STATE OF NEW HAMPSHIRE
BEFORE THE
PUBLIC UTILITIES COMMISSION

In the matter of

Public Service of New Hampshire (Eversource Energy)

Docket No. DE 19-057

Petition for Permanent Rate Increase

SUPPLEMENTAL TESTIMONY

OF

Dr. Pradip K. Chattopadhyay
Assistant Consumer Advocate

July 16, 2020

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1 **I. INTRODUCTION**

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

3 A. My name is Pradip K. Chattopadhyay. My business address is 21 South Fruit Street,
4 Suite 18, Concord, New Hampshire. I am employed as the Assistant Consumer Advocate/Rate
5 and Market Policy Director with the New Hampshire Office of the Consumer Advocate (OCA).

6 **Q. What is your educational and professional background?**

7 A. Please see my Direct Testimony in this docket (Bates pages 003-004) for that description.

8 **Q. Have you previously provided testimony before this or any other Commission?**

9 A. Yes. Please see my Direct Testimony in this docket at Bates pages 005-006 for the list of
10 my testimonies before this Commission and references to other testimonies before other
11 Commissions.

12 **Q. What is the purpose of your testimony?**

13 A. The Commission in Order No. 26,363 directed the Company to file updated Return on
14 Equity (ROE) testimony, and ordered that "any party that previously filed Rate of Return or
15 capital structure testimony may update its testimony provided that the testimony is filed no later
16 than 30 days from the date of this order." In this brief testimony, I am updating my
17 recommendation to reflect current financial market realities. As I rely solely on the Discounted
18 Cash Flow (DCF) approach to inform my point estimate of allowed ROE, the main focus of my
19 analysis is on updating the DCF estimation. I have, however, also updated the CAPM

1 estimations, and provided some thoughts on why I continue to stress that the Commission should
2 rely only on the DCF approach to set the allowed ROE for PSNH.

3 **Q. What is your updated allowed ROE for the company?**

4 A. I am recommending a return of 8.64 percent as a point estimate. Based on my analysis, I
5 am also recommending a range of returns on equity that I consider reasonable for the company,
6 i.e., 8.55 percent to 8.75 percent.

7 **Q. Please discuss how your testimony is organized.**

8 A. As for what follows, Section II discusses the updated DCF estimation of ROE. Section
9 III focuses on my updated CAPM estimation. Section IV concludes with the OCA's updated
10 recommendation on PSNH's allowed ROE. Section V includes the updated schedules that
11 inform the OCA's analysis. Finally, Section VI contains two Attachments.

12

13 **II. UPDATED DCF ESTIMATIONS**

14 **Q. Please confirm that you are still using the Single-Stage DCF model to derive estimates**
15 **for the proxy that you had identified in your direct testimony.**

16 A. I am confirming that. For the description of my proxy selection and screening methods,
17 please see my direct testimony, Bates page 21, Line 15 to Bates page 25, Line 5. I believe that the
18 proxy group selected previously is still soundly reasonable (*see* Schedules Updated PKC-1 and
19 Updated PKC-2). The equity/debt ratio and the credit rating (which reflects both financial and
20 business risks) of Eversource (PSNH's parent company) indicate that Eversource continues to be
21 less risky than the proxy group.

1 **Q. Do you have any additional observations on the choice of your proxy group?**

2 A. Yes. I would like to respond to an assertion by PSNH witness Ann Bulkley in her rebuttal
3 testimony that OCA has not analyzed financial and business risks; *see* Rebuttal Testimony of Ann
4 E. Bulkley, Bates page 000812, Lines 10-12. Ms.Bulkley's appears to have overlooked that I have
5 analyzed S&P and Moody's credit ratings of the proxy group's constituent companies. Credit
6 ratings by Moody's and S&P encompass considerations of financial risk and business risk.[1] The
7 whole reason behind our discussing credit ratings (*see* my direct testimony, Schedule PKC-1) was
8 indeed to weigh the credit agencies' consideration of financial and business risks and help the
9 OCA to determine the appropriateness of the proxy group. I expect that the credit rating agencies
10 do not take operational and business considerations lightly when assigning credit ratings to utility
11 companies, and the fact that both Moody's and S&P have rated Eversource at the highest of the
12 ratings for any of the proxy group's companies gives me the comfort that the proxy group
13 represents a higher risk level compared to Eversource. Yet, as Ms. Bulkley appears to have
14 overlooked the fact that I have already analyzed credit ratings to judge both financial and business
15 risks, I have, in this testimony, additionally analyzed Earnings Before Interest and Taxes (EBIT)
16 and Earnings Before Interest, Taxes, Depreciation, and Amortization (EBITDA), which are often
17 used to examine business realities for a company, annually for the period 2015-2019; *see*
18 Attachment A. The data shows that Eversource has EBIT and EBITDA coefficient of variations
19 (CV) that are comfortably lower than that of the proxy group.[2] Also, the mean plus/minus
20 2*STDEV ranges for EBIT/Interest Expense for the proxy group's companies and Eversource

[1] *See* S&P's key credit factors for regulated utilities at
https://www.standardandpoors.com/en_US/web/guest/article/-/view/type/HTML/id/2351400

[2] Coefficient of variation (CV) is defined as the ratio of the standard deviation (STDEV) to the mean. It shows the extent of variability in relation to the mean.

1 show that Eversource is business-wise more attractive for investors than the proxy group.[3] That
2 finding conforms to the credit rating agencies' view of Eversource relative to the proxy group.

3 **Q. Please confirm that you are still using the same DCF approach as was laid out in your**
4 **direct testimony.**

5 A. I am confirming that. To facilitate the discussion of the updated estimation, however, I
6 will briefly summarize my method here too. For a theoretical description of the Single-Stage DCF
7 method, I would respectfully direct the Commission to my direct testimony at Bates page 21, Lines
8 6-14, but it is important to stress again that the two essential practical elements of this method are
9 the dividend yield and the growth component. It is important to point out again that the growth
10 component of the DCF equation tends to be the most critical element in the use of the DCF
11 methodology. A couple of things render the estimation of the growth component somewhat
12 challenging. First, while the growth component of the single-stage DCF model is in principle
13 meant to be based on long-term projections, in practice, it is based at most on three-to-five-years'
14 projections, since long-term projections are seldom available. Second, "it is reasonable to believe
15 that investors, as a group, do not utilize a single growth estimate when they price a utility's stock."[4]
16 While growth projections by equity analysts are available on variables like earnings, dividends,
17 book value per share, among other things, what weight one should give to different projections is
18 often a matter of contention. Unlike Ms. Bulkley's approach, which relies only on earnings growth
19 to estimate the growth component, I have relied on three estimates for the growth component: (1)
20 the average of the growth rates in earnings per share (EPS), book value per share (BVPS), and

[3] STDEV represents Standard Deviation. In statistics, the standard deviation is a measure of the amount of variation of a set of values. The lower the standard deviation that the closer are the values to the mean. Standard Deviation is often used to characterize risk.
[4] *The Cost of Capital - A Practitioner's Guide*, by David C. Parcell, prepared for the Society of Utility and Regulatory Financial Analysts (2010 edition), Page 146.

1 dividends per share (DPS); (2) earnings growth only; and (3) the sum of the internal growth rate,
2 *br*, and the external growth component, *sv*.[5] For reasons why I disagree with Ms. Bulkley, please
3 see my direct testimony, Bates page 026, Line 15 to Bates page 029, Line 2. The other important
4 variables for the DCF estimation are the stock prices and dividend yield.

5 **Q. You have previously used pricing data from November 7, 2019 to December 6, 2019**
6 **to measure the dividend yields for the proxy's constituent companies. Which period did you**
7 **update the pricing data to for your supplemental DCF estimation?**

8 A. As of preparing this testimony, I used daily pricing data from the most recent month to
9 calculate the average price (Schedule Updated PKC-3), which in conjunction with the annualized
10 dividend helps measure the dividend yield (Schedule Updated PKC-4) component of the DCF
11 based cost of equity. That period to accommodate the production and the filing of this testimony
12 is June 8, 2020 to July 6, 2020.

13 **Q. Please remind us what measures of the DCF growth component were considered.**

14 A. As I had indicated above, I have considered three approaches to measuring DCF's growth
15 component. For the first approach, I have used the average of the Value Line five-year projections
16 for growth in DPS and BVPS *and* the average of the Value Line, Zacks and SNL median long-
17 term projections for EPS growth rates, appropriately updated to reflect the latest information from
18 the noted sources to calculate the growth component. For the second approach, which is based on
19 estimates for the internal and external components for growth, I used the latest Value Line and
20 Yahoo Finance data on retention ratio, expected return on common equity, market-to-book ratio,
21 and expected growth in the number of outstanding shares (called retention growth). For the third

[5] The alternative is based on the formula, *br + sv*, where *b* is the retention ratio, *r* is the expected return on equity, *s* is the expected funds raised from the sale of stock as a fraction of existing equity, and *v* is (1-(B/P)), where B is the book value of the share and P is the price of the share.

1 approach, even though I have reservations about Ms. Bulkley's sole reliance on earnings growth
2 as a measure of the growth component, I considered and applied that approach to my proxy to
3 derive another DCF estimate for the cost of equity, updated to reflect recent information (*see*
4 Schedule Updated PKC-5 for the calculation of the growth components; *see also* Schedules
5 Updated PKC-6 and Updated PKC-7 for the inputs for external and internal growth components).

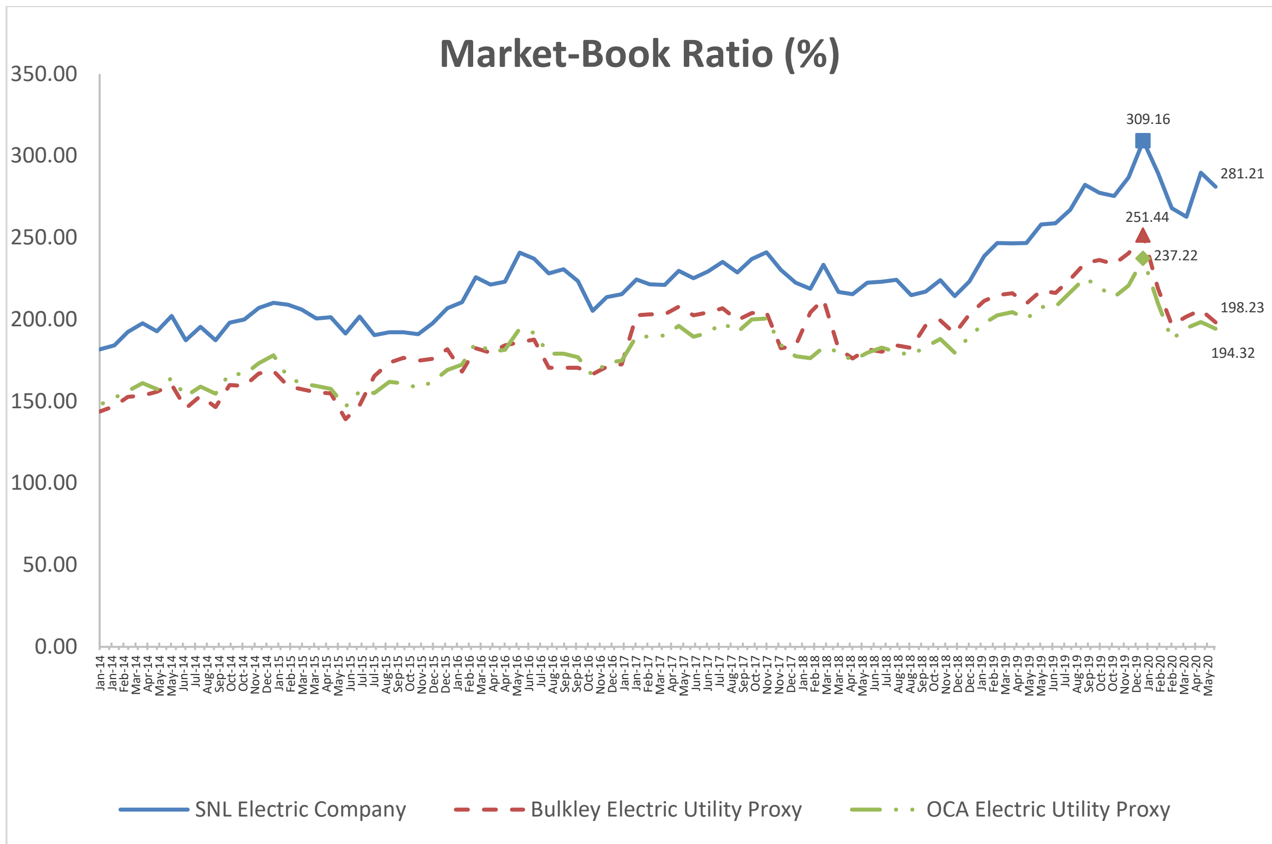
6 **Q. Briefly explain the estimation of the growth component based on the retention ratio,**
7 **expected return on common equity, market-to-book ratio, and growth in the number of**
8 **outstanding stocks.**

9 A. I have used the latest Value Line's expectations regarding retention ratios and returns on
10 equity for five years into the future to derive estimates for *b* and *r* and have used them to calculate
11 the expected internal growth component, *b* times *r*. To account for growth expectations from
12 external financing and derive estimates of the external growth component, I have also used the
13 latest market-to-book ratios from Yahoo Finance and the average of Value Line's five-year
14 projections for the number of outstanding shares. That is helpful in calculating the external growth
15 component, $s_e * v$, where s_e = expected funds raised from sale of stock as a fraction of existing
16 equity, and $v = \left(1 - \frac{B}{P}\right)$.[6] The revised formulation for the growth component can be alternatively
17 expressed as $b_e r_e + g_e\left(\frac{P}{B} - 1\right)$, where g_e is the expected growth rate in the number of outstanding
18 shares. In short, the growth component can be viewed as the sum of the "internal" growth rate,
19 i.e. $b_e r_e$, and the "external" growth rate, i.e. $g_e\left(\frac{P}{B} - 1\right)$.

[6] *See "The Cost of Capital to a Public Utility,"* Myron Gordon, MSU Public Utilities Studies (1974), Page 30.

1 **Q. Did you employ the same outlier-determination approach here as used in your direct**
2 **testimony?**
3 A. Yes.
4 **Q. As part of the outlier determination, you rely on an additional screening that**
5 **eliminates ROE estimates that are less than or equal to the sum of the recent yield on Utility**
6 **A preferred stocks and 50 basis points. What is the latest cut-off?**
7 A. The latest yield on Utility A preferred stocks is 6.19 percent (*see* Value Line's Selection &
8 Opinion, July 10, 2020). Therefore the updated cut-off is 6.69 percent.
9 **Q. What are the DCF estimates for your proxy?**
10 A. The single-stage DCF estimate, based on the latest average expected growth rates in
11 earnings, dividends and book value, is 8.50 percent. Schedule Updated PKC-8 provides the
12 calculations. When only the EPS growth rate is used for the growth component, the single-stage
13 DCF method produces an estimate of 8.89 percent. When the "internal-plus-external" growth
14 approach is used, the DCF method produces an estimate of 8.53 percent. I have applied my
15 recommended outlier-determination criteria in deriving these estimates.
16 **Q. Are the upticks in the estimated ROEs over the last six months understandable?**
17 A. Yes. The COVID-19 pandemic has resulted in significant uncertainties about the economic
18 reality globally. I expect that when the dust settles, it will be fully confirmed that the U.S. economy
19 over the last six months has experienced a contraction. Also, while utility stocks tend to be
20 defensive stocks, when there is an unprecedented economic shock, even those stocks become
21 riskier relatively speaking. Another way to look at the current reality is to see Figure 1, shown
22 below, which plots the market-to-book ratio of SNL Electric Company, Ms. Bulkley's proxy
23 group, and the OCA's proxy group. As is observable, the market-to-book ratio of both Ms.

1 Bulkley's proxy group and the OCA's proxy group have fallen significantly over the last six
2 months or so. While Ms. Bulkley's proxy group's market-to-book ratio has fallen from 2.51 to
3 1.98 from January 2020 to June 2020 (data current as of June 15), the OCA's proxy group's
4 market-to-book ratio has fallen from 2.37 to 1.94 over the same period. Indeed, the significant
5 drop in market prices, *ceteris paribus*, indicates that utility stocks now require a higher return on
6 equity (through the dividend yield component) to attract investors' dollars.



7

8 **Q. Do you continue to disagree with Ms. Bulkley's recommendation of an implicit**
9 **adjustment for flotation costs to derive allowed ROE?**

10 A. Yes.

11

12 **III CAPITAL ASSET PRICING MODEL (CAPM)**

1 **Q. Did you follow the same approach that you relied on in your direct testimony to**
2 **calculate three CAPM estimates of ROE?**
3 A. Essentially, I did. Presentation-wise, I have however made three calculations separately in
4 three EXCEL worksheets. Therefore, Schedule 11 is reported as Schedules 11.a, 11.b, and 11.c,
5 rather than just 11.a and 11.b. Also, based on the analysis and Dr. Woolridge's direct testimony,
6 I have provided three additional estimates, as discussed later.
7 **Q. Can you briefly describe the CAPM method?**
8 A. Yes. The CAPM method recognizes that common equity capital is more risky than debt
9 from an investor's standpoint, and that investors require higher returns on stocks than on bonds to
10 be compensated for the additional risk. The cost of common equity under CAPM is represented
11 by the following equation: $K = R_f + \beta_s * (R_M - R_f)$ where K is the cost of equity, R_f is the yield
12 on risk free securities, R_M is the expected return on the overall market and $(R_M - R_f)$ is the equity
13 risk premium demanded by shareholders to accept equity relative to debt. β_s is the average beta
14 of a group of comparable-risk companies that is used to adjust the risk premium to measure risks
15 specific to the regulated utility in question.
16 **Q. As you have already discussed your approach in your direct testimony, please briefly**
17 **highlight the key elements to be considered in updating the CAPM estimates of ROE.**
18 A. The key inputs for the estimations are the betas associated with the proxy group's
19 companies, an estimate of the risk-free rate, and three estimates of the market risk premium. I had
20 already discussed in detail in my direct testimony why I disagree with Ms. Bulkley's estimate of
21 risk-free rate as well as her approach to estimating market risk premiums. I will therefore simply
22 discuss the key inputs used for my updated estimations.
23 **Q. What beta measures do you use for your sample?**

1 A. I use Value Line beta estimates for the companies in my DCF proxy group (*see* Schedule
2 Updated PKC-9) to derive the average beta for those companies. The proxy beta currently is 0.88.
3 It is worth noting that the proxy beta has increased significantly compared to what it was at the
4 time of writing the direct testimony.[7]

5 **Q. What risk-free rate did you use for your estimations?**

6 A. Consistent with the direct testimony's approach, I have used the latest yield on 10-Year
7 Treasury bond. As a proxy for latest yield I have used the data for the last month, i.e. June 9, 2020
8 to July 6, 2020. As explained previously in the direct testimony, it is appropriate to use the most
9 current data on such a yield but, to iron out any anomalous daily movements, it is helpful to rely
10 on the data from the latest month. I have therefore used the average yield over June 9, 2020 to July
11 7, 2020; 0.70 percent.

12 As for the expected market returns, I applied the DCF construct to the S&P 500 companies
13 essentially using the same approach that Ms. Bulkley followed, but for the DCF growth
14 components I use not only earnings growth projections, but also the latest Value Line dividends
15 and book value growth projections to derive three capitalization-weighted estimates of the
16 expected market return. Those three estimates are associated with three samples of S&P 500
17 stocks. Estimate CAPM1 uses only dividend paying S&P 500 stocks and uses only EPS growth
18 projections for the DCF growth component. Estimate CAPM2 uses only dividend paying S&P
19 500 stocks and uses the average of the EPS, DPS, and BVPS growth projections for the DCF

[7] A point that Dr. Woolridge makes in his direct testimony needs to be stressed. The Value Line betas as reported are adjusted to model the tendency of historical betas to regress towards 1; *see* Direct Testimony of Dr. Woolridge, Bates page 000078, Line 22 to Bates page 000079, Line 12. As pointed out by Dr. Woolridge, that tendency is questionable for utilities. If anything, the cited research by him suggests that for utilities the tendency may be to regress to a number well below 1.

1 growth component. Estimate CAPM3 uses all S&P 500 stocks (including non-dividend yielding
2 stocks) and uses EPS growth projections for the DCF growth component.

3 **Q. Please discuss the three updated market return estimates.**

4 A. The calculations are reported in Table 1 below.

Table 1. CAPM Cost of Equity Estimates			
	CAPM1	**CAPM2**	**CAPM3**
	Dividend-Paying S&P 500 Stocks		**All S&P 500 Stocks**
	EPS growth projection	**Average EPS, DPS & BVPS growth projections**	**EPS growth projection**
DCF Market Return (a)	11.95	11.41	13.58
Risk Free Return (b)	0.70	0.70	0.70
Market Beta (c)	0.988	0.990	0.979
Risk Premium (a)-(b)	11.25	10.71	12.88
Beta adjusted RP (d) = ((a)-(b))/(c)	11.39	10.82	13.16
Proxy group beta (e)	0.88	0.88	0.88
CAPM ROE estimate (b)+(e)*(d)	10.71	10.21	12.26

5

6 The approaches for the three estimates are exactly the same as those relied upon in the
7 direct testimony. I would direct the Commission to that testimony at Bates pages 37-39 for a
8 revisit. It would however be also helpful to view the quantitative steps noted in the first column
9 of Table 1 above.

10

11 **Q. What are the current estimates of the cost of equity for the PSNH proxy group based**
12 **on the three estimated market risk premiums?**

1 A. The last row of Table 1 reports the three estimates. CAPM1, CAPM2 and CAPM3 ROE
2 estimates are 10.71 percent, 10.21 percent and 12.26 percent, respectively.[8]

3 **Q. Have you relied on these CAPM estimates to provide your recommended allowed**
4 **ROE?**

5 A. No. As stated in my direct testimony, the CAPM estimation, building upon the Company's
6 approach, is performed simply as a check. I have actually relied solely on the DCF approach to
7 inform my recommendation on ROE in my direct testimony. The OCA's CAPM estimations are
8 provided in order to point out areas where we find the Company's approach to be absolutely
9 unreasonable, and simply to opine on what would result when one corrects for those unreasonable
10 inputs, while still using the Company's approach.

11 Fundamentally, the OCA is opposed to relying on the CAPM approach with any
12 meaningful weightage, when the market-to-book ratios for the utility companies are significantly
13 higher than 1. That we have conducted those estimations should not be viewed as an overt or a
14 tacit acceptance of that method. I believe that the Commission's long-standing overwhelming
15 reliance on the DCF method is just and reasonable.

16 **Q. Do you have any additional observations with respect to the application of the CAPM**
17 **method?**

18 A. Yes, I do. It is evident from Table 1, that all of the CAPM estimates are significantly higher
19 than those derived using the DCF approach. The CAPM3 estimate in particular is definitely
20 "ridiculous" for reasons well discussed by Dr. Woolridge, Staff's ROE witness, in his direct
21 testimony; *see* Dr. Woolridge's direct testimony, Bates page 000091, Line 23 to Bates page

[8] Compared to the estimates derived end of 2019, the current estimates are significantly higher largely on account of a marked increase in the Value Line Betas following the COVID-19 scare.

1 000092, Line 4.[9] The OCA agrees with Dr. Woolridge's view that many of the EPS growth
2 estimates that inform the market returns for stocks in S&P 500 when relying on the Company's
3 approach cannot realistically represent long-term growth estimates. I agree with Staff that to
4 assume long-term EPS growth rates are higher than 8 percent is very unreasonable. Indeed, if we
5 restrict the CAPM analyses quite generously to stocks that have Value Line 3-5 years' growth
6 projections of less or equal to 12 percent, and recalculate the CAPM estimates, *ceteris paribus*, we
7 obtain ROEs of 9.33 percent, 9.04 percent and 8.98percent for CAPM1, CAPM2, and CAPM3,
8 respectively.

9 I also believe that the DCF construct, for estimating returns on equity, is not suitable for
10 S&P 500 companies that are in their early years of growth or do not provide dividends.
11 Fundamentally, the DCF construct is more suited for mature companies that also pay predictable
12 dividends. Its application to derive the cost of equity on S&P 500 stocks, especially for those that
13 do not pay dividends or have very high early growth rates, is very questionable.

14

15 **IV. CONCLUSION**

16 **Q. Please summarize your updated cost of equity estimates.**

17 A. Table 2 below reports the cost of equity estimates based on the different methodologies
18 used in this testimony.

Table 2: Summary of Cost of Equity Estimates (in %)	
DCF (traditional: EPS, BVPS & DPS average)	8.50
DCF (traditional: EPS)	8.89
DCF (*g*=*br*+*sv* Method)	8.53

[9] For rate cases in the US during 2018-2020 with Commission orders with expressly stated ROEs, there have been no instances where Commissions have allowed ROEs of greater or equal to 12 percent; *see* Attachment B. In fact, over 2018-2020 there has only been one ROE that was greater than 11 percent; i.e. 11.2 percent.

CAPM1	10.71
CAPM2	10.21
CAPM3	12.27
CAPM1 (sans VL growth projections > 12 percent)	9.33
CAPM2 (sans VL growth projections > 12 percent)	9.04
CAPM3 (sans VL growth projections > 12 percent)	8.98

1
2 **Q. What is your recommendation on the allowed rate of return on equity?**

3 A. Table 2 summarizes estimates of cost of equity that the OCA's analyses produced in this
4 updated testimony. The OCA recommends using the DCF approach exclusively in estimating the
5 cost of equity, for reasons that were discussed in Sections II and IIIA of my direct testimony as
6 well as at the end of the previous section in this testimony. The average of all of the DCF
7 estimates is 8.64 percent. As for a specific point estimate, the OCA therefore recommends an
8 allowed return of 8.64 percent. With respect to what constitutes a reasonable range of allowed
9 return on equity, the OCA recommends 8.55 to 8.75 percent.

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

11 A. Yes, it does.