conclusions that you have arrived at within**  
2 **your rebuttal testimony.**

3 A. Within my rebuttal testimony, I present arguments and evidence which demonstrate that  
4 the recommendations of the Opposing Witnesses are flawed, and should therefore be  
5 rejected by the Commission. In forming their recommendations, the Opposing Witnesses  
6 have relied upon assumptions, analyses and conclusions which suffer from a number of  
7 critical shortcomings, as summarized below:

- 8 • The cost of equity recommendations of DOE witness Woolridge, OCA  
9 witness Rothschild and supporting position of OCA witness Vatter<sup>1</sup> do not  
10 adequately recognize the increase in long-term capital costs that has  
11 occurred in recent years. This is clearly demonstrated by the fact that both  
12 U.S. Treasury and utility bond yields are significantly higher in the current  
13 market environment than during the time of the Company's last rate  
14 proceeding in 2019 (Case No. DE-19-057), which suggests that PSNH's  
15 cost of equity is also higher now than at the time of the Company's last rate  
16 proceeding. Notwithstanding these recent capital market trends, Mr.  
17 Rothschild has nevertheless recommended a cost of equity in this  
18 proceeding that is *significantly lower* than the 9.30 percent ROE authorized  
19 by the Commission in the Company's 2019 rate proceeding.
- 20 • Dr. Woolridge has proposed a cost of equity of 9.50 percent in the instant  
21 proceeding, but only if his hypothetical capital structure consisting of 50.0  
22 percent long-term debt and 50.0 percent common equity is adopted by the  
23 Commission. To the extent that the Company's proposed capital structure  
24 is adopted, Dr. Woolridge instead proposes a cost of equity of 9.25 percent.  
25 As I will discuss further herein, neither of Dr. Woolridge's respective cost  
26 of equity recommendations reflect the prevailing opportunity cost of capital  
27 for utility stock investors, which is demonstrated by the fact that the national

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<sup>1</sup> Note that OCA witness Vatter has not made a specific cost of equity recommendation in this proceeding, but has conducted a quantitative analysis which he maintains further supports Mr. Rothschild's cost of equity recommendation in this proceeding.

1 average of authorized ROEs granted to electric utilities during 2024 was  
2 9.74 percent.<sup>2</sup>

- 3 • Mr. Rothschild’s proposed cost of equity of 8.13 percent does not even  
4 remotely reflect the opportunity cost of capital for utility stock investors,  
5 which is demonstrated by the recent national averages of authorized ROEs  
6 for electric utilities. As noted earlier, during 2024, the national average of  
7 authorized ROEs granted to U.S. electric utilities was 9.74 percent, which  
8 is 161 basis points higher than Mr. Rothschild’s ROE recommendation of  
9 8.13 percent. The fact that Mr. Rothschild’s cost of equity recommendations  
10 are so far removed from the realities of the U.S. capital markets and the  
11 recent national averages of authorized ROEs is further demonstrated by the  
12 fact that over the past five years (2020-2024), 98 percent of the authorized  
13 ROE decisions for electric utilities in the U.S. have been higher than Mr.  
14 Rothschild’s recommended ROE of 8.13 percent. For these reasons, it is  
15 clear that his cost of equity recommendations in this proceeding are  
16 woefully understated and are inconsistent with the comparable earnings  
17 standard established in Hope and Bluefield.
- 18 • The approaches and input assumptions that Mr. Woolridge has applied to  
19 his discounted cash flow (“DCF”), and capital asset pricing model  
20 (“CAPM”) analyses are subject to a number of shortcomings, and as a  
21 result, they materially understate the Company’s cost of equity in the  
22 current market environment. Of particular note, with respect to his DCF  
23 analysis, Mr. Woolridge’s excessive reliance upon dividend-per-share  
24 (“DPS”), book-value-per-share (“BVPS”) and retention growth rate  
25 measures, which are not widely-referenced by investors, causes his DCF  
26 estimates of the cost of equity to be materially understated.

27 With respect to Dr. Woolridge’s CAPM analysis, his decision to reject the  
28 beta coefficients currently reported by Value Line, which he attempts to  
29 justify on the basis of a short-period of market volatility associated with the  
30 COVID-19 pandemic, should be rejected, since the period of time in  
31 question remains part of the historical market record. In addition, his  
32 estimate of the market risk premium, which is based entirely on various  
33 publications and surveys rather than direct market data, introduces  
34 subjective bias into his CAPM analysis. As a result, his CAPM-based  
35 estimates of the cost of equity do not appropriately recognize the random-  
36 walk nature of stock market returns.

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<sup>2</sup> Major Energy Rate Case Decisions in the U.S., January-December 2024, RRA Regulatory Focus, S&P Global, February 4, 2025, at 3.

- 1           • Mr. Rothschild’s implementation of the DCF and CAPM models also suffer  
2 from a number of critical shortcomings. Most notably, he has relied upon  
3 proprietary and highly unconventional approaches in conducting his DCF  
4 and CAPM analyses, for which he has not provided any evidence  
5 demonstrating that his approaches are widely-utilized by investors. For  
6 these reasons, his modeling results are highly unlikely to reflect the actual  
7 return expectations of equity investors. Along these lines, Mr. Rothschild  
8 has placed significant emphasis on using stock options trading data as the  
9 underlying basis for deriving the required inputs for his analytical models,  
10 despite the fact that stock options are predominately used for either hedging  
11 purposes or speculative trading purposes, rather than as a direct  
12 measurement of the cost of equity capital.

13           With respect to his constant-growth DCF analysis, Mr. Rothschild has also  
14 placed excessive reliance upon the sustainable growth rate methodology,  
15 despite the fact that the empirical finance literature has demonstrated that  
16 the sustainable growth rate method is not as closely correlated to measures  
17 of a stock’s valuation as compared to the EPS growth estimates of equity  
18 analysts. In addition, Mr. Rothschild’s use of “option-implied” growth rates  
19 in the constant-growth DCF model suffers from a host of data integrity  
20 issues, as I will further discuss herein . At the same time, Mr. Rothschild  
21 has not provided any evidence that investors actually utilize option-implied  
22 growth rates in implementing the constant-growth DCF model.

23           Meanwhile, Mr. Rothschild’s CAPM analyses produce estimates of the cost  
24 of equity that are vastly understated, as low as 6.16 percent, which is only  
25 marginally higher than recent trading yields on “Baa” rated long-term utility  
26 bonds (5.77 percent).<sup>3</sup> This provides clear evidence that Mr. Rothschild’s  
27 CAPM results do not reflect a sufficient enough equity risk premium to  
28 adequately compensate investors for assuming the higher level of risks  
29 associated with common stock investments. Moreover, as was the case with  
30 Mr. Rothschild’s use of option-implied growth rates in the DCF model, his  
31 use of option-implied betas and an option-implied market risk premium in  
32 his CAPM analysis also suffers from data integrity issues. Lastly, Mr.  
33 Rothschild has not provided any evidence that investors actually utilize  
34 option-implied beta coefficients or option-implied market risk premiums  
35 when implementing the CAPM. When asked in Data Request PSNH-OCA  
36 2-4 that he provide copies of verifiable studies or other evidence of which  
37 he is aware that demonstrates that option-implied betas and risk premiums

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<sup>3</sup> Source of data: Mergent Bond Record, January 2025, (Volume 90, No. 1), at 408. Average trading yield for “Baa” rated long-term utility bonds during December 2024.

1 are widely-used by investors in implementing the CAPM, Mr. Rothschild  
2 could not produce any such verifiable evidence.

- 3
- 4 • Mr. Vatter’s quantitative evaluation also suffers from a number of critical  
5 shortcomings. As is the case with Mr. Rothschild’s evaluation, Mr. Vatter  
6 has also relied upon proprietary and unconventional approaches in  
7 conducting his evaluation, and he has not provided any evidence  
8 demonstrating that his approaches are actually utilized by investors. For  
9 this reason, his modeling results are highly unlikely to reflect the actual  
10 return expectations of equity investors.
  - 11 • Mr. Vatter’s CAPM analysis produces a woefully understated estimate of  
12 the cost of equity for Eversource Energy of 7.67 percent, which is the end-  
13 product of flawed input assumptions with respect to his estimates of the  
14 risk-free rate of return, the beta coefficient, and the market risk premium.  
15 Moreover, Mr. Vatter’s focus on Eversource Energy as a “target” company  
16 for cost of capital estimation purposes<sup>4</sup> violates the standalone principle of  
17 utility ratemaking. In addition, Mr. Vatter’s attempt at predicting “inferred  
18 market ROEs” on the basis of “allowed book ROEs” through his M/B  
19 adjustment approach is also flawed, since it is based on the fallacious  
20 assumption that whenever a utility’s M/B ratio exceeds 1.0x or unity, this  
21 suggests that the utility is “over-earning” its market-determined cost of  
22 equity. As I will discuss further herein, if this were actually the case, then  
23 virtually every company included in the S&P 500 Index would be over-  
24 earning its market-determined cost of equity, which is simply illogical.
  - 25 • None of the Opposing Witnesses in this proceeding have conducted a  
26 comprehensive comparative risk assessment to evaluate the differences in  
27 business and financial risks between PSNH and the respective proxy group  
28 companies, which causes their cost of capital evaluations to be unreliable.
  - 29 • Dr. Woolridge’s alternative recommendation to apply a 25 basis point  
30 reduction<sup>5</sup> to PSNH’s authorized ROE in the event that the Commission  
31 adopts the Company’s proposed capital structure constitutes a de facto  
32 hypothetical capital structure adjustment and should therefore be rejected.  
33 Likewise, Mr. Rothschild makes a similar recommendation to apply a 27

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<sup>4</sup> Vatter Direct, at 2.

<sup>5</sup> Dr. Woolridge has recommended that in the event that the Commission adopts PSNH’s proposed capital structure in this proceeding, the Commission should authorize an ROE of 9.25 percent for the Company, rather than the 9.50 percent ROE he recommends if his hypothetical capital structure is adopted.



1 basis point reduction<sup>6</sup> to PSNH's authorized ROE if the Commission adopts  
2 the Company's proposed capital structure. Both Dr. Woolridge and Mr.  
3 Rothschild make these recommendations despite the fact that, as I will  
4 demonstrate herein, the Company's proposed equity capitalization ratio is  
5 well-within the range of the equity capitalization ratios for the operating  
6 utilities included in the Rea Electric Group, as well as the average equity  
7 capitalization ratio adopted by the Commission for both electric and gas  
8 utilities in New Hampshire over the five years.

9  
10 **II. UPDATE TO COST OF EQUITY QUANTITATIVE EVALUATION**

11 **Q. Please summarize the results of your updated cost of equity quantitative analyses.**

12 A. The summarized results of my updated quantitative analyses are presented in Table 2R,  
13 Table 3R and Table 4R below, and are further detailed in Attachments ES-VVR-2R  
14 through ES-VVR-7R, which accompany by rebuttal testimony. Table 2R below presents  
15 the results of my updated quantitative analyses for each of the respective analytical models  
16 that I evaluated by utilizing the market and financial data of the companies comprising the  
17 three proxy groups shown in Table 2R below.

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<sup>6</sup> Mr. Rothschild has recommended that in the event that the Commission adopts PSNH's proposed capital structure in this proceeding, the Commission should authorize an ROE of 7.86 percent for the Company, rather than the 8.13 percent ROE he recommends if his hypothetical capital structure is adopted.

<b>Table 2R Indicated Cost of Equity for the Proxy Groups</b>			
<b>Method/Model</b>	<b>Electric Group</b>	<b>Gas LDC Group</b>	<b>Non-Regulated Group</b>
DCF Method	10.69%	10.44%	10.69%
Traditional CAPM	10.78%	10.78%	10.65%
CAPM (w/size adj.)	11.24%	11.39%	10.59%
ECAPM	10.91%	10.91%	10.81%
Risk Premium Method	11.13%	11.05%	10.98%

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A further analysis of the results reflected in Table 2R above yielded the following measures of central tendency for each of the analytical methods employed, as reflected in Table 3R and Table 4R below. Specifically, Table 3R presents these measures of central tendency for the Rea Electric Group only, while Table 4R presents the measures of central tendency on a combined basis for the Rea Electric Group, Gas LDC Group and the Non-Regulated Group.

<b>Table 3R Cost of Equity Estimates Measures of Central Tendency for the Rea Electric Group</b>	
Median DCF Result	10.69%
Average DCF Result	10.69%
Median CAPM Result	10.91%
Average CAPM Result	10.98%
Median RPM Result	11.13%
Average RPM Result	11.13%

8

<b>Table 4R Cost of Equity Estimates Measures of Central Tendency for the Combined Proxy Groups</b>	
Median DCF Result	10.69%
Average DCF Result	10.61%
Median CAPM Result	10.81%
Average CAPM Result	10.90%
Median RPM Result	11.05%
Average RPM Result	11.05%

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As was the case with the recommendations in my direct testimony, I have placed primary emphasis on the cost of equity estimates derived for the Rea Electric Group, and have therefore viewed the results produced from my evaluation of the Gas LDC Group and the Non-Regulated Group as a further validation of the cost of equity estimates yielded for the Rea Electric Group. At the same time, it is important to recognize that the cost of equity estimates derived for the Non-Regulated Group provide useful perspective into the returns required by investors for non-utility investments with risk profiles that are similar to the Company, and therefore reflect the “competitive market result” that utility regulation is intended to replicate.

**Q. How do the results of your updated quantitative evaluation generally compare to your original quantitative results that you presented in your direct testimony?**

A. On an overall basis, my updated quantitative analyses suggest that PSNH’s cost of equity is marginally higher now in the current market environment than it was at the time the Company filed its case-in-chief in June 2024. This is to a large degree attributable to the

1 material increase in long-term interest rates that has occurred in recent months, which I  
2 will discuss further herein. In addition, the average Value Line beta coefficients for the  
3 utility proxy group companies have also increased since the time that the Company filed  
4 its case-in-chief. Both of these recent trends have contributed to marginally higher  
5 estimates of the cost of equity under both my CAPM and RPM analyses. At the same  
6 time, the DCF-based estimates of the cost of equity produced by my updated analyses are  
7 generally the same as, or slightly lower than, the results produced by my original analysis,  
8 which is to some extent attributable to the higher relative trading valuations seen in the  
9 U.S. equity market in recent months.

10  
11 After reviewing my original evaluation, and giving consideration to my updated results, I  
12 have once again concluded that a reasonable estimate of PSNH's cost of equity is in the  
13 range of 10.30 percent to 11.30 percent, and that a midpoint estimate of 10.80 percent fairly  
14 represents the Company's cost of equity in the current market environment. This  
15 conclusion is further supported by the fact that, on balance, my updated quantitative  
16 evaluation suggests that PSNH's cost of equity is marginally higher now than it was at the  
17 time the Company filed its case-in-chief. Notwithstanding these most recent capital market  
18 developments, the Company continues to propose a 10.30 percent cost of equity in this  
19 proceeding, which is at the lower-end of my recommended range.

1 **III. OVERVIEW OF THE RECOMMENDATIONS OF THE OPPOSING WITNESSE**

2 **Q. Please provide an overview of DOE witness Woolridge’s cost of equity and capital**  
3 **structure recommendations in this proceeding.**

4 A. Dr. Woolridge’s overall range estimate of the cost of equity for PSNH is between 9.25  
5 percent and 9.75 percent, and he has recommended a 9.50 percent point estimate of the  
6 cost of equity,<sup>7</sup> but only if the hypothetical capital structure he has recommended,  
7 consisting of 50 percent long-term debt and 50 percent common equity,<sup>8</sup> is adopted by the  
8 Commission. In the event that the Commission adopts the Company’s proposed capital  
9 structure with a common equity ratio of 53.85 percent, Dr. Woolridge instead recommends  
10 a cost of equity for the Company of 9.25 percent.<sup>9</sup> In conducting his cost of equity  
11 evaluation, Dr. Woolridge referenced both an electric utility proxy group of 24 companies  
12 that he developed (which I will refer to herein as the “Woolridge Electric Group”), and  
13 also the same electric proxy group consisting of 11 companies that I referenced in my direct  
14 testimony (which I will refer to herein as the “Rea Electric Group”).<sup>10</sup> In conducting his  
15 cost of capital evaluation, Dr. Woolridge applied the constant growth version of the  
16 discounted cash flow model (“DCF” model),<sup>11</sup> and a traditional Capital Asset Pricing  
17 Model (“CAPM”) analysis<sup>12</sup>. Based upon his application of the aforementioned analytical  
18 models to the market and financial data of the proxy group companies, Dr. Woolridge’s  
19 cost of equity results were determined to be as reflected in Table 5R below:  
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<sup>7</sup> Woolridge Direct, at 5.

<sup>8</sup> Id., at 5.

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<b>Table 5R DOE Witness Woolridge’s Cost of Equity Estimates and Recommendations</b>		
<b>Method / Analytical Model</b>	<b>Woolridge Electric Group Results</b>	<b>Rea Electric Group Results</b>
Constant Growth DCF Model	9.70%	10.00%
Capital Asset Pricing Model (CAPM)	8.90%	8.85%
Cost of Equity Range Estimate for PSNH	8.90% - 9.70%	8.85% - 10.00%
Cost of Equity Point Estimate Recommendation for PSNH (Woolridge Hypothetical Capital Structure)	9.50%	9.50%
Cost of Equity Point Estimate Recommendation for PSNH (Company’s Proposed Capital Structure)	9.25%	9.25 %

2 As reflected in Table 5R above, Dr. Woolridge’s evaluation yielded an overall cost of  
3 equity range for PSNH of between 8.85 percent and 10.00 percent, and he has  
4 recommended a point estimate of the cost of equity of 9.50 percent if his proposed  
5 hypothetical capital structure is adopted, and a cost of equity of 9.25 percent if the  
6 Company’s proposed capital structure is adopted. Additionally, as reflected in Attachment  
7 JRW-2 to his direct testimony, Dr. Woolridge has recommended an overall weighted  
8 average cost of capital for PSNH of 6.80 percent, which incorporates Dr. Woolridge’s

<sup>9</sup> Id., at 6.

<sup>10</sup> Id., at 25-27

<sup>11</sup> The summary results of Dr. Woolridge’s DCF model analyses are presented in Table 7 (p. 66) in his direct testimony, and also within Attachment JRW-6.

<sup>12</sup> The summary results of Dr. Woolridge’s CAPM model analyses are presented in Table 8 (p.85) in his direct testimony, and also within Attachment JRW-7.

1 proposed hypothetical capital structure consisting of 50.0 percent long-term debt and 50.0  
2 percent common equity.

3 **Q. Please provide an overview of Mr. Rothschild’s cost of equity and capital structure**  
4 **recommendations in this proceeding.**

5 A. Mr. Rothschild’s overall range estimate of the cost of equity for PSNH is between 6.60  
6 percent and 8.13 percent, and he has recommended a 8.13 percent point estimate of the  
7 cost of equity, but only if the hypothetical capital structure he has recommended, consisting  
8 of 52.76 percent long-term debt and 47.24 percent common equity, is adopted by the  
9 Commission.<sup>13</sup> In the event that the Commission adopts the Company’s proposed capital  
10 structure with a common equity ratio of 53.85 percent, Mr. Rothschild instead recommends  
11 a cost of equity for the Company of 7.86 percent.<sup>14</sup> In conducting his cost of equity  
12 evaluation, Mr. Rothschild applied a Constant Growth Discounted Cash Flow (“DCF”)  
13 analysis, a Non-Constant Growth DCF analysis, and a Capital Asset Pricing Model  
14 (“CAPM”) analysis to his proxy group (the “RFC Electric Proxy Group”) of 11 publicly-  
15 traded electric utility holding companies. In view of the fact that the composition of Mr.  
16 Rothschild’s electric proxy group is identical to the electric proxy group that was defined  
17 earlier in my response to Dr. Woolridge as the “Rea Electric Group”, I will refer to Mr.  
18 Rothschild’s proxy group throughout the remainder of my rebuttal testimony as the “Rea  
19 Electric Group”. Based upon his application of the aforementioned analytical models to

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<sup>13</sup> Rothschild Direct, at 10-11.

<sup>14</sup> Id., at 11.

1 the market and financial data of the Rea Electric Group companies, Mr. Rothschild’s cost  
2 of equity results were determined to be as outlined in Table 6R below<sup>15</sup>:

<b>Table 6R OCA Witness Rothschild’s Cost of Equity Estimates and Recommendations</b>	
<b>Method / Analytical Model</b>	<b>Range of Recommendations</b>
Constant Growth DCF Model - Sustainable Growth - Option-Implied Growth	8.25% - 8.35% 8.59% - 8.90%
Non-Constant Growth DCF Model	7.24% - 7.63%
CAPM <sup>16</sup>	6.16% - 7.09%
Outer Percentile Range of Estimates	6.60% - 8.13%
Cost of Equity Recommendation for PSNH at Rothschild Proposed Capital Structure	8.13%
Cost of Equity Recommendation for PSNH at Company’s Proposed Capital Structure	7.86%

3  
4 As reflected in Table 6R above, Mr. Rothschild’s evaluation yielded a range of cost of  
5 equity estimates between 8.25 percent and 8.90 percent under his Constant Growth DCF  
6 analyses; a range of 7.24 percent to 7.63 percent under his Non-Constant Growth DCF

<sup>15</sup> Also see Exhibits ALR-1, ALR-2, ALR-3 and ALR-4 to Mr. Rothschild’s direct testimony.

<sup>16</sup> In deriving his CAPM range estimate of the cost of equity, Mr. Rothschild evaluated both the 3-month weighted average assumed risk-free rate of return (for the period between September 2024 and November 2024) for both U.S. Treasury bills and the 30-year U.S. Treasury bond, and also referenced “spot” data as of November 30, 2024.



1 analysis; and a range of 6.16 percent to 7.09 percent under his CAPM analysis. Mr.  
2 Rothschild then eliminated the “top and bottom 28% of results”,<sup>17</sup> based upon the range of  
3 outcomes for each of the analytical models he evaluated. This approach yielded Mr.  
4 Rothschild’s overall recommended cost of equity range of 6.60 percent to 8.13 percent,  
5 which he describes as the “outer percentile range”<sup>18</sup> of estimates. Furthermore, as reflected  
6 in Table 1 (p. 11) in his direct testimony, Mr. Rothschild has recommended an overall  
7 weighted average cost of capital for PSNH of 6.00 percent, which incorporates Mr.  
8 Rothschild’s proposed hypothetical capital structure consisting of 52.76 percent long-term  
9 debt and 47.24 percent common equity.

10 **Q. Please provide an overview of Mr. Vatter’s cost of equity recommendations in this**  
11 **proceeding.**

12 A. Mr. Vatter states in his testimony that his cost of equity quantitative evaluation in this  
13 proceeding is designed to complement and support the testimony of OCA witness Aaron  
14 Rothschild.<sup>19</sup> Although Mr. Vatter discusses various levels of allowed ROEs that may be  
15 appropriate in the instant proceeding,<sup>20</sup> I could not find a conclusive recommendation in  
16 his testimony which stated his specific cost of equity recommendation for PSNH in this  
17 proceeding. However, Mr. Vatter did indicate in his response to Data Request No. PSNH-  
18 OCA 1-8 that he supports Mr. Rothschild’s cost of equity recommendation in this

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<sup>17</sup> Rothschild Direct, at 13.

<sup>18</sup> Id., at 13, and footnote 13 (p.13).

<sup>19</sup> Vatter Direct, at 2.

<sup>20</sup> Id., at 14-15.

1 proceeding. Notably, Mr. Vatter has not conducted a comprehensive cost of equity  
2 evaluation in this proceeding, but has instead focused his evaluation on his “CAPM with  
3 trending betas” approach,<sup>21</sup> which he further supports by deriving “inferred market  
4 ROEs”,<sup>22</sup> which he derives by dividing various realized and/or allowed book ROEs  
5 assumptions by Eversource Energy’s recent average market-to-book (“M/B”) ratio.

6 Mr. Vatter’s cost of equity evaluation is comprised of two fundamental components. The  
7 first component of his evaluation is his “holding company analysis”, where he use utilizes  
8 a ”panel” study for which he evaluated the three electric utility holding companies with  
9 operations in New Hampshire (including Eversource Energy, Unitil Corporation and  
10 Algonquin Power & Utilities).<sup>23</sup> Mr. Vatter justifies this approach by arguing that the  
11 regional economy encompassing New Hampshire “can be unique”.<sup>24</sup> In conducting his  
12 holding company analysis, Mr. Vatter also separately conducted a “time-series” analysis  
13 for Eversource Energy.<sup>25</sup> The second component of Mr. Vatter’s evaluation is his utility-  
14 level analysis, where he evaluated the moving average book value ROEs for three of  
15 Eversource’s Energy operating utilities, including the Company (PSNH), Connecticut  
16 Light & Power, and Yankee Gas.<sup>26</sup>

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<sup>21</sup> Id., at 3.

<sup>22</sup> Id., at 8.

<sup>23</sup> Id., at 3-5.

<sup>24</sup> Id., at 36.

<sup>25</sup> Id., at 3-5.

<sup>26</sup> Id., at 7-12.

1 **Q. Please provide an overview of Walmart witness Perry's cost of equity**  
2 **recommendations in this proceeding.**

3 A. Although Ms. Perry has not conducted a quantitative cost of equity evaluation in this  
4 proceeding, she has made several general recommendations regarding the factors that she  
5 believes the Commission should consider in arriving at an appropriate authorized ROE for  
6 the Company in this proceeding. Ms. Perry's recommendations are best summarized in the  
7 following statement that she makes in her direct testimony:

8 (1) The Commission should thoroughly and carefully consider the impact  
9 on customers associated with the ROE requested by the Company, in  
10 addition to all other facets of this case, to ensure that any increase in the  
11 Company's rates reflects the minimum amount necessary to compensate the  
12 Company for adequate and reliable service, *while also providing the*  
13 *Company an opportunity to earn a reasonable return for its shareholders*  
14 (emphasis added).

15  
16 (2) The Commission should closely examine the Company's proposed  
17 revenue requirement increase and the associated ROE in light of: (a) The  
18 customer impact of the resulting revenue requirement increase as discussed  
19 below; (b) The use of a risk-reducing ratemaking structures such as the  
20 Company's proposed step increases in revenue requirement, which remove  
21 the risk of regulatory lag and rate case review for those costs, and alternative  
22 ratemaking such as the Company's requested PBR plan; (c) The Company's  
23 currently approved ROE; and (d) Recent ROEs approved in New  
24 Hampshire and other jurisdictions nationwide, which do not support the  
25 Company's requested ROE.<sup>27</sup>

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<sup>27</sup> Perry Direct, at 4-5.

1 **IV. INITIAL REACTIONS TO THE RECOMMENDATIONS OF THE OPPOSING**  
2 **WITNESSES**

3 **Q. What is your initial reaction to Dr. Woolridge’s recommended cost of equity for the**  
4 **Company?**

5 A. As noted earlier, Dr. Woolridge has proposed a cost of equity of 9.50 percent in the instant  
6 proceeding, but only if his hypothetical capital structure consisting of 50.0 percent long-  
7 term debt and 50.0 percent common equity is adopted by the Commission. To the extent  
8 that the Company’s proposed capital structure is adopted, Dr. Woolridge has instead  
9 proposed a cost of equity of 9.25 percent. As I will discuss further herein, neither of Dr.  
10 Woolridge’s respective cost of equity recommendations reflect the prevailing opportunity  
11 cost of capital for utility stock investors, which is demonstrated by the fact that the national  
12 average of authorized ROEs granted to electric utilities during calendar-year 2024 was 9.74  
13 percent.<sup>28</sup>

14 Specifically with regard to Dr. Woolridge’s DCF analysis, his heavy reliance on DPS,  
15 BVPS and retention growth measures, which are not widely-referenced by investors, and  
16 which do not provide the “complete picture” of investor growth expectations, causes his  
17 DCF-based estimates of the cost of equity to be materially understated. Although Dr.  
18 Woolridge maintains that he has placed the most emphasis on the EPS growth estimates of  
19 equity analysts, he nevertheless has referenced composite DCF growth rate assumptions of  
20 5.90 percent for the Woolridge Electric Group and 6.20 percent for the Rea Electric Group,

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<sup>28</sup> Major Energy Rate Case Decisions in the U.S., January-December 2024, RRA Regulatory Focus, S&P Global, February 4, 2025, at 3.

1 which are still well-below the EPS growth estimates of equity analysts ranging from 6.60  
2 percent to 7.20 percent as reflected in Attachment JRW-6 (p. 6) to his direct testimony

3 With regard to Dr. Woolridge’s CAPM analysis, his decision to reject the beta coefficients  
4 currently reported by Value Line, which he attempts to justify on the basis of a short-period  
5 of market volatility during the COVID-19 pandemic, should be rejected, since the period  
6 of time in question remains part of the historical market record. In addition, his estimate  
7 of the market risk premium (5.00 percent) which is entirely based on various publications  
8 and surveys, introduces subjective bias into his CAPM analysis. In this regard, the  
9 publications and surveys that he references do not recognize the “random-walk” nature of  
10 stock market returns. I will further discuss the shortcomings that I found in Dr.  
11 Woolridge’s cost of equity evaluation later in the DCF and CAPM sections of my rebuttal  
12 testimony. Suffice to say, however, both his DCF and CAPM-based estimates of the cost  
13 of equity are significantly understated.

14 **Q. What are your initial reactions to Mr. Rothschild’s cost of equity and capital**  
15 **structure recommendations for PSNH in this proceeding?**

16 A. Mr. Rothschild’s proposed cost of equity recommendation does not even remotely meet  
17 established regulatory and judicial standards<sup>29</sup> for determining a fair rate of return in utility  
18 rate proceedings. His recommended cost of equity of 8.13 percent falls far outside of the  
19 range of the recent national averages of authorized ROEs for electric utilities, which, as

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<sup>29</sup> *See, Bluefield Water Works and Improvement Company v. Public Service Commission of the State of West Virginia*, 262 U.S. 679, 692 (1923), and *Federal Power Commission et.al. v. Hope Natural Gas Company*, 320 U.S. 591, 603 (1944).

1 noted earlier, was 9.74 percent during calendar-year 2024.<sup>30</sup> Mr. Rothschild's cost of  
2 equity recommendation is 161 basis points below the recent national average of authorized  
3 ROEs for electric utilities, and if adopted, would not allow the Company to earn the  
4 prevailing opportunity cost of capital. This is further demonstrated by the fact that Mr.  
5 Rothschild's cost of equity recommendation does not recognize the upward trend in  
6 authorized ROEs that has occurred since the time of the Company's 2019 base rate  
7 proceeding. In fact, the national average of authorized ROEs for electric utilities for each  
8 year since the time of the Company's 2019 rate proceeding has followed a general upward  
9 trend as follows: 9.44% (2020), 9.38% (2021), 9.54% (2022), 9.60% (2023), 9.74%  
10 (2024).<sup>31</sup> In addition, his proposed cost of equity of 8.13 percent also does not recognize  
11 the significant increase in long-term interest rates that has occurred in recent years, which  
12 I will demonstrate herein. In summary, despite the fact that both authorized ROEs and  
13 long-term capital costs have clearly increased in recent years, and particularly since the  
14 time of the Company's 2019 rate proceeding, Mr. Rothschild has nevertheless  
15 recommended a cost of equity in this proceeding (8.13 percent) which is 117 basis points  
16 lower than the 9.30 percent ROE authorized by the Commission in PSNH's 2019 rate  
17 proceeding, during which time long-term capital costs in the U.S. were significantly lower.

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<sup>30</sup> Major Energy Rate Case Decisions in the U.S., January-December 2024, RRA Regulatory Focus, S&P Global, February 4, 2025, at 3.

<sup>31</sup> Id., at Databook (Table 3).

1 **Q. What other initial reactions do you have to Mr. Rothschild’s cost of equity and capital**  
2 **structure recommendations in this proceeding?**

3 A. In forming his cost of equity recommendations, Mr. Rothschild has relied upon  
4 assumptions, analyses and conclusions which suffer from a number of infirmities, and  
5 should therefore be rejected by the Commission. First, Mr. Rothschild’s implementation  
6 of the Constant Growth DCF model is flawed due to the fact that he relied upon sustainable  
7 growth and option-implied growth rates, which, as I will demonstrate herein, are not widely  
8 referenced by investors. Second, Mr. Rothschild’s implementation of the CAPM is also  
9 flawed because he has relied exclusively upon option-implied betas and option-implied  
10 estimates of the market risk premium that he developed on the basis of research that is  
11 considered to be experimental and which produce estimates that are grossly inconsistent  
12 with the estimates produced by the conventional methods of estimation widely-utilized in  
13 utility rate proceedings. Third, Mr. Rothschild’s option-implied growth rates in his DCF  
14 analysis and his option-implied betas in his CAPM analysis are based on incomplete data  
15 where it was necessary for Mr. Rothschild to apply his subjective judgment by “filling-in”  
16 unavailable data by either interpolating the data or holding the data constant over multiple  
17 periods. Fourth, as I will discuss further herein, Mr. Rothschild’s recommendation that  
18 PSNH should reference a hypothetical capital structure for ratemaking purposes is  
19 unsupported. Therefore, as a result of the aforementioned infirmities in Mr. Rothschild’s  
20 cost of equity evaluation, both his model results and his recommendations are woefully  
21 understated, and should therefore be rejected.

1 **Q. In defending his cost of equity recommendations, Mr. Rothschild has presented**  
2 **various surveys and publications which suggest that future return expectations for**  
3 **U.S. equities are currently lower than historical market returns<sup>32</sup>. How do you**  
4 **respond to the conclusions drawn in these surveys and publications?**

5 A. My initial reaction to these surveys and publications would be to question the powers of  
6 prognostication that are incorporated into these various studies and surveys, particularly  
7 since 98 years of documented U.S. stock market history presents a very different story.  
8 While Mr. Rothschild presents various surveys and publications in Table 4 (p. 17) of his  
9 direct testimony which show various predictions of future U.S. equity returns ranging from  
10 6.0 percent and 8.5 percent, the *Kroll Cost of Capital Navigator* reports that over the past  
11 98 years (1926-2023), the historical average market return for large-capitalization stocks  
12 has been 12.04 percent. This is the pertinent benchmark return value to reference, since  
13 over the very long-run (i.e., 98 years), investor expectations are realized, and to my  
14 knowledge, there are no particularly compelling reasons to believe that future returns will  
15 be significantly lower. This is particularly the case in the view of the rapidly growing  
16 artificial intelligence revolution, which has the potential to significantly increase U.S. stock  
17 market returns well into the foreseeable future.

18 It is important to recognize that evaluating the historical returns of large-capitalization  
19 stocks provides an *unbiased* estimate of future market return expectations. This is because  
20 these historical returns reflect repeated observations of a variable that has behaved  
21 randomly in the past (U.S. stock market returns), and therefore, are devoid of subjective  
22

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<sup>32</sup> Rothschild Direct, at Table 4 (p. 17).



1 bias. In contrast, a common thread that runs through the surveys and publications that Mr.  
2 Rothschild has referenced is *recency bias*, which in this case is the fallacy of extrapolating  
3 a continuation of today's stock market conditions well into the distant future. There is  
4 simply no legitimate basis for making this assumption, as the past 98 years of U.S. stock  
5 market history has taught investors otherwise. Indeed, random-walk theory<sup>33</sup> has  
6 demonstrated that U.S. equity returns behave independently of recent historical returns,  
7 and for this reason, using data from surveys and publications to estimate future market  
8 returns is of limited value due to their inherent subjective bias.

9 In addition, the surveys and publications referenced by Mr. Rothschild suffer from other  
10 shortcomings. Mr. Rothschild has referenced a Horizon Actuarial Services, LLC Survey  
11 which surveys a number of financial institutions in an attempt to predict future market  
12 returns for purposes of actuarial calculations.<sup>34</sup> Mr. Rothschild also references the J.P.  
13 Morgan Asset Management 2025 Long-Term Capital Market Assumptions report, and a  
14 Charles Schwab article that discusses projected long-term market returns.<sup>35</sup> However, a  
15 closer examination of these publications reveals that the expected returns contained in all  
16 of these reports are based upon geometric averages, which the finance literature has clearly  
17 demonstrated is an inappropriate basis for purposes of projecting future market returns.

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<sup>33</sup> As defined by Investopedia, "Random walk theory suggests that changes in stock prices have the same distribution and are independent of each other. Therefore, it assumes the past movement or trend of a stock price or market cannot be used to predict its future movement. In short, random walk theory proclaims that stocks take a random and unpredictable path that makes all methods of predicting stock prices futile in the long run". *See*, Random Walk Theory Definition and Example (investopedia.com).

<sup>34</sup> Rothschild Direct, at Table 4 (p. 17).

<sup>35</sup> Id.

1 Multiple academic studies and financial publications<sup>36</sup> have made clear that the arithmetic  
2 mean is the appropriate basis to employ when estimating the forward-looking market return  
3 and risk premium expectations of investors. This is attributable to the fact that the  
4 arithmetic mean is the unbiased estimate of a security's expected future return, in that it  
5 incorporates the variability of historical returns into future return expectations. In contrast,  
6 the geometric mean does not incorporate the expected future variability of equity returns  
7 into the expected market return. In fact, the variability of investment returns has been  
8 removed from the geometric mean, which provides a "smoothed" growth calculation, and  
9 which is further illustrated by the fact that the geometric mean invariably has a standard  
10 deviation of *zero*.

11  
12 Considering that equity investors would in fact be exposed to potential wide variations in  
13 investment returns in the future, these backward-looking geometric returns are not an  
14 appropriate basis for estimating the forward-looking return expectations of utility stock  
15 investors. Therefore, Mr. Rothschild's reliance upon publications that reference geometric  
16 averages in estimating future market returns is a flawed approach.

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<sup>36</sup> *See*, Ibbotson Associates, *Stocks, Bonds, Bills, and Inflation*, 2005 Yearbook, Valuation Edition, at 75; Brealey, R., Myers, S., and Allen, P. *Principles of Corporate Finance*, International Edition, New York: McGraw-Hill, 2011, at 159; Bodie, Z., Kane, A., and Marcus, A.J. *Investments*, New York: McGraw-Hill Irwin, 8<sup>th</sup> ed., 2009, at 126-127; Brigham, E.F. and Ehrhardt, M. *Financial Management: Theory and Practice*, 8<sup>th</sup> ed., Hinsdale, IL, Dryden Press, 2005; and Bruner, R.F., Eades, K.M., Harris, R.S., and Higgins R.C. "Best Practices in Estimating the Cost of Capital: Survey and Synthesis," *Financial Practice and Education*, Spring/Summer 1998, at 13-28.

1 **Q. Do you have any other concerns regarding the various surveys and publications that**  
2 **Mr. Rothschild references in support of his cost of equity recommendations as**  
3 **presented in Table 4 (p. 17) of his direct testimony?**

4 A. Yes, I do. Mr. Rothschild’s reference to these same types of surveys and publications in  
5 previous regulatory proceedings has proven to be an unreliable indicator of future stock  
6 market returns. For example, in a 2017 multi-docket water utility proceeding involving  
7 four California water utilities (the “2017 Water Proceeding”), Mr. Rothschild included a  
8 table in his direct testimony which referenced long-term market return projections from  
9 Charles Schwab and the McKinsey Global Institute<sup>37</sup>. As reflected in Table 7R below,  
10 while Mr. Rothschild justified his cost of equity recommendations in the 2017 Water  
11 Proceeding on the basis of the 6.60 percent to 8.70 percent projected range of market  
12 returns reflected in the Charles Schwab and McKinsey studies, the average annual return  
13 of the S&P 500 Index during the eight-year period (2017-2024) after Mr. Rothschild filed  
14 his testimony in that proceeding was actually 16.16 percent, dramatically above the market  
15 return projections that Mr. Rothschild referenced in the proceeding. Moreover, the average  
16 annual return of the S&P 500 Utilities Index during this same eight-year period was 9.83  
17 percent, which is also significantly above the market return projections referenced by Mr.  
18 Rothschild in the 2017 Water Proceeding.

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<sup>37</sup> Direct Testimony of Aaron Rothschild (Table 6), Application 17-04-001, San Jose Water Company (August 2017).

1

<b>Table 7R</b>	
<b>Expected U.S. Market Returns Referenced by Mr. Rothschild from Surveys and Studies Presented in Application 17-04-001 (San Jose Water Company)</b>	
<b>Studies and Surveys Referenced vs. Actual Annual Market Index Returns</b>	<b>Projected vs. Actual Annual Returns</b>
Charles Schwab Long-Term Market Return Projections:	-
- U.S. Large Capitalization Stocks	6.70%
- U.S. Small Capitalization Stocks	7.50%
McKinsey Global Institute - Market Return Projections	6.60% - 8.70%
S&P 500 Index - Actual Average Annual Return (2017-2024)	16.16%
S&P 500 Utilities – Actual Avg. Annual Return (2017-2024)	9.83%

2

3

4

Table 7R above demonstrates the significant subjective downward bias inherent in the surveys and publications that Mr. Rothschild referenced in the 2017 Water Proceeding. Therefore, just as these surveys and publications were proven to be an unreliable measure of future market returns back in 2017, they continue to be unreliable for purposes of the instant proceeding, and should therefore be rejected.

9

10 **Q. What are your initial reactions to the positions taken by Mr. Vatter in this**  
11 **proceeding?**

12 A. As a preliminary matter, I would first point out that Mr. Vatter’s “panel” and “time-series”  
13 analyses are based on stock price data for a very limited barometer group of utilities  
14 (consisting of Eversource Energy, Unitil Corporation and Algonquin Power & Utilities),

1 which Mr. Vatter utilizes to calculate his proprietary beta coefficients. For this reason, his  
2 analyses are unlikely to reflect the broader perspective of investor return expectations and  
3 the actual opportunity cost of capital. Considering that Mr. Vatter supports Mr.  
4 Rothschild's 8.13 percent cost of equity recommendation in this proceeding, his position  
5 is inconsistent with established regulatory and judicial standards<sup>38</sup> for determining a fair  
6 rate of return in utility rate proceedings. Again, this is clearly demonstrated by the fact that  
7 Mr. Rothschild's proposed cost of equity of 8.13 percent falls far below the recent national  
8 averages of authorized ROEs for electric utilities, which was 9.74 percent during calendar-  
9 year 2024.<sup>39</sup>

10 It is important to recognize that the underlying basis for the positions taken by Mr. Vatter  
11 in this proceeding revolve around his approach of predicting what he characterizes as  
12 "inferred market ROEs" on the basis of various levels of "allowed book ROEs", which he  
13 derives through his M/B adjustment approach. I will discuss this topic in greater detail  
14 later, but an important takeaway here is that the 7.67 percent CAPM-based cost of equity  
15 estimate that Mr. Vatter has derived under his "time-series" approach for Eversource  
16 Energy represents his estimate of the forecasted rate of return for Eversource Energy's  
17 stock,<sup>40</sup> rather than for the Company, which is contrary to the standalone principle of utility

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<sup>38</sup> *See, Bluefield Water Works and Improvement Company v. Public Service Commission of the State of West Virginia*, 262 U.S. 679, 692 (1923), and *Federal Power Commission et.al. v. Hope Natural Gas Company*, 320 U.S. 591, 603 (1944).

<sup>39</sup> Major Energy Rate Case Decisions in the U.S., January-December 2024, RRA Regulatory Focus, S&P Global, February 4, 2025, at 3.

<sup>40</sup> Vatter Direct at Table 1 (p. 4).

1 ratemaking. However, in his response to Data Request No. PSNH-OCA-1-4, Mr. Vatter  
2 would appear to fully acknowledge this principle where he states the following:

3  
4 According to that principle, though a utility be a subsidiary of a holding  
5 company, for ratemaking purposes, it is treated as an independent  
6 corporation, with, as regards its cost of capital, its own capital structure in  
7 terms of debt and equity, its own cost of debt, and its own cost of and return  
8 on equity.<sup>41</sup>  
9

10 This matter notwithstanding, Mr. Vatter's woefully understated CAPM estimate of the cost  
11 of equity of 7.67 percent is largely the end-product of his flawed CAPM analysis, which  
12 incorporates input variables that are divorced from the current realities of the U.S. capital  
13 markets. Therefore, as I will further discuss in the CAPM section of my rebuttal testimony,  
14 it is highly unlikely that Mr. Vatter's estimates of the cost of equity reflect the return  
15 expectations of utility stock investors.

16 Furthermore, Mr. Vatter's approach of predicting "inferred market ROEs" is highly  
17 suspect, as he derives his inferred ROEs on the basis of dividing realized or allowed book  
18 ROEs by Eversource Energy's recent average market-to-book value ("M/B") ratio. The  
19 fatal flaw in this approach is that although Mr. Vatter argues that when the M/B ratios of  
20 utility companies exceed 1.0x or "unity", this somehow automatically suggests that utilities  
21 are "over-earning" the market-required return on equity, this is erroneous. The fact of the  
22 matter is that the vast majority of firms operating in the competitive marketplace have M/B  
23 ratios which exceed unity (1.0x) by a significant margin. In this regard, S&P Global has  
24

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<sup>41</sup> Vatter response to Data Request No. PSNH-OCA-1-4.

1 recently reported that the average M/B ratio for the S&P 500 Utilities Index has recently  
2 been 2.36x,<sup>42</sup> while the average M/B ratio for the S&P 500 Index has recently been 5.00x.<sup>43</sup>  
3 This data is consistent with the fact that, on a historical basis, utility stock valuations have  
4 generally reflected lower M/B ratios as compared to the overall U.S. equity market.  
5 Therefore, in order to accept Mr. Vatter’s premise in this regard, one would also need to  
6 make the incorrect assumption that the overwhelming majority of companies comprising  
7 the S&P 500 Index are earning ROEs in excess of their market-determined cost of equity,  
8 which is illogical. I will discuss this particular topic in greater detail later in my response  
9 to Dr. Woolridge’s DCF analysis.

10 **Q. Do you agree with Mr. Vatter’s approach of attempting to predict “inferred market**  
11 **ROEs” on the basis of “allowed book ROEs” as reflected in Table IV (p. 11) of his**  
12 **direct testimony?**

13 A. No, I do not. As reflected in Table IV (p. 11) in his direct testimony, Mr. Vatter attempts  
14 to predict “realized inferred market ROEs” for various levels of allowed ROEs, which he  
15 derives through his M/B adjustment approach discussed earlier. One of the inferred market  
16 ROEs shown in Table IV is 7.67 percent, which reflects his CAPM estimate of the cost of  
17 equity for Eversource Energy under his “time-series” approach.<sup>44</sup> Mr. Vatter cross-  
18 references between this “inferred market ROE” of 7.67 percent and the column labeled  
19 “allowed book value ROE”, which reveals that under his M/B adjustment approach, an

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<sup>42</sup> S&P Dow Jones Indices, S&P 500 Utilities (Sector), as of December 31, 2024. Available at <https://www.spglobal.com>

<sup>43</sup> S&P Dow Jones Indices, S&P 500, as of December 31, 2024. Available at <https://www.spglobal.com>

<sup>44</sup> See Vatter Direct, at Table 1 (p. 4).

1 allowed book value ROE (or authorized ROE) of 8.63 percent would predict a 7.67 percent  
2 inferred market ROE. In the same manner, an allowed book value ROE (or authorized  
3 ROE) of 8.13 percent, which is Mr. Rothschild’s cost of equity recommendation in this  
4 proceeding, would predict a 7.17 percent inferred market ROE according to Mr. Vatter.

5 I disagree with this approach for two primary reasons, which I discussed on an individual  
6 basis earlier. To summarize, my reasons for rejecting his approach are as follows: (1) Mr.  
7 Vatter’s CAPM analysis produces a woefully understated estimate of the cost of equity for  
8 Eversource Energy of 7.67 percent, which is the end-product of his flawed input  
9 assumptions with respect to his estimates of the risk-free rate of return, the beta coefficient,  
10 and the market risk premium. Such being the case, the underlying basis that Mr. Vatter  
11 utilizes for implementing his unconventional approach is flawed to begin with; and (2) Mr.  
12 Vatter’s attempts at predicting “inferred market ROEs” for various levels of allowed book  
13 ROEs by applying his M/B adjustment approach is also flawed, since it is based on the  
14 fallacious assumption that whenever a utility’s M/B ratio exceeds 1.0x or unity, this by  
15 definition suggests that the utility is “over-earning” its market-determined cost of equity.  
16 However, if this were actually the case, then virtually every company included in the S&P  
17 500 Index would be over-earning its market-determined cost of equity, which is illogical.



1 **Q. Has Mr. Vatter provided any evidence that his approach of predicting realized**  
2 **inferred market ROEs through his M/B adjustment approach has been adopted or**  
3 **otherwise recognized by a regulatory commission in a rate case decision?**

4 A. No. In response to Data Request No. PSNH-OCA 1-7, Mr. Vatter acknowledged that he  
5 was not aware of any rate case decisions where a regulatory commission adopted or  
6 otherwise recognized his “realized inferred market ROE” methodology.

7 In the same data request response, Mr. Vatter further stated that in the Hope<sup>45</sup> decision, the  
8 U.S. Supreme Court established that when determining the fairness or reasonableness of a  
9 utility’s authorized ROE, it is the result reached that matters rather than the methodology  
10 employed. While I am aware of the end-result doctrine established by the Court in Hope,  
11 any such application of the end-result doctrine does not eliminate the need to also adhere  
12 to the comparable earnings and capital attraction standards established by the Court in  
13 Hope and Bluefield.<sup>46</sup> Considering that Mr. Vatter supports Mr. Rothschild’s 8.13 percent  
14 ROE in his proceeding, while the national average of authorized ROEs granted to electric  
15 utilities during 2024 was 9.74 percent, it is quite evident that the “end-result” he supports,  
16 if adopted, would clearly violate both the comparable earnings and capital attraction  
17 standards.

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<sup>45</sup> See, Federal Power Commission et.al. v. Hope Natural Gas Company, 320 U.S. 591, 603 (1944).

<sup>46</sup> See, Federal Power Commission et.al. v. Hope Natural Gas Company, 320 U.S. 591, 603 (1944), and Bluefield Water Works and Improvement Company v. Public Service Commission of the State of West Virginia, 262 U.S. 679, 692 (1923).

1 **Q. What are your reactions to Walmart witness Perry’s cost of equity recommendations**  
2 **in this proceeding?**

3 A. Ms. Perry correctly states in her direct testimony that the Company should be provided “an  
4 opportunity to earn a reasonable return for its shareholders”,<sup>47</sup> although she qualifies this  
5 statement on the basis of the customer rate impact concerns that she has raised. While I do  
6 understand that customer rate impact concerns with respect to proposed revenue  
7 requirement increases are certainly valid considerations, and that utility ratemaking  
8 ultimately constitutes a balancing of interests between a utility’s customers and its  
9 shareholders, the fact remains that a “reasonable return” for PSNH’s shareholders is by  
10 definition dictated by market forces. Along these lines, it is an inescapable truth that  
11 investor return expectations are driven by market-related considerations including the  
12 opportunity cost of capital, the level of comparable earnings for investments bearing  
13 similar risk profiles, and whether a utility’s authorized ROE maintains the utility’s ability  
14 to continue attracting investment capital. While appropriately recognizing the current  
15 realities of the financial markets, I would further note that Company witness Edward A.  
16 Davis will more generally address the concerns that Ms. Perry has raised regarding  
17 customer rate impacts from the proposed revenue requirement increase in this proceeding.

18  
19 With regard to Ms. Perry’s observation that PSNH’s use of risk-reducing ratemaking  
20 structures such as the Company’s proposed step increases to its revenue requirement (or  
21 alternatively, its proposed PBR Plan) would serve to reduce regulatory lag and therefore

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<sup>47</sup> Perry Direct, at 4 and 13.

1 have an impact on the Company’s risk profile and cost of equity, I have already addressed  
2 this topic at length in my direct testimony.<sup>48</sup> In this regard, it is instructive to compare the  
3 broader suite of regulatory mechanisms currently employed by the Company to those  
4 employed by the Rea Electric Group companies, since the latter provides the underlying  
5 basis for which I have developed my cost of equity recommendations in this proceeding.  
6 As discussed in my direct testimony and reflected in Attachment ES-VVR-3 thereto, the  
7 majority of the operating utilities comprising the Rea Electric Group utilize either full or  
8 partial revenue decoupling mechanisms. However, PSNH currently only benefits from  
9 limited revenue decoupling through the lost base revenues (“LBR”) mechanism under the  
10 Regulatory Reconciliation Adjustment for net metering impacts, and also under the  
11 Systems Benefits Charge (“SBC”) for energy efficiency program impacts. Therefore,  
12 PSNH’s limited decoupling mechanism through the LBR is not as comprehensive as the  
13 decoupling mechanisms employed by the majority of the operating utilities comprising the  
14 Rea Electric Group. As such, the absence of a more comprehensive revenue decoupling  
15 mechanism does increase the Company’s relative risk profile versus the Rea Electric  
16 Group, since the Company is subject to a relatively higher degree of revenue variability. It  
17 would appear that Ms. Perry has not factored this particular consideration into her  
18 recommendations.

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<sup>48</sup> See, Rea Direct, at 38-39, 47-49 and Attachment ES-VVR-3.

1 Furthermore, as reflected in Attachment ES-VVR-3 to my direct testimony, the majority  
2 of the operating utilities of the Rea Electric Group utilize either a forward test year and/or  
3 infrastructure tracking mechanisms. In contrast, PSNH does not currently benefit from a  
4 forward test year or an infrastructure cost recovery mechanism. Although the Company is  
5 proposing to implement a PBR Plan, inclusive of a capital funding mechanism called the  
6 “K-Bar”, it is my understanding that that mechanism continues to reflect regulatory lag,  
7 since the Company’s capital infrastructure investment needs are increasing at a rate faster  
8 than that mechanism allows for revenue support recognition. This increases PSNH’s risk  
9 profile to some degree as compared to the Rea Electric Group, as the Company is subject  
10 to longer delays in cost recovery (i.e., regulatory lag) with respect to its infrastructure  
11 investments. This is a particularly important observation in view of the fact that Ms. Perry  
12 has recommended that the Commission should reject the Company’s proposed PBR Plan  
13 in the instant proceeding.<sup>49</sup>

14  
15 Lastly, with regard to Ms. Perry’s observations concerning PSNH’s proposed ROE in this  
16 proceeding versus the Company’s currently authorized ROE and the recently authorized  
17 ROEs for other electric utilities nationwide, I will discuss this topic in Section V of my  
18 rebuttal testimony. However, I would just further point out here, that while Ms. Perry cites  
19 to the ROE authorized by the Commission in the Unutil Energy Systems 2022 rate  
20 proceeding (Docket No. DE-21-030) as providing evidence that the Company’s proposed  
21 ROE in this proceeding is “significantly higher”, she has failed to give adequate

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<sup>49</sup> Perry Direct, at 6.

1 consideration to the significant increase in long-term capital costs that has occurred in the  
2 U.S. since the time of the Commission’s May 2022 rate order in Unital’s 2022 rate  
3 proceeding. For example, during May 2022, the average trading yield for “Baa” rated long-  
4 term utility bonds was 5.07 percent, while during December 2024, the average trading yield  
5 for “Baa” rated utility bonds was 5.77 percent, thus representing an increase of 70 basis  
6 points.<sup>50</sup> This clearly suggests that long-term capital costs, which includes the cost of  
7 equity, have increased significantly since the time of Unital’s 2022 rate proceeding.

8 **V. THE ROE RECOMMENDATIONS OF THE OPPOSING WITNESSES WOULD**  
9 **NOT ALLOW PSNH THE OPPORTUNITY TO EARN A FAIR RATE OF**  
10 **RETURN AS COMPARED TO OTHER ELECTRIC UTILITIES NATIONWIDE**

11 **Q. Would the ROE recommendations of the Opposing Witnesses allow PSNH the**  
12 **opportunity to earn a fair return as compared to other electric utility companies**  
13 **nationwide?**

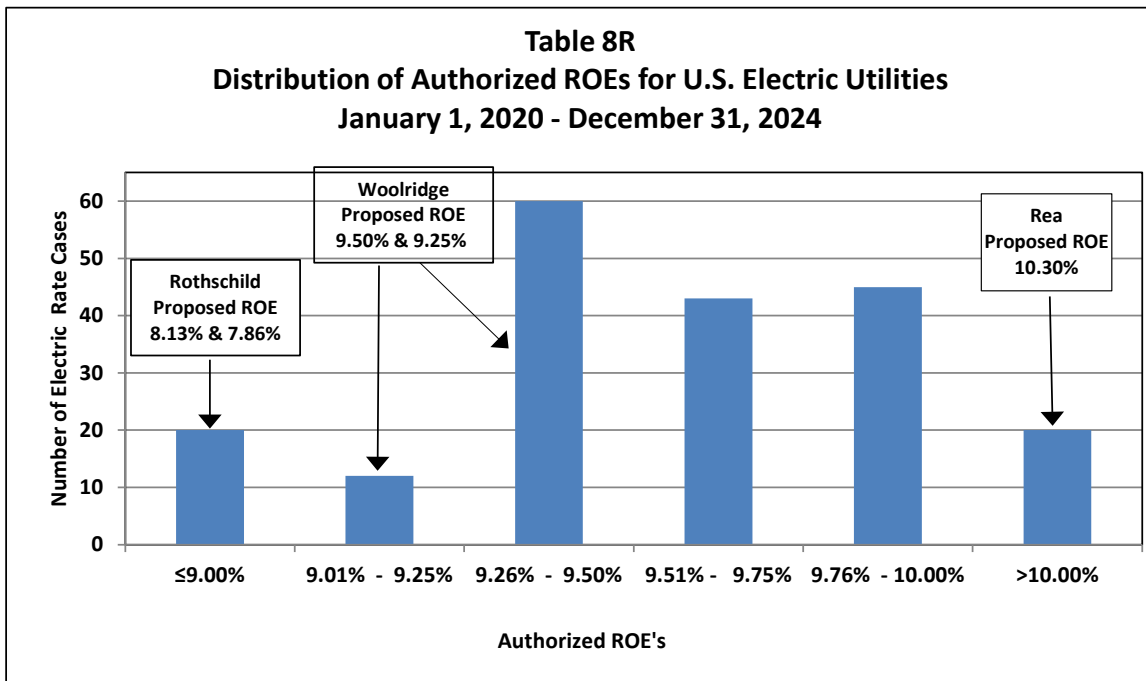
14 **A.** No. To thoroughly investigate this matter, I evaluated the ROE recommendations of the  
15 Opposing Witnesses against recent ROE determinations for other electric utility companies  
16 nationwide. Employing the above comparative approach, I will demonstrate that the ROE  
17 recommendations of the Opposing Witnesses would not allow PSNH the opportunity to  
18 earn a fair return as compared to other electric utility companies nationwide.

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<sup>50</sup> Source of data: Mergent Bond Record, January 2025 edition (Volume 90, No, 1), at 407-408.

1 **Q. How do the ROE recommendations of the Opposing Witnesses compare to the ROEs**  
2 **authorized by state commissions across the U.S. during the past five-plus years?**

3 A. To facilitate such a comparison, I present Table 8R below, which summarizes the  
4 distribution of ROE determinations (in 0.25 percent increments) from 200 electric utility  
5 rate proceedings<sup>51</sup> over the past five years (January 1, 2020 - December 31, 2024).



6  
7  
8 As Table 8R above illustrates, out of a total of 200 electric utility ROE determinations  
9 during the January 2020 - December 2024 period, Mr. Rothschild’s recommended ROE of  
10 8.13 percent falls near the very bottom of the range. In fact, during this period, only *four*  
11 ROE decisions were at or below Mr. Rothschild’s recommended ROE of 8.13 percent, and  
12 *all four* of those decisions occurred in a single regulatory jurisdiction - Illinois – which

<sup>51</sup> Excludes limited-issue rider proceedings and transmission proceedings.

1 required the use of formulaic ROEs as mandated under the state's formula rate plan for  
2 electric utilities. In other words, 98 percent of the ROE determinations for electric utilities  
3 during this five-year period were *higher* than Mr. Rothschild's recommended ROE of 8.13  
4 percent.

5 Meanwhile, 92 decisions during this same period were equal to or lower than Dr.  
6 Woolridge's ROE recommendation of 9.50 percent, while only 32 decisions were equal to  
7 or lower than his alternative ROE recommendation of 9.25 percent. Furthermore, 54  
8 percent of the ROE determinations for electric utilities during this period were higher than  
9 Dr. Woolridge's recommended ROE of 9.50 percent, while 84 percent of the ROE  
10 determinations during this period were higher than Dr. Woolridge's alternative ROE  
11 recommendation of 9.25 percent.

12 **Q. How would the financial community respond if the Commission authorized an ROE**  
13 **at the levels recommended by the Opposing Witnesses, and in particular Mr.**  
14 **Rothschild's recommended ROE?**

15 A. If the Commission were to authorize an ROE at the levels proposed by the Opposing  
16 Witnesses, and particularly Mr. Rothschild, the decision would be met with great concern,  
17 if not outright shock, by the financial community. This is because Mr. Rothschild's cost  
18 of equity recommendation of 8.13 percent, if adopted, would fall far-below recently  
19 authorized ROEs granted to electric utilities nationwide, which, as noted earlier, averaged  
20 9.74 percent during calendar year 2024.

21

1 It is important to recognize that equity investors derive their return expectations for  
2 individual utility stocks on the basis of authorized ROEs of similarly situated utilities in  
3 the same regulatory jurisdiction and also nationwide. As noted earlier, 98 percent of the  
4 ROE determinations for electric utilities nationwide over the past five years have been  
5 higher than Mr. Rothschild's cost of equity recommendation of 8.13 percent. Therefore, if  
6 Mr. Rothschild's recommendations were adopted, this would create a strong disincentive  
7 for investors to commit new investment capital to regulated utilities in New Hampshire,  
8 since significantly higher returns could be found in other utility stocks with similar risk  
9 profiles in other jurisdictions.

10  
11 While the Commission is certainly not bound by the decisions of other state regulatory  
12 bodies, it is nonetheless important to recognize that if utilities in New Hampshire are  
13 offering equity returns which are significantly lower than the returns offered by utilities in  
14 other jurisdictions, they will find it increasingly difficult to compete for investor capital  
15 with other utilities nationwide. This in turn could jeopardize the utility's ability to make  
16 critical infrastructure investments required for safety and reliability purposes, or to do so  
17 without a significant impact on its costs, which are ultimately borne by ratepayers. The  
18 Company is firmly committed to maintaining a safe, dependable electric distribution  
19 system, but it would not be in a position to effectively compete for discretionary capital  
20 dollars, whether raised externally or through its affiliate relationship with Eversource, if  
21 the cost of equity recommendations of Mr. Rothschild were adopted.

22



1 Moreover, if Mr. Rothschild’s extreme cost of equity recommendations were adopted, this  
2 would send a clear message to the financial community that the regulatory climate in New  
3 Hampshire was no longer fully supportive of maintaining financially sound utilities in the  
4 State. Ultimately, these adverse consequences would negatively impact PSNH’s  
5 customers, since the Company must maintain its financial viability in order to finance the  
6 necessary infrastructure investments that are essential to providing safe, adequate and  
7 reliable electric distribution services to its customers. Indeed, PSNH’s customers have a  
8 vested interest in the ongoing financial viability of the Company, and for this reason, the  
9 interests of PSNH’s customers and its shareholders are not mutually exclusive. Clearly,  
10 both stakeholders benefit from the maintenance of the financially sound utility.

11 **Q. Are you aware of any recent utility rate orders which provide an example of the**  
12 **adverse consequences associated with a regulatory commission adopting a proposed**  
13 **ROE at a level that is far below the recent national averages of authorized ROEs,**  
14 **which Mr. Rothschild has proposed in this proceeding?**

15 A. Yes. In its March 15, 2023 rate decision in the 2022 Aquarion Water Company  
16 (“Aquarion”)<sup>52</sup> rate proceeding (Docket No. 22-07-01), the Connecticut Public Utility  
17 Regulatory Authority (“PURA” or the “Authority”) authorized a return on equity of 8.70  
18 percent for Aquarion, which was 94 basis points lower than the 9.64 percent national  
19 average of authorized ROE granted to water utilities during that same year (2023). In view  
20 of multiple factors, including the extremely low ROE authorized in the rate order, PURA’s  
21 rejection of the multi-year rate plan proposed by Aquarion, as well and other cost recovery  
22 disallowances, the rate decision was generally not well-received in the investment

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<sup>52</sup> Aquarion is a subsidiary of Eversource Energy, and an affiliate of PSNH.

1 community. In fact, the chain of events that occurred in the aftermath of PURA's decision  
2 in the Aquarion case demonstrates the extent to which below-average authorized ROE  
3 decisions by regulatory commissions can have far-reaching negative implications. Along  
4 these lines, in September 2023, S&P Global noted the following:

5 ...recent rate orders for Aquarion and The United Illuminating Co. (UIL)  
6 significantly deviated from our base case. These rate orders did not approve the  
7 multiyear rate plans filed and included material disallowances, penalties for UIL,  
8 and below-average returns on equity. In addition, we expect that these rate orders  
9 will increase regulatory lag for these utilities. In general, we expect utilities in  
10 regulatory jurisdictions that we assess as more credit supportive to fully recover  
11 all operating and capital costs and operate under a consistent framework that  
12 demonstrates regulatory and cash flow stability.

13 ...

14 We revised the outlooks for Eversource's Connecticut utilities, including CL&P,  
15 Aquarion, and Yankee Gas, to negative. Should we revise downward our  
16 assessment of Connecticut's regulatory construct over the next 12-18 months, it  
17 would result in an increase in business risk for Eversource's Connecticut utilities,  
18 reflecting a weakening ability to effectively manage regulatory risk. In our view,  
19 consistent adverse regulatory outcomes could also limit the extent of Eversource's  
20 parental support for these utilities in certain situations and would likely result in  
21 our reassessment of Eversource's group support of these utilities to below core.  
22 This would then likely result in a ratings downgrade for CL&P, Aquarion, and  
23 Yankee Gas (emphasis added).<sup>53</sup>

24  
25 Subsequently, in February 2024, Eversource Energy announced it plans to evaluate a  
26 possible sale of its Aquarion water unit, prompting S&P to issue the following statement  
27 in early-March 2024:

28 We downgraded Aquarion Co. to 'BBB+' from 'A-', and revised Aquarion's  
29 senior unsecured debt rating to 'BBB' from 'BBB+'. This reflects Eversource  
30 evaluating a sale of its Aquarion water business and our assessment of a  
31 lower degree of group support. We assigned a developing rating outlook to  
32 Aquarion.

33 ....

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<sup>53</sup> Research Update: Eversource Energy Outlook Revised To Stable From Positive; Connecticut-Based Subsidiaries' Outlooks Revised To Negative, S&P Global (September 14, 2023).

1 Our downgrade of Aquarion Co. reflects Eversource evaluating the sale of this  
2 business. Given Eversource's announcement, we believe that Aquarion would  
3 only receive extraordinary support from Eversource in some foreseeable  
4 circumstances. As such, we revised downward our assessment of Aquarion's  
5 group support from parent Eversource to moderately strategic from core, resulting  
6 in a one-notch downgrade for Aquarion Co.<sup>54</sup>  
7

8 Moody's Investors Service followed suit just a few months later, announcing the rating  
9 agency would also downgrade the long-term credit rating of Aquarion, with Moody's  
10 stating the following:

11 Moody's Ratings (Moody's) downgraded Aquarion Water Company of  
12 Connecticut's (AWC-CT) Issuer rating to Baa1 from A3 and affirmed  
13 intermediate holding company Aquarion Company's (Aquarion) Baa2  
14 Issuer and senior unsecured ratings. The outlook for AWC-CT changed to  
15 stable from negative and Aquarion's outlook remains stable.  
16

16 ....

17 "The downgrade of Aquarion Water Company of Connecticut reflects a  
18 weakening financial profile resulting from the utility's rate order last year,  
19 which included a reduced revenue requirement as well as lower returns,"  
20 said Jeff Cassella, Vice President – Senior Credit Officer. "The rate order  
21 was another indication that the Connecticut regulatory environment has  
22 become more challenging and less credit supportive for the state's regulated  
23 utilities" added Cassella.<sup>55</sup>  
24

25 Therefore, to summarize, the Aquarion case provides a compelling example of the adverse  
26 consequences that can occur as a result of a utility being granted an authorized ROE that  
27 is far-below the return expectations of equity investors. This includes credit rating  
28 downgrades by the rating agencies, which ironically has the effect of increasing the cost of

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<sup>54</sup> Eversource Energy Ratings Off CreditWatch; On N.Y. Selecting Its Wind Farm; Outlook Negative; Aquarion Water Downgraded, S&P Global, (March 5, 2024).

<sup>55</sup> Moody's Ratings Downgrades Aquarion Water Co. of CT's Issuer rating to Baa1 and Affirms Aquarion Company's Baa2 ratings; Outlooks Stable, Moody's Investors Service, Inc. (May 23, 2024).

1 the utility's debt and equity capital, and also, at least in the case of Aquarion and  
2 Eversource, the previously unanticipated sale of the company.

3 **Q. Did the rate decision in the Aquarion case have any negative effects on the ability of**  
4 **Connecticut's utilities to attract the necessary investment capital to support the**  
5 **state's utility infrastructure investments?**

6 A. Yes. Eversource Energy has indicated that it would be reducing its planned capital  
7 investments in Connecticut by \$500 million over the next five years, citing the deteriorating  
8 regulatory environment in the state. To this extent, the *Hartford Business Journal* reported  
9 the following:

10 Eversource Energy officials said during an earnings call Thursday morning  
11 that the utility company plans to cut its capital expenditures in Connecticut  
12 by nearly \$100 million in 2024, and by \$500 million over the next five  
13 years, as a result of the state's "uncertain" regulatory environment. John  
14 Moreira, Eversource's executive vice president, CFO and treasurer, said the  
15 reductions will continue "until we see Connecticut's regulatory decisions  
16 come back into alignment with law and state policy." Eversource President  
17 and CEO Joe Nolan added that he has "serious concerns" about the  
18 company's ability to implement clean energy technologies, and to reduce  
19 carbon emissions, in light of the ongoing dispute over cost recovery. "As it  
20 stands, regulatory policies in Connecticut discourage investment in utility  
21 innovation, as well as our participation in a wide range of clean energy  
22 initiatives that rely on our balance sheet and our capital resources," Nolan  
23 said. Asked by an analyst what the cuts would entail, Nolan said they could  
24 affect the reliability of service in Connecticut, which he said is currently  
25 "best in class." "Our investment objectives in Connecticut have been  
26 centered around safety and reliability, as you'd expect," Nolan said. "We  
27 will not reduce our safety spending. The reduction will likely come from  
28 reliability areas."<sup>56</sup>

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<sup>56</sup> Eversource Plans to Cut Investment in CT by \$500M Over 5 Years Due to Regulatory 'Uncertainty',  
Hartford Business Journal (May 2, 2024).

1 **VI. UPDATE ON U.S. CAPITAL MARKET CONDITIONS AND RECENT FEDERAL**  
2 **RESERVE BOARD POLICY ACTIONS**

3 **Q. Please provide an update on recent trends in the U.S. capital markets, particularly as**  
4 **it relates to the Company's long-term capital costs for purposes of the instant**  
5 **proceeding?**

6 A. As I discussed at length in my direct testimony,<sup>57</sup> it is clear that long-term capital costs  
7 have increased significantly in recent years. This is perhaps best demonstrated by the fact  
8 that the trading yields for the 10-year U.S. Treasury note and 30-year Treasury bond  
9 climbed to their recent historical high levels during October 2023. Specifically, the 10-  
10 year Treasury yield rose to 4.98 percent during late October 2023, its highest level in more  
11 than 16 years (since July 2007), while the 30-year Treasury yield rose to 5.11 percent  
12 during mid-October 2023, its highest level in more than 17 years (since July 2006).  
13 However, between October 2023 and September 2024, the 10-year and 30-year Treasury  
14 yields generally followed a downward trajectory as compared to the highs recorded during  
15 October 2023, as the U.S. inflation rate also continued to trend downward from the 40-year  
16 high levels recorded during the summer of 2022.

17 However, since October 2024, longer-term interest rates have once again trended upward,  
18 which many market observers have attributed to a higher level of uncertainty in the U.S.  
19 capital markets surrounding the potential effects of fiscal and other governmental policy  
20 changes which are expected to be implemented by the Trump Administration. For the most  
21 part, these concerns center upon the potential inflationary impacts of various policy

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<sup>57</sup> Rea Direct, at 18-20.

1 initiatives that President Trump committed to implementing on the campaign trail,  
2 including potential increased tariffs on U.S. trading partners, federal income tax policy  
3 changes which could potentially have the effect of increasing the federal deficit, as well as  
4 a number of immigration reforms. As a result, long-term interest rates have generally  
5 trended upward since October 2024, and this is reflected in my updated estimates of the  
6 Company's cost of equity under the CAPM and RPM models.

7 It is further important to recognize that long-term U.S. Treasury and utility bond yields  
8 remain significantly higher now than the levels recorded during the time of PSNH's 2019  
9 rate proceeding. This strongly suggests that other long-term capital costs, including  
10 PSNH's cost of equity, have also risen significantly since the Company's last base rate  
11 proceeding in 2019.

12 **Q. To what extent have long-term interest rates increased over the past five years, and**  
13 **do they remain higher now than at the time of the Company's 2019 rate proceeding?**

14 A. There is no question that long-term U.S. interest rates have increased significantly over the  
15 past five years and are markedly higher today than at the time of the Company's 2019 rate  
16 proceeding. For comparison purposes, I have referenced the average bond yields reported  
17 during Q2, 2019, which generally corresponds to the Company's May 28, 2019 filing date  
18 in its 2019 proceeding. (Docket No. DE 19-057). As can be seen in Table 9R below, since  
19 Q2, 2019, the 30-year U.S. Treasury bond yield, which is a proxy for long-term capital  
20 costs, increased by 180 basis points, from 2.78 percent to an average of 4.58 percent during  
21 December 2024. Meanwhile, the 10-year U.S. Treasury note yield has risen by 205 basis

1 points since Q2, 2019, from 2.34 percent to an average of 4.39 percent during December  
2 2024.

<b>Table 9R</b>				
<b>Changes in Key U.S. Interest Rates – December 2024 vs. Q2, 2019</b>				
Time Period	30-Year U.S. Treasury Bond Yield (1)	10-Year U.S. Treasury Bond Yield (1)	Long-Term A Rated Utility Bond Yield (2,3)	Long-Term Baa Rated Utility Bond Yield (2,3)
Key Interest Rates – Q2, 2019 (avg.)	2.78%	2.34%	3.96%	4.44%
Key Interest Rates – December 2024	4.58%	4.39%	5.58%	5.77%
Increase – December 2024 vs. Q2, 2019	+1.80%	+2.05%	+1.62%	+1.33%
Source: (1) <a href="http://www.federalreserve.gov">www.federalreserve.gov</a> (accessed January 29, 2025) and (2) Mergent Bond Record (January 2025 edition).				

3

4 **Q. Have long-term utility bond yields also increased significantly since Q2, 2019?**

5 A. Yes. As reflected in Table 9R above, the average "A-rated" long-term utility bond yield  
6 increased from 3.96 percent during Q2, 2019 to 5.58 percent during December 2024, thus  
7 reflecting an increase of 162 basis points. During this same period, the average "Baa-rated"  
8 long-term utility bond yield increased from 4.44 percent to 5.77 percent during December  
9 2024, thus reflecting an increase of 133 basis points.<sup>58</sup>

<sup>58</sup> Source of data: Mergent Bond Record, January 2025 edition (Volume 90, No.1), at 407-408.

1 **Q. What monetary policy actions has the Fed taken in recent months?**

2 A. In recent months, the Fed has elected to reduce the Federal Funds target rate by a  
3 cumulative amount of 1.00 percent (100 basis points), or from 5.25-5.50 percent to 4.25-  
4 4.50 percent. The Fed implemented these rate reductions in three steps, which included a  
5 50 basis point reduction announced after the central bank's September 17-18, 2024 FOMC  
6 meeting, an additional 25 basis point reduction announced after the Fed's November 6-7,  
7 2024 FOMC meeting, and another additional 25 basis point reduction announced after the  
8 Fed's December 17-18, 2024 FOMC meeting. Furthermore, in the Fed's press release after  
9 the December 17-18, 2024 FOMC meeting, the central bank also indicated that it would  
10 continue reducing its holdings of U.S. Treasury and mortgage-backed securities by  
11 allowing \$60 billion of these securities holdings to mature each month without further  
12 reinvestment of the proceeds. More specifically, the Fed stated the following in its press  
13 release after the December 17-18, 2024 FOMC meeting:

14 Recent indicators suggest that economic activity has continued to expand at  
15 a solid pace. Since earlier in the year, labor market conditions have  
16 generally eased, and the unemployment rate has moved up but remains low.  
17 Inflation has made progress toward the Committee's 2 percent objective but  
18 remains somewhat elevated.

19  
20 The Committee seeks to achieve maximum employment and inflation at the  
21 rate of 2 percent over the longer run. The Committee judges that the risks  
22 to achieving its employment and inflation goals are roughly in balance. The  
23 economic outlook is uncertain, and the Committee is attentive to the risks  
24 to both sides of its dual mandate.

25  
26 In support of its goals, the Committee decided to lower the target range for  
27 the federal funds rate by 1/4 percentage point to 4-1/4 to 4-1/2 percent. In  
28 considering the extent and timing of additional adjustments to the target  
29 range for the federal funds rate, the Committee will carefully assess  
30 incoming data, the evolving outlook, and the balance of risks. The  
31 Committee will continue reducing its holdings of Treasury securities and



1 agency debt and agency mortgage-backed securities. The Committee is  
2 strongly committed to supporting maximum employment and returning  
3 inflation to its 2 percent objective.<sup>59</sup>  
4

5 It is noteworthy that in each of the Fed's post-FOMC meeting statements since March  
6 2022, the Fed has reiterated its commitment to reduce the size of its balance sheet, which  
7 the Fed has gradually pared down to the current level of \$6.6 trillion, which includes U.S.  
8 Treasury and mortgage-backed securities holdings. As the Fed continues to liquidate its  
9 security holdings going forward, the downward pressure that the Fed's quantitative easing  
10 programs were originally designed to exert on long-term interest rates will gradually be  
11 removed. In other words, considering that the Fed's Quantitative Easing programs have  
12 had the effect of *reducing* intermediate and long-term interest rates, the Fed's current  
13 policy objective of Quantitative Tightening is widely expected to have the opposite effect  
14 by putting *upward* pressure on interest rates going forward, which is consistent with the  
15 marked increase in long-term U.S. interest rates over the past several years.

16 **Q. What actions did the Fed take during its January 28-29, 2025 FOMC meeting?**

17 A. During the January 28-29, 2025 FOMC meeting, the Fed did not take any further actions  
18 with regard to the Federal Funds target rate, citing the fact that the U.S. inflation rate  
19 remains somewhat elevated. Therefore, the Fed Funds target rate currently remains at 4.25  
20 percent to 4.50 percent.

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<sup>59</sup> *Federal Reserve Issues FOMC Statement* (December 18, 2024), at 1. Available at:  
<https://www.federalreserve.gov/newsevents/pressreleases/monetary20241218a.htm>

1 **Q. Mr. Rothschild states the following in his direct testimony: “The Federal Funds rate**  
2 **is important because it can impact the cost of long-term borrowing and the cost of**  
3 **equity”.**<sup>60</sup> **Do you agree with statement?**

4 A. Generally, no. The Federal Funds target rate represents the overnight intra-bank borrowing  
5 rate that the Federal Reserve member banks charge one another for overnight borrowings  
6 to cover their reserve requirements, and therefore has by far the greatest impact on the short-  
7 end of the fixed-income yield curve, and not on the long-end of the yield curve. This was  
8 clearly demonstrated during the time of the 2008-09 financial crisis and Great Recession,  
9 where the Federal Reserve Board had been largely unsuccessful in its attempt to reduce  
10 long-term interest rates to stimulate the flagging U.S. economy, even after reducing the  
11 Federal Funds target rate to *zero*. As a result, the Fed chose to take the unprecedented step  
12 of engaging in massive purchases of U.S. Treasury and agency bonds in order to put  
13 downward pressure on long-term interest rates to stimulate the U.S. economy. This  
14 unprecedented monetary policy action, known as Quantitative Easing (“QE”), ultimately  
15 proved to be successful whereas the Fed’s more traditional approach of reducing the Fed  
16 Funds target rate clearly was not. Therefore, Mr. Rothschild’s statement in this regard is  
17 inaccurate.

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<sup>60</sup> Rothschild Direct, at 27.

1 **Q. Do you agree with Mr. Rothschild’s statement that “the yield on the 30-year U.S.**  
2 **Treasury bond has increased along with the Federal Funds rate, from 2% at the start**  
3 **of 2022 to 4.20% as of August 30, 2024”<sup>61</sup>?**

4 A. While I do agree the factual nature of the statement, Mr. Rothschild nevertheless confuses  
5 cause and effect. Mr. Rothschild’s statement in this regard seems to imply that there is  
6 high degree of positive correlation between the 30-year U.S. Treasury bond and the Fed  
7 Funds target rate. As I discussed earlier, this is simply not the case. In fact, the 30-year  
8 Treasury bond yield began to rise rapidly during the course of 2022 as the bond markets  
9 began pricing-in the dramatically escalating U.S. inflation rate, which rose to a 40-year  
10 high level during June 2022, when the Consumer Price Index (“CPI”) peaked at 9.10  
11 percent. In other words, as market observers would fully expect, the 30-year Treasury  
12 bond yield began rising rapidly during this period largely in response to the escalating rate  
13 of inflation. Meanwhile, in an attempt to rein-in the dramatic increase in the U.S. inflation  
14 rate, the Fed began raising the Federal Funds target rate beginning in March 2022 in an  
15 attempt to slow the U.S. economy. Therefore, although the general timing of these events  
16 did overlap, contrary to Mr. Rothschild’s suggestion, any attempt to imply cause and effect  
17 is simply unfounded.

18  
19 Along these lines, it is particularly noteworthy that although the Fed has reduced the  
20 Federal Funds target rate by a cumulative amount of 100 basis points since it began its  
21 current easing cycle after the Fed’s September 18, 2024 FOMC meeting, the 30-year U.S.  
22 Treasury bond yield has moved in the opposite direction since that time, and as of mid-

---

<sup>61</sup> Id., at 27.

1 February 2025 has increased by approximately 75 basis-points<sup>62</sup> since the time of the Fed’s  
2 September 2024 FOMC meeting. This is the case because the future path of U.S. inflation  
3 remains uncertain, as does the impact of the Fed’s ongoing liquidation of its \$6.6 trillion  
4 portfolio of security holdings as I will discuss further herein.

5  
6 Meanwhile, on the other end of the yield-curve, it is noteworthy that the Fed has indicated  
7 that for the foreseeable future, it will continue to liquidate its holdings of U.S. Treasury  
8 and mortgage-backed securities by \$60.0 billion each month (a policy action often referred  
9 to as “Quantitative Tightening”). This policy action has the effect of putting additional  
10 *upward pressure* on intermediate-term and long-term interest rates, as the Fed releases  
11 these securities back into the “market float”, thus increasing the available supply of  
12 Treasury and mortgage-backed securities. This latter point is especially noteworthy, as the  
13 Fed’s bond-buying or “Quantitative Easing” programs that were implemented between  
14 2008-2022 were demonstrated to have a much more significant impact on the direction of  
15 long-term interest rates as compared to the Fed’s policy adjustments the Federal Funds  
16 target rate. For this reason in particular, it remains to be seen whether intermediate and  
17 longer-term interest rates will decline from their current levels, or potentially move even  
18 higher going forward.

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<sup>62</sup> As of February 18, 2025.

1 **VII. THE DCF METHODOLOGIES OF THE OPPOSING WITNESSES ARE FLAWED**  
2 **AND THE RESULTS ARE SIGNIFICANTLY UNDERSTATED**

3  
4 **Discussion of Dr. Woolridge's DCF Analysis**

5 **Q. What significant shortcomings did you identify in Dr. Woolridge's DCF analysis?**

6 A. The significant shortcomings that I identified in Dr. Woolridge's DCF analysis includes:  
7 (1) placing an excessive reliance on dividend-per-share (DPS), book-value-per-share  
8 (BVPS) and retention growth rates, which the finance literature has demonstrated are not  
9 nearly as widely-referenced by investors as earnings-per-share (EPS) growth estimates; (2)  
10 failure to incorporate DCF estimates which reference the market and financial data of non-  
11 rate-regulated companies of comparable risk, which defines the competitive result in the  
12 capital markets for companies of comparable risk; (3) failure to adopt a financial leverage  
13 adjustment to recognize the difference in financial risk between the market value based  
14 capital structures that correspond to the estimated the cost of equity, and the book value  
15 based capital structures used for rate-setting purposes; and (4) failure to adopt a proper  
16 flotation cost adjustment within his DCF analyses. Collectively, these shortcomings cause  
17 Dr. Woolridge's cost of equity range estimate under the DCF method, which is 9.70 percent  
18 to 10.00 percent, to be materially understated.

19 **Q. Do you agree with the amount of emphasis that Dr. Woolridge has placed on the DPS,**  
20 **BVPS and retention growth rates reported by Value Line within his constant growth**  
21 **DCF analyses?**

22 A. No, I do not. As a preliminary matter, it should be noted that these particular growth  
23 estimates are forecasted by a single financial analyst at Value Line, and therefore do not

1 constitute a consensus estimate of multiple analysts, which is the case with the EPS growth  
2 estimates of sell-side equity analysts. As such, they are much more likely to be vulnerable  
3 to forecasting error. Moreover, DPS, BVPS and retention growth rates are not widely-  
4 referenced by institutional investors, and to my knowledge, very few, if any, of the sell-  
5 side equity analysts that work for the major U.S. banks and brokerage firms disseminate  
6 DPS, BVPS or retention growth estimates to their investor clients. If investors actually  
7 relied upon these growth rate measures in forming their return expectations for common  
8 stocks, they would clearly demand this information from equity analysts. And yet, they do  
9 not. For this reason, DPS, BVPS and retention growth measures are generally not reported  
10 by the major investment information consolidators, such as Thomson-Reuters, Yahoo  
11 Finance, and Zacks.

12 It is important to recognize that the most relevant measure of growth for purposes of the  
13 constant growth DCF model is the growth rate that investors actually expect, and therefore  
14 incorporate into their investment decisions. Contrary to the implicit assumption made by  
15 Dr. Woolridge, which is that presumably<sup>63</sup> investors place a significant emphasis on the  
16 DPS, BVPS and retention growth estimates reported by Value Line, a substantial body of

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<sup>63</sup> See, Woolridge Direct, at 54.

1 evidence indicates otherwise. In fact, substantial academic research<sup>64</sup> has demonstrated  
2 that it is actually the earnings estimates of equity analysts that exert a significant influence  
3 over stock valuations, and therefore on the return expectations of investors.

4 Villadsen, Vilbert, Harris and Kolbe provide further support for this finding in *Risk and*  
5 *Return for Regulated Industries*, an authoritative guide on utility cost of capital matters,  
6 where the authors state:

7 ....forecasts of EPS from security analysts are the best available information  
8 on forecast growth rates for the DCF model.

9 ....

10 In the constant growth version of the DCF model, the growth rates of  
11 dividends, earnings, and the stock price are all expected to be equal and  
12 constant....In any case, EPS growth is the fundamental parameter because  
13 dividends are ultimately paid from earnings, so dividends cannot grow in  
14 the long term at a rate that exceeds EPS growth. Dividends can grow at a  
15 slower rate if the company is reinvesting a larger portion of its earnings, but  
16 this sets the stage for an increased rate of dividend growth in the future.  
17 (emphasis added).<sup>65</sup>

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<sup>64</sup> See, Robert S. Harris, *Using Analysts' Growth Forecasts to Estimate Shareholder Required Rates of Return*, *Financial Management*, (Spring 1986), at 59, 66; James H. Vander Weide and William T. Carleton, "Investor Growth Expectations: Analysts vs. History," *The Journal of Portfolio Management* (Spring 1988), at 4; Eugene F. Brigham, Dilip K. Shome, and Steve R. Vinson, *The Risk Premium Approach to Measuring a Utility's Cost of Equity*, *Financial Management* (Spring 1985), at 36; E.J. Elton, M.J. Gruber and J. Gultekin, "Expectations and Share Prices", *Management Science* (September 1981) at 975-981; K.L. Stanley, W.G. Lewellen, and G.G. Schlarbaum, "Further Evidence on the Value of Professional Investment Research", *Journal of Financial Research* (Spring 1981), at 1-9; Roger A. Morin, *New Regulatory Finance* (Public Utility Reports, Inc., 2006), at 298; Jing Liu, Doron Nissim and Jacob Thomas, *Equity Valuation Using Multiples*, *Journal of Accounting Research*, Vol. 40, No. 1, March 2002; Cristi A. Gleason, W. Bruce Johnson, Haidan Li, *Valuation Model Use and the Price Target Performance of Sell-Side Equity Analysts*, *Contemporary Accounting Research* (Volume 30, Issue 1, Spring 2013).

<sup>65</sup> Bente Villadsen, Michael J. Vilbert, Dan Harris and A. Lawrence Kolbe, *Risk and Return for Regulated Industries*, Academic Press, Elsevier, Inc. (2017), at 99.

1 Dr. Morin also discusses the propriety of referencing the EPS growth estimates of equity  
2 analysts in the constant growth DCF model in *Modern Regulatory Finance*, where he  
3 states:

4 Since investor growth expectations are the quantities desired in the DCF  
5 model, the use of growth forecasts published by investment services merits  
6 serious consideration. The growth rates assumed by investors can be  
7 determined by a study of the analyses of future earnings and projected long-  
8 run growth rates made by the investment community. The anticipated long-  
9 run growth rates actually used by institutional investors to determine the  
10 desirability of investing in different securities influence investors' growth  
11 anticipations. Typically, growth forecasts are in the form of earnings per  
12 share over periods ranging from one to 5 years, and are supported by  
13 extensive financial analysis.

14 Because of the dominance of institutional investors and their influence on  
15 individual investors, analysts' forecasts of long-run growth rates provide a  
16 sound basis for estimating required returns. Financial analysts exert a  
17 strong influence on the expectations of many investors who do not possess  
18 the resources to make their own forecasts, that is, *they are a cause of g.*

19 The use of analysts' forecasts in the DCF model is sometimes denounced  
20 on the grounds that it is difficult to forecast earnings and dividends for only  
21 one year, let alone for longer time periods. This objection is unfounded,  
22 however, because it is present investor expectations that are being priced, *it*  
23 *is the consensus forecast that is embedded in price and therefore the*  
24 *required return, and not the future as it will turn out to be* (emphasis  
25 added).<sup>66</sup>

26  
27 The fact that EPS growth estimates have a strong influence on stock valuations is further  
28 demonstrated in a widely referenced article published in the *Financial Analysts Journal*,  
29 wherein professional investment analysts were surveyed. The survey results showed that a  
30 company's earnings and cash flow estimates are the factors that are most heavily referenced

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<sup>66</sup> Roger A. Morin, *Modern Regulatory Finance* (PUR Books, LLC, 2021), at 371-372.



1 by investment analysts in forming their stock valuation opinions. In contrast, DPS ranked  
2 at the *very bottom* of the list of the factors that investment analysts consider in forming  
3 their valuation opinions. More specifically, the article’s author concluded the following  
4 with regard to the relative importance of dividends:

5 The respondents were also asked to determine the relative importance of other  
6 inputs in analyzing securities. Table 6 shows how the survey participants  
7 ranked the importance of earnings, cash flow, book value, and dividends.

8 ...  
9 Earnings and cash flow are considered far more important than book value and  
10 dividends. The lack of importance these respondents assigned to dividends is  
11 interesting. As reported in Table 6, only 3 of the 297 respondents considered  
12 dividends to be the most important variable in valuing a security.<sup>67</sup> (emphasis  
13 added).  
14

15 The conclusion drawn from this survey of professional analysts is only logical, as a  
16 company’s earnings are the very source of both its dividend payments and retained  
17 earnings, and for this reason, EPS growth estimates provide a more complete picture of the  
18 future growth expectations of investors. Considering that the finance literature has clearly  
19 demonstrated that the EPS growth estimates of “sell-side” equity analysts have a significant  
20 influence on the investment decisions of both institutional and individual investors, they  
21 represent the most appropriate measure of expected earnings and dividend growth for  
22 purposes of the constant growth DCF model.  
23

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<sup>67</sup> Stanley B. Block, “A Study of Financial Analysts; Practice and Theory”, *Financial Analysts Journal*, (July-August, 1999), at 88-89.

1 **Q. Does any of the research cited by Dr. Woolridge further suggest that EPS, rather than**  
2 **DPS or BVPS, is the primary driver of stock valuations?**

3 A. Yes, Dr. Woolridge cites to a study by Cornell which states the following: “The long-run  
4 performance of equity investments is fundamentally linked to growth in earnings”.<sup>68</sup>

5  
6 **Q. Do you agree with Dr. Woolridge’s assertion that “it is well known that the long-term**  
7 **EPS growth-rate forecasts of Wall Street securities analysts are overly optimistic and**  
8 **upwardly biased”<sup>69</sup>?**

9 A. No. As a result of the Self-Regulatory Organization (SRO) reforms implemented during  
10 the period between 2002 and 2005, and the Global Analyst Research Settlement (GRAS),<sup>70</sup>  
11 which separated the research and investment banking divisions of financial institutions,  
12 many of the conflicts-of-interest previously facing sell-side research analysts have now  
13 been largely eliminated. Thus, while Dr. Woolridge references a number of studies which  
14 allege that an over-optimism bias still exists, all but one of these studies evaluated time  
15 periods prior to the time that the SRO reforms and Global Analyst Research Settlement  
16 were implemented. Notably, more recent studies have reached an entirely different  
17 conclusion. For example, in a 2009 study conducted by academics at Baruch College and  
18 Arizona State University, the study’s authors came to the following conclusion with respect  
19 to the alleged over-optimism bias:

20 Recent efforts of regulators have helped neutralize analysts’ conflict of  
21 interest. Analysts tended to make overly optimistic earnings forecasts prior  
22 to Regulation FD and the Global Analysts Research Settlement. Regulation

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<sup>68</sup> Woolridge Direct, at 114.

<sup>69</sup> Id., at 58.

<sup>70</sup> *SEC v. Bear, Stearns & Co., Inc.*, No. 03 Civ. 2937, 2003 U.S. Dist. LEXIS 19359 (S.D.N.Y, October 31, 2003).

1 FD made analysts less dependent on insider information and, thereby,  
2 diminished analysts' motives to inflate their forecasts....

3 ...

4 The Global Settlement had an even bigger impact on analyst behavior.  
5 After the Global Settlement, the mean forecast bias declined significantly,  
6 whereas the median forecast bias essentially disappeared. These results are  
7 not limited to 12 banks covered by the Global Settlement, but are similar  
8 for all analysts<sup>71</sup>.

9 **Q. Are you aware of any other studies that were conducted after the SRO reforms and**  
10 **Global Settlement were implemented which indicate that the growth estimates of**  
11 **Wall Street analysts are not upwardly biased?**

12 A. Yes. A 2006 study conducted by Clarke, Ferris, Jayaraman and Lee came to the following  
13 conclusion:

14 We fail to find overoptimism in analyst recommendations, including those  
15 of affiliated analysts.

16 ....

17 Overall, our results suggest that recently passed legislation to reduce  
18 analysts' conflicts of interest might be an overreaction.<sup>72</sup>

19  
20 Furthermore, another 2006 study conducted by Yang and Mensah also concluded  
21 that Wall Street analyst forecasts were no longer biased towards optimism, stating:

22 The main findings indicate that forecast accuracy improved for both OPC  
23 [open-call] and CLC [closed-call] firms compared to the NCC [non-  
24 conference-call] firms in the post-Reg. FD [fair disclosure] period. More  
25 importantly, the differences in earnings forecast performance between the  
26 pre-Reg. FD OPC and CLC firms had disappeared in the post-Reg. FD  
27 period.<sup>73</sup>

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<sup>71</sup> Armen Hovakimian and Ekkachai Saenyasiri, *Conflicts of Interest and Analyst Behavior: Evidence from Recent Changes in Regulation*, April 20, 2009 (available at: <http://ssrn.com/abstract=1133102>).

<sup>72</sup> Jonathan Clarke, Stephen P. Ferris, Narayanan Jayaraman and Jinsoo Lee, *Are Analyst Recommendations Biased? Evidence from Corporate Bankruptcies*, *Journal of Financial and Quantitative Analysis*, Volume 41, Issue 1, March 2006, pp. 169-196.

<sup>73</sup> R. Yang and Y.M. Mensah, *The Effect of the SEC's Regulation Fair Disclosure on Analyst Forecast Attributes*, *Journal of Financial Regulation and Compliance*, Vol. 14, No. 2, 2006, pp. 192-209.

1 **Q. Dr. Woolridge presents a study by McKinsey and Company which evaluated time**  
2 **periods after the SRO reforms and Global Settlement, and which Dr. Woolridge**  
3 **maintains provides evidence that the overoptimism bias of equity analysts persists**  
4 **today.<sup>74</sup> How do you respond?**

5 A. As a preliminary matter, I would first point out that the McKinsey study evaluated the 25-  
6 year time period from January 1985 to November 2009, and therefore presents data that is  
7 between 16 - 40 years old, and therefore cannot possibly speak to whether an alleged over-  
8 optimism bias persists today. Furthermore, the McKinsey study cited by Dr. Woolridge  
9 only evaluated seven years of data (2003-2009) during the period after the Global  
10 Settlement was implemented, and during four of the seven years (2003-2006), the EPS  
11 growth estimates of equity analysts did in fact prove to be accurate<sup>75</sup>. Although the  
12 McKinsey study did conclude that the EPS estimates of equity analysts turned out to be  
13 overoptimistic during the 2007-2009 period, this is largely explained by the fact that the  
14 U.S. economy was impacted by the collapse of the U.S. housing market, sub-prime  
15 mortgage crisis, and financial crisis and Great Recession that ensued thereafter, all during  
16 the 2007-2009 period. Therefore, suggesting that the EPS growth estimates of equity  
17 analysts were overoptimistic during the 2007-2009 period without also acknowledging the  
18 prevailing dynamics in the U.S. economy and capital markets during the 2007-2009 period,  
19 lacks sufficient context to fully inform the reader.

20

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<sup>74</sup> Woolridge Direct, at 96-97.

<sup>75</sup> Marc H. Goedhart, Rishi Raj, and Abhishek Saxena, *Equity Analysts: Still Too Bullish (McKinsey and Company, 2010)*, at 1.

1 Therefore, although some analysts may continue to debate whether an over-optimism bias  
2 persists among sell-side equity analysts, the primary focus for purposes of the instant  
3 proceeding should be whether an over-optimism bias actually exists with respect to  
4 regulated utilities, and in particular, electric utilities. Notably, not a single one of the  
5 studies referenced by Dr. Woolridge specifically evaluated whether the so-called over-  
6 optimism bias actually applies to regulated utilities. In fact, logic dictates that it is highly  
7 unlikely that a significant level of over-optimism bias exists with respect to the earnings  
8 estimates for regulated utilities, since a utility's earnings growth is largely constrained by  
9 the cost of service ratemaking process. Dr. Woolridge acknowledges this very fact in his  
10 direct testimony where he states the following:

11 ....a utility's earnings are predetermined to a certain degree though the  
12 ratemaking process, in which performance is reviewed by state  
13 commissions and other interested parties.<sup>76</sup>  
14

15 In Figure 10 (p. 60) in his direct testimony, Dr. Woolridge attempts to argue that the alleged  
16 overoptimism bias of equity analysts also applies to electric utilities. However, as reflected  
17 within Figure 10, the largest divergences between analyst estimates of EPS growth rates  
18 and actual EPS growth rates actually occurred during periods where the U.S. economy was  
19 in recession, including during the periods 1990-1991, 2001-2002 and 2007-2009. To the  
20 extent that the ultimate effect of economic recessions on corporate earnings are often times  
21 unpredictable, this explains why the EPS growth estimates of equity analysts may from  
22 time to time exceed the actual EPS growth rates ultimately realized.

---

<sup>76</sup> Woolridge Direct, at 124.

1 It should be further noted that it is ultimately investor *expectations* that matter when  
2 applying the DCF model. In other words, a DCF-based estimate of the cost of equity should  
3 recognize that it is actually the EPS growth rate expectations of investors which influence  
4 stock prices and therefore the expected return on equity. Therefore, regardless of whether  
5 equity analyst estimates ultimately turn out to be optimistic or pessimistic, a proper  
6 application of the DCF model requires that the prevailing growth rate expectations of  
7 investors are incorporated into the model.

8 **Q. Are the DPS, BVPS and retention growth rates referenced in Attachment JRW-6 (p.  
9 6) to Dr. Woolridge’s testimony reasonably consistent with the projected EPS growth  
10 rates he references in the same attachment?**

11 A. No. As reflected in Attachment JRW-6 (p. 6), Dr. Woolridge’s DPS, BVPS and retention  
12 growth rate assumptions are as much as 310 basis points<sup>77</sup> lower than the EPS growth rate  
13 assumptions reflected in the same attachment. For example, while Dr. Woolridge  
14 references a 7.20 percent median EPS consensus growth rate estimate from Yahoo, Zacks  
15 and S&P Capital IQ for the Rea Electric Group, he also references a 4.10 percent retention  
16 growth rate estimate for both the Woolridge Electric Group and the Rea Electric Group,  
17 which reflects a difference of 310 basis points. Likewise, as can be seen in Attachment  
18 JRW-6 (p. 6), the disparity between his 7.20 percent median EPS consensus growth  
19 estimate and his DPS and BVPS growth rate estimates range from between 220 basis points  
20 and 290 basis points. As noted earlier, a company’s earnings are the source of both its

---

<sup>77</sup> Calculated as 7.20 percent minus 4.10 percent, which equals 3.10 percent (310 basis points).

1 dividend payments and retained earnings, and for this reason, EPS growth estimates  
2 provide a more complete picture of the future growth expectations of investors.  
3 Considering that the finance literature has demonstrated that the EPS growth estimates of  
4 equity analysts have a strong influence on stock valuations and investor growth  
5 expectations, Mr. Woolridge's reliance upon DPS, BVPS and retention growth rate  
6 estimates results in a significant downward bias in his DCF estimates of the cost of equity.

7 **Q. How to you respond to Dr. Woolridge's statement that he gave "primary weight to**  
8 **the projected growth rates of Wall Street analysts and Value Line..."<sup>78</sup> within his**  
9 **DCF analysis?**

10 A. Notwithstanding this approach, Dr. Woolridge's DCF growth rate estimates remain  
11 materially understated. For example, as reflected in Attachment JRW-6 (p. 6), Dr.  
12 Woolridge referenced a 5.90 percent composite growth rate in his DCF analysis for the  
13 Woolridge Electric Group, while his EPS growth rate estimates for the same group  
14 reflected both a mean and median value of 6.60 percent. This clearly suggests that his  
15 DCF-based estimates of the cost of equity for the Woolridge Electric Group are understated  
16 by no less than 70 basis points.<sup>79</sup>

17  
18 Furthermore, as also reflected in Attachment JRW-6 (p. 6), Dr. Woolridge referenced a  
19 6.20 percent composite growth rate in his DCF analysis for the Rea Electric Group, while  
20 his EPS growth rate estimates for the same group reflected a mean value of 6.80 percent

---

<sup>78</sup> Woolridge Direct, at 65.

<sup>79</sup> Calculated as 6.60 percent minus 5.90 percent, which equals 0.70 percent (70 basis points).

1 and a median value of 7.20 percent. This suggests that his DCF-based estimates of the cost  
2 of equity for the Rea Electric Group are understated by as much as 60-100 basis points.<sup>80</sup>

3 **Q. Dr. Woolridge also incorporated Value Line’s projected sustainable retention growth**  
4 **rates within his constant growth DCF analysis. In your opinion, is this a reasonable**  
5 **approach?**

6 A. No. The finance literature has demonstrated that there are alternative proxies for the  
7 growth rate referenced in the constant growth DCF model that are superior to the  
8 sustainable retention growth method, including both historically based growth rates and  
9 the earnings-per-share (“EPS”) growth estimates of equity analysts. Among these two  
10 superior options, the EPS growth estimates of equity analysts have been determined to be  
11 the primary influencing factor on stock valuations. It is important to note that the empirical  
12 finance literature has indicated that the sustainable retention growth rate method is not as  
13 closely correlated to measures of a stock’s valuation as compared to the EPS growth  
14 estimates of equity analysts, which further undermines Dr. Woolridge’s suggestion that the  
15 sustainable retention growth rate methodology reflects market expectations. Along these  
16 lines, in *Modern Regulatory Finance*, Dr. Morin makes the following important  
17 observations:

18 The empirical finance literature discussed earlier demonstrates that the  
19 sustainable growth method of determining growth is not as significantly  
20 correlated to measures of value, such as stock price and price/earnings  
21 ratios, as other historical growth measures or analysts’ growth forecasts.

---

<sup>80</sup> Calculated as 6.80 percent minus 6.20 percent, which equals 0.60 percent (60 basis points), and 7.20 percent minus 6.20 percent, which equals 1.00 percent (100 basis points).



1 Other proxies for growth, such as historical growth rates and analysts’  
2 growth forecasts, outperform retention growth estimates.

3 ....

4 In summary, there are three proxies for the expected growth component of  
5 the DCF model: historical growth rates, analysts’ forecasts, and the  
6 sustainable growth method... *The retention growth method is the weakest*  
7 *of the three proxies on both conceptual and empirical grounds* (emphasis  
8 added).<sup>81 82</sup>

9  
10 Therefore, contrary to the implicit assumption made by Dr. Woolridge, which is that  
11 investors place a great deal of reliance on the sustainable retention growth rate method  
12 when determining their equity return expectations, a substantial body of evidence has  
13 indicated otherwise.

14 **Q. Can you please elaborate further as to why you believe that the sustainable growth**  
15 **rate technique employed by Dr. Woolridge is flawed?**

16 A. Yes. As a preliminary matter, it is helpful to identify the sustainable growth rate equation,  
17 and the key variables or inputs to the equation that are required to derive the sustainable  
18 growth rate. The sustainable growth rate equation is shown as reflected below:

$$19 \quad k_e = \text{Div}_1/P_0 + g$$

20 where...  $g = br + sv$

21 and where... “ $k_e$ ”, is defined as the cost of equity;

22 “ $\text{Div}_1/P_0$ ”, is defined as the dividend yield;

23 “ $g$ ” is defined as the dividend growth rate;

---

<sup>81</sup> Roger A. Morin, *Modern Regulatory Finance* (PUR Books, LLC, 2021), at 384.

<sup>82</sup> Note that in *Modern Regulatory Finance*, Dr. Morin uses the terms “sustainable growth method” and “retention growth method” interchangeably.

- 1                   “b”, is defined as the earnings retention rate;
- 2                   “r”, is defined as the book return on common equity;
- 3                   “s”, is defined as the rate of continuous new stock financing, and...
- 4                   “v”, is defined as the fraction of funds raised on the sale of stock that
- 5                   increases the book value of the existing shareholders’ common equity.

6

7           What is apparent when reviewing the model inputs into the sustainable growth equation is

8           that the “r” factor, or book return on common equity, is logically circular by its nature.

9           This is because the model requires the analyst to input an assumption as to the expected

10          book return on common equity, when in fact that particular assumption is highly dependent

11          upon the cost of equity that the DCF model is attempting to estimate. This circular

12          relationship is a fundamental flaw of the sustainable growth methodology.

13   **Q.    Can you identify any additional flaws or challenges in the implementation of the**

14   **sustainable growth rate technique, as employed by Dr. Woolridge?**

15   A.    Yes. Dr. Woolridge has relied entirely on the internal growth or “br” component of the

16          sustainable growth formula that is reported by Value Line, while he has ignored the

17          component of sustainable growth that is attributable to new stock issuances, which is

18          reflected in the "sv" component of the sustainable growth formula presented above.

19          Considering that Dr. Woolridge has omitted this “external growth” component of the

20          formula, his sustainable growth rates are understated. Notwithstanding this shortcoming,

21          it is nevertheless important to note that, as discussed earlier, the empirical finance literature

22          has demonstrated that the sustainable retention growth rate method is not as closely

1 correlated to measures of a stock's valuation as compared to the EPS growth estimates of  
2 equity analysts<sup>83</sup>.

3 **Response to Dr. Woolridge's Criticisms of the Company's DCF Analyses**  
4  
5

6 **Q. Dr. Woolridge criticizes your outlier screening methodology, claiming that it results**  
7 **in an "asymmetric elimination of DCF results"<sup>84</sup> for the Rea Electric Group**  
8 **companies. How do you respond?**

9 A. I disagree. As discussed at length in Appendix B to my direct testimony, I have relied upon  
10 the regulatory precedent established by FERC in determining which DCF estimates of the  
11 cost of equity do not meet threshold tests of reasonableness and economic logic. Thus,  
12 while Dr. Woolridge criticizes the approach I took in evaluating DCF outlier results, these  
13 criticisms are unfounded.

14 First, the five low-end outlier DCF estimates that I eliminated for the Rea Electric Group  
15 included cost of equity estimates ranging from *negative* -7.30 percent to 6.60 percent for  
16 Allele, Inc., Consolidated Edison, and OGE Energy Corp.<sup>85</sup> With regard to the Gas LDC  
17 Group, I eliminated low-end outlier estimates of 5.70 percent and 6.20 percent for  
18 Northwest Natural Gas.<sup>86</sup> Lastly, with regard to the Non-Regulated Group, I eliminated  
19 seven low-end outlier estimates ranging from 5.40 percent to 6.70 percent for multiple  
20 companies, while also eliminating four high-end outlier estimates ranging from 18.0

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<sup>83</sup> See, Roger A. Morin, *Modern Regulatory Finance* (PUR Books, LLC, 2021), at 384.

<sup>84</sup> Woolridge Direct, at 8, 92 and 93.

<sup>85</sup> See Attachment ES-VVR-4, at 1 and 2.

<sup>86</sup> See Attachment ES-VVR-5, at 1 and 2.

1 percent to 28.80 percent.<sup>87</sup> Considering that during December 2024, the average trading  
2 yield for “Baa” rated long-term utility bonds<sup>88</sup> was 5.77 percent<sup>89</sup>, it is unlikely that a  
3 rational investor would commit their investment capital to an equity investment that  
4 promised a negative return, or a return that is only marginally higher than the return offered  
5 by fixed income securities. In such circumstances, it is more likely that investors would  
6 seek a superior risk-return tradeoff by either investing in the company’s fixed-income  
7 securities, or in another company’s common stock. Accordingly, consistent with the risk-  
8 and-return investment principle and fundamental tests of economic logic, DCF estimates  
9 which are lower than, or only marginally higher than, yields available on corporate and  
10 utility debt securities have been eliminated from my analysis. This is the case because  
11 investors cannot reasonably be expected to invest in common stocks if they are unable to  
12 earn a minimally sufficient equity risk premium as compensation for the additional risks  
13 they bear by investing in equity securities, vis-à-vis fixed income securities.

14 Second, while Dr. Woolridge maintains that I only eliminated low-end outlier estimates,  
15 and that my high-end outlier screening threshold was set at 19.4 percent,<sup>90</sup> these statements  
16 are inaccurate. As noted earlier, within my DCF analysis for the Non-Regulated Group, I  
17 eliminated four high-end outlier estimates ranging from 18.0 percent to 28.8 percent.

---

<sup>87</sup> See Attachment ES-VVR-6, at 1 and 2.

<sup>88</sup> Notably, as reflected in Attachment ES-VVR-4, the average Moody’s long-term credit rating for the Electric Group is “Baa1”.

<sup>89</sup> Mergent Bond Record, January 2025 Edition, Volume 90, No.1, at 408.

<sup>90</sup> Woolridge Direct, at 93.

1 Lastly, as reflected in Attachment ES-VVR-4 (footnote 6) to my direct testimony, the high-  
2 end outlier threshold that I actually applied to my DCF analyses was 17.7 percent, not the  
3 19.4 percent level that Dr. Woolridge references in his testimony.

4 **Q. Dr. Woolridge maintains that your financial leverage risk adjustments are**  
5 **unwarranted for several reasons. How do you respond?**

6 A. Dr. Woolridge maintains that the financial leverage risk adjustments that I have applied to  
7 my DCF analyses are unwarranted for the following reasons: (1) the market value of a firm  
8 exceeds its book value (M/B ratio is greater than 1.0) when a firm is expected to earn more  
9 on the book value of an investment than investors require; (2) there is no change in  
10 leverage, since the firm's financial statements and fixed financial obligations remain the  
11 same; and (3) both financial publications and investment firms report capitalizations on a  
12 book value basis and not on a market value basis.<sup>91</sup>

13  
14 As discussed at length in Appendix C to my direct testimony, the financial leverage risk  
15 adjustments that I have proposed are necessary to recognize the increase in financial risk  
16 which often results when a market-based cost of equity estimate, which corresponds to a  
17 market-value based capital structure, is applied to a utility's book value based rate-setting  
18 capital structure. Therefore, contrary to Dr. Woolridge's assertion, there actually is a  
19 difference in financial leverage between these two respective capital structures.

20  
21 Furthermore, Dr. Woolridge fails to recognize that when the market-based cost of equity

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<sup>91</sup> Id., at 97-98

1 analytical models were originally developed, the creators of these models did not  
2 specifically contemplate that the market-based cost of equity estimates derived from these  
3 models would be applied to a book value based capital structure for utility ratemaking  
4 purposes, which almost invariably has a different financial risk profile. Therefore, the  
5 financial risk adjustments I have proposed are necessary to recognize the increase in  
6 financial risk which results when a market-based cost of equity estimate, which  
7 corresponds to a market-value based capital structure, is applied to a utility's book value  
8 based regulatory capital structure. The finance literature has long recognized that to  
9 properly analyze the effects of financial leverage on the cost of capital, current market  
10 values must be considered, not historically focused book values. For example, both  
11 M&M's classic financial theorems<sup>92</sup> and Hamada's research<sup>93</sup> on the effects of financial  
12 leverage on systematic risk evaluated market value capital structures, not book value based  
13 capital structures.

14 Thus, while Dr. Woolridge maintains that a financial leverage risk adjustment is  
15 unwarranted for the above stated reasons, he fails to acknowledge that investors and stock  
16 analysts evaluate both risk and return on an equivalent valuation basis. In fact, the  
17 implication of Dr. Woolridge's position is that while investors evaluate investment *returns*  
18 on the basis of the market value of their investments, they inexplicably choose to evaluate

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<sup>92</sup> See, Franco Modigliani and Merton H. Miller, "Taxes and the Cost of Capital: A Correction," *American Economic Review*, 53 (June 1963), 433-443; Franco Modigliani and Merton H. Miller, *The Cost of Capital, Corporation Finance and the Theory of Investments*, *American Economic Review* 48 (June 1958) at 261-297.

<sup>93</sup> Robert S. Hamada, The Effect of the Firm's Capital Structure on the Systematic Risk of Common Stocks," *The Journal of Finance*, 27 (May 1972) at 435-452.

1 investment *risk* on a book value basis. This is not only illogical, but is also inconsistent  
2 with fundamental investment principles, which state that an investment's risk and return  
3 are closely interrelated, suggesting that the basis upon which both risk and return are  
4 evaluated should be consistent and inseparable.

5  
6 **Q. How do you respond to Dr. Woolridge's assertion that a financial leverage risk**  
7 **adjustment is unwarranted because the market value of utilities exceeds their book**  
8 **values?**

9 A. Dr. Woolridge further asserts that a financial leverage risk adjustment is unwarranted  
10 because, in his judgment, the underlying reason why a firm's market value exceeds its book  
11 value (i.e., M/B ratio is greater than 1.0) is because the company is earning a return on  
12 equity that is greater than its cost of equity.<sup>94</sup> In this regard, Dr. Woolridge overstates the  
13 significance of M/B ratios in determining whether a utility's earned ROE is consistent with  
14 the prevailing market-based cost of equity, as he ignores the various other factors unrelated  
15 to a firm's earned ROE which have a significant influence on M/B ratios.

16  
17 Indeed, in a paper published in the Quarterly Bulletin of the National Regulatory Research  
18 Institute, Joy Nicdao-Cuyugan, who serves on the staff of the Illinois Commerce  
19 Commission, maintains that because each element of the M/B ratio (that is, the "market  
20 value" numerator and the "book value" denominator), differs with respect to both time and  
21 construction, M/B ratios represent an unreliable indicator of whether a utility is actually  
22 under-earning or over-earning relative to the market-determined cost of equity. While a

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<sup>94</sup> Woolridge Direct, at 99.

1 firm's market value is largely based on the present value of future cash flows, its book  
2 value is a function of historical accounting information, which is heavily influenced by  
3 generally accepted accounting principles (GAAP). Nicdao-Cuyugan further maintains that  
4 a firm's M/B ratio is significantly impacted by the overall volatility of the stock market, as  
5 influenced by general market sentiment and changing levels of investor risk aversion. She  
6 further argues that exogenous events such as changes in interest rates can have a significant  
7 impact on M/B ratios, as well as special accounting charges and changes in accounting  
8 rules and regulations.

9  
10 Indeed, in her paper, Nicdao-Cuyugan makes the following observations:

11 There is no merit to the myths that an M/B ratio exceeding 1 necessarily  
12 indicates that a utility is either overearning or underearning its market-based  
13 allowed return on common equity. Because the myths' underlying rationale  
14 and assumptions are critically flawed, adjusting investor-required return on  
15 equity estimates accordingly is inappropriate. Such adjustments would  
16 result in allowed returns on common equity that are unreflective of utility  
17 investors' required returns and could be harmful to ratepayers or  
18 shareholders.

19 Market-to-book ratios of various types of utilities have on average exceeded  
20 1 for many years. Critical differences in the construction of a market price  
21 and book value lend an explanation to the ratio's divergence from unity.  
22 Distortions in the measurement of the book value of common equity, factors  
23 unique to the regulatory ratemaking process, and interest rates can also  
24 account for the difference between stock price and book value per share.  
25 These findings further diminish the significance of the M/B ratio in  
26 determining a fair and reasonable rate of return on common equity as  
27 implied by the "overearning" and "underearning" myths.<sup>95</sup>

28  

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<sup>95</sup> Nicdao-Cuyugan, Joy, *Market-to-Book Ratio Myths in Utility Cost of Equity Estimation*, National Regulatory Research Institute, Quarterly Bulletin Vol. 17, No. 3 (1996).



1 As further evidence that Nicdao-Cuyugan’s arguments are well-founded, it should be noted  
2 that the vast majority of firms operating in the competitive marketplace have M/B ratios  
3 which exceed unity (1.0x) by a significant margin. In this regard, S&P Global has reported  
4 that the average M/B ratio for the S&P 500 Utilities Index has recently been 2.36x,<sup>96</sup> while  
5 the average M/B ratio for the S&P 500 Index has recently been 5.00x.<sup>97</sup> This data is  
6 consistent with the fact that utility stock valuations, on a historical basis, have generally  
7 reflected lower M/B ratios as compared to the overall U.S. equity market.

8 Therefore, in order to accept Dr. Woolridge’s premise in this regard, one would also need  
9 to make the erroneous assumption that the overwhelming majority of companies  
10 comprising the S&P 500 Index are earning ROEs in excess of their market-determined cost  
11 of equity. This is simply not logical. If this were true, the forces of market competition  
12 would quickly respond (i.e. new entrants would flood into the marketplace in an attempt to  
13 earn the “excessive” returns), thus restoring market equilibrium, whereby the affected firms  
14 would once again be earning no greater than, and no less than, the market-determined cost  
15 of equity. Furthermore, considering that the average M/B ratio for U.S. utilities remain  
16 significantly below the average M/B ratio for the companies comprising the S&P 500  
17 Index, it would constitute an even bigger leap of faith to conclude that U.S utilities are also  
18 earning ROEs in excess of the market-determined cost of equity.

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<sup>96</sup> S&P Dow Jones Indices, S&P 500 Utilities (Sector), as of December 31, 2024. Available at <https://www.spglobal.com>

<sup>97</sup> S&P Dow Jones Indices, S&P 500, as of December 31, 2024. Available at <https://www.spglobal.com>

1 **Q. Dr. Woolridge maintains that your flotation cost adjustment is not justified because**  
2 **you have not provided any evidence that the Company has paid flotation costs and**  
3 **also because investors are well aware of the difference between the price they pay to**  
4 **buy the stock and the amount the company actually receives.<sup>98</sup> How do you respond?**

5 A. I disagree on both counts. As an operating subsidiary of Eversource Energy Inc.  
6 (“Eversource Energy”), the Company does not directly issue common equity in the public  
7 markets, and like the rest of Eversource Energy’s utility subsidiaries, the Company receives  
8 its equity financing from its parent company. Nevertheless, this does not justify Dr.  
9 Woolridge’s position, which is essentially that PSNH should be deprived of recovering a  
10 “return on” the flotation costs incurred by Eversource Energy on the Company’s behalf.  
11 To do so would deprive investors, who provided the capital to Eversource Energy to  
12 support its utility subsidiary operations, an opportunity to earn a fair return on their *entire*  
13 investment. The finance literature provides useful guidance on the matter of flotation costs  
14 in those circumstances where a utility’s equity capital is obtained from the parent holding  
15 company, as follows:

16 Some controversies have surfaced regarding the flotation cost allowance.  
17 The first is the contention that a flotation allowance is inappropriate if the  
18 utility is a subsidiary whose equity capital is obtained from its parent. This  
19 objection is unfounded since the parent-subsidiary relationship does not  
20 eliminate the costs of a new issue, but merely transfers them to the parent.  
21 It would be unfair and discriminatory to subject parent shareholders to  
22 dilution while individual shareholders are absolved from such dilution. Fair  
23 treatment must consider that if the utility subsidiary had gone to the capital  
24 marketplace directly, flotation costs would have been incurred.<sup>99</sup>

25

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<sup>98</sup> Woolridge Direct, at 99-101.

<sup>99</sup> Morin, Roger A., *Modern Regulatory Finance*, PUR Books LLC (2021), at 340.

1 As to Dr. Woolridge’s assertion that investors have already accounted for flotation costs  
2 when making their decision to purchase shares at the quoted price, he has provided no  
3 evidence in support of this assertion, and particularly as it relates to utility stock investors.  
4 Moreover, Dr. Woolridge has failed to recognize that a critical underlying assumption of  
5 the respective cost of equity analytical models referenced in utility rate proceedings is that  
6 there are no transaction costs. For example, a critical underlying assumption of the  
7 constant growth DCF model is that there is no external financing, and therefore that growth  
8 is only facilitated through the retention of earnings. In other words, if the DCF model  
9 assumes there is no external financing, then by definition, there can be no flotation costs.  
10 Likewise, a key assumption underlying the CAPM is that there are no taxes, transaction  
11 costs, restrictions on selling short, or other market imperfections. Therefore, due to the  
12 inability of the cost of equity models to incorporate transaction costs into the cost of equity  
13 estimation process, it is entirely appropriate to make a separate adjustment for flotation  
14 costs, as I have proposed in the instant proceeding. Dr. Morin also addresses this particular  
15 topic in *Modern Regulatory Finance*, where he makes the following observations:

16 The suggestion that the flotation cost allowance is unwarranted because  
17 investors factor this shortcoming in the stock price implies that it is  
18 appropriate to use a deficient model because such a deficiency is reflected  
19 in stock prices. In other words, it is appropriate to use a deficient model  
20 because investors are aware of this. Such circular reasoning could be used  
21 to justify any regulatory policy. For example, under this reasoning, it  
22 would be appropriate to authorize a return on equity of 1% because  
23 investors reflect this fact in the stock price. This is clearly illogical and  
24 erroneous. Any regulatory policy, as irrational as it may be, can be justified  
25 using this argument.<sup>100</sup>  
26

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<sup>100</sup> Id., at 341-342

1  
2 Consistent with the foregoing arguments, the Company should be entitled to earn a “return-  
3 on” the flotation costs which Eversource Energy has already incurred on behalf of its  
4 subsidiary companies, as well as those flotation costs that it expects to incur in the  
5 foreseeable future. Therefore, despite Dr. Woolridge’s arguments to the contrary, the  
6 Company’s proposed flotation cost adjustment of between 10-11 basis points,<sup>101</sup> which is  
7 based on PSNH’s contributed capital equity layer, constitutes an appropriate “return-on”  
8 the flotation costs incurred by Eversource Energy on the Company’s behalf, and should  
9 therefore be adopted by the Commission.

10 **Discussion of Mr. Rothschild’s DCF Analysis**

11 **Q. Mr. Rothschild has relied upon the sustainable growth method in calculating the**  
12 **growth rate component within his Constant Growth DCF analysis. In your opinion,**  
13 **is this a reasonable approach?**

14 **A.** No. As I discussed at length in my response to Dr. Woolridge, the finance literature has  
15 demonstrated that there are alternative proxies for the growth rate referenced in the  
16 Constant Growth DCF model that are clearly superior to the sustainable growth method,  
17 including both historically based growth rates and the earnings-per-share (“EPS”) growth  
18 estimates of equity analysts. Among these two superior options, the EPS growth estimates  
19 of equity analysts have been demonstrated to have the most significant influence on  
20 investor decisions and stock valuations.

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<sup>101</sup> See, Rea Direct, at 58-61

1 **Q. Can you please elaborate further as to why you believe that the sustainable growth**  
2 **rate technique employed by Mr. Rothschild is flawed?**

3 A. Yes. As I discussed in my response to Dr. Woolridge, it is useful to first identify the  
4 sustainable growth rate equation, and the key variables or inputs to the equation, that are  
5 required to derive the sustainable growth rate. The sustainable growth rate equation is  
6 shown as reflected below:

$$k_e = \text{Div}_1/P_0 + g$$

7  
8 where....  $g = br + sv$

9  
10 and where.... “ $k_e$ ”, is defined as the cost of equity;

11 “ $\text{Div}_1/P_0$ ”, is defined as the dividend yield;

12 “ $g$ ” is defined as the dividend growth rate;

13 “ $b$ ”, is defined as the earnings retention rate;

14 “ $r$ ”, is defined as the book return on common equity;

15 “ $s$ ”, is defined as the rate of continuous new stock financing,  
16 and....

17  
18 “ $v$ ”, is defined as the fraction of funds raised on the sale of  
19 stock that increases the book value of the existing  
20 shareholders’ common equity.

21  
22 What is apparent when reviewing the model inputs into the sustainable growth equation is  
23 that the “ $r$ ” factor, or book return on common equity, is logically circular by its nature.

24 This is because the model requires the analyst to input an assumption as to the expected  
25 book return on common equity, when in fact that particular assumption is highly dependent  
26 upon the cost of equity that the DCF model is attempting to estimate. This circular

1 relationship is a fundamental flaw of the sustainable growth methodology. While Mr.  
2 Rothschild argues that the “ $k_e$ ” variable (the market based cost of equity), is not the same  
3 variable as “ $r$ ” (the expected book return on equity),<sup>102</sup> this is incorrect because state  
4 commissions set the allowed return in utility rate proceedings on the basis of the market-  
5 based cost of equity “ $k_e$ ”, which, once applied to a utility’s rate base, ultimately becomes  
6 the book return on common equity “ $r$ ”.

7  
8 Notwithstanding the circular relationship found in the sustainable growth rate approach as  
9 noted above, Mr. Rothschild proceeds to derive his estimate of the “ $r$ ” factor, or expected  
10 book return on equity, on the basis of the expected return on common equity for each  
11 member of the Electric Group for the period between 2024-2029, as reported by Value  
12 Line<sup>103</sup>. Mr. Rothschild also evaluates the return on equity to achieve the Zacks growth  
13 rate, and based upon the totality of this information, elects to reference an “ $r$ ” factor, or  
14 expected book return on common equity, of 10.10 percent,<sup>104</sup> in developing his sustainable  
15 growth rate. It is therefore readily apparent that the 10.10 percent book return on equity  
16 assumption that Mr. Rothschild has incorporated into his sustainable growth rate  
17 calculation exceeds the cost of equity estimates he developed for the Rea Electric Group  
18 under his sustainable growth rate methodology (8.25 percent and 8.35 percent,  
19 respectively) by a significant margin.

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<sup>102</sup> Rothschild Direct, at 54.

<sup>103</sup> See Exhibit ALR-5, page 2.

<sup>104</sup> Rothschild Direct, at 55 and Exhibit ALR-3, page 1.

1 In essence, Mr. Rothschild has assumed that the Rea Electric Group companies will  
2 continue to earn book ROEs that are significantly higher than the cost of equity that he has  
3 determined is appropriate for the Electric Group (and PSNH). This assumption simply  
4 defies logic, since the only practical way for the Electric Group companies to earn book  
5 returns in the range of 10.10 percent on a consistent basis going forward is if their allowed  
6 returns on equity are also set at 10.10 percent or even higher to compensate for cost  
7 disallowances and regulatory lag. Such being the case, the flawed logic that is incorporated  
8 in Mr. Rothschild's sustainable growth DCF analysis undermines the integrity of his  
9 recommendations and is sufficient enough reason to reject the results of the sustainable  
10 growth version of his Constant Growth DCF analysis.

11 **Q. Can you identify any additional flaws or challenges in the implementation of the**  
12 **sustainable growth rate technique, as employed by Mr. Rothschild?**

13 A. Yes. Implementing the sustainable growth rate technique requires the analyst to estimate  
14 what the universe of investors have assumed with regard to each of the four variables that  
15 are input into the sustainable growth equation. As noted earlier, this includes the "b"  
16 factor, defined as the earnings retention rate; the "r" factor, defined as the book return on  
17 common equity; the "s" factor, defined as the rate of continuous new stock financing, and  
18 the "v" factor, defined as the fraction of funds raised on the sale of stock that increases the  
19 book value of the existing shareholders' common equity. In view of the level of  
20 complexity involved in estimating each of these input variables, there exists a significant  
21 risk of measurement and forecasting errors, particularly since four separate input variables  
22 must be estimated to derive a single growth rate. In contrast, the EPS growth estimates of

1 equity analysts, which Mr. Rothschild has chosen to ignore in his DCF analyses, provides  
2 a *single variable* estimate of growth, which logic would seem to suggest would be less  
3 vulnerable to measurement and forecasting errors. In addition, it is important to note that  
4 the empirical finance literature has demonstrated that the sustainable growth rate method  
5 is not as closely correlated to measures of a stock's valuation as compared to the EPS  
6 growth estimates of equity analysts<sup>105</sup>, which further undermines Mr. Rothschild's  
7 suggestion that his sustainable growth rate methodology reflects market expectations.

8 **Q. Mr. Rothschild cites to the college textbook *Principles of Corporate Finance* as**  
9 **providing support for this sustainable growth DCF analysis, claiming that this**  
10 **textbook “recommends using the very same method I use to calculate the cost of**  
11 **equity for regulated energy utility companies”.<sup>106</sup> Is this statement a fair**  
12 **representation of what the authors of this textbook actually state with regard to**  
13 **suitable proxies for the growth rate component of the Constant Growth DCF model?**

14 A. No. Mr. Rothschild failed to acknowledge the immediately preceding statement made by  
15 the authors of this textbook in the pages he cited, which is as follows:

16 The hard part is estimating *g*, the expected rate of dividend growth. One  
17 option is to consult the view of security analysts who study the prospects  
18 for each company. Analysts are rarely prepared to stick their necks out by  
19 forecasting dividends to kingdom come, *but they often forecast growth rates*  
20 *over the next five years, and these estimates may provide an indication of*  
21 *the expected long-run growth path (emphasis added).*<sup>107</sup>  
22

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<sup>105</sup> Roger A. Morin, *Modern Regulatory Finance* (PUR Books LLC, 2021), at 384.

<sup>106</sup> Rothschild Direct, at 13, citing Brealey, Myers, and Allen, *Principles of Corporate Finance*, pp. 86-87 (12th ed. 2017).

<sup>107</sup> Brealey, Myers, and Allen, *Principles of Corporate Finance*, at 86. (12th ed. 2017).



1 **Q. Mr. Rothschild has also relied upon his proprietary option-implied growth estimates**  
2 **within his Constant Growth DCF model analysis. In your judgment, is this an**  
3 **appropriate approach to estimating the growth rate component of the Constant**  
4 **Growth DCF model?**

5 A. No. Mr. Rothschild has not provided any theoretical or empirical based evidence  
6 supporting the use of option-implied growth rates in the Constant Growth DCF model.  
7 Moreover, he has not provided any evidence that investors actually utilize option-implied  
8 growth rates in deriving their equity return expectations, or that his approach to  
9 implementing the DCF model has been adopted by utility regulatory commissions. And,  
10 as I will discuss in my response to Mr. Rothschild's use of option-implied data in his  
11 CAPM analysis, even the research paper that he cites in support of his option-implied data  
12 methodologies indicates that relying upon 180-day option contracts for cost of capital  
13 estimation purposes is likely inappropriate.<sup>108</sup> Lastly, the option-implied growth rates that  
14 Mr. Rothschild has derived are based on incomplete market data where it was necessary  
15 for him to apply subjective judgment by "filling-in" unavailable data by either interpolating  
16 the data or holding the data constant over multiple periods. As a result, this introduces data  
17 integrity concerns with regard to the input variables that he has relied upon in deriving his  
18 option-implied growth rates.

19 **Q. Please elaborate further on your findings that the option-implied growth rates Mr.**  
20 **Rothschild developed for purposes of his DCF analysis are based on incomplete**  
21 **market data where it was necessary for him to apply his subjective judgment by**  
22 **"filling-in" unavailable data.**

23 A. Mr. Rothschild's workpapers<sup>109</sup> indicate that a significant portion of the proxy group data  
24 required to develop his option-implied growth rates is unavailable due to limited trading

1 volumes for the options on the proxy group companies. This is demonstrated in Attachment  
2 ES-VVR-8R,<sup>110</sup> which illustrates the following:

- 3
- 4 • Mr. Rothschild's workpapers indicate that 4 of the 11 companies he evaluated in  
5 the Rea Electric Group did not have a sufficient level of options trading data  
6 available, which prevented him from deriving his option-implied growth rates for  
7 those companies (which he labeled as "N/A"). These companies include: Allete,  
8 Inc., Avista Corp., Northwestern Corp., and OGE Energy Corp.
  - 9 • Mr. Rothschild's workpapers further indicate that in the case of another 4 of the 11  
10 companies included in the Rea Electric Group, it was necessary for him to "fill-in"  
11 a significant number of his option-implied growth rates due to incomplete market  
12 data, whereby Mr. Rothschild either elected to estimate the missing values through  
13 interpolation or by simply holding known values constant over multiple time  
14 periods. In addition, neither of these two approaches were consistently applied for  
15 all of the proxy group companies. The companies included in this category include:  
16 Alliant Energy, CMS Energy Corp. IDACORP and Portland General Electric.

17  
18 Perhaps the most compelling examples of why Mr. Rothschild's option-implied  
19 growth rates suffer from data integrity issues is illustrated by the Alliant Energy  
20 and Portland General Electric data presented in Attachment ES-VVR-8R. As  
21 reflected in Attachment ES-VVR-8R, all 14 of the weekly estimates shown for  
22 Alliant Energy's growth rate are fixed at 7.64 percent, which indicates that due to  
23 limited options trading data, it was necessary for Mr. Rothschild to hold the single  
24 market-based value that was actually available as of 8/27/2024 constant for each of  
25 the succeeding 13 weeks thereafter. Additionally, 13 of the 14 beta estimates for  
26 Portland General Electric are also *not* based on actual market data, but are instead  
27 based on Mr. Rothschild's application of his subjective judgment by either  
28 interpolating the missing data between two known values or by holding a known  
29 value constant over multiple time periods.

- 30
- 31 • Lastly, it is further notable that only 3 of the 11 companies included in the Rea  
32 Electric Group actually reflect market-based options trading data for all 14 of the

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<sup>108</sup> Bo-Young Chang, Peter Christoffersen, Kris Jacobs, and Gregory Vainberg, *Option-Implied Measures of Equity Risk*, Review of Finance (2012) 16, at 391 and 421.

<sup>109</sup> See, Mr. Rothschild's workpaper file "2024.11 - RFC Electric PG Betas - SELECT.xlsx", "OPTIVA GROWTH" tab.

<sup>110</sup> Note that in Attachment ES-VVR-8R, I have highlighted in gray shading the 11 companies that are included in the Rea Electric Group.

1 weekly periods evaluated by Mr. Rothschild. These companies include:  
2 Consolidated Edison, Sempra Energy and WEC Energy Group.

3 Therefore, to the extent that the growth rates referenced in Mr. Rothschild's Constant  
4 Growth DCF analysis are based on his option-implied growth rate methodology, it is clear  
5 that the limited availability of options trading data for many of the companies included in  
6 the Rea Electric Group renders his analysis incomplete, and therefore invalid. Although  
7 Mr. Rothschild characterizes his option-implied growth rate methodology as appropriately  
8 reflecting market data, this is factually incorrect, since most of the input data he has  
9 referenced is actually based on his subjective estimation approaches discussed earlier. As  
10 a result, his option-implied growth rates and corresponding DCF estimates of the cost of  
11 equity are unlikely to reflect the actual growth and return expectations of equity investors  
12 and should therefore be rejected by the Commission.

13 **Q. Have you identified any other significant shortcomings associated with Mr.**  
14 **Rothschild's use of option-implied growth rates in his Constant Growth DCF**  
15 **analysis?**

16 A. Yes. Despite the fact that the Constant Growth DCF method is conceptually premised  
17 upon a long-term if not perpetual growth rate extending well into the distant future, Mr.  
18 Rothschild's option-implied growth rates are based on options trading data that generally  
19 only extend 6-months into the future based upon the expiration date of the options contracts  
20 for the proxy group companies. For this reason alone, the options trading data referenced  
21 by Mr. Rothschild, which is of limited duration, are unlikely to capture the long-term  
22 growth and return expectations of equity investors.

1 **Q. Please provide an overview of Mr. Rothschild’s Non-Constant Growth DCF analysis.**

2 A. Mr. Rothschild’s Non-Constant Growth DCF analysis is premised upon an internal rate of  
3 return (IRR) calculation that analyzes: (1) an initial cash outflow in the form of a stock  
4 purchase; (2) a relatively short period (2025-2027) of cash inflows in the form of annual  
5 dividend payments received; and (3) a final cash inflow in the form of cash proceeds from  
6 the sale of the stock in 2028, which represents the terminal value in Mr. Rothschild’s IRR  
7 analysis. Mr. Rothschild has relied upon projected data from Value Line for the 2025-  
8 2028 forecast period, including forecasted dividends per share (“DPS”) and projected book  
9 value per share (“BVPS”), and then estimates the terminal value of each individual stock  
10 by applying a constant market-to-book (M/B) ratio to the projected BVPS for each of the  
11 constituents of the Electric Group. Mr. Rothschild’s Non-Constant Growth DCF analysis  
12 yields a cost of equity estimate of 7.24 percent based on the end-of-period closing stock  
13 price at November 30, 2024, and a 7.63 percent estimate based on the average closing stock  
14 price for the year ending November 30, 2024.<sup>111</sup>

15 **Q. Do have any concerns with the approach that Mr. Rothschild took in implementing**  
16 **his Non-Constant Growth DCF analysis?**

17 A. Yes. Mr. Rothschild’s Non-Constant Growth DCF analysis only evaluates just three years  
18 of discrete dividend payments, and as a result, places a disproportionate weighting on his  
19 assumed stock price terminal value in year (5) of his analysis. This observation is of critical  
20 importance, because in estimating the terminal value of each individual stock, Mr.  
21 Rothschild has relied entirely upon the approach of applying a constant market-to-book

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<sup>111</sup> Rothschild Direct, at 57.

1 (M/B) ratio to the projected BVPS values reported by Value Line. In my judgment, this  
2 approach is significantly flawed, since the finance literature has clearly demonstrated that  
3 it is the EPS growth estimates of equity analysts that exert the greatest influence on stock  
4 valuations. Such being the case, Mr. Rothschild erred by instead relying upon projected  
5 BVPS values to derive his terminal stock price assumptions in his analysis. His analysis  
6 would have better reflected the return expectations of investors had he considered other  
7 approaches to developing his future stock price assumption, such as referencing the  
8 projected EPS estimates of equity analysts in conjunction with projected price-earnings  
9 (P/E) multiples. Therefore, as a result of the aforementioned critical shortcomings, Mr.  
10 Rothschild's cost of equity estimates under his Non-Constant Growth DCF methodology  
11 are woefully understated.

12 **Response to Mr. Rothschild's Criticisms of the Company's DCF Analyses**

13 **Q. Mr. Rothschild maintains that your DCF model analysis contradicts your own**  
14 **description of the underlying theoretical assumptions of the constant growth DCF**  
15 **model because you have referenced the EPS growth rate estimates of equity analysts**  
16 **rather than a "sustainable" growth rate.<sup>112</sup> How do you respond?**

17 **A.** Mr. Rothschild has confused the strict theoretical underpinnings of the constant growth  
18 DCF model with the practical implementation of that model in the real world. As discussed  
19 at length in my response to Dr. Woolridge, the empirical finance literature is quite clear  
20 that among the various different growth rate measures, the EPS growth estimates of equity  
21 analysts have the most significant influence on the growth and return expectations of equity

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<sup>112</sup> Rothschild Direct, at 80.

1 investors. It is therefore perplexing as to why Mr. Rothschild would state in his testimony:  
2 “To my knowledge, financial publications do not recommend using EPS growth rates to  
3 calculate the cost of equity in a DCF model”.<sup>113</sup> In fact, such financial literature is widely-  
4 available to analysts.<sup>114</sup>

5 **Q. Mr. Rothschild maintains that the EPS growth estimates of institutional equity**  
6 **analysts are overly-optimistic and upwardly-biased, and in support of his assertion,**  
7 **cites to articles from McKinsey & Company which he maintains supports his**  
8 **position.<sup>115</sup> How do you respond?’**

9 A. I have fully addressed this topic in my earlier response to Dr. Woolridge.

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<sup>113</sup> Id., at 81.

<sup>114</sup> *See, for example*, Robert S. Harris, *Using Analysts’ Growth Forecasts to Estimate Shareholder Required Rates of Return*, Financial Management, (Spring 1986), at 59, 66; James H. Vander Weide and William T. Carleton, “Investor Growth Expectations: Analysts vs. History,” The Journal of Portfolio Management (Spring 1988), at 4; Eugene F. Brigham, Dilip K. Shome, and Steve R. Vinson, *The Risk Premium Approach to Measuring a Utility’s Cost of Equity*, Financial Management (Spring 1985), at 36; E.J. Elton, M.J. Gruber and J. Gultekin, “Expectations and Share Prices”, Management Science (September 1981) at 975-981; K.L. Stanley, W.G. Lewellen, and G.G. Schlarbaum, “Further Evidence on the Value of Professional Investment Research”, Journal of Financial Research (Spring 1981), at 1-9; Jing Liu, Doron Nissim and Jacob Thomas, *Equity Valuation Using Multiples*, Journal of Accounting Research, Vol. 40, No. 1, March 2002; Cristi A. Gleason, W. Bruce Johnson, Haidan Li, *Valuation Model Use and the Price Target Performance of Sell-Side Equity Analysts*, Contemporary Accounting Research (Volume 30, Issue 1, Spring 2013); Roger A. Morin, *Modern Regulatory Finance* (PUR Books, LLC, 2021), at 371-372; Stanley B. Block, “A Study of Financial Analysts; Practice and Theory”, *Financial Analysts Journal*, (July-August, 1999), at 88-89 and Bente Villadsen, Michael J. Vilbert, Dan Harris and A. Lawrence Kolbe, *Risk and Return for Regulated Industries*, Academic Press, Elsevier, Inc. (2017), at 99.

<sup>115</sup> Rothschild Direct, at 81-82.

1 **VIII. THE CAPM METHODOLOGIES OF THE OPPOSING WITNESSES ARE**  
2 **FLAWED AND THE RESULTS ARE SIGNIFICANTLY UNDERSTATED**

3 **Discussion of Dr. Woolridge's CAPM Analysis**  
4

5 **Q. What significant shortcomings did you identify in Dr. Woolridge's CAPM analysis?**

6 A. The significant shortcomings that I identified in Dr. Woolridge's CAPM analysis include:  
7 (1) giving significantly less weight to the beta coefficients reported by Value Line, simply  
8 because Value Line's betas coefficients have increased since the time of the COVID-19  
9 pandemic; (2) improper reliance upon various surveys and publications for purposes of  
10 estimating the market risk premium, which by their nature are biased, and therefore do not  
11 likely reflect the future return expectations of investors; and (3) failure to recognize  
12 substantial empirical evidence supporting the use of both the CAPM with size adjustment  
13 and the ECAPM.

14 **Q. Do you agree with Dr. Woolridge's decision to reject the beta coefficients currently**  
15 **reported by Value Line simply because they are higher now than they have been in**  
16 **recent years?**

17 A. No. Dr. Woolridge makes the following statements in his testimony: "In the past, I have  
18 used Value Line betas exclusively",<sup>116</sup> and "The betas for utilities recently increased  
19 significantly in 2020 as a result of the volatility of utility stocks during the stock market  
20 meltdown associated with the onset of COVID-19".<sup>117</sup> Therefore, due to the fact that the  
21 betas currently reported by Value Line continue to be higher than the recent historical

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<sup>116</sup> Woolridge Direct, at 74.

<sup>117</sup> Id., at 72.

1 average, Dr. Woolridge decided to depart from his traditional practice of placing a 100  
2 percent weighting on Value Line's betas, and instead has developed a composite beta  
3 which gives an equal weighting to the lower beta coefficients reported by S&P Capital IQ.

4  
5 I disagree with Dr. Woolridge's approach in this regard, as it essentially amounts to cherry-  
6 picking the data, since the composite betas he calculated are significantly lower than the  
7 betas currently reported by Value Line. While Dr. Woolridge attempts to justify his beta  
8 adjustment approach on the basis of ameliorating the effects of the short-term market  
9 disruptions seen during the early stages of the COVID-19 crisis, these particular short-term  
10 disruptions were actually part of the historical market record, and therefore should *not* be  
11 excluded from Dr. Woolridge's CAPM analysis. This is particularly the case because in  
12 order to be a true reflection of market or systematic risk, beta coefficients must incorporate  
13 the *entire* historical record of market volatility, which includes events such as the COVID-  
14 19 pandemic. Moreover, while Dr. Woolridge maintains that the betas of utility stocks  
15 increased significantly in 2020 with the onset of COVID-19, it should be recognized that  
16 59 months have now passed since the market disruptive events of March 2020, and with  
17 each passing month, the effects of the COVID-19 crisis (and the pre-COVID-19 period)  
18 have had an increasingly smaller impact on the betas reported by Value Line. This is the  
19 case because the overwhelming majority of weekly observations incorporated into Value  
20 Line's beta estimation process now reflect the post-COVID-19 period.



1 **Q. Do you have any other concerns with Dr. Woolridge’s approach of using composite**  
2 **beta coefficients in this proceeding?**

3 A. Yes. First, it should be recognized that equity investors rely on the beta coefficients  
4 reported by Value Line to inform their risk and return expectations and investment  
5 decisions, rather than the composite beta values derived by Dr. Woolridge. This explains  
6 why the betas reported by Value Line continue to be widely-referenced in utility rate  
7 proceedings across the U.S. As Dr. Woolridge concedes, this also explains why up until  
8 recently, he relied exclusively upon the betas reported by Value Line in implementing his  
9 CAPM analyses. Second, as Dr. Woolridge also concedes, the betas reported by S&P  
10 Capital IQ, which he incorporates into his composite betas, do not include the Blume  
11 adjustment, which is necessary to adjust raw betas for their tendency to regress to 1.0 (or  
12 unity) over time.<sup>118</sup> Dr. Woolridge maintains that he separately incorporated the Blume  
13 adjustment into the S&P Capital IQ betas that he utilized. However, other than a general  
14 overview of the Blume beta adjustment formula, I could not find any support in Dr.  
15 Woolridge’s testimony and/or attachments for the individual Blume adjustments that he  
16 applied to the S&P Capital IQ betas.

17  
18 In my judgment, for the above-stated reasons, Dr. Woolridge erred by deviating from his  
19 historical practice of relying exclusively on the betas reported by Value Line, particularly  
20 because they are widely-referenced in the investment community and in utility rate  
21 proceedings nationwide. Therefore, Dr. Woolridge’s use of composite betas has further

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<sup>118</sup> Id., at 74.

1 contributed to the significant downward bias in his CAPM-based estimates of the cost of  
2 equity.

3 **Q. Dr. Woolridge derives an estimated range for the market risk premium of between**  
4 **4.0 percent and 6.0 percent, and has elected to reference a 5.00 percent market risk**  
5 **premium in his CAPM analyses, which is at the midpoint of his overall range.<sup>119</sup>**  
6 **Please provide a brief overview of the publications and surveys that Dr. Woolridge**  
7 **referenced in developing his 5.00 percent point estimate of the market risk premium.**

8 A. Dr. Woolridge based his overall market risk premium estimate on the following  
9 approaches, which produce range estimates of the market risk premium as follows:

- 10 • Historic stock market and bond market returns, which Dr. Woolridge maintains indicate  
11 a market risk premium in the range of 4.40 percent to 6.80 percent.
- 12 • Ex-ante market risk premium models that indicate a market risk premium in the range  
13 of 2.51 percent to 6.00 percent.
- 14 • Various surveys which provide market risk premium estimates ranging from 3.40  
15 percent to 5.70 percent, and,
- 16 • Building block model analyses which provide market risk premium estimates in the  
17 range of 3.00 percent to 5.21 percent.<sup>120</sup>
- 18

19 **Q. Among the numerous publications and surveys on the market risk premium that Dr.**  
20 **Woolridge presents in Attachment JRW-7 (pp. 5-6) to his testimony, which of those**  
21 **publications and surveys did he place the greatest emphasis upon in developing his**  
22 **5.00 percent overall estimate of the market risk premium?**

23 A. Dr. Woolridge indicates in his testimony that in developing his estimate of the market risk  
24 premium, he has placed the greatest emphasis on the publications and surveys presented in  
25 Table 10R below.<sup>121</sup>

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<sup>119</sup> Id., at 84-85.

<sup>120</sup> Id., at 80.

<sup>121</sup> Id., 85.

<b>Table 10R</b>	
<b>Dr. Woolridge’s Estimates of the Expected Equity Risk Premium Based on Surveys and Publications</b>	
<b>Studies and Surveys Referenced</b>	<b>Projected Equity Risk Premium</b>
IESE Business School Survey	5.50%
Kroll Report (previously Duff & Phelps)	5.00%
Damodaran (average implied ERP)	4.00%
KPMG	5.00%
JP Morgan Asset Management	4.40%
Duke – CFO Magazine Survey	4.60%
Overall Average Equity Risk Premium Referenced by Dr. Woolridge in his CAPM Analysis	5.00%
98-Year Historical Average Annual Equity Risk Premium (2026-2023) per the Kroll Cost of Capital Navigator	7.17% (actual)

1 **Q. What is your initial reaction to Dr. Woolridge’s proposed market risk premium**  
2 **estimate of 5.00 percent?**

3 A. As can be seen in Table 10R above, the 5.00 percent average estimated equity risk premium  
4 that Dr. Woolridge references in his CAPM analysis is 217 basis points lower than the 98-  
5 year historical average equity risk premium of 7.17 percent. This large disparity calls into  
6 question the validity of Dr. Woolridge’s estimate of the market risk premium. Again, as  
7 reflected in Table 10R above, the *Kroll Cost of Capital Navigator* reports that during the  
8 98-year period between 1926-2023, the historical average market equity risk premium was

1        7.17 percent. This is the pertinent benchmark return value to reference, since over the very  
2 long-run (i.e., 98 years), investor expectations are realized, and to my knowledge, there are  
3 no particularly compelling reasons to believe that future returns will be significantly lower.  
4 This is particularly the case in the view of the rapidly expanding artificial intelligence  
5 revolution, which has the potential to significantly increase U.S. stock market returns well  
6 into the foreseeable future.

7  
8        Moreover, evaluating the historical returns of large-capitalization stocks provides an  
9 unbiased estimate of future market return expectations. This is because these historical  
10 returns reflect repeated observations of a variable that has behaved randomly in the past  
11 (U.S. stock market returns), and therefore, are devoid of subjective bias. In contrast, a  
12 common thread that runs through the publications and surveys that Dr. Woolridge has  
13 referenced is *recency bias*, which in this case is the fallacy of extrapolating a continuation  
14 of today's stock market conditions (i.e., high relative valuations) well into the distant future.  
15 There is simply no legitimate basis for making this assumption, as the past 98 years of U.S.  
16 stock market history has certainly taught investors otherwise.

17        As noted earlier, random-walk theory has demonstrated that U.S. equity returns behave  
18 independently of historical returns, and for this reason, the use of various forecasts from  
19 publications and surveys to estimate the equity risk premium is of limited value due to their  
20 inherent subjective bias. For this reason, they should be given little, if any, consideration.

21

1 **Q. Do the authoritative publications that address utility cost of capital matters indicate**  
2 **that survey-based techniques, such as the annual surveys completed by Pablo**  
3 **Fernandez at the IESE Business School,<sup>122</sup> have significant shortcomings and are**  
4 **therefore of limited value in estimating the market equity risk premium?**

5 A. Yes. The multiple shortcomings associated with the use of survey-based techniques in  
6 estimating the equity risk premium have been summarized quite well in *Modern*  
7 *Regulatory Finance*, which states the following:

8 Surveys of academics and investment professionals, for example the  
9 Graham and Harvey survey or the Fernandez annual surveys or the Welch  
10 (2000, 2001) surveys, provide another technique of estimating the MRP.  
11 This technique is subject to the well-known shortcomings of survey  
12 techniques. There are several reasons to place little weight on survey  
13 results relative to the results from other approaches. First, return  
14 definitions and risk premium definitions differ widely. Second, survey  
15 responses are subject to bias. Surveys may tell more about hoped-for  
16 expected returns rather than objective required returns. Third, subjective  
17 assumptions about long-term market behavior may well place undue weight  
18 on recent events and immediate prospects (emphasis added).<sup>123</sup>

19  
20  
21 Notably, in the above passage Dr. Morin specifically points out the shortcomings of the  
22 Fernandez (IESE Business School) annual surveys, which Dr. Woolridge places a heavy  
23 reliance upon in deriving his estimate of the equity risk premium.

24  
25 Furthermore, In *Risk and Return for Regulated Industries*, the authors also address the  
26 shortcomings associated with using survey techniques in estimating the equity risk  
27 premium, as follows:<sup>124</sup>

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<sup>122</sup> Woolridge Direct, at 81.

<sup>123</sup> Roger A. Morin, *Modern Regulatory Finance*, PUR Books, LLC (2021) at 186.

<sup>124</sup> Note that the authors refer to the equity risk premium (ERP) and market risk premium (MRP) as interchangeable terms.

1 In theory, since the ERP is a forward-looking estimate, simply asking people  
2 what they expect the ERP to be seems like an appealing idea. In practice, the  
3 use of survey results to estimate the ERP is problematic.

4 ....

5 Recently, Pablo Fernandez of the IESE Business School has published annual  
6 survey data on the MRP in many countries. Unfortunately, these surveys are  
7 less useful than they might otherwise be because the question regarding the  
8 respondent's forecast or belief regarding the MRP does not specify whether  
9 the MRP estimates should be an arithmetic or geometric estimate or whether it  
10 is in relation to LT or ST government bonds. As noted earlier, the difference  
11 between the geometric and arithmetic realized MRP is about 2%, so the lack  
12 of specificity in the question could easily lead to forecasts that are inconsistent.  
13 *While the survey results are interesting, we do not recommend that substantial*  
14 *weight be given to survey-based estimates of the MRP in the regulatory*  
15 *setting.*<sup>125</sup>

16  
17  
18 Consistent with the foregoing observations made by Villadsen, Vilbert, Harris and Kolbe,  
19 it is important to note that the Fernandez survey<sup>126</sup> is simply based on a very brief *two-line*  
20 *email request* for survey responses that asks the following two questions:

21  
22 **(1) The Market Risk Premium that I am using in 2024 for USA is: \_\_\_%.**

23 **(2) The Risk-Free rate that I am using in 2024 for USA is: \_\_\_%.**

24  
25 That's it. No further elaboration or guidance is provided as to whether the survey  
26 respondents should base their responses on arithmetic or geometric averages, or which  
27 particular debt security or term-to-maturity should be referenced for purposes of both  
28 responses. This ambiguity clearly undermines the validity, consistency and usefulness of

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<sup>125</sup> Bente Villadsen, Michael J. Vilbert, Dan Harris and A. Lawrence Kolbe, *Risk and Return for Regulated Industries*, Academic Press, Elsevier, Inc. (2017) at 67-68. (Emphasis added).

<sup>126</sup> Pablo Fernandez, Diego García and Lucia F. Acin, *Survey: Market Risk Premium and Risk-Free Rate Used for 96 Countries in 2024*, IESE Business School (March 11, 2024).

1 the results yielded by the Fernandez survey. Moreover, the fact that the survey results for  
2 2024 reflect a very wide dispersion of survey responses, ranging from as low as 3.00  
3 percent to as high as 16.00 percent<sup>127</sup>, in and of itself does *not* inspire confidence in the  
4 validity and usefulness of the survey results.

5 **Q. Did you identify any critical shortcomings with regard to the Kroll market risk**  
6 **premium that Dr. Woolridge has referenced?**<sup>128</sup>

7 A. Yes. I have reviewed the publication that Dr. Woolridge referenced in support of Kroll's  
8 recommended market equity risk premium of 5.00 percent, however that publication does  
9 not provide any specific guidance as to exactly how Kroll derives its market risk premium  
10 recommendation. For example, if Kroll evaluated the long-run historical market risk  
11 premium in deriving its recommendation, it raises the question of whether the historical  
12 values that Kroll referenced are based on the arithmetic mean or the geometric mean. This  
13 alone is a critically important question, as the finance literature has demonstrated that the  
14 geometric average is an inappropriate basis for purposes of estimating the forward-looking  
15 market return and risk premium expectations of investors.<sup>129</sup> Moreover, the difference  
16 between the arithmetic mean and the geometric can be quite substantial, as Villadsen,

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<sup>127</sup> Id., at 3.

<sup>128</sup> Woolridge Direct, at 82. Note that Mr. Rea uses the terms "market risk premium" and "equity risk premium" interchangeably throughout this rebuttal testimony.

<sup>129</sup> See Ibbotson Associates, *Stocks, Bonds, Bills, and Inflation, 2005 Yearbook, Valuation Edition*, at 75; Brealey, R., Myers, S., and Allen, P. *Principles of Corporate Finance*, International Edition, New York: McGraw-Hill, 2011, at 159; Bodie, Z., Kane, A., and Marcus, A.J. *Investments*, New York: McGraw-Hill Irwin, 8<sup>th</sup> ed., 2009, at 126-127; Brigham, E.F. and Ehrhardt, M. *Financial Management: Theory and Practice*, 8<sup>th</sup> ed., Hinsdale, IL, Dryden Press, 2005; and Bruner, R.F., Eades, K.M., Harris, R.S., and Higgins R.C. "Best Practices in Estimating the Cost of Capital: Survey and Synthesis," *Financial Practice and Education*, Spring/Summer 1998, at 13-28.

1 Vilbert, Harris and Kolbe have noted in *Risk and Return for Regulated Industries*, where  
2 the authors state the following:

3 .....the difference between the geometric and arithmetic realized MRP is  
4 about 2%, so the lack of specificity in the question could easily lead to  
5 forecasts that are inconsistent.<sup>130</sup>  
6

7 In the absence of this information, an analyst has no way of evaluating the validity of the  
8 underlying assumptions that are incorporated into Kroll's recommended market risk  
9 premium, and for this reason, I recommend that the Commission reject it.

10 **Q. Did you identify any significant shortcomings with regard to the Damodaran implied**  
11 **market risk premium that Dr. Woolridge has referenced in his CAPM analysis?**<sup>131</sup>

12 A. Yes. The Damodaran implied market risk premium is based upon the fundamentally flawed  
13 modeling assumption that the growth rate for U.S. stocks will decline to an anemic constant  
14 long-term growth rate after five years. As noted earlier, there is no compelling reason to  
15 believe that the growth rate for U.S. stocks will suddenly decline after an arbitrarily  
16 selected five-year period, particularly in view of the fledgling artificial intelligence  
17 revolution. Nevertheless, as a proxy for the constant long-term growth rate, the Damodaran  
18 model references the current yield on U.S. Treasury securities. In my judgment, there is  
19 no logical association between the long-term growth expectations of equity investors and  
20 the prevailing yield on U.S. Treasury securities. This is clearly demonstrated by the fact  
21 that the average consensus EPS growth rate estimate from institutional equity analysts for

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<sup>130</sup> Bente Villadsen, Michael J. Vilbert, Dan Harris and A. Lawrence Kolbe, *Risk and Return for Regulated Industries*, Academic Press, Elsevier, Inc. (2017) at 67-68.

<sup>131</sup> Woolridge Direct, at 81-82.



1 the S&P 500 stock index has recently been in the range of 9.0 percent to 10.0 percent,  
2 which is significantly higher than recent yields for both the 10-year U.S. Treasury note  
3 (4.55 percent) and the 30-year U.S. Treasury bond (4.80 percent). This critical shortcoming  
4 undermines the validity and usefulness of the Damodaran implied market risk premium  
5 estimate that Dr. Woolridge has referenced.

6 **Q. Did you identify any shortcomings with regard to the KPMG research summary that**  
7 **Dr. Woolridge references for purposes of estimating the expected market risk**  
8 **premium?**

9 A. Yes. Dr. Woolridge references a KPMG Corporate Finance publication that recommends  
10 a market risk premium of 5.00 percent.<sup>132</sup> As was the case with Kroll's estimate of the  
11 market risk premium, the KPMG publication does not provide any specific information as  
12 to how KPMG developed their recommended market risk premium, and it is unclear as to  
13 whether the "historical observation methodology" they reference in this publication reflects  
14 historical data that is based on the arithmetic mean or the geometric mean.

15 It is also important to recognize that KPMG's market risk premium recommendations are  
16 compiled by KPMG's affiliate in the Netherlands, and that the underlying data reflects a  
17 "global MRP" which incorporates data from the Amsterdam Exchange Index (AEX),  
18 Financial Times (London) Stock Exchange (FTSE), and the European Stock Index  
19 (STOXX 600). It is therefore questionable as to whether a market risk premium estimate  
20 derived from multiple European stock exchange indices is an appropriate basis for  
21 estimating the cost of equity for a regulated utility in the United States. In view of this

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<sup>132</sup> Woolridge Direct, at 83-84.

1           shortcoming, and the fact that I have no basis for evaluating the validity of the underlying  
2           assumptions incorporated into KPMG’s recommended market risk premium, I recommend  
3           that the Commission reject it.

4   **Q.   Please summarize your findings with regard to the critical shortcomings you**  
5   **identified in Dr. Woolridge’s CAPM analysis.**

6   A.   The primary shortcomings that I identified in Dr. Woolridge’s CAPM analyses are as  
7       follows: (1) referencing a composite beta coefficient that essentially removes any  
8       remaining effects of the COVID-19 pandemic from the beta estimation process and  
9       therefore selectively ignores part of the historical market record, resulting in a composite  
10      beta that is significantly lower than the beta coefficients currently reported by Value Line;  
11      and (2) deriving an estimate of the market risk premium entirely on the basis of various  
12      publications and surveys, that do not likely reflect the return expectations of investors, but  
13      instead incorporate subjective bias and other flaws into the cost of equity estimation  
14      process. As a result, Dr. Woolridge’s market risk premium assumption of 5.00 percent  
15      significantly understates the prevailing risk premium, which is my judgment, is presently  
16      close to the long-run historical average market risk premium of 7.17 percent.<sup>133</sup>

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<sup>133</sup>       See, Rea Direct, at 68-70.

1           **Response to Dr. Woolridge’s Criticisms of the Company’s CAPM Analysis**

2   **Q.    Dr. Woolridge criticizes the 7.00 percent market risk premium you developed for**  
3   **purposes of your CAPM analysis, because, in his judgment, both the 98-year**  
4   **historical average market risk premium and the projected market returns that you**  
5   **developed are “poor measures of expected market risk premiums”.<sup>134</sup> How do you**  
6   **respond?**

7   **A.    I disagree, and find it perplexing as to why Dr. Woolridge would suggest that the**  
8   **publications and surveys that he has referenced in developing his estimate of the market**  
9   **risk premium is a better measure of the expected market risk premium, as compared to the**  
10   **data that I evaluated, which includes: (1) 98-years of documented U.S. stock market**  
11   **history; and (2) the prospective market return and risk premium data provided by the DCF-**  
12   **derived expected returns for the S&P 500 Index, as well as Value Line’s 3-5 year annual**  
13   **price appreciation potential estimates.**

14           It should first be noted that referencing the long-run historical market returns data, which  
15           is referred to as the Ibbotson Approach<sup>135</sup> in developing an estimate of the market risk  
16           premium is a widely-accepted approach in utility rate proceedings. As noted earlier, these  
17           are the pertinent benchmark return values to reference in developing an estimate of the  
18           market risk premium, since over the very long-run (i.e., 98 years), investor expectations  
19           are realized. Moreover, evaluating the historical returns of large-capitalization stocks  
20           provides an unbiased estimate of future market return expectations. Again, this is because  
21

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<sup>134</sup> Woolridge Direct, at 106.

<sup>135</sup> As previously reported each year in the *SBBI Yearbook*, and which is now reported in the *Kroll Cost of Capital Navigator*.

1 these historical returns reflect repeated observations of a variable that has behaved  
2 randomly in the past (i.e., U.S. stock market returns), and are therefore devoid of the  
3 subjective bias that is incorporated into the publications and surveys referenced by Dr.  
4 Woolridge.

5 Secondly, developing an estimate of the market risk premium by conducting a DCF  
6 analysis of the S&P 500 Index is also a generally-accepted approach in utility rate  
7 proceedings, as this approach most often incorporates the consensus EPS growth estimates  
8 of Wall Street analysts, which the finance literature has demonstrated has a strong influence  
9 on stock valuations. Along these lines, it is noteworthy that the FERC has adopted this  
10 very same approach for purposes of CAPM analyses.<sup>136</sup> Additionally, referencing a DCF  
11 analysis of the S&P 500 Index is a prospectively focused approach, which provides a  
12 balancing effect relative to the long-run historical market returns data noted earlier.

13 Lastly, developing an estimate of the market risk premium by evaluating the expected price  
14 appreciation potential of Value Line's 1,700 stock universe is another methodology often  
15 used in utility rate proceedings. An important benefit of this approach is that it incorporates  
16 the most recent stock market relative trading valuation levels into the cost of equity  
17 estimation process, as Value Line's expected price appreciation potential metric almost  
18 invariably declines as the trading valuation of the U.S. stock market indices increase.  
19

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<sup>136</sup> See, FERC Opinion 569-B (P. 21).

1 **Q. Dr. Woolridge criticizes the prospective growth rate assumption (9.12 percent) you**  
2 **referenced in your CAPM analyses that is based upon a hybrid approach between the**  
3 **consensus EPS growth estimates of Wall Street analysts and the Value Line stock**  
4 **price appreciation potential approach. How do you respond?**

5 A. I would point out that the prospective market returns that I have developed in my CAPM  
6 analyses are the product of a balanced analytical approach, whereby I have evaluated both  
7 the DCF market return for the S&P 500 stock index, and also the expected price  
8 appreciation potential for the Value Line universe of companies. As reflected in  
9 Attachment ES-VVR-7 (p.1) to my direct testimony, after combining the 3-5 year  
10 consensus EPS growth estimates of institutional equity analysts (10.29 percent) and the  
11 five-year realization estimate of stock price appreciation potential for the Value Line 1,700  
12 stock index (7.94 percent), I determined that a 9.12 percent growth rate assumption was a  
13 fair reflection of the current growth rate expectations of both institutional equity analysts  
14 and Value Line's analysts for the large-capitalization U.S. stock market indices.

15 **Q. How does the 11.03 percent prospective market return estimate you referenced in**  
16 **your CAPM analyses<sup>137</sup> compare to the historical annual market returns for large**  
17 **capitalization stocks?**

18 A. As reported by the *Kroll Cost of Capital Navigator*, the total annual return for large  
19 capitalization stocks for the 98-year period between 1926-2023 averaged 12.04 percent.  
20 Therefore, the 11.03 percent prospective market return estimate that I have referenced in  
21 my CAPM analyses is 101 basis points below the 98-year historical average, which further  
22 validates the reasonableness of my estimate.

23

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<sup>137</sup> Rea Direct, at 68-69, and Attachment ES-VVR-7 (p.1).

1 **Q. Dr. Woolridge also criticizes your prospective market risk premium assumption of**  
2 **6.82 percent as being overstated and upwardly biased.<sup>138</sup> How do you respond?**

3 A. Again, Dr. Woolridge fails to recognize that my prospective market risk premium analysis  
4 employed a balanced approach whereby I evaluated the consensus EPS growth estimates  
5 of Wall Street analysts, while also conducting a more conservative evaluation of the market  
6 risk premium as based upon the expected price appreciation potential of the Value Line  
7 stock universe. In the current market environment, this latter approach is a more  
8 conservative approach, since the currently high relative stock valuations in the U.S. equity  
9 market tend to limit the price appreciation potential for the companies comprising the  
10 Value Line stock universe. Therefore, by placing equal weight on the above two  
11 approaches, I determined that a reasonable estimate of the prospectively focused market  
12 risk premium is 6.82 percent, which is actually 35 basis-points lower than the 98-year  
13 historical average market risk premium of 7.17 percent.

14 **Q. As a supporting basis for rejecting the consensus EPS growth estimates of equity**  
15 **analysts in your CAPM analysis, Dr. Woolridge references various estimates of the**  
16 **expected U.S. nominal GDP growth rate, and concludes that a projected GDP growth**  
17 **rate estimate of 4.5 percent is more appropriate for purposes of estimating the**  
18 **expected market return and market risk premium.<sup>139</sup> In your opinion, is this a**  
19 **proper approach?**

20  
21 A. No, I disagree with this approach for several reasons. First, the U.S. nominal GDP growth  
22 rate, which measures the growth rate of the monetary value of finished goods and services  
23 produced in the U.S., has not been demonstrated to be a primary determinant of stock

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<sup>138</sup> Woolridge Direct, at 110-111.

<sup>139</sup> Woolridge Direct, at 116.

1 valuations or the investment decisions of stock investors, and therefore is not an  
2 appropriate growth rate measure to reference in the constant growth DCF model. In this  
3 regard, Dr. Woolridge has not presented any empirical studies which actually demonstrate  
4 that GDP growth estimates are a primary determinant of stock valuations. Second, in recent  
5 years, regulated utilities have been engaged in a long-term investment growth phase due to  
6 the adoption of long-term initiatives to replace aging electric and gas utility infrastructure.  
7 As such, the level of rate base growth, and therefore earnings growth, that is expected to  
8 result from this long-term investment growth phase is expected to significantly exceed  
9 commonly referenced measures of U.S. economic growth, such as the nominal GDP  
10 growth rate for the foreseeable future. Third, the GDP growth rates referenced by Dr.  
11 Woolridge do not reflect the anticipated company-specific EPS and/or DPS growth rates  
12 for the individual companies comprising the market index, and therefore would be  
13 misspecified relative to the company-specific stock prices and dividend yields for each of  
14 the companies in the market index.

15  
16 **Q. Dr. Woolridge objects to your evaluation of the Empirical CAPM (ECAPM), stating**  
17 **that the ECAPM “is nothing more than an ad hoc version of the CAPM and has not**  
18 **been theoretically or empirically validated in refereed journals”.<sup>140</sup> How do you**  
19 **respond?**

20 **A.** I find Dr. Woolridge’s assertion in this regard to be somewhat perplexing, since he prefaced  
21 this particular statement by first stating the following:

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<sup>140</sup> Woolridge Direct, at 104.

1           The ECAPM, as popularized by rate of return consultant Dr. Roger  
2           Morin,<sup>141</sup> attempts to model the *well-known finding of tests of the CAPM*  
3           *that have indicated the security market line (“SML”) is not as steep as*  
4           *predicted by the CAPM (emphasis added).*<sup>142</sup>  
5

6           Therefore, by acknowledging that empirical tests of the CAPM have demonstrated that the  
7           security market line is actually not as steep as predicted by the traditional CAPM, Dr.  
8           Woolridge has likewise acknowledged that lower beta stocks, such as utility stocks, will  
9           actually have higher returns as compared to what is indicated by the traditional CAPM. In  
10          this regard, the ECAPM was specifically developed to recognize this empirical finding.

11          By way of background, Dr. Morin developed the ECAPM based upon the large body of  
12          empirical research which demonstrated that the CAPM risk-return relationship, as  
13          illustrated by the Security Market Line, is actually flatter than what is predicted by the  
14          traditional CAPM. Dr. Morin’s development of the ECAPM was heavily influenced by  
15          the research of other well-respected finance academics<sup>143</sup> that similarly developed  
16          enhanced CAPM models based on many of the same principles and empirical findings  
17          which Dr. Morin applied in developing the ECAPM. Most notably, the esteemed finance  
18

---

<sup>141</sup>       Notably, Dr. Roger Morin has authored four authoritative guides on utility cost of capital matters, including *Modern Regulatory Finance* (2021), *New Regulatory Finance* (2006), *Regulatory Finance* (2004), and *Utilities’ Cost of Capital* (1984).

<sup>142</sup>       Woolridge Direct, at 104.

<sup>143</sup>       See, Fama, E.F. and French, K.R. “The Cross-Section of Expected Stock Returns,” *Journal of Finance*, June 1992, 427-465; Fama, E.F. and MacBeth, J.D. “Risk, Returns and Equilibrium; Empirical Tests,” *Journal of Political Economy*, September 1972, pp. 607-636; Litzenberger, R.H. and Ramaswamy, K., “The Effect of Personal Taxes and Dividends on Capital Asset Prices: Theory and Empirical Evidence,” *Journal of Financial Economics*, June 1979, 163-196; Litzenberger, R.H., Ramaswamy, K., and Sosin, H. “On the CAPM Approach to the Estimation of a Public Utility’s Cost of Equity Capital.” *Journal of Finance*, May 1980, 369-383; Pettengill, G.N., Sundaram, S. and Mathur, I. “The Conditional Relation Between Beta and Returns,” *Journal of Financial and Quantitative Analysis*, Vol. 30, No. 1, March 1995, at 101-116.



1 academics Fama and French have provided further support for the ECAPM where they  
2 indicated the following:

3 The evidence that the relation between beta and average return is too flat is  
4 confirmed in time-series tests, such as Friend and Blume (1970), Black,  
5 Jensen and Scholes (1972) and Stambaugh (1982).  
6

7 Confirming earlier evidence, the relation between beta and average return  
8 for the ten portfolios is much flatter than the Sharpe-Lintner CAPM  
9 predicts. The returns on the low beta portfolios are too high, and the return  
10 on the high beta portfolios are too low. For example, the predicted return  
11 on the portfolio with the lowest beta is 8.3 percent per year; the actual return  
12 is 11.1 percent. The predicted return on the portfolio with the highest beta  
13 is 16.8 percent per year; the actual is 13.7 percent.  
14

15 The version of the CAPM developed by Sharpe (1964) and Lintner (1965)  
16 has never been an empirical success....in the late 1970's, research begins to  
17 uncover variables like size, various price ratios and momentum that add to  
18 the explanation of average returns provided by beta.  
19

20 But the empirical work, old and new, tells us that the relation between beta  
21 and average return is flatter than predicted by the Sharpe-Lintner version of  
22 the CAPM. As a result, CAPM estimates of the cost of equity for high beta  
23 stocks are too high (relative to historical average returns) and estimates for  
24 low beta stocks are too low (Friend and Blume, 1970).<sup>144</sup>  
25

26 **Q. Dr. Woolridge further objects to your use of the ECAPM because he is unaware of**  
27 **any tests of the CAPM that use adjusted betas, and also because according to Dr.**  
28 **Woolridge, adjusted betas already address the empirical issues associated with the**  
29 **CAPM<sup>145</sup>. How do you respond?**

30 A. I disagree on both points. On the first point, it is important to note that an academic study  
31 by Litzenberger, Ramaswamy and Sosin,<sup>146</sup> as supported by a number of other academic

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<sup>144</sup> Eugene F. Fama and Kenneth R. French, *The Capital Asset Pricing Model: Theory and Evidence*, *The Journal of Economic Perspectives*, Vol. 18, No. 3 (Summer, 2004) at 32-33, and 43-44.

<sup>145</sup> Woolridge Direct, at 104.

<sup>146</sup> *See*, Robert Litzenberger, Krishna Ramaswamy, and Howard Sosin, *On the CAPM Approach to the Estimation of a Public Utility's Cost of Equity Capital*, *The Journal of Finance*, Volume XXXV, No. 2 (May 1980).

1 studies,<sup>147</sup> helped lay the foundation for the development of the ECAPM. The Litzenberger  
2 et al. study did in fact evaluate adjusted betas in the context of an empirically based CAPM  
3 construct. In addition, Dr. Morin referenced Value Line's adjusted betas in his ECAPM  
4 studies that were conducted in 2001.<sup>148</sup> Therefore, there have in fact been tests of the  
5 CAPM that have incorporated adjusted betas.

6 On the second point, it is important to note that the ECAPM does not represent a risk  
7 adjustment to beta (or a horizontal axis adjustment to the SML), but instead represents a  
8 return adjustment (or vertical axis adjustment to the SML) for empirically observed  
9 differences in actual stock returns versus what is predicted by the traditional CAPM. In  
10 contrast, the adjustments that are made to raw betas by investment advisory services such  
11 as Value Line are designed to correct for the tendency of betas to regress towards the mean  
12 value of 1.0 over time. For this reason, the use of adjusted betas within the ECAPM does  
13 not result in any "error"<sup>149</sup> as suggested by Dr. Woolridge, since the ECAPM incorporates  
14 a return adjustment for empirically observed differences in actual returns, rather than a risk  
15 adjustment to beta. Dr. Morin has made clear that there are no inconsistencies or  
16 redundancies associated with using adjusted betas within an ECAPM analysis.  
17 Specifically, in *Modern Regulatory Finance*, Dr. Morin makes the following observations:

---

<sup>147</sup> *See*, Bente Villadsen, Michael J. Vilbert, Dan Harris and A. Lawrence Kolbe, *Risk and Return for Regulated Industries*, Academic Press, Elsevier, Inc. (2017), at 83.

<sup>148</sup> Roger A. Morin, *Modern Regulatory Finance*, PUR Books LLC, 2021, at 224.

<sup>149</sup> Woolridge Direct, at 104.

1 The use of an adjusted beta by Value Line is correcting for a different  
2 problem than the ECAPM. The adjusted beta captures the fact that betas  
3 regress toward one over time. The ECAPM corrects for the fact that the  
4 CAPM under-predicts observed returns when beta is less than one and over-  
5 predicts observed returns when beta is greater than one.

6 ....

7 The two adjustments are not the same and there is no double-counting.

8 ....

9 Another way of looking at it is that the Empirical CAPM and the use of  
10 adjusted betas comprise two separate features of asset pricing. Assuming  
11 *arguendo* a company's beta is estimated accurately, the CAPM will still  
12 understate the return for low-beta stocks. Furthermore, if a company's beta  
13 is understated, the Empirical CAPM will also understate the return for low-  
14 beta stocks. Both adjustments are necessary.<sup>150</sup>

15  
16 **Q. Has the ECAPM been adopted by U.S. regulatory commissions and/or proposed by**  
17 **commission staffs and intervening parties in utility rate proceedings?**

18 A. Yes, a growing number of utility commissions, commission staffs and intervening parties  
19 have recognized the merits of empirical forms of the CAPM, and have elected to utilize  
20 the ECAPM in utility regulatory proceedings. A summary of some of these proceedings  
21 is listed in Table 11R below.  
22

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<sup>150</sup> Roger A. Morin, *Modern Regulatory Finance*, PUR Books LLC, 2021, at 223-224.

<b>Table 11R  Utility Regulatory Proceedings Where the ECAPM Has Been  Adopted by Regulatory Commissions and/or Proposed by  Commission Staff and Consumer Advocates</b>		
<b>Regulatory Commission</b>	<b>Party Adopting or Proposing an ECAPM Analysis</b>	<b>Docket No. / Case No.</b>
Maryland Public Service Commission	Commission Staff	Case Nos. 9299, 9316, 9326 and 9336.
Regulatory Commission of Alaska	Commission Order	Order No. P-97-004 (151)
Colorado Public Utilities Commission	Commission Staff	Proceeding No. 13AL-0067G
New York Public Service Commission	Commission Order	Docket No. 91-M-0509
Mississippi Public Service Commission	PSC Authorization: Use of the ECAPM for Quarterly Benchmark ROE Calculations	Docket U-4761
Montana Public Service Commission	Commission Order	Docket No. D2017.9.80
Wyoming Public Service Commission	Office of Consumer Advocate	See Morin, <i>Modern Regulatory Finance</i> , at 225.
Arkansas Public Service Commission	Office of Attorney General	See Morin, <i>Modern Regulatory Finance</i> , at 225.

1  
2 It is further notable that in the aforementioned Montana rate proceeding involving Energy  
3 West Montana, Inc. and Cut Bank Gas Company, the Public Service Commission of  
4 Montana stated the following in its Final Order with regard to the ECAPM:

5 The evidence in this proceeding has convinced the Commission that  
6 Empirical Capital Asset Pricing Model (“ECAPM”) should be the primary

1 method for estimating the Joint Applicants' cost of equity in two different  
2 variations, as explained below.

3 ....  
4

5 The Commission agrees with Scheig that the issue should be remedied by  
6 adopting the ECAPM, including his  $x$  factor of 0.25, which is intended to  
7 approximate the  $a$  effect identified by the academic literature reviewed in  
8 Morin's textbook<sup>151</sup>.

9 Therefore, in view of the empirically observed shortcomings of the traditional CAPM as  
10 demonstrated by a number of academic studies, as well as the growing recognition of the  
11 merits of the ECAPM by regulatory commissions and commission staff, it is both  
12 reasonable and prudent to consider the ECAPM as a useful adjunct within a comprehensive  
13 CAPM evaluation.

14 **Q. Citing a 1993 study by Wong,<sup>152</sup> Dr. Woolridge maintains that there is no evidence to**  
15 **suggest that the small-firm size premium that you have recommended applies to**  
16 **regulated utilities, and he more generally disputes the existence of the size premium**  
17 **based upon a 2018 study by Ang<sup>153</sup> and a 2015 study by Damodaran.<sup>154</sup> How do you**  
18 **respond?**

19 A. Once again, I disagree. Support for the use of the size premium in the utility industry  
20 comes from at least two studies which have demonstrated that the size effect does in fact  
21 apply to utilities. For example, in *Equity and the Small-Stock Effect*, Annin concluded:

22 For the traditional CAPM, the large-company composite shows a cost of equity  
23 of 12.05 percent; the small company composite, 13.93 percent. However, once  
24

---

<sup>151</sup> *In the Matter of the Joint Application for Approval to Change and Establish Natural Gas Delivery Service Rates for Energy West Montana, Inc. and Cut Bank Gas Company*, Docket No. D2017.9.80, Final Order (September 26, 2018), at 40 and 42.

<sup>152</sup> Woolridge Direct, at 124-125.

<sup>153</sup> *Id.*, at 125-126

<sup>154</sup> *Id.*, at 126.127

1 the respective small capitalization premium is added in, the spread increases  
2 dramatically, to 12.07 and 17.95 percent, respectively. Clearly, the smaller the  
3 utility (in terms of equity capitalization), the larger the impact that size exerts  
4 on the expected return of that security<sup>155</sup>.

5  
6 Similarly, in *Utility Stocks and the Size Effect–Revisited*, Zepp concluded:

7 New studies based on different size water utilities are presented that do support  
8 a small firm effect in the utility industry<sup>156</sup>.

9  
10 Furthermore, in a recent opinion, the FERC characterized the small size premium as a  
11 “generally accepted approach” to CAPM analyses for purposes of utility regulatory  
12 proceedings. Specifically, the FERC stated the following in this regard:

13 We disagree with Petitioners’ argument that the NETOs CAPM analysis is  
14 flawed due to the fact that the NETOs applied a size adjustment to account for  
15 the difference in size between the NETOs and the dividend-paying companies  
16 in the S&P 500. *This type of size adjustment is a generally accepted approach*  
17 *to CAPM analyses, and we are not persuaded that it was inappropriate to use*  
18 *a size adjustment in this case.* The purpose of the NETOs size adjustment is to  
19 render the CAPM analysis useful in estimating the cost of equity for companies  
20 that are smaller than the companies that were used to determine the market risk  
21 premium in the CAPM analysis (emphasis added).<sup>157</sup>

22  
23 With regard to the Ang (2018) and Damodaran (2015) findings that the small size premium  
24 has largely disappeared in recent years, another research paper from 2018 maintains that  
25 the size premium continues to be alive and well. In the research paper “*The Size Effect*  
26 *Continues to be Relevant When Estimating the Cost of Capital*,” the paper’s author, Roger  
27 Grabowski, who serves as Managing Director, Valuation Advisory Services for Kroll LLC,

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<sup>155</sup> Annin, M., *Equity and the Small-Stock Effect*, Public Utilities Fortnightly, October 15, 1995, 133, at 42.

<sup>156</sup> Zepp, T., *Utility Stocks and the Size Effect–Revisited*, The Quarterly Review of Economics and Finance, 43 (2003), at 578-582.

<sup>157</sup> Federal Energy Regulatory Commission, Opinion 531-B, 61,165 at P117 (2015).

1 and is a widely recognized expert on business valuation, comes to the following  
2 conclusions:

3 Academic and empirical evidence indicate that the pure textbook CAPM is  
4 an imperfect indicator of expected returns.

5 ....

6  
7 Size premia help the valuation professional correct the pure CAPM for the  
8 risks of smaller companies not captured by beta. In this paper, I  
9 demonstrate that the methodology followed by Duff & Phelps (now Kroll)  
10 to calculate size premia is robust and yields a consistent stable premium to  
11 be used for pricing long term project as it should be for a good measure of  
12 cost of capital.<sup>158</sup>  
13

14 These observations notwithstanding, the finance literature does suggest that the small-firm  
15 size premium does tend to “ebb and flow” over the longer-run horizon, but this should not  
16 be interpreted as suggesting that the small-firm size premium no longer exists. This  
17 particular controversy is further addressed in the *2023 SBBI Yearbook*, which states:

18 The increased risk faced by investors in small stocks is quite real. It is  
19 important to note, however, that the risk/return profile is over the long-term.  
20 The long-term expected return for any asset class can be quite different from  
21 short-term expected returns. Investors in small-cap stocks should expect  
22 losses and periods of underperformance relative to large-cap stocks. While  
23 this might lead some market observers to speculate that there is no size  
24 premium, statistical evidence suggests that periods of smaller stocks’  
25 underperformance should be expected. The evidence also suggests that the  
26 longer small-cap companies are given to “race” against large-cap  
27 companies, the greater the chance that small-cap companies outpace their  
28 larger counterparts.

29 ....

30 As the holding period is increased, and the time that small-cap companies  
31 and large-cap companies are given to “race” against each other is  
32 lengthened, small-cap stocks tend to increasingly outperform large-cap

---

<sup>158</sup> “The Size Effect Continues to be Relevant When Estimating the Cost of Capital,” *Business Valuation Review*, Volume 37, Number 3 (Fall 2018, at 93 and 109).

1 stocks. For example, over the entire range January 1926-December 2022  
2 (see leftmost column of Exhibit 7.3), as the holding period is increased to  
3 60 months (5-years), to 120 months (10-years), to 240 months (20-years)  
4 and finally to 360 months (30-years), small stocks increasingly outperform  
5 large stocks (54%, 66%, 88%, and 96% of the time, respectively).<sup>159</sup>

6 It should further be noted that Kroll continues to report size premiums derived from the  
7 CRSP<sup>160</sup> Deciles Size Study within the Kroll *Cost of Capital Navigator*, which is the same  
8 data that I referenced in my CAPM analyses. If size premiums had in fact disappeared as  
9 Dr. Woolridge alleges, Kroll would no longer be in position to report size premiums by  
10 market-capitalization deciles, as they continue to do today.

11 **Q. Dr. Woolridge maintains that you erred by using leveraged-adjusted betas in your**  
12 **CAPM analysis.<sup>161</sup> How do you respond?**

13 A. I did not use leverage-adjusted betas in my CAPM. I used the average beta coefficients  
14 reported by Value Line for the companies included in each of the three proxy groups I  
15 evaluated.

16 **Discussion of Mr. Rothschild's CAPM Analysis**

17  
18 **Q. Please provide an overview of Mr. Rothschild's CAPM analyses.**

19 Mr. Rothschild presents two versions of his CAPM analysis, the first with 3-month  
20 weighted average values (for the period between September 2024 and November 2024) for  
21 his CAPM input variables, and the second with spot values as of November 30, 2024.  
22 Within the two versions of his CAPM analyses, Mr. Rothschild references both a risk-free

---

<sup>159</sup> 2023 *SBB* Yearbook, Kroll LLC, at 147-148.

<sup>160</sup> The CRSP refers to the "Center for Research in Security Prices" at the University of Chicago, Booth School of Business.

<sup>161</sup> Woolridge Direct, at 105.



1 rate of return based on the 3-month U.S. Treasury bill, and a risk-free rate that is based on  
2 the 30-year U.S. Treasury bond. Mr. Rothschild then develops his own “option-implied”  
3 forward betas and option implied market risk premiums on the basis of a single research  
4 paper published in 2011, which I will discuss further herein. Mr. Rothschild also evaluated  
5 a “historical blend” of beta values in his analysis, which places a 50 percent weighting on  
6 his beta regression analysis that evaluated a six-month period, a 30 percent weighting on  
7 his regression analysis that evaluated a two-year period, and 20 percent weighting on this  
8 regression analysis that evaluated a five-year period. Based upon the above approaches,  
9 Mr. Rothschild’s CAPM analyses produce cost of equity estimates that range from between  
10 6.16 percent and 7.09 percent.<sup>162</sup> The results of Mr. Rothschild’s CAPM analyses are  
11 summarized in Table 12R below.

12

<b>Table 12R Results of Mr. Rothschild’s CAPM Analyses</b>	
Method / Analytical Model	Range of Recommendations
<b>3-Month Weighted Average</b>	
3-Month Treasury Bill (Rf rate)	6.51% - 7.09%
30-Year Treasury Bond (Rf rate)	6.37% - 6.99%
<b>Spot (November 30, 2024)</b>	
3-Month Treasury Bill (Rf rate)	6.27% - 6.99%
30-Year Treasury Bond (Rf rate)	6.16% - 6.93%

13

---

<sup>162</sup> See, Rothschild Direct, at 74-75 and Exhibit ALR-2.

1 **Q. What critical shortcomings did you identify in Mr. Rothschild’s CAPM analyses?**

2 A. The critical shortcomings that I identified include: (1) relying upon the spot and 3-month  
3 historical U.S. Treasury security yields as of November 30, 2024, which are outdated and  
4 do not reflect the recent upward trend in long-term capital costs which continued through  
5 the date that Mr. Rothschild filed his direct testimony in the instant proceeding; (2) relying  
6 upon the 3-month U.S. Treasury bill yield as a proxy for the risk-free rate of return, which  
7 is not a proper approach; (3) relying upon his “in-house” proprietary beta coefficient  
8 calculations, which are woefully inconsistent with the widely-referenced beta coefficients  
9 published by Value Line, and which place an unusually heavy weighting (50 percent) on  
10 stock return observations for just a 6-month period; (4) relying upon a calculation  
11 methodology for his “option-implied” betas which is based on the research of a single  
12 group of researchers who themselves have raised doubts concerning the suitability of  
13 referencing option-implied betas for cost of capital estimation purposes;<sup>163</sup> and (5) relying  
14 upon option-implied betas that Mr. Rothschild has developed on the basis of incomplete  
15 market data, where it was necessary for him to “fill-in” unavailable data by either  
16 interpolating the data or holding the data constant over multiple periods, which introduces  
17 significant data integrity concerns.

18 **Q. Do the risk-free rate of return assumptions referenced by Mr. Rothschild in his**  
19 **CAPM analysis comport with the most recent trends for long-term capital costs?**

20 A. No. Mr. Rothschild has referenced risk-free rate of return assumptions that are based on  
21 both spot values and 3-month historical values as of November 30, 2024, which are both  
22 outdated and understated. More specifically, while Mr. Rothschild has referenced risk-free

1 rate of return values in his CAPM analysis that range from 4.34 percent to 4.64 percent,  
2 with a midpoint value of 4.49 percent, the average trading yield for the 30-year U.S.  
3 Treasury bond during December 2024 and January 2025 has been 4.71 percent. This 22  
4 basis-point disparity further contributes to the significant downward bias in Mr.  
5 Rothschild's CAPM-based estimates of the cost of equity.

6 **Q. In his CAPM analysis, Mr. Rothschild has relied upon the 3-month U.S. Treasury bill**  
7 **yield as a proxy for the risk-free rate of return. Is this a proper approach?**

8 A. No. From a duration or tenor standpoint, the 30-year U.S. Treasury bond most closely  
9 parallels the investment characteristics of common stocks, since both are considered long-  
10 term, if not permanent, capital. Furthermore, 30-year Treasury yields, like common stocks,  
11 reflect the long-term inflation expectations of investors, and are subject to less volatility  
12 than shorter-dated Treasury securities. Therefore, Mr. Rothschild's use of the 3-month  
13 Treasury bill as a proxy for the risk-free rate of return is inappropriate, and has further  
14 contributed to the downward bias in his CAPM analyses.

15 **Q. Do you agree with Mr. Rothschild's approach of using "in-house" proprietary**  
16 **historical beta coefficient calculations in his CAPM analyses?**

17 A. No, for two primary reasons. First, unlike the beta coefficients reported by Value Line,  
18 Mr. Rothschild's proprietary historical beta calculations are not widely-disseminated to a  
19 broad universe of investors, and for this reason, his calculated betas have limited, if any,  
20 influence on the return expectations of equity investors. Second, Mr. Rothschild has

---

<sup>163</sup> Bo-Young Chang, Peter Christoffersen, Kris Jacobs, and Gregory Vainberg, *Option-Implied Measures of Equity Risk*, *Review of Finance* (2012) 16, at 391 and 421.

1 elected to place a 50 percent weighting on his beta regression analysis that evaluated only  
2 a six-month historical period, which includes only 26 weekly observations. In my  
3 judgment, placing a 50 percent weighting on stock return data that only covers a 6-month  
4 historical period is not of adequate duration, as it does not capture a sufficient number of  
5 historical observations to reliably conduct a regression analysis for calculating the beta  
6 coefficient. This time horizon is simply not long enough to sufficiently smooth out any  
7 short-term market volatility, which is why referencing betas that are based on longer time  
8 horizons, such as five years, is more appropriate. This is borne out by the longstanding  
9 approach utilized by Value Line, which has historically evaluated 260 weekly observations  
10 over a five-year period of time. Thus, while Mr. Rothschild has calculated beta coefficients  
11 under his “historical blended” methodology that range from 0.51 – 0.52,<sup>164</sup> the average  
12 beta coefficient currently reported by Value Line for the Rea Electric Group is 0.92.<sup>165</sup>  
13 Considering the Value Line’s beta coefficients are widely-referenced by the investment  
14 community while Mr. Rothschild’s “in-house” beta coefficients are not, it is clear that Mr.  
15 Rothschild’s use of his “historical blended” beta coefficients further contributes to the  
16 significant downward bias in his CAPM-based estimates of the cost of equity.

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<sup>164</sup> Rothschild Direct, at Table 7 (p. 74) and Table 8 (p. 75).

<sup>165</sup> See, Attachment ES-VVR-3R, at 6.

1 **Q. Mr. Rothschild also relies upon “option-implied” betas in his CAPM analysis which**  
2 **he has calculated “in-house”, and which differ significantly from the widely-**  
3 **disseminated beta coefficients reported by Value Line. Do you agree with this**  
4 **approach?**

5 A. No. Mr. Rothschild’s “option-implied” betas are subject to a number of shortcomings,  
6 including: (1) reliance upon spot market data for a single trading day in each week that Mr.  
7 Rothschild evaluated,<sup>166</sup> which exposes Mr. Rothschild’s beta estimates to the vagaries and  
8 day-to-day volatility of the financial markets; (2) referencing options contracts that expire  
9 in 180 days (6 months), which likely do not reflect the longer-term return expectations of  
10 investors; (3) relying upon option-implied betas that have been developed on the basis of  
11 incomplete market data, where it was necessary for Mr. Rothschild to “fill-in” unavailable  
12 data by either interpolating the data or holding the data constant over multiple periods; and  
13 (4) placing a heavy reliance upon a beta calculation methodology that involves a series of  
14 complicated calculations and subjective input assumptions<sup>167</sup> which is a process that the  
15 vast majority of investors will not engage in, particularly in view of the fact that beta  
16 coefficients are already widely-circulated by various investment service organizations,  
17 such as Value Line and Bloomberg.

18 **Q. Do you have concerns with Mr. Rothschild’s approach of using spot market data to**  
19 **calculate his option-implied betas?**

20 Yes. Mr. Rothschild’s calculation of his option-implied betas is dependent upon options  
21 data for a single trading day in each of the 14 weeks that he evaluated.<sup>168</sup> Therefore, the

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<sup>166</sup> See, Rothschild Direct, at 68, and Mr. Rothschild's workpaper file: "Rothschild CoC Calculation – Fundamentals - OPTIVA Results – Source Data" tab.

1 use of spot market data for just one day each week causes Mr. Rothschild’s analysis to be  
2 subject to the vagaries and day-to-day volatility of the financial markets, which can result  
3 in significant disparities in Mr. Rothschild’s beta estimates over a short period of time. The  
4 options contract data that is used to determine the CBOE<sup>169</sup> implied volatility measure, or  
5 “VIX”, is the same data that Mr. Rothschild has relied upon in developing his option-  
6 implied betas. As can be seen in Chart 10 (p. 41) in Mr. Rothschild’s direct testimony, the  
7 VIX index can change dramatically on a weekly or even daily basis. This strongly suggests  
8 that the particular day selected by Mr. Rothschild in calculating his option-implied betas  
9 can have a significant impact on his beta estimates. This very fact is acknowledged in the  
10 research paper authored by Chang, Christoffersen, Jacobs and Vainberg (“Chang et al.  
11 (2011)”) which Mr. Rothschild references as support for his approach in calculating option-  
12 implied betas. In this research paper, the study’s authors point out that their beta  
13 calculation methodology could potentially be improved if more data points were referenced  
14 in the development of the beta estimates. Specifically, the authors observed the following:

15 The three case studies also illustrate that the forward-looking betas contain a  
16 certain amount of high-frequency noise when estimated from only one day of  
17 options data. We could reduce this noise by estimating the forward-looking  
18 betas using several days of options. However, in order to be as transparent as  
19 possible all the forward looking betas below are estimated using just one day  
20 of options data.

21 . . . .

22 We compute option-implied moments and betas using option prices on a given  
23 day. While this is the most obvious and transparent initial approach to  
24 investigating the method’s merits, the performance of the option-implied betas

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<sup>167</sup> See, Rothschild Direct, at 67-71

<sup>168</sup> See, Exhibit ALR-4 (p. 3).

<sup>169</sup> “CBOE” is the acronym for the Chicago Board Options Exchange.

1           may be improved by adjusting these betas using a predetermined rule, or by  
2           smoothing betas and/or moments using information extracted from option  
3           prices on other days. The optimal use and optimal smoothing of information  
4           contained in option prices is certainly worthy of further study<sup>170</sup>.

5  
6           As noted above, the paper's authors have acknowledged that relying upon option contracts  
7           for a single trading day may not produce consistently reliable beta estimates. This is readily  
8           apparent in Mr. Rothschild's forward beta calculations shown in his Exhibit ALR-4, page  
9           3. As reflected in this exhibit, Mr. Rothschild derived an option-implied beta of 0.66 for  
10          November 5, 2024, while just one week later, on November 12, 2024, his beta estimate had  
11          increased to 0.74. In other words, over the course of just one week, Mr. Rothschild's beta  
12          estimate increased by 0.08, which is a significant increase. Moreover, in a previous  
13          regulatory proceeding where Mr. Rothschild derived the same option-implied betas, the  
14          week-to-week disparities in his beta estimates were even greater. In *Montana-Dakota*  
15          *Utilities Co.*<sup>171</sup>, Mr. Rothschild derived an option-implied beta of 0.65 as of September 29,  
16          2020, while just one week later, on October 6, 2020, his beta estimate had decreased to  
17          0.29. Therefore, over the course of just one week, Mr. Rothschild's beta estimate decreased  
18          by 0.36, which is greater than one-half of his previous week's beta estimate. I have  
19          summarized these noted disparities in Mr. Rothschild's forward beta estimates in Table  
20          13R below.

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<sup>170</sup> Bo-Young Chang, Peter Christoffersen, Kris Jacobs, and Gregory Vainberg, *Option-Implied Measures of Equity Risk*, *Review of Finance* (2012) 16; at 409 and 421.

<sup>171</sup> Direct Testimony of Aaron L. Rothschild (Schedule ALR-4, p. 3), *Montana-Dakota Utilities Co.*, Case No. PU-20-379.

<b>Table 13R</b> <b>Variability of Beta Estimates Produced by Mr. Rothschild’s</b> <b>Option-Implied Beta Calculation Methodology</b>		
Docket No. DE 24-070 Public Service New Hampshire	Estimate Date: Nov. 5, 2024	Estimate Date: Nov. 12, 2024
Forward Beta Estimate	0.66	0.74
Case No. PU-20-379, Montana-Dakota Utilities	Estimate Date: Sept. 29, 2020	Estimate Date: Oct. 6, 2020
Forward Beta Estimate	0.65	0.29

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In either of these two examples, the volatile nature of Mr. Rothschild’s beta estimates would result in significant changes in his CAPM-derived cost of equity estimates, and therefore demonstrates that the use of spot market data for beta estimation purposes can often result in inconsistent and therefore unreliable estimates of the cost of equity.

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7

**Q. Do you have any concerns relating to Mr. Rothschild’s use of options with expiration dates of 180 days?**

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12

A. Yes. It should be noted that in the Chang et al. (2011) study paper, the authors acknowledge that options liquidity is the most robust within 30-90 days of an option’s expiration date, which suggests that Mr. Rothschild’s approach of relying upon options with 180 days remaining until the expiration date may in fact not provide the most reliable pricing information. However, at the same time, it should also be noted that referencing options



1 with 180-day expiration dates is not likely to adequately capture the longer-term risk and  
2 return expectations of equity investors. Along these lines, the study's authors noted:

3 The choice of a 180-day horizon is to some extent based on the trade-off between  
4 option liquidity that is largest for options with 30-90 days to maturity and the  
5 relevant horizon for firm risk, which is arguably considerably longer.

6 ....

7 The main focus in this paper has been on forecasting 180-day ex-post betas,  
8 which are relevant for certain applications such as abnormal returns. *For other*  
9 *applications, such as cost of capital calculations, longer-horizon betas may be*  
10 *needed.* We plan to investigate the performance of option implied betas in this  
11 context by using long-term equity anticipation securities as well as option  
12 contracts with longer maturities traded on non-U.S markets (emphasis  
13 added)<sup>172</sup>.

14  
15 Therefore, based on the conclusions reached in the Chang et al. (2011) research paper, it  
16 would appear that relying upon 180-day option contracts for cost of capital estimation  
17 purposes is inappropriate, notwithstanding Mr. Rothschild's suggestions to the contrary.  
18 Thus, while the options contracts that Mr. Rothschild relied upon only reflect investors'  
19 expectations for approximately the next six months, the pertinent time horizon to evaluate  
20 for purposes of utility regulatory proceedings is the rate-effective period, which is typically  
21 much longer than six months. Therefore, considering that Mr. Rothschild's option-implied  
22 betas only reflect options data for the next six months, his beta estimates are not based on  
23 a forecast horizon that reflects the typical rate-effective period after a utility rate proceeding

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<sup>172</sup> Bo-Young Chang, Peter Christoffersen, Kris Jacobs, and Gregory Vainberg, *Option-Implied Measures of Equity Risk*, *Review of Finance* (2012) 16, at 391 and 421.

1 is completed. This further undermines the validity of Mr. Rothschild's beta estimates and  
2 ultimately his CAPM results.

3 **Q. Please elaborate further on your findings that the option-implied betas Mr.**  
4 **Rothschild developed for purposes of his CAPM analysis are based on incomplete**  
5 **market data where it was necessary for him to apply his subjective judgment by**  
6 **“filling-in” unavailable data.**

7 A. As was the case with Mr. Rothschild's option-implied growth rates in his DCF analysis,  
8 his workpapers<sup>173</sup> once again indicate that a significant portion of the proxy group data  
9 required to develop his option-implied *betas* is unavailable due to limited trading volumes.

10 This is demonstrated in Attachment ES-VVR-9R,<sup>174</sup> which confirms the following:

- 11 • Mr. Rothschild's workpapers indicate that 4 of the 11 companies he evaluated in  
12 the Rea Electric Group did not have a sufficient level of options trading data  
13 available, which prevented him from deriving option-implied betas for those  
14 companies (which he labeled as “N/A”). These companies include: Allete, Inc.,  
15 Avista Corp., Northwestern Corp., and OGE Energy Corp.  
16
- 17 • Mr. Rothschild's workpapers further indicate that in the case of another 4 of the 11  
18 companies included in the Rea Electric Group, it was necessary for him to “fill-in”  
19 a significant number of his option-implied betas due to incomplete market data,  
20 whereby Mr. Rothschild either elected to estimate the missing values through  
21 interpolation or by simply holding known values constant over multiple time  
22 periods. The companies included in this category include: Alliant Energy, CMS  
23 Energy Corp. IDACORP and Portland General Electric.  
24

25 Perhaps the most compelling examples of why Mr. Rothschild's option-implied  
26 betas suffer from data integrity issues are illustrated by the Alliant Energy and  
27 Portland General Electric data presented in Attachment ES-VVR-9R. As reflected  
28 in Attachment ES-VVR-9R, all 14 of the weekly estimates shown for Alliant  
29 Energy's beta are fixed at 1.0976, which indicates that due to limited options  
30 trading data, it was necessary for Mr. Rothschild to hold the single market-based

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<sup>173</sup> See, Mr. Rothschild's workpaper file "2024.11 - RFC Electric PG Betas - SELECT.xlsx", "OPTIVA BETAS"  
tab.

<sup>174</sup> Note that in Attachment ES-VVR-9R, I have reflected in gray shading the 11 companies that are included in  
the Rea Electric Group.

1 value that was actually available as of 8/27/2024 constant for each of the succeeding  
2 13 weeks thereafter. Additionally, 13 of the 14 beta estimates for Portland General  
3 Electric are also *not* based on actual market data, but are instead based on Mr.  
4 Rothschild's application of his subjective judgment by either interpolating the  
5 missing data between two known values or by holding a known value constant over  
6 multiple time periods.  
7

- 8 • Lastly, it is further notable that only 3 of the 11 companies included in the Rea  
9 Electric Group actually reflect *market-based* options trading data for all 14 of the  
10 weekly periods evaluated by Mr. Rothschild. These companies include:  
11 Consolidated Edison, Sempra Energy and WEC Energy Group.  
12

13 Therefore, to the extent that the betas referenced in Mr. Rothschild's CAPM analysis are  
14 based on his option-implied beta methodology, it is clear that the limited availability of  
15 options trading data for many of the companies included in the Rea Electric Group once  
16 again renders his analysis incomplete, and therefore invalid.

17 **Q. Have you identified any other shortcomings associated with the methodology that Mr.**  
18 **Rothschild has relied upon in calculating his option-implied beta estimates?**

19 A. Yes. The Chang et al. (2011) research paper made clear that the tests the authors conducted  
20 to validate their option-implied beta methodology determined that their beta estimates  
21 performed better for higher beta stocks. Since utility stocks are typically lower beta stocks  
22 as compared to the overall U.S. equity market, this further suggests that the beta calculation  
23 methodology employed by Mr. Rothschild may have in fact have limited applicability to  
24 utility stocks. This is further borne out by the fact that the study's authors also indicated  
25 that the betas developed for other business sectors (other than the utility industry)

1 performed better in the various validation tests that were conducted by the authors.

2 Specifically, the authors made the following observations:

3 The mean *ex post* beta variable is significant in two of three option-implied  
4 beta cases, suggesting that *option-implied beta perform better for higher*  
5 *beta stocks*.

6 ....

7 The improvements provided by option-implied and hybrid betas differ  
8 across sectors. For the industrials, consumer discretionary, materials and  
9 IT sectors, they perform well. Their performance is generally weaker for  
10 the consumer staples and health care industries.

11 ....

12 The results across industries largely confirm the findings from Table IV: the  
13 option-implied betas perform best for the materials, industrials, and  
14 consumer discretionary sectors (emphasis added)<sup>175</sup>.

15  
16 Notably, in Table IV of the Chang et al. (2011) study, the performance of the utility sector  
17 was shown to be very similar to the performance of the consumer staples and health care  
18 industries, which were the weakest performing industries, particularly for the 180-day  
19 realized beta comparison.

20 **Q. What method did Mr. Rothschild use to calculate the market risk premium?**

21 A. To calculate the market risk premium, Mr. Rothschild used essentially the same approach  
22 he used to calculate his forward beta, but instead used options data for the S&P 500 Index,  
23 as based upon both weighted data (three months average data as of November 30, 2024)  
24 and spot data (as of November 30, 2024). Mr. Rothschild's weighted analysis yielded risk  
25 premium results of 3.93 percent (30-year Treasury bond approach) and 3.64 percent (3-

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<sup>175</sup> Bo-Young Chang, Peter Christoffersen, Kris Jacobs, and Gregory Vainberg, *Option-Implied Measures of Equity Risk*, *Review of Finance* (2012) 16, at 417 and 418.

1 month Treasury bill approach), while his spot analysis yielded risk premium results of 3.56  
2 percent (30-year Treasury bond approach) and 3.34 percent (3-month Treasury bill)<sup>176</sup>.

3 **Q. Are Mr. Rothschild's market risk premium estimates susceptible to the same**  
4 **shortcomings you noted earlier with respect to his forward beta estimates?**

5 A. Yes. Both the weighted and spot market risk premiums that Mr. Rothschild developed are  
6 calculated using options contracts data for the S&P 500 Index. To determine the weighted  
7 average of the term structure of option-implied volatility and skewness, Mr. Rothschild  
8 evaluates options contracts that expire up to 61 months into the future. Nevertheless, he  
9 gives the most weight to option contracts with an expiration period of 12 months. Notably,  
10 Mr. Rothschild's market risk premium estimates also rely upon options data for only a  
11 single trading day in each of the weeks he evaluated, which, as noted earlier, leaves his risk  
12 premium estimates vulnerable to the day-to-day volatility of the financial markets.

13 **Q. Have the results of Mr. Rothschild's option-implied market risk premium estimates**  
14 **been relatively predictable over time, thereby providing evidence that they are of**  
15 **sufficient accuracy and reliability to be used for ratemaking purposes in a utility**  
16 **regulatory proceeding?**

17 A. No. As discussed earlier, Mr. Rothschild's estimates of the option-implied market risk  
18 premium are susceptible to the day-to-day volatility of the financial markets, and this is  
19 borne out by comparing his previous estimates of the market risk premium to his current  
20 estimates in the instant proceeding. Although the market risk premium is dynamic and has  
21 historically demonstrated an inverse relationship with long-term U.S. Treasury bond

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<sup>176</sup> See, Rothschild Direct, at 74-75 and Exhibit ALR-4 (pp. 4 and 6).

1 yields, the finance literature<sup>177</sup> has demonstrated that on average, the market risk premium  
2 will only change by about one-half of the amount that long-term interest rates change, but  
3 in the opposite direction.<sup>178</sup> It is therefore notable that in recent years, Mr. Rothschild’s  
4 calculations of the option-implied market risk premium have changed by significantly more  
5 than would be expected as indicated by the finance literature. For example, I present two  
6 tables below that were included in Mr. Rothschild’s direct testimony in a regulatory  
7 proceeding from 2021 involving Connecticut Light & Power (“CL&P”),<sup>179</sup> which is an  
8 electric utility operating subsidiary of Eversource Energy and affiliate of PSNH.

**TABLE 10: CAPITAL ASSET PRICING MODEL (CAPM) - INDICATED COST OF EQUITY  
WEIGHTED - All Inputs Weighted From January 2021 to March 2021**

	<u>3-Month Treasury Bill</u>		<u>30-Year Treasury Bond</u>	
	<u>Hybrid Beta</u>	<u>Forward Beta</u>	<u>Hybrid Beta</u>	<u>Forward Beta</u>
Risk-Free Rate	0.04%	0.04%	2.20%	2.20%
Beta	0.59	0.58	0.59	0.58
Risk Premium	10.29%	10.29%	8.14%	8.14%
CAPM	6.15%	5.97%	7.02%	6.88%

<sup>177</sup> See, Robert S. Harris, “Using Analysts’ Growth Forecasts to Estimate Shareholder Required Rates of Return,” *Financial Management*, (Spring 1986), at 58-67; Robert S. Harris and F. Marston, “Estimating Shareholder Risk Premia Using Analysts’ Growth Forecasts,” *Financial Management*, 21 (Summer 1992), at 63-70; Farris M. Maddox, Donna T. Pippert and Rodney N. Sullivan, “An Empirical Study of Ex Ante Risk Premiums for the Electric Utility Industry,” *Financial Management*, 24 (Autumn 1995), at 89-95.

<sup>178</sup> As reflected in the preceding footnote, a number of academic studies have demonstrated an inverse relationship between the market risk premium and government interest rates. Specifically, these studies found that when government interest rates change by 100 basis points in either direction, the equity risk premium will change by between 37 and 75 basis points in the opposite direction, and therefore, a 50-basis point “inverse relationship” assumption provides a reasonable basis for estimating the prevailing market risk premium based on current government interest rates (i.e.. U.S. Treasury security yields).

<sup>179</sup> Direct Testimony of Aaron L. Rothschild, Cost of Capital, On Behalf of The Connecticut Public Utilities Regulatory Authority’s Office of Education, Outreach, and Enforcement, Docket No. 17-12-03RE11 (April 26, 2021), at 76-77.

1

	<u>3-Month Treasury Bill</u>		<u>30-Year Treasury Bond</u>	
	<u>Hybrid Beta</u>	<u>Forward Beta</u>	<u>Hybrid Beta</u>	<u>Forward Beta</u>
Risk-Free Rate	0.03%	0.03%	2.41%	2.41%
Beta	0.63	0.62	0.63	0.62
Risk Premium	9.62%	9.62%	7.24%	7.24%
<b>CAPM</b>	<b>6.10%</b>	<b>5.98%</b>	<b>6.98%</b>	<b>6.89%</b>

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As reflected in the above two tables, Mr. Rothschild’s estimates of the option-implied market risk premium in CL&P’s 2021 proceeding (Docket No. 17-12-03RE11) ranged from 7.24 percent to 10.29 percent, thereby demonstrating a central tendency of approximately 8.85 percent.

For comparative purposes, I have also presented below two tables that were included in Mr. Rothschild’s direct testimony (pp. 74-75) in the instant proceeding.

	<u>3-Month Treasury Bill</u>		<u>30-Year Treasury Bond</u>	
	<u>Historical Blended Beta</u>	<u>Forward Beta</u>	<u>Historical Blended Beta</u>	<u>Forward Beta</u>
Risk-Free Rate	4.64%	4.64%	4.34%	4.34%
Beta	0.52	0.67	0.52	0.67
Risk Premium	3.64%	3.64%	3.93%	3.93%
<b>CAPM</b>	<b>6.51%</b>	<b>7.09%</b>	<b>6.37%</b>	<b>6.99%</b>

11

	<u>3-Month Treasury Bill</u>		<u>30-Year Treasury Bond</u>	
	<u>Historical Blended Beta</u>	<u>Forward Beta</u>	<u>Historical Blended Beta</u>	<u>Forward Beta</u>
Risk-Free Rate	4.58%	4.58%	4.36%	4.36%
Beta	0.51	0.72	0.51	0.72
Risk Premium	3.34%	3.34%	3.56%	3.56%
<b>CAPM</b>	<b>6.27%</b>	<b>6.99%</b>	<b>6.16%</b>	<b>6.93%</b>

1  
2 As reflected in the above two tables, Mr. Rothschild’s estimates of the option-implied  
3 market risk premium in the instant proceeding range from 3.34 percent to 3.93 percent, and  
4 thereby demonstrate a central tendency of approximately 3.62 percent.

5 **Q. What conclusions have you drawn after comparing Mr. Rothschild’s estimates of the**  
6 **options-implied market risk premium from CL&P’s 2021 proceeding to his estimates**  
7 **in the instant proceeding?**

8 A. As reflected in the four tables above, the central tendency (i.e., median and mean values)  
9 of Mr. Rothschild’s option-implied market risk premium estimates declined from 8.85  
10 percent in CL&P’s 2021 proceeding to 3.62 percent in the instant proceeding, thus  
11 reflecting an astonishing decrease of 5.23 percent. To test the validity of this dramatic  
12 downward change in Mr. Rothschild’s estimated market risk premium, I first evaluated the  
13 change in the 30-year U.S. Treasury bond yield that occurred between CL&P’s 2021  
14 proceeding and the instant proceeding, which I determined by reviewing Mr. Rothschild’s  
15 30-year Treasury bond yield assumptions presented in the far right columns of the four  
16 tables above. On this basis, I determined that the central tendency of Mr. Rothschild’s 30-  
17 year Treasury bond yield assumptions increased from 2.31 percent in CL&P’s 2021



1 proceeding to 4.35 percent in the instant proceeding, reflecting an increase in the 30-year  
2 Treasury bond yield of 2.04 percent. As noted earlier, the finance literature has  
3 demonstrated that the market risk premium would be expected to change by approximately  
4 one-half of the amount of the change in the 30-year Treasury bond yield, but in the opposite  
5 direction. It is therefore reasonable to expect, that since Mr. Rothschild's 30-year Treasury  
6 bond yield assumption *increased* by 2.04 percent, that his market risk premium assumption  
7 would *decrease* by approximately one-half of that amount, or 1.02 percent. However, as  
8 noted earlier, in stark contrast, Mr. Rothschild's estimate of the option-implied market risk  
9 premium actually decreased by 5.23 percent, which is more than 5x times the amount that  
10 would be expected to occur as indicated by the empirical finance literature. Clearly then,  
11 Mr. Rothschild's estimates of the option-implied market risk premium in this proceeding  
12 do not comport with the empirical finance literature and are therefore likely to be grossly  
13 understated. This is further demonstrated by the fact that the central tendency of Mr.  
14 Rothschild's estimate of the market risk premium in this proceeding, which is 3.62 percent,  
15 is 3.55 percent lower than the 98-year (1926-2023) historical annual average market risk  
16 premium of 7.17 percent.<sup>180</sup>

17 **Q. In your opinion, was it appropriate for Mr. Rothschild to rely heavily upon the beta**  
18 **and market risk premium estimates he derived on the basis of the Chang et al. (2011)**  
19 **research paper?**

20 A. No. The conclusions arrived at in the Chang et al. (2011) research paper can hardly be  
21 interpreted as a ringing endorsement of the option-implied beta methodology for purposes

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<sup>180</sup> Source: Kroll Cost of Capital Navigator.

1 of cost of capital estimation, and particularly not for utility companies. In their closing  
2 remarks, the authors made clear that their option-implied beta methodology was still a work  
3 in progress. Most notably, the authors concluded the following:

4 *Much remains to be done.* The computation of the option-implied beta uses  
5 moments extracted from options data. While we have made full use of recent  
6 innovations in the implementation of these procedures, and added some  
7 innovations ourselves, it may be that the out-of-sample *performance of the*  
8 *option-implied betas can be improved* through more efficient estimation of  
9 moments.

10 ....

11 Also, we have not provided an explanation for the relatively poor performance  
12 of option-implied betas for stocks with very small *ex post* betas, and *the*  
13 *differences in performance across industries also merit further investigation*  
14 (emphasis added)<sup>181</sup>.

15  
16 Therefore, considering that the authors considered their beta methodology to still be a work  
17 in progress, Mr. Rothschild should not have placed a heavy reliance upon this methodology

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<sup>181</sup> Bo-Young Chang, Peter Christoffersen, Kris Jacobs, and Gregory Vainberg, *Option-Implied Measures of Equity Risk*, *Review of Finance* (2012) 16, at 420.

1 in conducting his CAPM analyses. In summary, the beta calculation methodology he has  
2 employed should be viewed in the context as an unproven beta estimation methodology.

3  
4 **Response to Mr. Rothschild's Criticisms of the Company's CAPM Analysis**

5 **Q. Mr. Rothschild criticizes your use of the beta coefficients reported by Value Line,**  
6 **because according to Mr. Rothschild, they reflect “anomalous historical data” as a**  
7 **result of the financial turmoil caused by the COVID-19 pandemic.<sup>182</sup> How do you**  
8 **respond.**

9 A. I disagree, and have already addressed this same topic in my earlier response to Dr.  
10 Woolridge.

11 **Q. Mr. Rothschild cites to publications and data from various sources including Kroll**  
12 **and Aswath Damodaran to argue that your estimate of the market premium is**  
13 **overstated.<sup>183</sup> How do you respond?**

14 A. Once again, I disagree, and have already addressed this topic in my earlier response to Dr.  
15 Woolridge.

16 **Q. What critical shortcomings did you identify in Mr. Vatter's CAPM analyses?**

17 A. As noted earlier, Mr. Vatter's CAPM analysis for Eversource Energy using his “time-  
18 series” approach produces a woefully understated cost of equity estimate of 7.67 percent.  
19 The critical shortcomings that I identified in Mr. Vatter's CAPM analysis includes: (1)  
20 relying upon a three-month compound average Secured Overnight Financing Rate of 4.10  
21 percent as a proxy for the risk-free rate of return,<sup>184</sup> which is not the appropriate risk-free

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<sup>182</sup> Rothschild Direct, at 86.

<sup>183</sup> Id., at 86-89.

<sup>184</sup> Vatter Direct, at 7.

1 rate to employ in the CAPM, and which understates the risk-free rate by approximately 50-  
2 70 basis points in the current market environment; (2) calculating “in-house” proprietary  
3 beta coefficients for Eversource Energy, Unitil Corporation and Algonquin Power &  
4 Utilities through his “panel” and “time-series” analyses, which produces an average beta  
5 coefficient of 0.58,<sup>185</sup> notwithstanding the fact that the average beta coefficient reported by  
6 Value Line for the Rea Electric Group holding companies is currently 0.92, which, in  
7 contrast to Mr. Vatter’s proprietary beta calculations, constitutes the betas that are actually  
8 referenced by equity investors; and (3) relying upon a market risk premium assumption of  
9 6.18 percent,<sup>186</sup> which he selectively determined on the basis of 45-years’ historical  
10 market data (from 1980 to 2024), despite the fact that 98-years of documented historical  
11 market data (from 1926 to 2023) is readily available, and which reflects a 7.17 percent<sup>187</sup>  
12 average annual historical market risk premium. Taken in the aggregate, the above critical  
13 shortcomings ultimately cause Mr. Vatter’s CAPM-based estimates of the cost of equity to  
14 be woefully understated.

15 **Q. Please elaborate further on the shortcomings that you have identified with respect to**  
16 **Mr. Vatter’s risk-free rate assumption in his CAPM analysis.**

17 A. Mr. Vatter’s use of the Secured Overnight Financing Rate (“SOFR”) as a proxy for the  
18 risk-free rate of return in the CAPM is inappropriate because it constitutes an overnight  
19 borrowing rate, which is at the far short-end of the yield curve, and therefore is not an

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<sup>185</sup> Id., at 4-5.

<sup>186</sup> Id., at 5-7

<sup>187</sup> Source of data: Kroll Cost of Capital Navigator.

1 appropriate basis for estimating the cost of equity, since common equity capital constitutes  
2 long-term investment capital. As such, a widely-accepted practice in utility regulatory  
3 proceedings is to reference the 30-year U.S. Treasury bond yield as a proxy for the risk-  
4 free rate of return in the CAPM, largely because 30-year Treasury bonds most closely  
5 parallel the investment characteristics of common stock, as both are considered long-term,  
6 if not permanent, capital. Considering that as of mid-February 2025, the 30-year U.S.  
7 Treasury bond yield has been trading in the range of 4.70 percent to 4.80 percent, this  
8 strongly suggests that Mr. Vatter's risk-free rate of return assumption of 4.10 percent is  
9 understated by as much as 60-70 basis, which has clearly contributed to the significant  
10 downward bias in his CAPM-based estimates of the Company's cost of equity.

11 **Q. Please elaborate further on the shortcomings that you have identified with respect to**  
12 **the beta coefficients that Mr. Vatter calculated for purposes of his CAPM analysis.**

13 A. As noted earlier, Mr. Vatter has calculated "proprietary" beta coefficients in his CAPM  
14 analysis which produce an average beta coefficient of 0.58. In stark contrast, the average  
15 beta coefficient reported by Value Line for the Rea Electric Group holding companies is  
16 presently 0.92. This is a critically important observation, since in contrast to Mr. Vatter's  
17 proprietary beta coefficients, the betas reported by Value Line are widely-referenced in the

1 investment community and therefore have a significant influence on the return expectations  
2 of equity investors.

3 **Q. Please elaborate further on the shortcomings you identified with respect to the market**  
4 **risk premium that Mr. Vatter has referenced for purposes of his CAPM analysis.**

5 **A.** As noted earlier, Mr. Vatter has relied upon a market risk premium assumption of 6.18  
6 percent,<sup>188</sup> which is based on 45-years of historical market data (from 1980 to 2024), despite  
7 the fact that 98-years of documented historical market data (from 1926 to 2023) is readily  
8 available, and which reflects a 7.17 percent<sup>189</sup> average annual historical market risk  
9 premium over the past 98-years. By selectively limiting the time horizon that Mr. Vatter  
10 evaluated for purposes of developing his estimate of the market risk premium, he has  
11 introduced subjective bias into the cost of equity evaluation process, which undermines the  
12 reliability of his cost of equity estimates. In contrast, evaluating the historical returns of  
13 common stocks over the longest period possible provides an *unbiased* estimate of future  
14 market return expectations. This is because these historical returns reflect repeated  
15 observations of a variable that has behaved randomly in the past (U.S. stock market  
16 returns), and therefore, are devoid of subjective bias. For these reasons, Mr. Vatter's  
17 estimate of the market risk premium is significantly understated, which further contributes  
18 to downward bias in his CAPM-based estimates of the cost of equity.

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<sup>188</sup> Id., at 5-7

<sup>189</sup> Source of data: Kroll Cost of Capital Navigator.

1           **Response to Dr. Woolridge’s Criticisms of the Company’s RPM Analysis**

2   **Q.    Dr. Woolridge criticizes your RPM analysis on several fronts.<sup>190</sup> How do you**  
3   **respond?**

4   **A.**Dr. Woolridge makes several of the same criticisms of my RPM analysis that he did with  
5       respect to my CAPM analysis. Therefore, my responses to Dr. Woolridge in this regard is  
6       consistent with my earlier responses in the discussion of the CAPM. However, I would  
7       further note that although Dr. Woolridge maintains that I employed a levered beta in my  
8       RPM analysis, this is inaccurate. I have relied upon the average beta coefficients reported  
9       by Value Line for each of the companies included in the respective proxy groups, without  
10      any further adjustments to these “as-reported” betas.

11   **IX.    FAILURE TO CONSIDER A BROADER GROUP OF COMPARABLE-RISK**  
12   **NON-RATE-REGULATED COMPANIES WHICH PROVIDES PERSPECTIVE**  
13   **ON THE COMPETITIVE MARKET RESULT**

14   **Q.    Dr. Woolridge rejects the use of your Non-Regulated Group, claiming that these non-**  
15   **rate-regulated companies are engaged in lines of business that are “vastly**  
16   **different”<sup>191</sup> from the electric distribution business, and that such companies do not**  
17   **operate in a highly-regulated environment. Meanwhile, Mr. Rothschild also criticizes**  
18   **your use of the Non-Regulated Group because the companies in your Non-Regulated**  
19   **Group “have unregulated operations, which almost certainly make them riskier than**  
20   **PSNH”.<sup>192</sup> How do you respond?**

21   **A.**The regulatory precedent established in *Hope and Bluefield* does not require that  
22       comparable companies be similar with respect to a firm’s business operations, or extent to  
23       which they are regulated. Comparable companies need only be similar with respect to their

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<sup>190</sup> Woolridge Direct, 129-130.

<sup>191</sup> Woolridge Direct, at 10-11

<sup>192</sup> Rothschild Direct, at 91.

1 corresponding risks, and contrary to Dr. Woolridge’s assertion that the DCF-based cost of  
2 equity estimates yielded for the Non-Regulated Group companies are “particularly  
3 overstated”,<sup>193</sup> he has not provided any specific evidence in support of this assertion.

4  
5 Moreover, in making this statement, Dr. Woolridge fails to acknowledge that the Non-  
6 Regulated Group is fundamentally comprised of stable, lower-risk companies which  
7 operate in the consumer staple, food and beverage, waste management, industrial supply,  
8 and chemicals processing sectors of the economy.

9 **Q. In your judgment, have you adequately demonstrated that the companies comprising**  
10 **the Non-Regulated Group have a risk profile that is comparable to the Rea Electric**  
11 **Group companies?**

12 A. Yes. Based upon my evaluation of a number of investment risk measures, which is  
13 summarized in Table 7 (p. 46) of my direct testimony, and which I have presented again in  
14 Table 14R below, I have concluded that the Non-Regulated Group has a somewhat lower  
15 investment risk profile as compared to the Electric Group, and thereby provides an  
16 appropriate complementary basis for estimating the cost of equity for PSNH’s  
17 jurisdictional electric utility operations.

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<sup>193</sup> Woolridge Direct, at 11.



<b>Table 14R Comparative Risk Assessment of Proxy Groups</b>			
<b>Risk Measure</b>	<b>Electric Group</b>	<b>Gas LDC Group</b>	<b>Non-Reg. Group</b>
Value Line Beta	0.91	0.88	0.90
Value Line Safety Rank	2	2	1
Value Line Fin. Strength Rating	B++	A	A+
Value Line Stock Price Stability Rating	89	90	95
S&P Long-Term Debt Rating	BBB+	A-	A-
Moody's Long-Term Debt Rating	Baa1	A3	A3

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Therefore, as illustrated in Table 14R above, the comparative risk assessment that I conducted demonstrates that the Non-Regulated Group and the Rea Electric Group have very similar investment risk profiles, and are therefore attended by corresponding risks as per the *Hope and Bluefield* standards. Notwithstanding this fact, both Dr. Woolridge and Mr. Rothschild have nonetheless rejected the Non-Regulated Group, which serves to define the competitive market result for risk-comparable companies.

**Q. Do the financial markets provide any additional market-based evidence that non-rate-regulated companies and regulated utility companies share similar investment risk profiles, assuming that their respective long-term credit ratings are the same?**

A. Yes. The evidence shows, that for a given credit rating, the debt capital markets will price the trading yields of “A” rated and “Baa” rated bonds almost identically for non-rate-

1 regulated “corporate” fixed income securities and utility fixed income securities. For  
2 example, during calendar-year 2024, the average trading yield for “A” rated long-term  
3 corporate bonds was 5.43 percent, versus 5.54 percent for “A” rated long-term utility  
4 bonds. Also during calendar-year 2024, the average trading yield for “Baa” rated long-term  
5 corporate bonds was 5.75 percent, versus 5.76 percent for “Baa” rated long-term utility  
6 bonds.<sup>194</sup> Clearly, these are very similar trading yields for both “A” rated and “Baa” rated  
7 fixed income securities.

8 If the investment risk profile of non-rate-regulated companies were materially different  
9 than the risk profile of utility companies, given the same credit ratings, the debt capital  
10 markets would price the trading yields of corporate bonds differently than the trading yields  
11 of utility bonds in order to recognize this risk differential. However, as the aforementioned  
12 trading yields from 2024 demonstrate, the debt capital markets price the trading yields of  
13 both “corporate” and utility bonds almost identically for a given long-term credit rating.  
14 Therefore, despite Dr. Woolridge and Mr. Rothschild’s assertions that it is not appropriate  
15 to evaluate the Non-Regulated Group in this proceeding, evidence from the debt capital  
16 markets strongly suggests that business entities sharing the same long-term credit ratings  
17 share similar investment risk profiles, irrespective of the particular lines of business in  
18 which they are engaged.

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<sup>194</sup> Source of data: Mergent Bond Record, January 2025, Volume 90, No.1, at 407.

1 **X. DOE WITNESS WOOLRIDGE AND OCA WITNESS ROTHSCHILD'S**  
2 **PROPOSALS TO IMPUTE A HYPOTHETICAL CAPITAL STRUCTURE IS**  
3 **UNSUPPORTED AND WOULD PENALIZE THE COMPANY FOR**  
4 **MAINTAINING A CAPITAL STRUCTURE THAT IS CONSISTENT WITH**  
5 **OTHER ELECTRIC UTILITIES IN NEW HAMPSHIRE AND THE ELECTRIC**  
6 **PROXY GROUP.**

7 **Discussion of Dr. Woolridge's Testimony**

8 **Q. Dr. Woolridge maintains that the Company's proposed equity capitalization ratio**  
9 **(53.85 percent) is much higher than that of its parent, Eversource Energy, Inc. (34.50**  
10 **percent), which constitutes a financial strategy known as "double leverage".<sup>195</sup> He**  
11 **further maintains that the Company's proposed equity capitalization ratio is higher**  
12 **than the average of the Woolridge Electric Group (40.90 percent) and the Rea Electric**  
13 **Group (44.0 percent), and for the above reasons, a hypothetical capital structure of**  
14 **50.0 percent common equity and 50.0 percent long-term debt should be imputed for**  
15 **the Company.<sup>196</sup> How do you respond?**

16 **A.** I disagree. Imputing a hypothetical capital structure that is deemed to be more consistent  
17 with the consolidated capital structure of Eversource Energy and/or other utility holding  
18 companies would indeed be tantamount to a "double-leverage" adjustment, which  
19 effectively penalizes the Company for maintaining a capital structure which is consistent  
20 with that of its industry peer group. Again, as noted earlier, the Company's proposed equity  
21 capitalization ratio in this proceeding is well-within the range of the equity capitalization  
22 ratios of the operating subsidiaries of the Rea Electric Group, as well as the equity  
23 capitalization ratios adopted by the Commission in New Hampshire's utility rate  
24 proceedings over the past five years.

25

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<sup>195</sup> Woolridge Direct, at 30-32.

<sup>196</sup> Id., at 29.

1 According to Dr. Woolridge, his proposed hypothetical capital structure is intended to be  
2 more consistent with the consolidated capital structure of Eversource Energy. However,  
3 in determining an appropriate overall fair rate of return for a utility, which is impacted by  
4 the rate-setting capital structure, what is of critical importance is identifying the risk to  
5 which the investment capital is exposed, and not the identity of the provider of that capital.  
6 In other words, the cost of capital depends entirely upon the particular use of funds,  
7 irrespective of the source of those funds. Therefore, regardless of whether the Company's  
8 equity capitalization was funded by its parent company or by otherwise unaffiliated  
9 investors, equity investments are invariably exposed to greater structural risks as compared  
10 to debt capital, and for this reason, the owner/investor must be adequately compensated for  
11 bearing these greater risks. Accordingly, if Dr. Woolridge's proposal to reference a  
12 hypothetical capital structure were adopted, this would constitute an unjustified economic  
13 penalty, as a significant portion of the Company's current equity capitalization layer would  
14 be allocated returns commensurate with that of debt capital. At the same time, PSNH  
15 would continue to bear all of the attendant risks associated with equity investments on this  
16 layer of the Company's capital structure. In other words, the form of double-leverage  
17 adjustment proposed by Dr. Woolridge would essentially recharacterize the investment  
18 returns associated with an investment in the Company's common equity, but at the same  
19 time, would not alter the corresponding risks. This is clearly inconsistent with the risk-  
20 return investment principle, and for this reason alone, Dr. Woolridge's proposal to impute  
21 a hypothetical capital structure for the Company should be rejected.

22

1 **Q. Is there a fundamental disconnect that prevents the Eversource Energy capital**  
2 **structure from representing an appropriate benchmark capital structure for utility**  
3 **ratemaking purposes?**

4 A. Yes. Dr. Woolridge derived his proposed hypothetical capital structure on the basis of  
5 utility *holding company* capital structures, which often reflect the operating results of both  
6 regulated and unregulated business operations, and are therefore not appropriate to  
7 reference for utility ratemaking purposes. For these reasons, in evaluating the  
8 reasonableness of the Company's proposed rate-setting capital structure, Dr. Woolridge  
9 should have instead analyzed the capital structure ratios of the utility operating subsidiaries  
10 of the proxy group holding companies. This is particularly the case because a utility's  
11 long-lived rate base assets, which serve the public interest, directly correspond to the  
12 permanent financing conducted at the utility operating company level.

13  
14 Eversource Energy is a public utility holding company that up until recently, held  
15 unregulated wind generation assets. As a result, the balances of debt and equity comprising  
16 the Eversource Energy capital structure represent the consolidation of all debt and equity  
17 balances across the Eversource Energy enterprise, including those of its electric, gas and  
18 water subsidiary companies. In addition, the Eversource Energy consolidated capital  
19 structure has been affected by historical acquisitions and divestitures that have had the  
20 impact of increasing or decreasing the equity and/or debt balances in the capital structure,  
21 and which involve cost or accounting items that are totally inappropriate for inclusion in  
22 customer rates.

1 **Q. Are there other types of financing transactions that affect the Eversource Energy**  
2 **consolidated capital structure?**

3 A. Yes, most definitely. In addition to more traditional debt and equity issuances, there have  
4 been a number of impairment charges, losses and other write-offs associated with  
5 transactions such as Eversource Energy's divestiture of its 50 percent ownership interest  
6 in three jointly-held offshore wind partnerships, cancelled investments such as the  
7 Northern Pass transmission project and the Access Northeast natural gas pipeline  
8 expansion project, all of which are reflected in the Eversource Energy consolidated capital  
9 structure. Similarly, the results of any acquisition financings, including acquisition  
10 premiums, are reflected in the consolidated Eversource Energy capital structure, such as  
11 the results of transactions completed to acquire Bay State Gas Company (Columbia Gas  
12 Company of Massachusetts) and Aquarion Water Company. All of these types of  
13 transactions increase or decrease the level of equity and debt in the capital structure and  
14 are inappropriate to overlay on the utility business.

15 **Q. Have you conducted an evaluation to determine if the Company's proposed capital**  
16 **structure in this proceeding is reasonable?**

17 A. Yes. I presented this evaluation in my direct testimony,<sup>197</sup> and I have presented it again in  
18 Table 15R below. In order to evaluate the reasonableness of PSNH's proposed capital  
19 structure, I compared it to the capital structure ratios of the utility operating subsidiaries of  
20 the Rea Electric Group companies. To ensure a consistent analysis across the respective

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<sup>197</sup> See, Rea Direct, at 87-88

1 regulatory jurisdictions, I have conducted this analysis on the basis of permanent  
2 capitalization, which excludes short-term debt.

<b>Table 15R</b>				
<b>Capital Structure Ratios of the Utility Operating Subsidiaries of the Rea Electric Group<sup>198</sup> Based on Permanent Capitalization</b>				
<b>Utility Operating Company</b>	<b>Parent</b>	<b>Common Equity Ratio</b>	<b>Preferred Stock Ratio</b>	<b>Long-Term Debt Ratio</b>
Minnesota Power Enterprises, Inc.	ALE	62.4%	-	37.6%
Superior Water, Light & Power	ALE	61.0%	-	39.0%
Interstate Power and Light Co.	LNT	49.7%	-	50.3%
Wisconsin Power and Light Co.	LNT	54.8%	-	45.2%
Alaska Electric Light & Power Co.	AVA	62.0%	-	38.0%
Avista Corp. (Idaho)	AVA	50.0%	-	50.0%
Avista Corp. (Washington)	AVA	48.5%	-	51.5%
Consumers Energy Company	CMS	50.2%	0.2%	49.6%
Consolidated Edison of New York	ED	49.2%	-	50.8%
Orange and Rockland Utilities	ED	49.6%	-	50.4%
Idaho Power Company	IDA	49.4%	-	50.6%
Northwestern Energy Group	NWE	49.9%	-	50.1%
Northwestern Energy (Montana)	NWE	48.0%	-	52.0%
Oklahoma Gas and Electric Co.	OGE	53.3%	-	46.7%
Portland General Electric Co.	POR	50.0%	-	50.0%
Oncor Electric Delivery Holdings	SRE	52.6%	-	47.4%
San Diego Gas & Electric Co.	SRE	52.6%	-	47.4%
Wisconsin Electric Power Co.	WEC	60.5%	0.4%	39.1%
Upper Mich. Energy Res. Corp	WEC	53.9%	-	46.1%
Wisconsin Public Service Corp.	WEC	56.5%	-	43.5%
Utility Operating Co. - Maximum	-	62.4%	0.4%	52.0%
Utility Operating Co. - Minimum	-	48.0%	-	37.6%
Utility Operating Co. - Average	-	53.2%	-	46.8%
PSNH Capital Structure	-	53.85%	-	46.15%

3

<sup>198</sup> Source: S&P Global Market Intelligence.

1 **Q. What conclusions did you arrive at regarding the appropriateness of the Company's**  
2 **proposed capital structure in this proceeding?**

3 A. After reviewing the data contained in Table 15R above, I determined that the common  
4 equity capitalization ratios for the operating subsidiaries of the Rea Electric Group range  
5 from 48.0 percent to 62.4 percent, and reflect an average common equity ratio of 53.2  
6 percent. Based upon this data, I concluded that the Company's proposed common equity  
7 ratio of 53.85 percent is well-within the range of what is typical and customary for electric  
8 utility operating companies, including the operating subsidiaries of the Rea Electric Group.  
9 Based upon these findings, I have concluded that the Company's proposed capital structure  
10 is reasonable for purposes of the instant proceeding, and for this reason, Dr. Woolridge's  
11 proposal to impute a hypothetical capital structure for the Company should be rejected.

12 **Q. Have you also evaluated how the Company's proposed equity capitalization ratio of**  
13 **53.85 percent compares to recently authorized equity capitalization ratios for other**  
14 **utility operating companies in New Hampshire?**

15 A. Yes. During the five-year period between 2020-2024, the average equity capitalization  
16 ratio adopted by the Commission in both electric and gas rate proceedings was 52.48  
17 percent,<sup>199</sup> which is reasonably consistent with the Company's proposed 53.85 percent  
18 equity capitalization ratio in this proceeding. It is further noteworthy that the Company's  
19 proposed equity capitalization ratio in the instant proceeding (53.85 percent) is marginally

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<sup>199</sup> Source of data: S&P Global. Data includes the following proceedings: Liberty Utilities, Energy North (DG-20-105), 52.00 percent; Liberty Utilities, Granite State (DE-19-064), 52.00 percent; Northern Utilities Inc. (DG-21-104), 52.00 percent; Public Service Company of New Hampshire (DE-19-057), 54.40 percent; and Unitil Energy Systems, Inc. (DE-21-030), 52.00 percent.



1 lower than the 54.40 percent equity capitalization ratio adopted by the Commission in the  
2 Company's 2019 base rate proceeding (Docket No. DE-19-057).

3 **Discussion of Mr. Rothschild's Testimony**

4 **Q. Mr. Rothschild has also proposed that a hypothetical capital structure be imputed for**  
5 **PSNH because the Company's proposed equity capitalization ratio of 53.85 percent**  
6 **is higher than the average common equity capitalization ratio used by other electric**  
7 **utilities in the country. Mr. Rothschild therefore proposes that a hypothetical capital**  
8 **structure consisting of 47.24 percent common equity and 52.76 percent long-term**  
9 **debt should be imputed for the Company in the instant proceeding.<sup>200</sup> How do you**  
10 **respond?**

11 **A.** I have already addressed this topic at length in my response to Dr. Woolridge, and therefore  
12 my response to Mr. Rothschild on the particular topic is the same.

13  
14 **Q. Does this conclude your prepared rebuttal testimony?**

15 **A.** Yes.

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<sup>200</sup> Rothschild Direct, at 75-76.