

STATE OF NEW HAMPSHIRE  
BEFORE THE  
PUBLIC UTILITIES COMMISSION

In the matter of

Public Service Company of New Hampshire  
Distribution Service Rate Case

Docket No. DE 09-035

COST OF CAPITAL DIRECT TESTIMONY

OF

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January 15, 2010

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1 **I. INTRODUCTION**

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

4 A. My name is Pradip K. Chattopadhyay. My business address is 21 South Fruit Street,  
5 Suite 10, Concord, New Hampshire. I am employed as a Regional Energy Analyst with the New  
6 Hampshire Public Utilities Commission ("Commission").  
7

8 **Q. Please describe your formal education and professional experience.**

9 A. I have a Ph.D. in Economics from the University of Washington, Seattle, which I earned in  
10 1997. I have also taken courses in Energy Planning and Static Optimization with applications to  
11 energy planning from Ohio State University in 2001-02. I have taught several classes at the  
12 University of Washington in Microeconomics, Macroeconomics, Managerial Economics, Applied  
13 Microeconomics, and Public Sector Economics as an instructor and Adjunct Faculty at the  
14 Business School, and I was a teaching assistant for several graduate and undergraduate courses in  
15 Microeconomics and Macroeconomics while pursuing my Ph.D. at the University of Washington.  
16 I have also been intermittently associated with Southern New Hampshire University as an  
17 Adjunct Faculty member, where I have taught Managerial Economics, Money & Banking,  
18 Microeconomics and Macroeconomics.  
19

20 From March 1998 to October 1999, I was a Consultant (at the Senior Economist level) with the  
21 National Council of Applied Economic Research, New Delhi, India. From November 1999 to  
22 August 2001, I was the Economist at the Uttar Pradesh Electricity Regulatory Commission  
23 (UPERC) in India, and advised UPERC on tariff issues. From September 2001 to June 2002, I  
24 worked at the National Regulatory Research Institute, Columbus, Ohio as a Graduate Research  
25 Associate while pursuing advanced courses in Energy Planning in the City and Regional Planning

1 Program at Ohio State University. From June 2002 to July 2002, I worked at the World Bank,  
2 Washington D.C. as a short-term consultant/intern with its Energy and Water Division.

3  
4 I joined the New Hampshire Public Utilities Commission in August 2002 as a Utility Analyst III,  
5 and was employed in that capacity until January 2007. My responsibilities were in electric utility  
6 issues, including analyzing and advising the Commission on rate design, cost of capital issues,  
7 wholesale market issues, and other regional matters.

8  
9 I briefly worked at the Massachusetts Department of Telecommunications and Energy (later  
10 reorganized into the Department of Public Utilities (MA-DPU)) starting January 2007 as an  
11 Economist. At MA-DPU, I represented the Staff and examined gas demand estimation and  
12 forecasting, decoupling issues, environmental remediation matters, etc. I rejoined the New  
13 Hampshire Public Utilities Commission in June 2007, and I did so in the capacity of Assistant  
14 Director, Telecom Division. I moved to my current position in January 2010.

15  
16 **Q. Have you previously provided testimony before this Commission?**

17 A. Yes. I provided testimony before the Commission in Docket No. DE 03-200, which was about  
18 delivery rates for retail customers of Public Service of New Hampshire (PSNH). I have also  
19 provided cost of capital testimony in Docket No. DE 06-028, which was also about PSNH's  
20 delivery rates. Further, I have provided testimony on competition in retail telephony in Docket  
21 No. DT 07-027 that pertained to TDS operations in New Hampshire. I have also provided cost of  
22 equity testimony in Docket DG 08-009, which related to gas delivery rates of National Grid NH.

23  
24 **Q. What is the purpose of your testimony?**

25 A. The purpose of my testimony is to recommend, for Public Service of New Hampshire (PSNH  
26 or the Company) delivery service, the rate of return on capital in accordance with standards set  
27 forth in *Bluefield Water Works and Improvement Co. v. P.S.C. of West Virginia*, 262 U.S. 679,

1 692-93 (1923) (*Bluefield*) and *F.P.C. v. Hope Natural Gas Co.*, 320 U.S. 591, 603-05 (1944).  
2 Under those standards, “[t]he return should be reasonably sufficient to assure confidence in the  
3 financial soundness of the utility and should be adequate, under efficient and economical  
4 management, to maintain and support its credit and enable it to raise the money necessary for the  
5 proper discharge of its public duties.” *Bluefield* at 693. “[T]he return to the equity owner should  
6 be commensurate with returns on investments in other enterprises having corresponding risks . . .  
7 . [and] sufficient to assure confidence in the financial integrity of the enterprise, so as to maintain  
8 its credit and to attract capital.” *Hope*, 320 U.S. at 603.

9

10 I also state my views on PSNH’s recommendations on cost of equity, and articulate the reasons  
11 for my views.

12

13 **Q. What rate of return on capital is the Company requesting in this case?**

14 A. The Company is requesting 8.11 percent weighted average return on capital, based on a  
15 requested return on common equity of 10.50 percent and 5.61 percent cost of long-term debt  
16 applied to a capital structure consisting of 48.88 percent long-term debt and 51.12 percent equity.

17

18 **Q. What do you recommend as the allowed return on capital for the Company?**

19 A. Staff recommends an overall return on capital of 7.335 percent, based on a 9.47 percent return  
20 on equity, and the capital structure set out in the Table below. This capital structure is based on  
21 the regulatory books and records on file with the Commission. In this case, we started with the  
22 September 30<sup>th</sup> 2009 information along with adjustments as described in the notes below the table  
23 that follows (Also, see Staff’s Testimony by Mr. Steve Mullen).

24

25

26

	Proformed Amount in \$ (000)	Weight	Cost Rate	Average Cost Rate
Common Equity	885,166	51.07%	9.47%	4.837%
Long-term Debt	816,267	47.10%	5.22%	2.460%
Short-Term Debt	31,655	1.83%	2.10%	0.038%
Total Capitalization	1,733,088			7.335%

**Notes:**

(a) Balances as of September 30, 2009 are from PSNH's 9/30/09 NHPUC Form F-1.

(b) Proforma adjustments are for \$219,000,000 equity infusion and the net amount of PSNH's 12/14/09 long-term debt issuance.

(c) The short-term debt balance is computed at the December 31, 2008 5-quarter average percentage of short-term debt in the capital structure (1.83%), rather than September 30, 2009, due to delay in PSNH's long-term debt financing in DE 09-033 (which would have repaid short-term debt).

(d) Cost rate of short-term debt is the effective interest rate for short-term debt as reported in 9/30/09 NHPUC Form F-1.

1

2 **Q. How is your testimony organized?**

3 A. Section II reports Staff's recommendation on the capital structure and cost of debt. In section  
4 III, I use several approaches to derive estimates of the cost of equity. I conclude that section by  
5 stating Staff's recommendation on the cost of equity, and determining the Staff's recommended  
6 cost of capital for PSNH. The Attachments referred to in this testimony are in Section IV.

7

8 **II. CAPITAL STRUCTURE AND WEIGHTED COST OF CAPITAL**

9

10 **Q. Please summarize the process of estimating the cost of capital.**

11 A. The cost of capital is comprised of the costs of long term debt, short term debt and equity  
12 capital. The first step in estimating the cost of capital is to determine the appropriate capital  
13 structure. Then, the cost rates for debt and equity capital are determined. Finally, the overall  
14 weighted average cost of capital is computed by weighting individual costs of debt and equity  
15 capital by their respective proportions of total capital and summing the result. This cost of capital

1 estimate forms the basis of the recommended allowed return on capital. Typically, debt costs are  
2 computed using their actual embedded costs, while equity costs must be estimated.

3  
4 **Q. What is the method that you use to calculate the cost of long term debt?**

5 A. The cost of long-term debt is based on the Company's data (PSNH's December 15, 2009  
6 update; R.A. Baumann/G.J. Eckenroth Schedule V, page 4 of 4), and reflects the embedded cost  
7 of long-term debt.

8  
9 **Q. Please explain why you include short-term debt in the Company's capital structure.**

10 A. The Commission has previously concluded that "a factor influencing whether short term debt  
11 is included is whether it is a reasonably stable percentage of total capital over time." *Verizon*  
12 *New Hampshire*, Order No. 24,265, 89 NH PUC 17, 21 (2004). "If it is stable then it could be  
13 considered to be permanent and included." *Id.* Utilizing this approach, the Commission has  
14 previously found short-term debt to be appropriate for inclusion in a reasonable capital structure.  
15 *Id.* at 22 (citing cases); *see also Public Service Company of New Hampshire*, Order No.  
16 24,750, 92 NH PUC 124 (2007); *Unitil Energy Systems, Inc.*, Order No. 24,677, 91 NH  
17 PUC 416 (2006).

18  
19 Given that PSNH consistently uses short-term debt to fund its operations, and that such  
20 debt represents a fairly stable percentage of the Company's total capital over time, short-  
21 term debt must be incorporated into the Company's capital structure. Furthermore, since  
22 the total amount of debt relative to total capitalization affects credit standing, all  
23 components of debt must be included in the rate of return calculation.

### **III. ESTIMATING COST OF EQUITY USING SEVERAL APPROACHES**

#### **Q. Which approaches have you used to estimate the cost of equity for PSNH?**

A. While I have relied primarily on the DCF construct to estimate the cost of equity for the utility, I have also estimated the cost of equity using the CAPM construct. As for the DCF construct, I have conducted two types of estimations. First, I have used the standard DCF approach (subsection III.a), where the cost of equity is estimated as the sum of the dividend yield and a measure of the growth component. Second, I have also used the market-to-book method (subsection III.b), which too is rooted in the DCF construct, wherein the cost of equity is equated to the sum of the “internal” return, which utilizes data on pay-out and market-to-book ratios and expected return on common equity, and the “external” return, which accounts for expected growth in outstanding shares. As for the CAPM approach (subsection III.c), while I have derived an estimate of the cost of equity, for reasons I discuss later, I do not base my point-estimate recommendation on that method. The CAPM estimation is nevertheless useful as it provides a check on the reasonableness of the DCF estimates, in line with the accepted Commission approach. *See e.g., EnergyNorth Natural Gas, Inc.*, Order No.s 24,972 (May 29, 2009) and 25,044 (November 13, 2009) (denying rehearing of Order No. 24,972). I should also add that unlike Mr. Eckenroth, I did not use the RPM to derive an estimate of the cost of equity, and I discuss the reasons in subsection III.d. In each of these subsections I comment on Mr. Eckenroth’s analysis to the extent it is relevant to my recommendation. Finally, I conclude with my recommendation on the cost of equity for PSNH.

#### **Q. Please explain why you rely primarily on the DCF construct to estimate the cost of equity?**

A. Of the methods that Mr. Eckenroth used to estimate his recommended cost of equity, the Capital Asset Pricing Model (CAPM) and the Risk Premium Model (RPM) predominantly use historical stock-price appreciation as the basis for measuring the expected return on common

1 equity. Compared to attempts at forward looking estimations, these methods rely to a great extent  
2 on the historical trends in stock prices. While the CAPM model relies on betas that are based on  
3 historical data on stock prices, the RPM approach relies on forecasts that are still significantly  
4 informed by historical trends in risk premiums and yields. By contrast, the DCF approach is  
5 essentially forward looking. Also, the fundamental underlying construct behind the DCF  
6 analysis, i.e. the value of a common stock equates to the sum of the discounted stream of income  
7 from that stock, is widely accepted. Further, regarding the techniques that are used to estimate  
8 the cost of equity, "the [DCF] technique is one of the most popular of those currently in use."<sup>1</sup>  
9 Last, but not least, the DCF method has been the primary method used by the New Hampshire  
10 Public Utilities Commission to estimate the rate of return on equity although the Commission has  
11 recognized that other valid methods may be used as a test of reasonableness to compare to the  
12 DCF result. *See e.g., EnergyNorth Natural Gas, Inc.*, Order No.s 24,972 (May 29, 2009) and  
13 25,044 (November 13, 2009) (denying rehearing of Order No. 24,972).

### 14 15 **III.a Discounted Cash Flow Approach**

#### 16 **Q. Which DCF model do you use to estimate the cost of equity?**

17 A. I use a single-stage DCF model to derive estimates for the cost of equity for a group of  
18 companies that forms a reasonable proxy for PSNH. The two essential elements of this method  
19 are the dividend yield and the growth component. While I discuss the estimation of both  
20 elements later in detail, it is important to point out that the growth component of the DCF  
21 equation tends to be the most critical element in the use of the DCF methodology. A couple of  
22 things render the estimation of the growth component somewhat challenging. First, while the  
23 growth component of the single-stage DCF model is in principle meant to be based on long-term

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<sup>1</sup> See "*The Cost of Capital - A Practitioner's Guide*," by David C. Parcell, prepared for the Society of Utility and Regulatory Financial Analysts (1997 edition), pages 8-39 and 8-40.

1 projections, in practice, it is based on five-year projections, as long-term projections are seldom  
2 available. Second, "it is reasonable to believe that investors, as a group, do not utilize a single  
3 growth estimate when they price a utility's stock."<sup>2</sup> I have therefore relied on several estimates of  
4 the growth rates. At one end, I have used the projections for growth rates in earnings per share  
5 (EPS), book value per share (BVPS), and dividends per share (DPS), and on the other I have  
6 relied on estimates for projections of the internal growth rate, i.e.  $br$ , as well as the external  
7 growth component, i.e.  $sv$ ,<sup>3</sup> in the formula, to derive an alternative growth estimate.

8  
9 **Q. Briefly describe the single-stage DCF method.**

10 A. The single-stage DCF model is typically represented by the equation,

11 
$$K = \frac{D_1}{P} + g$$

12 where  $K$  is the estimate of the cost of equity,  $\frac{D_1}{P}$  is next period's dividend yield, i.e. next period's  
13 dividend divided by the stock price, and  $g$  is the expected (constant) growth rate in dividends. The  
14 model is based on the premise that since cash dividends are the only income from a share of stock  
15 held to infinity, the value of that stock is the present value of its stream of cash dividends, where  
16 the discount rate is the market's required return, i.e.,  $K$ . Expected future dividends are represented  
17 by applying a constant growth rate to the current observable dividend, to obtain the functionally  
18 elegant expression for  $K$  as shown above.

19  
20 **Q. What are your criteria behind the Staff-recommended DCF proxy group?**

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<sup>2</sup> *The Cost of Capital - A Practitioner's Guide*, by David C. Parcell, prepared for the Society of Utility and Regulatory Financial Analysts (1997 edition), Page 8-32.

<sup>3</sup> 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 A. When choosing my recommended sample, I began with Mr. Eckenroth's proxy (which are  
2 based on criteria listed on Page 58 of Mr. Eckenroth's testimony), but eliminated companies that  
3 are not analyzed by Value Line,<sup>4</sup> that have not consistently paid dividends as far back as 2004,<sup>5</sup>  
4 whose generation business accounts for more than 60 percent of their operating expenses<sup>6</sup> and  
5 that do not have greater than 70 percent monthly revenue from *regulated electric* business at the  
6 end of 2009 (based on AUS monthly reports).<sup>7</sup> I have also excluded Northeast Utilities from my  
7 proxy as I do not believe it is appropriate to consider the parent company of PSNH as part of the  
8 proxy.

9  
10  
11 **Q. Why do your criteria differ from that of Mr. Eckenroth's criteria?**

12 A. While I essentially use Mr. Eckenroth's proxy as my beginning screening group, in creating a  
13 reasonably "pure play" proxy that is comparable to PSNH it is important that not only do these  
14 companies exhibit a high percentage of regulated assets, but also that they exhibit a high  
15 percentage of regulated electric revenues. PSNH's distribution business is purely regulated  
16 electric business, and it is reasonable to include companies in the proxy that have recently  
17 reported at least 70 percent of their revenues from regulated electric business. Staff also  
18 recognizes that the companies in the screening group have considerable exposure to generation  
19 business risk as on average 45 percent of their operating expenses comes from expenses incurred  
20 to produce electric energy. As the focus in this rate case is solely the distribution business of  
21 PSNH, it is important to drop companies that are overly exposed to generation risk. Staff has  
22 therefore excluded companies whose generation business accounts for more than 60 percent of

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<sup>4</sup> Northwestern Corporation was eliminated on account of this criterion.

<sup>5</sup> PG&E Corp. and Portland General were eliminated on account of this criterion.

<sup>6</sup> It should be stressed that the proxy, even after the exclusion of CLECO Corporation (73% of its operating expenses are generation related) from the proxy, reflects a considerable exposure to generation risk (see Attachment I).

<sup>7</sup> Companies eliminated on account of this criterion were: Avista Corp., CH Energy Group, Consol. Edison, DTE Energy Company, Northwestern Corporation, TECO Holding Company, and Wisconsin Energy.

1 their operating expenses. Also, Staff includes companies in the sample that are at a minimum  
2 covered by the Value Line Survey, as Staff relies not only on earnings projections but also on  
3 dividends and book value projections in its DCF analysis. To the best of my knowledge,  
4 dividends and book value projections are covered only by the Value Line Survey. Finally, I do  
5 not believe it is appropriate to consider PSNH's parent company NU as part of the proxy, as in  
6 determining the opportunity cost of equity it is important that we look at investors' alternative  
7 opportunities. Strictly speaking, the proxy should only include companies that are completely  
8 unrelated to PSNH, ownership-wise.

9  
10 **Q. What is the Staff's recommended DCF proxy?**

11 A. The Staff's recommended proxy group comprises Allete Inc., Alliant Energy, American  
12 Electric Power Company, DPL Inc., Empire District Electric Company, IDACORP Inc., NSTAR,  
13 Pinnacle West Capital Corporation, Progress Energy, Southern Company, UIL Holdings, Westar  
14 Electric and XCEL Energy, Inc.

15  
16 **Q. Do you believe that the group listed above is a reasonable proxy for PSNH?**

17 A. Yes, I do. The screening criteria go a long way in ensuring that my proxy group reasonably  
18 reflects the risk profile of distribution business of PSNH. For example, the proxy's average  
19 percentage of assets subject to utility regulation is 95 percent and the average percentage of  
20 revenue subject to regulated electric business is 91 percent (see Attachment I), which are  
21 reasonably close to complete regulation as is the case for the distribution business of PSNH.  
22 Also, a check (see Attachment II) reveals that on average the S&P organizational rating for the  
23 group is close to BBB, which is also the S&P organizational rating for PSNH. Also, while the  
24 average (end-of-year) common equity ratio during 2004-08 for PSNH was 46.4 percent (PSNH  
25 response to TS-01 Q-TECH-004), for the proxy it was 48.3 percent (see Attachment III). It  
26 should also be recognized, as stated before, even without the inclusion of CLECO Corporation

(which has a very high exposure to generation) Staff's proxy is characterized by a considerable exposure to generation risk. In view of these screening criteria, the Staff proxy appears to be a conservative and reasonable proxy for PSNH's distribution business. To further assure the reasonableness of my proxy group, it is also useful to look at the economic conditions characterizing the jurisdiction of PSNH relative to the nation as well as to the proxy.

**Q. Briefly describe the economic conditions in the USA and New Hampshire.**

A. While a year ago, the economy was reeling under a recession that was perhaps the worst since the Great Depression, the US economy has started to grow again. While much of the positive performance during the third quarter of 2009 perhaps can be traced to federal programs to assist troubled auto and housing industries,<sup>8</sup> and the economic performance is expected to moderate over the next year, it is reasonable to expect that such a turn-around will prove sustainable in the near future. While New Hampshire's economic circumstances have been closely tied to the national economy's performance, a look at data for economic activity<sup>9</sup> in August 2009, as reported by the Federal Reserve Bank of Boston, suggests that New Hampshire's economy is doing relatively better than the country as a whole and other New England states. In August 2009, while the national economy contracted by 3.4 percent year-to-year, New Hampshire's economy contracted by 3.1 percent year-to-year.<sup>10</sup> New Hampshire also registered better performance than any other state in New England.<sup>11</sup> Similar comparisons can also be observed in unemployment (seasonally adjusted) statistics for October 2009. While the unemployment rate in

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<sup>8</sup> See The Value Line Investment Survey, *Selection and Opinion*, November 13, 2009.

<sup>9</sup> Economic activity is captured by The Economic Activity Index, which is the monthly coincident indicator developed for each of the 50 states by economists at the Federal Reserve Bank of Philadelphia. Calibrated to trend at each state's pace of growth in real gross state product relative to July 1992 levels, the state indexes are derived from total nonfarm employment, unemployment rates, average hours worked in manufacturing, and wage and salary disbursements.

<sup>10</sup> See page 3 of <http://www.bos.frb.org/economic/nee/current/nee.pdf> for the New England Economic Indicators (Third Quarter 2009 for the data on Economic Activity Index).

<sup>11</sup> Ibid., footnote 10

1 New Hampshire was 6.8 percent, in New England and the country's unemployment rates were  
2 8.8 and 10.2 percent, respectively.<sup>12</sup>

3

4 **Q. What bearing do the economic conditions, as described above, have on the**  
5 **reasonableness of the DCF proxy?**

6 A. Investors are assumed to be aware of current regional and national economic conditions.

7 Investors in PSNH know that the company operates in New Hampshire where the local economy  
8 lately has not performed as poorly as did the national economy. An investor's opportunity cost of  
9 equity, i.e. investor's required return, is expected to be lower for investing in an economic  
10 activity in New Hampshire when compared to investing in a comparable activity operating in an  
11 environment that is relatively less robust, all else equal. A closer look at the economic  
12 environment characterizing PSNH's DCF proxy is helpful to confirm whether or not the proxy as  
13 chosen is reasonable or not. The Philadelphia Federal Reserve Bank produces coincident indexes  
14 every month that measure economic activity for every state in the USA. Monthly data from  
15 September to November 2009 for yearly growth rates indicate that out of the twenty-nine states  
16 where the companies included in the proxy have geographical presence, only six performed better  
17 than New Hampshire.<sup>13</sup> Of the twenty-nine states, however, twenty states registered significantly  
18 higher negative growth rates in the indexes (see Attachment IV) compared to New Hampshire.  
19 On average, while the other states represented in the proxy registered a negative growth of 5.76  
20 percent, NH registered a negative growth of 2.98 percent. It is therefore reasonable to conclude  
21 that Staff's proxy group of companies operate under economic conditions that are less favorable  
22 than those of New Hampshire. Thus, the proxy produces an estimate for the cost of equity that

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<sup>12</sup> See [http://www.nh.gov/nhes/elmi/pdfzip/econanalys/econcond/ec\\_0110.pdf](http://www.nh.gov/nhes/elmi/pdfzip/econanalys/econcond/ec_0110.pdf) i.e. New Hampshire Economic Conditions (January 2010).

<sup>13</sup> See <http://www.philadelphiafed.org/econ/indexes/coincident/>. While only one state reported slightly positive growth, the other five were in negative territory not too far away from New Hampshire.

1 perhaps reflects a greater risk than that which would be associated with PSNH. In conclusion, I  
2 believe that the DCF proxy as chosen is rather conservative and reasonable.

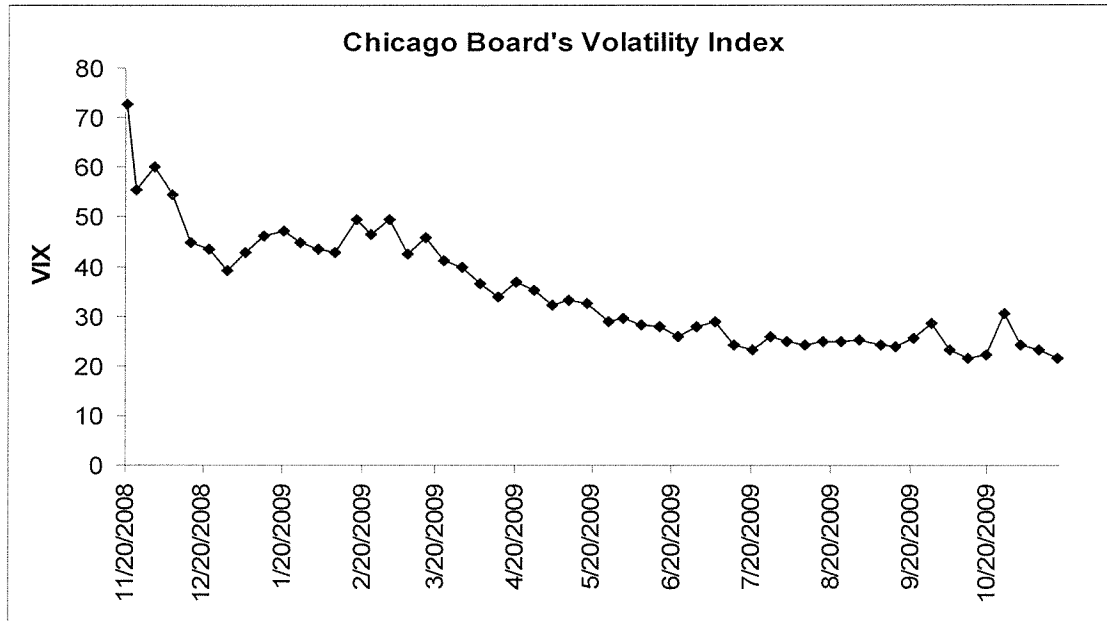
3  
4 **Q. Please comment on Mr. Eckenroth's characterization of the current market conditions.**

5 A. Mr. Eckenroth described in some detail how the spread associated with BBB/Baa rated utility  
6 bonds and the yield on 30-year Treasury bonds had increased substantially lately; see his direct  
7 testimony, page 36, line 8 to page 37, line 13. He also relied on several publications which were  
8 predominantly from the end of 2008 to argue that these conditions are expected to continue into  
9 the foreseeable future; see his testimony, page 39, lines 3-10. He also stressed how investment  
10 risk has recently increased and argued that this increased risk ought to be considered in setting the  
11 return on capital.

12  
13 Mr. Eckenroth's data and predictions are outdated and therefore his predictions are unreliable.  
14 Since Mr. Eckenroth filed his testimony, economic conditions have changed. As corroborated by  
15 his response to Data Request STAFF-03, Q-STAFF-062, page 3 of 3, the spread and the relevant  
16 yields actually fell substantially by as early as September 2009. Compared to the 425 basis points  
17 spread in May 2009, September 2009 recorded a spread of 185 basis points, and the bond yield  
18 also fell from 8.48 percent to 6.04 percent, which actually turns out to be lower than even the  
19 level that was recorded in May 2007. Even in the beginning of November 2009 one finds that the  
20 yields and the spreads, which started to soften in August 2009, have remained considerably lower  
21 compared to the second half of 2008 and early 2009.<sup>14</sup>

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<sup>14</sup> Incidentally, even with respect to the new offering of PSNH's 10-year bond (see R.A. Baumann/G.J.Eckenroth Schedule V, page 3 of 4), the interest rate was only 4.5 percent.



Further, a look at the CBOE Volatility index, which is good reflection of expected investment risk associated with the market in general, shows that the index has fallen quite substantially, from around 70 to around 20, over the last year (See Figure 1). At the least, it is reasonable to conclude that the predictions on which Mr. Eckenroth relied have not turned out to be correct.

**Q. Please explain how the dividend yields and the growth component were calculated for the DCF proxy's constituent companies.**

A. I have used the data from Yahoo Finance on the daily closing stock prices for each of the sample companies for the period December 11<sup>th</sup> 2009 to January 11<sup>th</sup> 2010 to calculate the average stock prices for those companies (see Appendix V). To derive the next period's dividend yield ( $D_1/P$ ) for any company, I used the Value Line 2010 projections for dividends and divided it by the average stock price. See Appendix VI for the calculations.

**Q. Please explain why you have used data from December 11<sup>th</sup> 2009 to January 11<sup>th</sup> 2010 to measure the dividend yields for the proxy's constituent companies.**

1 A. Much of investors' expectations about how companies will fare in the future is captured in the  
2 most recently observed price and dividend data. Data from fairly long historical periods are  
3 unlikely to reflect investors' current expectations. That said, it is also true that some smoothing  
4 of the price trend is useful as it filters possible transitory and temporary changes that characterize  
5 daily movements in prices. I have therefore used daily pricing data for the most recent month to  
6 calculate the average price, which is then compared with the annualized dividend to measure the  
7 dividend yield.

8  
9 **Q. Mr. Eckenroth exclusively uses expected earnings growth rates for the growth**  
10 **component in his DCF analysis. Do you agree with his approach?**

11 A. No. As I have indicated before, investors do not use a single growth estimate when pricing a  
12 utility's stock. I therefore find it appropriate to consider other measures for the growth  
13 component.

14  
15 **Q. What other measures of the growth component do you consider?**

16 A. Since the DCF estimate is derived from the concept that cash dividends are the only income  
17 from a share of stock held to infinity, in principle it is the growth in dividends that should be used  
18 for the growth component. Investors, however, have different expectations about growth and no  
19 single indicator captures the expectations of all investors. Investors also care about whether  
20 growth in dividends per share (DPS) is sustainable or not and they are aware that its sustainability  
21 is affected by how both earnings per share (EPS) and book value per share (BVPS) perform in the  
22 future. Sustainability of growth in dividends under the DCF construct also assumes that EPS,  
23 DPS and BVPS are all expected to grow at the same rate in the future. Value Line five-year  
24 projections for the growth rates in earnings, dividends and book value, however, reveal that these

1 financial variables are expected to grow at significantly different rates over the next five years.<sup>15</sup>  
2 In view of that, the earnings growth rate that Mr. Eckenroth recommends as the sole proxy for the  
3 DCF growth component is unlikely to be the most reliable measure of growth. I instead use as  
4 one of the measures for the growth component, the average of the three expected growth rates, to  
5 represent the growth component in the DCF analysis. One may reasonably assume that the  
6 sustainable long-run growth rate to which earnings, dividends and book value growth rates may  
7 converge in the future is represented by their average. I have used the average of the Value Line  
8 five-year projections for growth in DPS and BVPS and the average of the Value Line, SNL and  
9 Zacks projections for EPS growth rates to calculate the growth component. While in principle the  
10 single-stage DCF model is meant to be based on long-term projections, in practice it is based on  
11 five-year projections, as long-term projections are seldom available.

12

13 I have also considered a second measure of the growth component, which is based on estimates  
14 for the internal and external components for growth, retention ratio, expected return on common  
15 equity, market-to-book ratio, and growth in the number of outstanding shares. Finally, even  
16 though I have reservations about Mr. Eckenroth's sole reliance on earnings growth as a measure  
17 of the growth component, I considered and applied that approach to the Staff's proxy to derive  
18 another DCF estimate for the cost of equity (see Attachment VII for the calculation of the growth  
19 components; also see Attachments VIII and IX for the calculations for the input for external and  
20 internal growth components).<sup>16</sup>

21

---

<sup>15</sup> Based on my proxy, the averages for the earnings, dividends, and book value growth rates are 4.94 percent, 3.0 percent and 3.88 percent, respectively.

<sup>16</sup> I have used the average of the latest available five-year projections on EPS growth from Value Line, SNL and Zacks to represent the growth component.

1 **Q. Mr. Eckenroth relied on growth projections for earnings from not only Value Line, SNL**  
2 **and Zacks, but also from IBES and Yahoo Finance. Why did you ignore IBES and Yahoo**  
3 **Finance?**

4 A. Projections from SNL, IBES and Yahoo Finance are all derived essentially from analysts'  
5 projections provided by Thomson Financial. If we were to use the projections from SNL, IBES  
6 and Yahoo Finance, we would be essentially weighting the projections from Thomson Financial  
7 60 percent while that of Zacks and Value Line by 20 percent each. Doing so is not reasonable. It  
8 is Staff's view that forecasts from different original sources like Thomson Financial, Value Line,  
9 and Zacks should be accorded equal weights. To support such weighting, Staff believes it is  
10 appropriate that only one of three of SNL, IBES or Yahoo Finance should be used in the  
11 derivation of the average growth projections for earnings. Staff has opted to choose SNL  
12 projections.

13  
14 **Q. Please explain how you estimated the growth component based on the retention ratio,**  
15 **expected return on common equity, market-to-book ratio, and growth in the number of**  
16 **outstanding stocks.**

17 A. I have used Value Line's expectation regarding retention ratios and returns on equity for five  
18 years into the future to derive estimates for  $b$  and  $r$  and have used them to calculate the expected  
19 internal growth component, i.e.  $br$ . To account for growth expectations from external financing  
20 and derive estimates of the external growth component, I have also used the latest market-to-book  
21 ratios from the AUS Monthly Report and the average of Value Line's five-year projections for  
22 the number of outstanding shares. (For a description of modeling of the internal and external  
23 growth components, see my discussion of the market-to-book method below).

24  
25 **Q. Do you have any observation on Mr. Eckenroth's DCF Acceptance Criteria?**

1 A. Yes. Mr. Eckenroth establishes a collar of cost of long term debt plus half of the PSNH  
2 proxy expected risk premium *and* cost of long-term debt plus one-and-a-half times of the PSNH  
3 proxy expected risk premium, and rejects ROE estimates that lie outside this collar. The  
4 derivation of this collar depends crucially on long-term historic data on bond returns and relies on  
5 betas that are derived from historical data from the previous five years. Cost of equity is  
6 essentially a forward looking concept and in Staff's opinion it is more appropriate to rely on a  
7 symmetric statistical outlier-determination approach that is applied directly to the estimates of  
8 cost of equity associated with a proxy that closely resembles PSNH's distribution business.

9  
10 **Q. Please describe your outlier-determination approach?**

11 The outlier-determination approach I have used is to consider that cost of equity estimates lying  
12 outside the bandwidth of the mean plus or minus two times the variance are not statistically  
13 representative of the proxy. In terms of probabilistic distribution terminology, this selection  
14 criterion effectively mimics the widely-used statistical confidence interval of 95 percent.

15  
16 **Q. What are the DCF estimates for your proxy?**

17 A. The single-stage DCF estimate, based on the average expected growth rates in earnings,  
18 dividends and book value, is 9.19 percent. Attachment X provides the calculations. When only  
19 the EPS growth rate is used for the growth component, the single-stage DCF method produces an  
20 estimate of 10.19 percent. When the "internal-plus-external" growth approach is used, the DCF  
21 method produces an estimate of 9.04 percent. It should be reiterated that I have applied my  
22 recommended outlier-determination criterion in deriving these estimates.

23  
24 **Q. Mr. Eckenroth recommends adjustment for flotation costs in his estimates of the cost of**  
25 **equity. Do you agree with those adjustments?**

1 A. No. Importantly, stock-buyers are well aware that a company's receipt of funds per share is  
2 less than the price of the share. Yet they commit to such funding, indicating that the return they  
3 expect from the company's equity capital is at least as high as the opportunity cost of equity, if  
4 not even higher. Also, when the market-to-book ratio is significantly higher than one (the  
5 average market-to-book ratio of Staff's proxy is 1.47), DCF and other methods produce  
6 sufficiently upward-biased estimates of the market cost of equity that dilution of stocks, which is  
7 the reason why flotation costs usually become relevant, is a non-issue. I, therefore, conclude that  
8 an adjustment for flotation costs, as proposed by Mr. Eckenroth, is inappropriate. See also  
9 *EnergyNorth Natural Gas, Inc.*, Order No. 24,972 (May 29, 2009) at 67-68; *Public Service*  
10 *Company of New Hampshire*, Order No. 24,473 (2005) (the Commission has historically denied  
11 inclusion of such an adjustment to the return on equity).

### 12 13 **III.b Market-to-Book Method**

#### 14 **Q. Briefly describe the Market-to-Book Method.**

15 A. The method is based on the DCF formulation, which translates into

16 
$$K = \frac{(1 - b_e)r_e}{P/B} + b_er_e$$

17 where  $r_e$  is the expected return on equity,  $B$  is the book value of stock,  $b_e$  is the retention ratio,  
18  $P$  is the market stock price, and  $K$  is the cost of equity.<sup>17</sup>

19  
20 The above formulation ignores the impact of growth in outstanding shares and external financing.

21 When one models that, the above equation can be revised to state

---

<sup>17</sup> See Roger Morin's *New Regulatory Finance*, Public Utilities Report, Inc. (2006), Page 360.

1  $K = \frac{(1-b_e)r_e}{P/B} + b_e r_e + s_e \nu$ , where  $s_e$  = expected funds raised from sale of stock as a fraction of

2 existing equity, and  $\nu = \left(1 - \frac{B}{P}\right)$ .<sup>18</sup> The revised formulation can be alternatively expressed as

3  $K = \frac{(1-b_e)r_e}{P/B} + b_e r_e + g_e \left(\frac{P}{B} - 1\right)$ , where  $g_e$  is the expected growth rate in the number of

4 outstanding shares. One can use the formulation to derive cost of equity estimates using available

5 data on investors' expectations about the retention ratio, return on equity, and growth in the

6 number of outstanding shares. In short, the growth component can be viewed as the sum of the

7 "internal" growth rate, i.e.  $b_e r_e$ , and the "external" growth rate, i.e.  $g_e \left(\frac{P}{B} - 1\right)$ .

8

9 **Q. What is the Market-to-Book Method cost of equity estimate for the DCF proxy?**

10 A. The market-to-book method estimate is 8.77 percent. I have used the outlier-determination

11 approach as described above for this method too. For the estimate for  $b$  and  $r$ , I have used the

12 same approach as in the case of the "internal-plus-external" growth component approach to

13 estimating the DCF cost of equity. To derive an estimate of the external growth component I

14 have used the current market-to-book ratio as reported by latest monthly AUS report and the

15 average of Value Line's five-year projections for the number of outstanding shares (see

16 Attachment X for the calculations). This estimate not only corroborates the reasonableness of the

17 estimates derived from the traditional DCF approaches, but is also used to derive a range of

18 reasonable point estimates, as described in section III.d below.

19

20 **III.c Capital Asset Pricing Model (CAPM)**

21 **Q. Briefly describe the CAPM method.**

---

<sup>18</sup> See "The Cost of Capital to a Public Utility," Myron Gordon, MSU Public Utilities Studies (1974), page 30.

1 A. The CAPM method recognizes that common equity capital is more risky than debt from an  
2 investor's standpoint, and that investors require higher returns on stocks than on bonds to be  
3 compensated for the additional risk. The cost of common equity under CAPM is represented by  
4 the following equation:

$$5 \quad K = R_f + \beta_s * (R_M - R_f)$$

6 where  $K$  is the cost of equity,  $R_f$  is the yield on risk free securities,  $R_M$  is the expected return on  
7 the overall market and  $(R_M - R_f)$  is the equity risk premium demanded by shareholders to accept  
8 equity relative to debt.  $\beta_s$  is the average beta of a group of comparable-risk companies that is  
9 used to adjust the risk premium to measure risks specific to the regulated utility in question.  
10

11 **Q. What is Mr. Eckenroth's estimate of the cost of equity based on the CAPM method?**

12 A. Mr. Eckenroth derives a CAPM estimate of the cost of equity of 11.90 percent. While Mr.  
13 Eckenroth derives a traditional CAPM estimate of 10.64 percent, he also proposes three distinct  
14 upward adjustments to this estimate. He derives a 0.15 percent adder on account of an empirical  
15 CAPM adjustment (see Mr. Eckenroth's direct testimony, Attachment GJE-4 CAPM). He also  
16 recommends upward adjustments for size of 0.74 percent, and for issuance (flotation) costs of  
17 0.37 percent.

18

19 **Q. Do you agree with Mr. Eckenroth's CAPM approach? Please explain.**

20 A. No. First with respect to the traditional CAPM estimate, I do not agree with his reliance on  
21 30-year treasury bonds to measure the risk-free rate of return. Strictly speaking, the risk-free  
22 return is best captured by short-term treasury bills, as they carry very little inflation risk at any  
23 point in time, but in recognition that utility rates are usually set for longer periods, something like  
24 a ten-year treasury bond is widely used for the purpose of determining the risk-free rate of return.  
25 Further, with respect to the derivation of the market return, I believe it is appropriate to adjust the

1 return associated with the S&P 500 portfolio to ensure that the return derived for the market is  
2 associated with a beta of one. This issue is discussed later in detail.

3  
4 Further, Staff doesn't believe that an adjustment accounting for the empirical CAPM construct is  
5 warranted, as the reported Value Line betas are already adjusted to account for the long-term  
6 tendencies for stocks to converge to a beta of one. This adjustment to beta is akin to the alpha  
7 adjustment that Mr. Eckenroth recommends. Additional accounting for alpha is therefore  
8 inappropriate. As for the adjustment for size, there is counter-evidence indicating that the small-  
9 firm effect is too dependent on the time-period chosen for analysis, and is dependent on the  
10 month of January for high stock price returns. There is also counter-evidence that the size effect  
11 may not apply to regulated utility operations. See for example, Block S.B., "*A Study of Financial*  
12 *Analysts: Practice and Theory*," Association for Investment Management Research (July/August  
13 1999) and Wong, A., "*Utility Stocks and the Size Effect: An Empirical Analysis*," Journal of the  
14 Midwest Finance Association (1993). In short, the evidence on small-firm effect is not  
15 sufficiently persuasive that I can recommend the adjustment proposed by Mr. Eckenroth. Finally,  
16 for the reasons set forth in the DCF subsection, Staff rejects the flotation cost adjustment.

17  
18 **Q. Have you estimated the cost of equity using the CAPM method?**

19 A. I have. I attempt to correct for the difference in market returns between the S&P 500 universe  
20 of stocks and the universe of stocks that truly is associated with the market beta of one. Also, as  
21 explained above I have rejected all of the adjustments to the basic CAPM model that Mr.  
22 Eckenroth has proposed.

23  
24  
25 **Q. What beta measure do you use for your sample?**

1 A. I use Value Line beta estimates for the companies in my DCF sample (see Attachment XII). I  
2 also report the latest median beta for the S&P 500 universe of companies, as it is an essential  
3 element of my estimation of the cost of equity using CAPM, as discussed below.

4  
5 **Q. How do you calculate the equity risk premium?**

6 A. The two key elements in the determination of the equity risk premium are the risk-free rate and  
7 the expected return on the market portfolio. As a proxy for the risk-free rate, I use the current  
8 yield on the 10-Year Treasury bond observed over the last month. The average yield over  
9 December 11<sup>th</sup> 2009 to January 11<sup>th</sup> 2010 was 3.73 percent.<sup>19</sup> To derive the market equity risk  
10 premium, I first note that the return on a representative S&P 500 portfolio can be expressed as  
11  $R_{SP} = R_f + \beta_{SP} * (R_M - R_f)$ , where  $R_{SP}$  is the expected total return on a representative S&P  
12 500 portfolio and  $\beta_{SP}$  is the representative beta for that portfolio. That can be rearranged to  
13 express the market risk premium,  $R_M - R_f$ , as  $(R_{SP} - R_f) / \beta_{SP}$ . Thus, the expected return on  
14 the S&P 500 portfolio, the risk-free rate, and the S&P 500 beta can be used to derive the estimate  
15 of market equity risk premium. The market cost of equity is a forward-looking concept, and I  
16 rely on the DCF construct to derive an estimate of the return expected for a representative S&P  
17 500 portfolio, i.e.  $R_{SP}$ . The approach I have used relies in part on the DCF approach that Mr.  
18 Eckenroth applied on S&P data to yield a forward-looking estimate of the market risk premium,  
19 even though my approach varies slightly. Succinctly,  $R_{SP}$  can be represented as

20 
$$R_{SP} = DY_{SP} * (1 + 0.50 * g_{SP}) + g_{SP},$$

21 where  $DY_{SP}$  represents the current dividend yield, and  $g_{SP}$  is the growth component of the  
22 representative S&P 500 portfolio (expected growth in EPS as obtained from updated Appendices

---

<sup>19</sup> See Attachment XII, the source for which is [www.sn1.com](http://www.sn1.com).

1 CAPM 3.1.1 to 3.1.6, attached to Mr. Eckenroth's testimony).<sup>20</sup> As for the next period's dividend  
2 yield I apply a growth rate on the current dividend yield of one half of  $g_{SP}$ , which is a reasonable  
3 way to recognize that quarterly dividends declared per share across different stocks typically  
4 change once a year; some will change right at the beginning of the year, while others will change  
5 in other quarters; using half of  $g_{SP}$  is a reasonable approximation to reflect the timing issue.

6  
7 **Q. What data do you use in estimating the market risk premium?**

8 A. I have used data from the entire set of S&P 500 stocks, as furnished by Mr. Eckenroth in data  
9 responses. I have used the dividend yield as reported by Mr. Eckenroth (Company's Response to  
10 TS-1, Q-TECH-002) and the median Value Line beta for that portfolio. For the S&P 500 growth  
11 component, I have relied on the estimate provided by Mr. Eckenroth (Company's Response to  
12 TS-1, Q-TECH-001).

13 **Q. What is your estimate for the market-risk premium?**

14 A. The input data for  $DY_{SP}$  and  $g_{SP}$  are 2.26 and 10 percent, respectively. This yields 12.37  
15 percent for  $R_{SP}$ . With  $\beta_{SP}$  being 1.05, the forward-looking market risk premium is  $(12.37 -$   
16  $3.73)/1.05$ , i.e. 8.23 percent.

17  
18 **Q. What is your CAPM cost of equity estimate for PSNH?**

19 A. Using the market risk-premiums as derived above as well as a proxy beta of 0.68, we can  
20 derive the CAPM cost of equity estimate for PSNH as  $3.73 + 0.68 \times 8.23$ , i.e. 9.33 percent. This  
21 estimate confirms the reasonableness of the estimates derived from the DCF approach which the  
22 Staff has predominantly relied on in recommending its return on equity for PSNH's distribution  
23 business.

---

<sup>20</sup> Ideally, Staff prefers using growth projections for not only earnings but dividends and book value as well. The data for the projections associated with dividends and book value were not readily available. However, even with the returns being based on earnings projections, we do get a CAPM estimate, which provides a reasonable check on the DCF estimations that I have relied on to recommend the point estimate for the return on equity. The CAPM estimation relied on by Staff is therefore still quite useful.

1     **III.d Additional Observations**

2     **Q. Please explain why you did not use the RPM approach for an estimate of the cost of**  
3     **equity?**

4     A. Staff recommends using the DCF approach to estimating the cost of equity, for reasons that I  
5     have discussed above. The RPM approach is inappropriate because RPM is largely not forward-  
6     looking. The reliance on historical data exposes the method to considerable subjective  
7     manipulation. Also, RPM is conceptually similar to the CAPM method as it too models a higher  
8     return for higher risk and purports to model the risk premium associated with equity capital over a  
9     risk-free debt instrument. For all these reasons, I do not find it useful to conduct any analysis to  
10    estimate the cost of equity using the RPM.

11

12    **Q. Please summarize your cost of equity estimates.**

13    A. My cost of equity estimates based on the different methodologies are as follows:

Summary of PSNH Cost-of-Equity Estimates	
DCF (traditional: EPS, BVPS & DPS average/ EPS)	9.19/10.19
DCF ( $g=br+sv$ Method)	9.04
Market-to-book Method	8.77
CAPM	9.33

14

15    **Q. What is your recommendation on the allowed rate of return on equity for PSNH?**

16    A. As indicated before, my preferred approach is the DCF approach. I therefore find it  
17    reasonable to use the average of estimates derived from the DCF methods to determine my  
18    recommended point-estimate of the allowed rate of return on equity, which is 9.47 percent. Also,  
19    since all but the CAPM estimates are primarily based on the DCF construct, it is also reasonable  
20    to look at the average of the traditional DCF methods as well as the market-to-book method. The  
21    estimate in that case is 9.30 percent. Consideration of my CAPM estimate by itself indicates that  
22    my recommended point-estimate of the allowed return on equity is reasonable. Further, as

1 CAPM estimation is influenced by historical betas and is therefore not as forward-looking as I  
2 would like the approach to be, to the extent that I tailored the approach to be somewhat forward-  
3 looking by using in part a DCF construct, it is instructive to look at the average of all the  
4 estimates above, i.e. including the CAPM estimates, which turns out to be 9.30 percent. In view  
5 of all of these, I would consider a range between 9.30 and 9.47 percent to be reasonable for the  
6 allowed rate of return on equity.

7  
8 **Q. Do you have any further comments on Staff's estimate of allowed cost of equity for**  
9 **PSNH's distribution business?**

10 A. Yes, I do. It is useful to point out that if one applies the approach that the Commission  
11 adopted in Docket DG 08-009, we obtain a point estimate for PSNH's cost of equity of 9.45  
12 percent, which incidentally falls within the range recommended above. The approach adopted by  
13 the Commission in docket DG 08-009 differs from the Staff's approach in only one respect.  
14 Instead of individually applying the outlier criteria to each of the traditional DCF estimations and  
15 then deriving the average (as does the Staff), the Commission first estimates the average for each  
16 of the companies in the proxy and only then subjects these estimates to the outlier criteria as  
17 proposed by the Staff. As it turns out, the two approaches yield very similar results in this case.  
18 Both approaches are acceptable to Staff.

19  
20 **Q. Does this conclude your testimony?**

21 A. Yes, it does.

Attachment I

<b>DCF Proxy: Some Metrics</b>			
	<b>State Regulated Assets as of Dec. 08 (from PSNH response)</b>	<b>Percentage Regulated Electric Revenues Dec. 2009 (AUS data)</b>	<b>% of operating expense attributable to generation business</b>
Allele	86.00	90	44.99
Alliant	80.00	71	35.35
American Electric Power	97.00	94	48.26
DPL Inc	100.00	100	53.2
Empire District	100.00	86	47.67
IDA Corp	97.00	100	43.25
NSTAR	98.00	79	50.81
Pinnacle West	94.00	97	46.88
Progress Energy	86.00	96	57.72
Southern Company	93.00	99	56.04
UIL Holdings	99.00	100	NA
Westar	100.00	73	44.67
XCEL Energy	95.00	79	50.43
<b>Average for the proxy</b>	94.23	89.54	48.27

Attachment II

<b>Stock Ratings</b>	
<b>Company</b>	<b>S&amp;P Organizational Rating</b>
Allete	BBB+
Alliant	BBB+
American Electric Power	BBB
DPL Inc	A-
Empire District	BBB-
IDA Corp	BBB
NSTAR	A+
Pinnacle West	BBB-
Progress Energy	BBB+
Southern Company	BBB+
UIL Holdings	<i>Baa2(Moody's)</i>
Westar	BBB-
XCEL Energy	BBB+
Average	between BBB to BBB+

Attachment III

<b>Common Equity Ratios</b>						
<b>Company</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>Average (2004-08)</b>
Allele	61.8	60.9	64.9	64.4	58.4	62.1
Alliant	50.2	53.1	62.9	61.9	58.6	57.3
American Electric Power	43.1	44.9	43	41.4	40.7	42.6
DPL Inc	32.8	37.9	31.1	35.8	41.1	35.7
Empire District	48.7	49	50.3	49.9	46.4	48.9
IDA Corp	50.7	50	54.8	51.1	52.4	51.8
NSTAR	40.2	38.6	39.7	40.1	42.8	40.3
Pinnacle West	53.3	56.8	51.6	53	53.2	53.6
Progress Energy	44.3	43.3	48.1	48.8	44.4	45.8
Southern Company	44.1	44.3	46.2	44.9	42.6	44.4
UIL Holdings	52.8	52.8	53	49.2	46.4	50.8
Westar	45.5	47.2	49.3	48.9	49.7	48.1
XCEL Energy	44.1	47.3	47	49.4	47.1	47.0
<b>Average for the proxy</b>	<b>47.0</b>	<b>48.2</b>	<b>49.4</b>	<b>49.1</b>	<b>48.0</b>	<b>48.3</b>

Source: Value Line, end-of-year ratios

PSNH (Source: PSNH

response to TS-01 Q-

TECH-004)	45.9	47.3	47.1	48.1	47.1	46.4
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Attachment IV

Average Year-to-Year Change in State-wise Coincident Indices for Sept., Oct. and Nov. 09	
Alabama	-8.73
Arkansas	-2.82
Arizona	-7.12
Connecticut	-4.39
Florida	-4.95
Georgia	-5.86
Idaho	-6.73
Illinois	-7.93
Indiana	-5.34
Iowa	-3.65
Kansas	-6.31
Kentucky	-7.96
Louisiana	-2.42
Massachusetts	-5.00
Michigan	-14.40
Minnesota	-5.00
Mississippi	-2.68
Missouri	-5.29
New Hampshire	-2.98
North Carolina	-4.84
North Dakota	0.34
Ohio	-7.21
Oklahoma	-5.58
Oregon	-13.81
South Carolina	-6.20
South Dakota	-1.74
Tennessee	-3.67
Texas	-3.14
Virginia	-1.69
Wisconsin	-4.22
West Virginia	-14.51
Average (excluding NH)	-5.76

Data from Philadelphia State Coincident Indices  
 prepared on Dec. 31, 2009 using the latest available data

## Attachment V

**STOCK PRICES**

Date	Allete	Alliant Energy	American Electric Power	DPL Inc	Empire District	IDA Corp	NSTAR	Pinnacle West	Progress Energy	Southern Company	UIL Holdings	Westar	XCEL Energy
1/11/2010	32.16	32.01	35.98	28.15	18.66	32.47	35.9	37.52	39.29	33.26	27.99	22.05	20.99
1/8/2010	32.23	32.08	35.61	27.96	18.57	32.3	35.61	36.92	39.36	32.83	27.91	21.72	20.79
1/7/2010	32.52	31.47	35.19	27.87	18.39	32.23	35.47	36.69	39.44	32.9	27.92	21.53	20.78
1/6/2010	32.64	31.3	34.89	27.63	18.44	32.24	35.71	36.76	40.54	33.04	28.04	21.67	20.87
1/5/2010	32.45	31.06	34.54	27.11	18.46	31.83	36.3	36.38	40.43	32.58	27.89	21.55	20.83
1/4/2010	32.96	30.35	34.94	27.55	18.84	32.17	36.69	36.88	40.93	33.25	28.44	21.84	21.08
12/31/2009	32.68	30.26	34.79	27.6	18.73	31.95	36.8	36.58	41.01	33.32	28.08	21.72	21.22
12/30/2009	33.31	30.76	35.26	28.04	18.92	32.57	37.56	37.18	41.55	33.68	28.61	22.18	21.45
12/29/2009	33.29	30.89	35.32	27.96	18.89	32.45	37.49	37.45	41.4	33.52	28.63	22.17	21.44
12/28/2009	33.46	30.89	35.03	27.79	18.82	32.48	37.29	37.35	41.39	33.44	28.25	22.05	21.45
12/24/2009	33.19	31.19	35.12	27.7	18.6	32.63	37.57	37.11	41.36	33.45	28.06	22.03	21.6
12/23/2009	33	30.96	34.73	27.54	18.54	32.26	37.23	37.05	41.03	33.29	27.91	21.92	21.4
12/22/2009	33.01	30.85	34.84	27.6	18.54	31.79	36.95	37	41.04	33.4	27.69	21.84	21.32
12/21/2009	33.1	30.79	35.18	27.8	18.69	32.02	36.05	37.3	41.42	33.74	27.61	22	21.77
12/18/2009	33.56	30.48	35.08	27.9	18.63	31.69	35.39	37.13	41.2	33.79	27.67	21.88	21.59
12/17/2009	32.99	30.1	34.82	27.85	18.67	31.11	35.52	37.2	41.01	33.5	27.39	21.76	21.3
12/16/2009	33.45	30.68	35.18	28.42	18.96	31.39	35.52	37.56	41.28	33.88	27.59	21.8	21.48
12/15/2009	34.01	30.49	35.06	28.58	19.17	31.32	35.21	37.44	41.51	34.1	28.24	21.85	21.48
12/14/2009	35.13	30.7	35.41	28.47	19.29	31.54	35.3	37.73	41.73	34.17	28.39	21.87	21.52
12/11/2009	34.72	30.47	35.58	28.68	19.26	31.18	35.28	37.72	41.98	34.22	28.23	21.91	21.41
<b>Mean Price</b>	<b>33.19</b>	<b>30.89</b>	<b>35.13</b>	<b>27.91</b>	<b>18.75</b>	<b>31.98</b>	<b>36.24</b>	<b>37.15</b>	<b>40.95</b>	<b>33.47</b>	<b>28.03</b>	<b>21.87</b>	<b>21.29</b>

Attachment VI

<b>Dividend Yield Estimate for the Next Period</b>			
Company	Average Stock Price	2010 Dividend	Div. Yield(1)
Allete	33.19	1.78	5.36%
Alliant	30.89	1.6	5.18%
American Electric Power	35.13	1.66	4.73%
DPL Inc	27.91	1.18	4.23%
Empire District	18.75	1.28	6.83%
IDA Corp	31.98	1.2	3.75%
NSTAR	36.24	1.63	4.50%
Pinnacle West	37.15	2.1	5.65%
Progress Energy	40.95	2.5	6.11%
Southern Company	33.47	1.8	5.38%
UIL Holdings	28.03	1.73	6.17%
Westar	21.87	1.24	5.67%
XCEL Energy	21.29	1	4.70%
			<b>5.25%</b>

Source Yahoo Finance and Value Line

Attachment VII

<b>Growth Components</b>										
Company	Value Line 5-yearly projections			SNL EPS	Zachs EPS	Average EPS	Average of Average EPS, DPS and BPS	Internal growth (br)	External Growth (sv)	Internal plus External growth
	EPS growth rate	DPS growth rate	BPS growth rate							
Allete	-1	3.00	3.00	4.00	4.00	2.33	2.78%	2.00%	1.40%	3.41%
Alliant	4	7.00	4.00	4.00	3.00	3.67	4.89%	2.92%	0.20%	3.11%
American Electric Power	3	3.00	5.00	3.00	3.25	3.08	3.69%	4.75%	1.09%	5.84%
DPL Inc	9	3.50	5.50	6.65	4.00	6.55	5.18%	13.56%	3.38%	16.94%
Empire District	6	1.00	1.50			6.00	2.83%	1.32%	0.82%	2.15%
IDA Corp	4.5	2.50	5.00	5.00	5.00	4.83	4.11%	3.79%	0.12%	3.91%
NSTAR	8	5.50	5.50	5.95	5.96	6.64	5.88%	5.35%	0.00%	5.35%
Pinnacle West	3	1.00	1.00	8.00	8.00	6.33	2.78%	2.29%	0.35%	2.64%
Progress Energy	6	1.00	2.00	4.50	4.50	5.00	2.67%	2.39%	0.39%	2.78%
Southern Company	4.5	4.00	5.00	4.15	7.60	5.42	4.81%	4.01%	1.00%	5.02%
UIL Holdings	3.5	0.00	2.50	4.40	4.00	3.97	2.16%	1.99%	1.73%	3.72%
Westar	4	4.50	6.00	3.00	5.00	4.00	4.83%	2.06%	0.06%	2.13%
XCEL Energy	6.5	3.00	4.50	7.05	5.63	6.39	4.63%	4.20%	0.16%	4.35%
<b>Average</b>	<b>4.69</b>	<b>3.00</b>	<b>3.88</b>	<b>4.98</b>	<b>5.00</b>	<b>4.94</b>	<b>3.94%</b>	<b>3.90%</b>	<b>0.82%</b>	<b>4.72%</b>

## Attachment VIII

**"External Component" of COE**

	current market to book ratio	# of shares from 2008	# of shares from 2013	growth rate in # of shares	sv
Allete	1.27	32.6	42	5.20%	1.40%
Alliant	1.2	110.45	116	0.99%	0.20%
American Electric Power	1.27	406.07	495	4.04%	1.09%
DPL Inc	3.02	115.96	126	1.67%	3.38%
Empire District	1.19	33.98	42	4.33%	0.82%
IDA Corp	1.06	46.92	52	2.08%	0.12%
NSTAR	2.03	106.81	106.81	0.00%	0.00%
Pinnacle West	1.11	100.89	118.00	3.18%	0.35%
Progress Energy	1.22	264	288	1.76%	0.39%
Southern Company	1.87	777.19	823	1.15%	1.00%
UIL Holdings	1.42	25.17	30.8	4.12%	1.73%
Westar	1.06	108.31	114	1.03%	0.06%
XCEL Energy	1.35	453.79	464	0.45%	0.16%
Average	1.466923				

Market to book ratio based on AUS Monthly Report data (January 2010)

Number of shares based on Value Line data and estimates

Attachment IX

Expected Return on Equity (r)				
EXPECTED ROE	2009	2010	2012-14	Average (2009 to 2014)
Allele	7.00%	8.00%	9.00%	8.40%
Alliant	7.00%	8.00%	10.00%	9.00%
American Electric Power	10.50%	10.50%	10.50%	10.50%
DPL Inc	23.50%	25.50%	27.00%	26.00%
Empire District	7.00%	8.50%	10.50%	9.40%
IDA Corp	8.00%	7.50%	7.50%	7.60%
NSTAR	13.00%	13.50%	14.50%	14.00%
Pinnacle West	7.00%	8.00%	9.00%	8.40%
Progress Energy	9.50%	9.50%	9.50%	9.50%
Southern Company	12.50%	12.50%	14.00%	13.40%
UIL Holdings	10.00%	10.00%	10.50%	10.30%
Westar	6.50%	7.50%	7.50%	7.30%
XCEL Energy	9.50%	9.50%	10.50%	10.10%

Retention Ratio (b)										
	2009			2010			2012-14			Average (2009 to 2014)
	earnings per share	dividends per share	b	earnings per share	dividends per share	b	earnings per share	dividends per share	b	
Allele	1.9	1.76	0.07	2.2	1.78	0.19	2.75	1.9	0.31	0.24
Alliant	1.85	1.5	0.19	2.25	1.6	0.29	3.1	1.92	0.38	0.32
American Electric Power	2.95	1.64	0.44	3	1.66	0.45	3.5	1.9	0.46	0.45
DPL Inc	2.2	1.14	0.48	2.45	1.18	0.52	2.8	1.3	0.54	0.52
Empire District	1.2	1.28	-0.07	1.4	1.28	0.09	1.75	1.35	0.23	0.14
IDA Corp	2.4	1.2	0.50	2.5	1.2	0.52	2.75	1.4	0.49	0.50
NSTAR	2.35	1.53	0.35	2.55	1.63	0.36	3.25	1.95	0.40	0.38
Pinnacle West	2.45	2.1	0.14	2.8	2.1	0.25	3.25	2.2	0.32	0.27
Progress Energy	3.05	2.48	0.19	3.15	2.5	0.21	3.6	2.56	0.29	0.25
Southern Company	2.3	1.73	0.25	2.4	1.8	0.25	3	2	0.33	0.30
UIL Holdings	1.9	1.73	0.09	2	1.73	0.14	2.3	1.73	0.25	0.19
Westar	1.4	1.2	0.14	1.7	1.24	0.27	2.1	1.4	0.33	0.28
XCEL Energy	1.5	0.97	0.35	1.6	1	0.38	2	1.1	0.45	0.42
Average										0.33

Source: Value Line

Attachment X

**DCF ROE Estimates**

Company	Average of EPS, DPS, and BPS growth rates	br and sv	EPS growth rates
Allete	8.14%	8.77%	7.70%
Alliant Energy	10.07%	8.29%	8.85%
American Electric Power	8.42%	10.57%	7.81%
DPL Inc	9.41%	21.17%	10.78%
Empire District	9.66%	8.97%	12.83%
IDA Corp	7.86%	7.67%	8.59%
NSTAR	10.38%	9.84%	11.13%
Pinnacle West	8.43%	8.29%	11.99%
Progress Energy	8.77%	8.89%	11.11%
Southern Company	10.18%	10.39%	10.79%
UIL Holdings	8.33%	9.90%	10.14%
Westar	10.50%	7.80%	9.67%
XCEL Energy	9.33%	9.05%	11.09%
Average	9.19%	9.97%	10.19%
Average plus 2*SD	11.03%	16.95%	13.35%
Average minus 2*SD	7.35%	2.99%	7.03%
Cost of Equity estimate	9.19%	9.04%	10.19%

A shaded cell identifies an outlier (see the testimony for the criteria)

Average of the three estimates

9.47%

Commission's approach  
in DG 08-009

8.20%
9.07%
8.93%
13.79%
10.49%
8.04%
10.45%
9.57%
9.59%
10.46%
9.45%
9.32%
9.82%
9.78%
12.65%
6.92%
9.45%

**Market to Book Ratio ROE Estimate**

Company	Internal cost of equity	external component	Cost of equity: Mkt./Book method
Allete	7.04%	1.40%	8.44%
Alliant Energy	7.99%	0.20%	8.18%
American Electric Power	9.28%	1.09%	10.37%
DPL Inc	17.68%	3.38%	21.06%
Empire District	8.11%	0.82%	8.93%
IDA Corp	7.38%	0.12%	7.51%
NSTAR	9.61%	0.00%	9.61%
Pinnacle West	7.79%	0.35%	8.14%
Progress Energy	8.22%	0.39%	8.60%
Southern Company	9.03%	1.00%	10.04%
UIL Holdings	7.84%	1.73%	9.57%
Westar	7.00%	0.06%	7.07%
XCEL Energy	8.57%	0.16%	8.73%
Average			9.71%
Average plus 2*SD			16.79%
Average minus 2*SD			2.63%
Cost of Equity estimate			8.77%

A shaded cell identifies an outlier (see the testimony for the criteria)

**Calculating the range**

Point Estimates	Method	Estimates
Point Estimate 1	Average of the DCF ROE Estimates	9.47%
Point Estimate 2	Average of the DCF ROE Estimates and the Market to Book ROE Estimate	9.30%
Point Estimate 3	Average of the DCF ROE Estimates, the Market to Book Ratio ROE Estimate and the CAPM Estimate	9.30%
Range of Reasonable Estimates	Based on the three point estimates	

CAPM Estimate

9.33%

**Attachment XI**

<b>PROXY BETA</b>	
Company	VL Betas
Allele	0.7
Alliant	0.7
American Electric Power	0.7
DPL Inc	0.6
Empire District	0.75
IDA Corp	0.7
NSTAR	0.65
Pinnacle West	0.75
Progress Energy	0.65
Southern Company	0.55
UIL Holdings	0.7
Westar	0.75
XCEL Energy	0.65
Proxy Average	<b>0.68</b>
Current Median Beta for S&P 500 companies	1.05

Source: Value Line

**Attachment XII: CAPM Calculations**

Date	10 Year T- Note Yield
01/11/2010	3.85
01/08/2010	3.83
01/07/2010	3.85
01/06/2010	3.85
01/05/2010	3.77
01/04/2010	3.85
12/31/2009	3.85
12/30/2009	3.80
12/29/2009	3.82
12/28/2009	3.85
12/24/2009	3.82
12/23/2009	3.77
12/22/2009	3.76
12/21/2009	3.69
12/18/2009	3.55
12/17/2009	3.50
12/16/2009	3.61
12/15/2009	3.60
12/14/2009	3.56
12/11/2009	3.55

Average Yield **3.73**

<b>CAPM Estimation</b>	
S&P 500 Dividend Yield	2.26
Expected growth S&P 500	10.00
Next Period's Dividend Yield	2.37
S&P 500 return	12.37
S&P 500 Median Value Line Beta	1.05
Market Risk Premium	8.23
Proxy Beta	0.68
<b>CAPM cost-of-equity estimate</b>	<b>9.33</b>