STATE OF NEW HAMPSHIRE

PUBLIC UTILITIES COMMISSION

In the matter of

National Grid NH | Docket No. DG 08-009

COST-OF-EQUITY DIRECT TESTIMONY

OF

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INDEX

I. Introduction 1-4

II. Market to Book Ratio, Leverage and Other Adjustments..... 4-13

III. Estimating Cost of Equity Using Several Approaches..... 13-33

a. Discounted Cash Flow Approach..... 14-25

b. Market-to-Book Method..... 25-26

c. Capital Asset Pricing Model (CAPM)..... 27-33

d. Additional Observations..... 34-35

IV. Attachments

Attachment I: Percentage of Assets Regulated by State

Attachment II: Stock Ratings

Attachment III: Common Equity Ratios

Attachment IV: Average State-wise Coincident Indices for June-Aug 08 (Three Month Changes)

Attachment V: Stock Prices

Attachment VI: Dividend Yield Estimate for the Next Period

Attachment VII: Growth Components

Attachment VIII: "External Component" of COE

Attachment IX: Expected Return on Equity and Retention Ratio

Attachment X: Company Response to Request No. Staff 1-127

Attachment XI: DCF ROE Estimates and Market-to-Book Ratio ROE Estimates

Attachment XII: Proxy Beta

I. INTRODUCTION

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

A. My name is Pradip K. Chattopadhyay. My business address is 21 South Fruit Street, Suite 10, Concord, New Hampshire. I am employed as the Assistant Director, Telecommunications Division for the New Hampshire Public Utilities Commission ("Commission").

Q. Please describe your formal education and professional experience.

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

From March 1998 to October 1999, I was a Consultant (at the Senior Economist level) with the National Council of Applied Economic Research, New Delhi, India. From November 1999 to August 2001, I was the Economist at the Uttar Pradesh

Electricity Regulatory Commission (UPERC) in India, and advised UPERC on tariff issues. From September 2001 to June 2002, I worked at the National Regulatory Research Institute, Columbus, Ohio as a Graduate Research Associate while pursuing advanced courses in Energy Planning in the City and Regional Planning Program at Ohio State University. From June 2002 to July 2002, I worked at the World Bank, Washington D.C. as a short-term consultant/intern with its Energy and Water Division.

I joined the New Hampshire Public Utilities Commission in August 2002 as a Utility Analyst III, and was employed in that capacity until January 2007. My responsibilities were in electric utility issues, including analyzing and advising the Commission on rate design, cost of capital issues, wholesale market issues, and other regional matters. I briefly worked at the Massachusetts Department of Telecommunications and Energy (later reorganized into the Department of Public Utilities (MA-DPU)) starting January 2007 as an Economist. At MA-DPU, I represented the staff and examined gas demand estimation and forecasting, decoupling issues, environmental remediation matters, etc.

Q. Have you previously provided testimony before this Commission?

A. Yes. I provided testimony before the Commission in Docket No. DE 03-200, which was about delivery rates for retail customers of Public Service of New Hampshire (PSNH). I have also provided cost of capital testimony in Docket No. DE 06-028, which was also about PSNH's delivery rates. Further, I have provided testimony on competition in retail telephony in Docket No. 07-027 that pertained to TDS operations in New Hampshire.

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

2 A. The purpose of my testimony is to recommend, for EnergyNorth Natural Gas, Inc.
3 d/b/a National Grid NH (National Grid NH or the Company) delivery service, the rate of
4 return on equity in accordance with standards set forth in *Bluefield Water Works v. PSC*,
5 262 U.S. 679, 692-93 (1923) (*Bluefield*) and *FPC v. Hope Natural Gas Co.*, 320 U.S.
6 591, 603-05 (1944). The standard set forth by the Supreme Court is that a public utility
7 be allowed to earn a return comparable to a return on investments in other enterprises
8 having similar risks that allows the utility the opportunity to attract capital and to
9 maintain its credit. "The return should be reasonably sufficient to assure confidence in
10 the financial soundness of the utility and should be adequate, under efficient and
11 economical management, to maintain and support its credit and enable it to raise the
12 money necessary for the proper discharge of its public duties." *Bluefield* at 693.
13 I also state my views on National Grid NH's recommendations on cost of equity, and
14 articulate the reasons for my views.

15

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

17 A. The Company is requesting an 11.5 percent rate of return on equity.

18

19 **Q. What do you recommend as the allowed return on equity for the Company?**

20 A. Staff recommends a return on equity of 9.01 percent.

21

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

A. Section II reports Staff's analysis of issues pertaining to the implications of the observed market-to-book ratios[1] and the Company's proposal regarding leverage and other adjustments. This is important as the Company's witness not only delves into these issues directly and indirectly, but also recommends upward leverage and other adjustments to the estimates of cost of equity as obtained from the traditional methods he employs. Following its analysis, Staff concludes that these adjustments are inappropriate and recommends that the Commission reject them. In section III, I use several approaches to derive estimates of the cost of equity. I conclude that section by stating Staff's recommendation on the cost of equity.

II. MARKET TO BOOK RATIO, LEVERAGE AND OTHER ADJUSTMENTS

Q. What is the relevance of the market-to-book ratio in the determination of the cost of equity?

A. When the market-to-book ratio is significantly higher than one, it indicates that the expected return on equity, which is greatly influenced by the allowed rate of return for a regulated entity, exceeds the true opportunity cost of equity. This has a couple of crucial implications for the recommendation on the allowed return on equity. First, using methods that largely rely on the appreciation in stock prices to determine the allowed return on equity would tend to overestimate the true cost of equity. Second, leverage adjustments as proposed by Mr. Moul would only further encourage the stock price to deviate away from the book value, at the expense of retail customers and to the advantage of investors. I discuss the implications in greater detail below.

[1] This ratio relates the market price of stock to its book value.

Q. Please explain why the expected return on equity exceeds the cost of equity when the market-to-book ratio is significantly greater than one.

A. This fundamental result stems from the seminal Discounted Cash Flow (DCF) analysis, which succinctly translates into the condition

$$\frac{P_M}{B} = \frac{r_e - b_e r_e}{K - b_e r_e} \qquad (1)$$

where r_e is the expected return on equity, B is the book value of stock, b_e is the retention ratio, P_M is the market stock price, and K is the cost of equity. [2]

The DCF approach is based on the premise that the market price of a particular stock equilibrates to the sum of the stream of returns expected in the future from the stock by investors, discounted by the market cost of equity. This is an explicit way of modeling investor behavior, and is a well accepted way of explaining observed investor behavior. For a price that is lower than the market price, the demand for the stock would be greater than the supply, and stock sellers would raise their price to take advantage of the situation. Likewise, if the price of the stock was higher than the market price, the demand would be less than the supply of stocks, putting pressure on the sellers to lower their price to be able to reduce their excess supply. It follows that when the expected return on equity is greater (smaller) than the cost of equity, the market-to-book ratio would be greater (smaller) than one.

Q. Can you explain condition (1) in greater detail?

[2] See Roger Morin's *New Regulatory Finance*, Public Utilities Report, Inc. (2006), Page 360. The result holds even if we model new equity financing, as long as the growth in the number of outstanding stocks is reasonably low ceteris paribus, which in practice is generally true.

A. Yes. If the expected return on equity is higher than the market cost of equity, the price of the stock would have to be higher relative to the book value to ensure that the expected dividend, i.e. $B(r_e - b_e r_e)$, on the stock equals the opportunity cost of receiving that dividend, i.e. $P(K - b_e r_e)$. If the expected return on equity is higher (lower) than the cost of equity, since the expected dividend would momentarily be higher (lower) than the opportunity cost of receiving that dividend, this would trigger a greater (lower) demand for the stock than what is being supplied and would consequently lead to a higher (lower) market price for the stock. The adjustments would persist until the opportunity cost associated with the expected dividend is equal to the expected dividend. A simple numerical example would be helpful. Suppose the cost of equity is 8 percent and the expected return on equity is 10 percent, and the expected retention ratio is 30 percent. Based on these numbers the dividend is 7 percent of the book value.[3] Since the opportunity cost of the dividend is 5 percent of that of the stock price,[4] the only way that the dividend can equal the opportunity cost associated with that dividend income is through an adjustment to the price of the stock until it is 40 percent higher than the book value of the stock, i.e. the market-to-book ratio is exactly equal to 1.4.

Q. Please explain the difference between the cost of equity and the expected return on equity in greater detail.

A. While the rate of return on equity for a regulated utility is an accounting return, i.e. it depends on the return allowed by the regulator as well as how the utility performs

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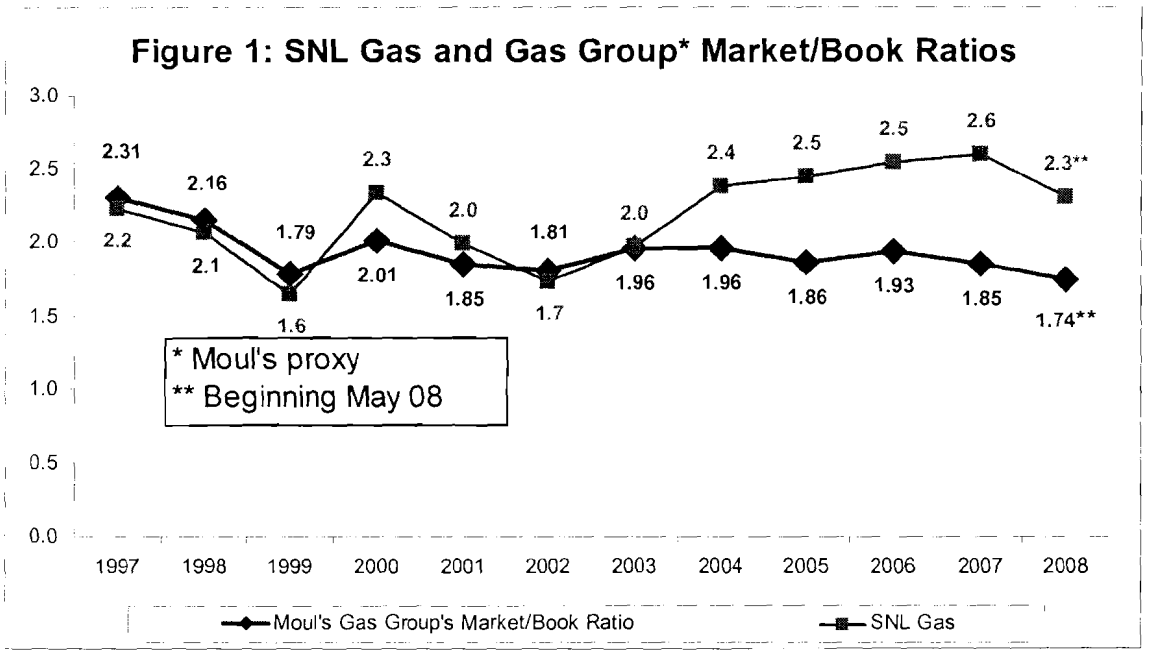
[3] $(r_e - b_e r_e)$ =10-.30*10=10-3=7.

[4] $(K - b_e r_e)$ =8-.30*10=8-3=5.

1 operationally, the cost of equity is the opportunity cost of equity, i.e. the minimum return
2 required to attract investment by investors.[5]
3
4 Ideally, a fair and reasonable return on equity for a regulated utility would be the
5 opportunity cost of equity. A look at a group of comparable risk, regulated utilities is
6 instructive in estimating the opportunity cost of equity. Intrinsic to the determination of
7 the allowed return is the need to avoid unnecessary wealth transfer from ratepayers to
8 shareholders. To properly balance the interests of ratepayers and the financial viability of
9 the utility, any approach to determine the cost of equity must reasonably target the need
10 to encourage investment in the utility's equity at the least cost to its ratepayers.
11 The expected return on equity for investment in a regulated utility at any point in time is
12 influenced by the return currently allowed on such investment, as authorized by the
13 regulator in the previous determination of such return. It is also influenced by investors'
14 expectations about possible changes in the future, especially with respect to operating
15 efficiency and income opportunities. The expected return on equity for a regulated utility
16 can be greater, lesser or the same as the cost of equity at any point in time.
17
18 **Q. Have you analyzed the gas industry's market-to-book ratio?**
19 A. Yes, I have. But as the objective of my analysis is to recommend the rate of return on
20 National Grid NH's equity, I have also analyzed the market-to-book ratio for Mr. Moul's
21 recommended proxy, i.e. his Gas Group. Both of these are depicted in Figure 1 below.

[5] "A rate of return may be reasonable at one time and become too high or too low by changes affecting opportunities for investment, the money market and business conditions in general." Bluefield at 693.



Q. What do the gas industry's market-to-book ratios indicate about the relationship between the investors' expected return on equity and the cost of equity in the current milieu?

A. Figure 1 shows that the average market-to-book-ratio of the gas industry has remained persistently above one over the past ten years, indicating that the cost of equity is less than the return on equity expected by investors in the gas industry. The average market-to-book ratios for the gas utilities and the Moul Gas Group over the last ten years have been 2.2 and 1.9 respectively. In view of that, if the cost of equity is estimated as the expected return on common equity (especially by methods that measure such rates of return predominantly on the basis of stock price appreciation), the resulting return would unreasonably benefit shareholders at the expense of ratepayers.

1 **Q. In view of the observed market-to-book ratio being considerably higher than**
2 **one, do you have any recommendation on the choice of your approach toward**
3 **estimating the cost of equity?**
4 A. Yes, I do. Out of the three methods that Mr. Moul used to estimate his recommended
5 cost of equity, the Capital Asset Pricing Model (CAPM) and the Risk Premium Model
6 (RPM) predominantly use historical stock-price appreciation as the basis for measuring
7 the expected return on common equity. Even with respect to forward looking estimates,
8 these methods rely considerably on the historical trends in stock prices. In a milieu of
9 market to book ratios significantly greater than one, these methods produce cost of equity
10 estimates that are higher than the true cost of equity. In contrast, the forward looking
11 DCF approach tends to somewhat correct for the deviation between stock prices and book
12 values, thus producing a cost of equity estimate that is more in line with the true market
13 cost of equity. It is true that an investor's expectation about ongoing sales in shares as
14 well as an observed greater-than-one market-to-book ratio tend to translate into a higher
15 DCF estimate of cost of equity than that resulting would result in an "internal" estimate
16 of cost of equity. However, to the extent investors understand that a divergence in the
17 stock price and the book value is unsustainable in the long-run, that understanding gets
18 reflected in the forward-looking DCF method, even as it is usually implemented, wherein
19 the cost of equity is equated to the dividend yield plus some measure of investors'
20 expectation about long-term growth in dividends. In view of that, Staff recommends
21 reliance on methods that are based on the DCF approach.
22
23 **Q. Are there other reasons why Staff recommends reliance on the DCF construct?**

1 Yes. As already pointed out above, the underlying construct behind the DCF analysis,
2 i.e. the value of a common stock equates to the sum of the discounted stream of income
3 from that stock, is a widely accepted construct. Also, as far as techniques that are used to
4 estimate the cost of equity are concerned, "the [DCF] technique is one of the most
5 popular of those currently in use."[6] Also, even Mr. Moul has acknowledged in his
6 testimony that "the Commission has relied on the DCF model in the past." Moul
7 Testimony, Page 5, line 23-24. See e.g. *Public Service Company of New Hampshire*,
8 Order No. 24,473 (2005) (DCF has been the primary method used in New Hampshire to
9 estimate the rate of return on equity though the Commission recognized that other valid
10 methods may be used as a test of reasonableness to compare to the DCF result).
11
12 **Q. Are you suggesting that a look at other methods of estimating cost of equity is**
13 **unnecessary?**
14 A. I am not suggesting that. In fact such a look provides a good context for a
15 comparison between different approaches. The analysis is instructive in pointing out that
16 since the DCF approach in practice overestimates the cost of equity when the observed
17 market-to-book ratio is significantly above one, if the DCF method produces estimates
18 that are lower than the estimates resulting from the other approaches, it can be concluded
19 that a reasonable allowed return on equity should, in fairness to ratepayers, be based on
20 the DCF construct. Moreover, even if the DCF estimate turns out to be higher than the
21 other estimates, given that the other approaches are generally not forward looking and
22 may produce relatively inaccurate estimates of the cost of equity, the DCF approach may

[6] See "*The Cost of Capital - A Practioner's Guide*," by David C. Parcell, prepared for the Society of Utility and Regulatory Financial Analysts (1997 edition), pages 8-39 and 8-40.

still be a preferred approach. To arrive at such a judgment, it is important to estimate the cost of equity using the other methods too. Section III of my testimony does precisely that.

Q. Mr. Moul has recommended an upward leverage adjustment to his various estimates of cost of equity. Do you agree with his recommendation?

A. I do not agree with his recommendation. The use of a book value capital structure to determine a utility's cost of capital is a long-standing practice and is well understood by investors. Investors are also well aware that a regulated utility's earnings are based on an allowed rate of return on the book value of equity. Also, for any regulated company, regardless of whether the book value or the market value of equity is used to represent the capital structure, the actual financial risks facing the company remain unchanged. If anything, permitting an upward leverage adjustment to the DCF (or any other) cost of equity estimate that already exceeds the market cost of equity (because the market-to-book ratio is significantly greater than one) would further inappropriately increase the transfer of wealth from ratepayers to shareholders. Consequently, the market equity-to-debt ratio would further deviate from the book value equity-to-debt ratio, perversely implying that an even greater adjustment would be required subsequently, which would lead to an even greater transfer of wealth from ratepayers to shareholders. The fallacy of Mr. Moul's recommendation can also be seen when one examines what happens when the market-to-book ratio is less than one. This would be the case when generally the allowed return on equity is less than the market cost of equity. The adjustment that Mr. Moul proposes would imply a downward adjustment to the allowed return on equity, because the market equity-to-debt ratio would be less than the book value equity-to-debt ratio.

1 Perversely, this would further aggravate the situation for the utility, as it would
2 experience even greater dilution in stocks.
3
4 **Q. Do you have any additional observations with respect to Mr. Moul's**
5 **recommendation on leverage adjustments?**
6 A. Yes, I do. In his testimony, Mr. Moul asserts that there are no specific factors that
7 influence the market-to-book ratios that determine whether a leverage adjustment should
8 be made. He also asserts that "any observations concerning market prices relative to
9 book are not on point." Moul Testimony, Page 24, Lines 18-22 Yet, he proposes an
10 adjustment to the cost of equity on account of differences in the capital structure
11 emanating precisely from the difference in the market price and the book value of stocks.
12 It is absolutely to the point to discuss why the stock price differs from book value and
13 explore the factors behind the divergence, and my discussion above is therefore very
14 pertinent.
15
16 **Q. Mr. Moul recommends adjustment for flotation costs in his estimates of the cost**
17 **of equity. Do you agree with those adjustments?**
18 A. No. Importantly, stock-buyers are well aware that a company's receipt of funds per
19 share is less than the price of the share. Yet they commit to such funding, indicating that
20 the return they expect from the company's equity capital is at least as high as the
21 opportunity cost of equity, if not even higher. Also, when the market-to-book ratio is
22 significantly higher than one, DCF and other methods produce sufficiently upward-biased
23 estimates of the market cost of equity, that dilution of stocks, which is the reason why

flotation costs usually become relevant, is a non-issue. I, therefore, conclude that an adjustment for flotation costs, as proposed by Mr. Moul, is inappropriate. See also *Public Service Company of New Hampshire*, Order No. 24,473 (2005) (the Commission has historically denied inclusion of such an adjustment to the return on equity).

III. ESTIMATING COST OF EQUITY USING SEVERAL APPROACHES

Q. Which approaches have you used to estimate the cost of equity for National Grid NH?

A. As I have already indicated above, I have relied primarily on the DCF construct to estimate the cost of equity for the utility. While 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, 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. I have in addition used the CAPM approach (subsection III.c) to derive an additional estimate of the cost of equity, but for reasons I discuss later, I do not base my point-estimate recommendation on that method. Also, 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 that section I also comment on Mr. Moul's use of RPM to estimate the cost of equity. Finally, I conclude with my recommendation on the cost of equity for National Grid NH.

1 **III.a Discounted Cash Flow Approach**

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

3 A. I use a single-stage DCF model to derive estimates for the cost of equity for a group of
4 companies that forms a reasonable proxy for National Grid NH. The two essential
5 elements of this method are the dividend yield and the growth component. While I
6 discuss the estimation of both elements later in detail, it is important to point out that the
7 growth component of the DCF equation tends to be the most critical element in the use of
8 the DCF methodology. A couple of things render the estimation of the growth
9 component somewhat challenging. First, while the growth component of the single-stage
10 DCF model in principle is meant to be based on long-term projections, in practice, it is
11 based on five-year projections, as long-term projections are seldom available. Second, "it
12 is reasonable to believe that investors, as a group, do not utilize a single growth estimate
13 when they price a utility's stock."[7] I have therefore relied on several estimates of the
14 growth rates. At one end, I have used the projections for growth rates in earnings per
15 share (EPS), book value per share (BVPS), and dividends per share (DPS), and on the
16 other I have relied on estimates for projections for the internal growth rate, i.e. *br*, as well
17 as the external growth component, i.e. *sv*,[8] in the formula, to derive an alternative
18 estimate.

19

20 **Q. Briefly describe the single-stage DCF method.**

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

---

[7] *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.

[8] 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 $K = \frac{D_1}{P} + g$

2 where K is the estimate of the cost of equity, $\frac{D_1}{P}$ is next period's dividend yield, i.e. next

3 period's dividend divided by the stock price, and g is the expected (constant) growth rate

4 in dividends. The model is based on the premise that since cash dividends are the only

5 income from a share of stock held to infinity, the value of that stock is the present value

6 of its stream of cash dividends, where the discount rate is the market's required return,

7 i.e., K. Expected future dividends are represented by applying a constant growth rate to

8 the current observable dividend, to obtain the functionally elegant expression for K as

9 shown above.

10

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

12 A. When choosing my recommended sample, I began with all the natural gas utilities

13 listed in Value Line. Then I included companies that have more than 85 percent of assets

14 engaged in regulated operations (based on average data from 2006 and 2007), have

15 publicly-traded common stock, have not recently omitted or cut their dividend, and have

16 not been recently a target of a merger or acquisition.

17

18

19 **Q. Why are your criteria different from those of Mr. Moul's criteria?**

20 A. Unlike Mr. Moul, I have not restricted the proxy to companies which operate with a

21 weather-normalization and/or decoupling feature in their tariff. The simple fact is that

22 National Grid NH does not have such features, and subjecting the Value Line companies

23 to such a restriction for the purpose of choosing the proxy group is inappropriate. On the

other hand, rather than choosing companies that have at least 60 percent of their assets subject to utility regulation, I have included in my proxy group companies that have at least 85 percent of their assets subject to utility regulation in recent years. National Grid NH has 100 percent of its assets subject to utility regulation, and I believe a 60 percent cut-off is not reasonably reflective of the realities that a completely regulated company like National Grid NH is faced with.

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

A. The Staff's recommended proxy group comprises Atmos Energy Corp., Laclede Group, Inc., NICOR, Inc., Northwest Natural Gas, Piedmont Natural Gas Co., Southwest Gas, and WGL Holdings, Inc.

Q. Do you believe that the group listed above is a reasonable proxy for National Grid NH?

A. Yes, I do. The screening criteria themselves go a long way to ensure that the group that I have used as the proxy mimics the risk profile of National Grid NH quite reasonably. For example, the proxy's average percentage of assets subject to utility regulation is 94.4 percent (see Attachment 1), which is quite reasonably close to complete regulation as is the case for National Grid NH. Also, a quick check (see Attachment II) reveals that on average the S&P organizational rating for the group is somewhere around A, which compares reasonably well with the A- S&P organizational rating for National Grid USA. The average S&P stock rating for the proxy turns out to be somewhere between B+ and A-. An S&P stock rating is not available for National Grid USA. The

1 utility subject to the rate case here is not rated by S&P, and is a very small affiliate of
2 National Grid plc, but this check on ratings suggests that using the group of the
3 companies recommended above as the DCF proxy is quite reasonable. Also, while the
4 average common equity ratio during 2002-06 for National Grid NH was 56.9 percent, for
5 the proxy it was 51.65 percent (see Attachment III). It is well understood that a "firm
6 with a low[er] common equity ratio has [a] higher financial risk."[9] The Staff proxy
7 therefore is a conservative and reasonable proxy for National Grid NH.
8
9 **Q. Do the current economic conditions have any bearing on the reasonableness of**
10 **your proxy?**
11 A. Yes, they do.
12
13 **Q. Briefly describe the economic conditions in the USA and New Hampshire.**
14 A. These are times of enormous economic stress. The global meltdown in stocks over
15 most of 2008 has undoubtedly jolted investors' confidence. Value Line opines that "[a]
16 recession probably is underway in the United States."[10] The same report also states,
17 "[w]e have become somewhat more pessimistic, and our sense now is that GDP will
18 decline again in the first quarter of next year and may even falter in the second period –
19 or register no better than a flat reading. In any event, a U.S. recession of at least
20 moderate proportions now seems unavoidable." A look at data for economic activity in
21 August 2008, as reported by the Federal Reserve Bank of Boston, suggests that New
22 Hampshire's economy is doing relatively better than the USA as well as other New

[9] Moul's Testimony, Page 13, Lines 21-23 and Page 14, Line 1.
[10] *The Value Line Investment Survey*, Part 2 (October 17, 2008), Page 3881.

England states. In August 2008, while the national economy grew by 0.8 percent year-to-year, New Hampshire posted growth of 1.8 percent year-to-year. New Hampshire registered better performance than any other state in New England.[11] Similar comparisons can also be observed in unemployment statistics for August 2008. While the unemployment rate in New Hampshire was 4.2 percent, in New England and the USA unemployment rates were 6.1 and 5.7 percent, respectively.[12]

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

When an economic slowdown is underway and expected to linger, investors tend to shift their resources to less risky assets, including low-risk equity such as utility stocks. The increased demand for these stocks and bonds puts an upward pressure on the price of such financial assets. Generally, the market cost of equity associated with low-risk equity and the cost of debt associated with low-risk bonds fall when investors expect a slowdown in the economy and increasingly move capital away from high-risk assets. Also, in general, investors are expected to be aware of current regional and national economic conditions. Investors in National Grid NH know that the company operates in New Hampshire where the local economy is out-performing the national economy. Investors would likely associate New Hampshire's economy with reduced risk compared to a similar company located elsewhere, all else equal. This would suggest that an investor's opportunity cost of equity is expected to be lower for investing in a low-risk

[11] See Page 3 of http://www.bos.frb.org/economic/neei/current/neei.pdf for the latest New England Economic Indicators (October 2008)).
[12] See http://www.nh.gov/nhes/elmi/pdfzip/econanalys/econcond/ec_1008.pdf, i.e. New Hampshire Economic Conditions (October 2008), Volume 108, Number 10.

1 economic activity in New Hampshire when compared to investing in a comparable
2 activity operating in an environment that is relatively less robust.
3
4 The Philadelphia Fed produces coincident indexes every month that measure economic
5 activity for every state in the USA. Monthly data from June to August 2008 for three-
6 month growth rates indicate that out of the nineteen states where the companies included
7 in the proxy have geographical presence, only two performed better than New
8 Hampshire.[13] However, those states, Texas and Louisiana, had performed only
9 marginally better than New Hampshire during that period. However economic conditions
10 in those states are of limited relevance to the proxy because Atmos Energy Corp. is the
11 only company in my proxy group to operate there and it operates in many other states as
12 well. Moreover, of these nineteen states, fourteen had registered negative growth rates in
13 the indexes (see Attachment IV). It is therefore reasonable to state that the proxy group
14 of companies represents economic conditions that are less favorable than those of New
15 Hampshire. Thus, the proxy produces an estimate for cost of equity that perhaps reflects
16 a greater risk than that which would be associated with National Grid NH. I am also
17 aware that Staff witness McCluskey believes that the Company's proposed rate design,
18 wherein customer charges will account for a greater percentage of the distribution
19 revenue, is essentially supported by the Company's marginal cost study and "reduces the
20 risks of the Company's operations and provides more assurances of net income available
21 to shareholders." In view of these factors, I believe that the DCF proxy as chosen is
22 rather conservative and therefore reasonable.

[13] See http://www.philadelphiafed.org/econ/indexes/coincident/. WGL Holdings Inc. has presence in Washington, DC too, but the coincident indexes cover only states. Washington, DC was therefore not included in the analysis.

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 September 22 to October 20, 2008 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 2009 projections for dividends and divided it by the average stock price.[14] See Appendix VI for the calculations.

Q. Mr. Moul uses dividend data from the previous five quarters to calculate dividend yield. You have used data from September 22 to October 20 to measure the dividend yields for the proxy's constituent companies. Please explain why.

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

Q. Mr. Moul exclusively uses expected earnings growth rates for the growth component in his DCF analysis. Do you agree with his approach?

[14] I have used the 2009 DPS Value Line projections.

1 A. As I have indicated before, investors do not use a single growth estimate when pricing
2 a utility's stock. I therefore find it appropriate to consider other measures for the growth
3 component.
4
5 **Q. What other measures of the growth component do you consider?**
6 A. Since the DCF estimate is derived from the concept that cash dividends are the only
7 income from a share of stock held to infinity, in principle it is the growth in dividends
8 that should be used for the growth component. Investors, however, have different
9 expectations about growth and no single indicator captures the expectations of all
10 investors. Investors also care about whether growth in DPS is sustainable or not and they
11 are aware that its sustainability is affected by how both EPS and BVPS perform in the
12 future. Sustainability of growth in dividends under the DCF construct also assumes that
13 EPS, DPS and BVPS are all expected to grow at the same rate in the future. Value Line
14 five-year projections for the growth rates in earnings, dividends and book value,
15 however, reveal that these financial variables are expected to grow at significantly
16 different rates over the next five years.[15] In view of that, the earnings growth rate that
17 Mr. Moul recommends as the sole proxy for the DCF growth component is unlikely to be
18 sustainable. I instead use as one of the measures for the growth component, the average
19 of the three expected growth rates to represent the growth component in the DCF
20 analysis. One may reasonably assume that the sustainable long-run growth rate to which
21 earnings, dividends and book value growth rates may converge in the future is
22 represented by their average. I have used the average of the Value Line five-year

[15] Based on my proxy, the averages for the earnings, dividends, and book value growth rates are respectively 5.57 percent, 2.86 percent and 4.14 percent.

1 projections for growth in DPS and BVPS and the average of the Value Line, I/B/E/S First
2 Call and Zacks projections for EPS growth rates to calculate the growth component.
3 While in principle the single-stage DCF model is meant to be based on long-term
4 projections, in practice it is based on five-year projections, as long-term projections are
5 seldom available.
6
7 I have also considered a second measure of the growth component, which is based on
8 estimates for the internal and external components for growth, retention ratio, expected
9 return on common equity, market-to-book ratio, and growth in the number of outstanding
10 shares. Finally, even though I have reservations about Mr. Moul's sole reliance on
11 earnings growth as a measure of the growth component, I considered and applied that
12 approach to the Staff's proxy to derive another DCF estimate for the cost of equity (see
13 Attachment VII for the calculation of the growth components; also see Attachments VIII
14 and IX for the calculations for the input for external and internal growth components).[16]
15
16 **Q. Please explain how you estimated the growth component based on** the **retention**
17 **ratio, expected return on common equity, market-to-book ratio, and growth in the**
18 **number of outstanding stocks.**
19 A. I have used the Value Line's expectation regarding the retention ratios and the return
20 on equity for five years into the future to derive estimates for b and r and have used them
21 to calculate the expected internal growth component, i.e. br. To account for growth
22 expectations emanating from external financing and derive an estimate of the external

[16] I have used the average of the latest available five-year projections on EPS growth from Value Line, I/B/E/S First Call and Zacks to represent the growth component.

growth component, I have also used the current market-to-book ratio and the average of Value Line's five-year projections for the number of outstanding shares. (For a description of modeling of the internal and external growth components, see my discussion of the market-to-book method below).

Q. Do you have any additional observations on Mr. Moul's recommendation that the expected earnings per share growth rate should be used to measure the growth component of the DCF cost of equity estimate?

A. Yes, I do. In recommending expected earnings per share growth, Mr. Moul cites an article by Myron Gordon and infers that Gordon concludes that "the best measure of growth in the DCF model is forecasts of earnings per share growth." See Moul Testimony, Page 21, Lines 10-11. It should be clarified that the four methods that Myron Gordon compared in the cited paper were the past growth rate in earnings, past growth rate in dividends, past retention growth rate, and forecasts of growth in earnings per share by security analysts.[17] That article does not offer any opinion or evidence on whether forecasts of dividend per share growth or book value per share forecasts are inferior compared to the forecast of earnings per share growth. At best, the article suggests that forecasts may perform better than historical data in estimating share yield. It is therefore important to point out that the cited paper by Mr. Moul should not be misconstrued as evidence in support of the sole use of forecasts of earnings per share growth over other forecasts such as growth in dividend per share and growth in book value per share.

[17] "*Choice Among Methods of Estimating Share Yield*," Gordon, Gordon and Gould, The Journal of Portfolio Management, Spring 1989.

1 **Q. Do you have any observation on how Mr. Moul uses his Gas Group to calculate**
2 **the DCF estimate of the cost of equity as compared to the approach you have used?**
3 A. Yes. Mr. Moul has used the *average* data individually on the key inputs, i.e.
4 dividend yield and growth rates, to calculate the cost of equity for the Gas Group proxy.
5 He stated in his testimony that "the determination of the cost of equity for an individual
6 company has become increasingly problematic." Moul Testimony, Page 6, lines 8-10.
7 He also responded to a Staff Data Request (Request No. Staff 1-127, Attachment X) by
8 citing two instances where individually calculated equity returns established on a
9 company-by-company basis by staff at another commission and a consumer advocate
10 produced cost of equity results that were "unrealistic because they were well outside the
11 bounds of what one could observe in the marketplace at the time." I believe it is
12 premature to assert whether an observation is within the bounds of reasonableness or not
13 without conducting some unbiased determination of outliers. As long as a careful
14 determination is made as to whether some individual observation is an outlier or not,
15 Staff believes it is perfectly reasonable to use data *individually* for companies to calculate
16 a company-specific cost of equity estimate, which is what I have done in my calculations.
17 The outlier-determination approach I have used is to consider that cost of equity
18 estimates lying outside the bandwidth of the mean plus or minus two times the variance
19 are not statistically representative of the proxy. In terms of probabilistic distribution
20 terminology, this selection criterion effectively mimics the widely-used statistical
21 confidence interval of 95 percent. I should also point out that if anything, Mr. Moul's
22 approach could hide an outlier and thus may produce an unrepresentative estimate for the
23 cost of equity. A look at estimates individually for companies in the proxy provides a

useful way to further determine whether any particular observation is truly representative or not.

Q. What are the DCF estimates for your proxy?

A. The single-stage DCF estimate, based on the average expected growths in earnings, dividends and book value, is 8.24 percent. I used the latest data from Yahoo Finance on dividends and the average closing stock prices for each of the sample companies for September 22 to October 20, 2008 to calculate the dividend yields. To arrive at the estimate of the next period's dividend yield, I have used Value Line's projection on DPS for 2009. Attachment XI provides the calculations. When only the EPS growth rate is used for the growth component, the single-stage DCF method produces an estimate of 9.82 percent. When the "internal-plus-external" growth approach is used, the DCF method produces an estimate of 8.95 percent. It should be reiterated that I have applied my recommended outlier-determination criterion in deriving these estimates.

III.b Market-to-Book Method

Q. Briefly describe the Market-to-Book Method.

A. The method is essentially based on equation (1), which easily translates into

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

The above formulation ignores the impact of growth in outstanding shares and external financing. When one models that, the above equation can be revised to state

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

2 fraction of existing equity, and $v = \left(1 - \frac{B}{P}\right)$.[18] The revised formulation can be

3 alternatively expressed as $K = \frac{(1-b_e)r_e}{P/B} + b_e r_e + g_e\left(\frac{P}{B} - 1\right)$, where g_e is the expected

4 growth rate in the number of outstanding shares. One can use the formulation to derive

5 cost of equity estimates using available data on investors' expectations about the

6 retention ratio, return on equity, and growth in the number of outstanding shares. In

7 short, the growth component can be viewed as the sum of the "internal" growth rate, i.e.

8 $b_e r_e$, and the "external" growth rate, i.e. $g_e\left(\frac{P}{B} - 1\right)$.

9

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

11 A. The market-to-book method estimate is 8.76 percent. I have used the outlier-

12 determination approach as described above for this method too. For the estimate for *b*

13 and *r*, I have used the same approach used in the case of the "internal-plus-external"

14 growth approach to estimating the DCF cost of equity. To account for growth

15 expectations emanating from external financing, I have again used the current market-to-

16 book ratio and the average of Value Line's five-year projections for the number of

17 outstanding shares to derive an estimate of the external growth component (see

18 Attachment XI for the calculations).

19

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

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

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

3 A. Using the CAPM method, Mr. Moul derives an estimate of the cost of equity of 13.45

4 percent.

5

6 **Q. Do you agree with his CAPM estimate?**

7 A. No. Foremost, in a milieu where market-to-book ratios are significantly greater than

8 one, the methodology, by relying largely on stock price appreciation data, tends to

9 overestimate the market cost of equity. Also, I do not recommend using the approach for

10 other specific reasons. The DCF model better reflects investors' perception of a

11 company's risk. The DCF model directly addresses how investors value a company's

12 stock through the stock price. The CAPM looks at stock price changes relative to the

13 entire market. This analysis becomes clouded by beta measurement issues, such as the

14 type of market indicator used and the appropriate length of time to measure beta.

15 Moreover, generally the length of time during which the average market return is

16 calculated influences the result.

17

18 As for Mr. Moul's specific approach, he bases his estimate of the market risk premium on

19 both historical and forecast market data. The cost of equity is essentially a forward-

20 looking concept, and relying on a beta resulting from historical data and estimating a

21 market risk premium that stresses historical data renders the cost of equity estimate quite

22 suspect. Further, even with his forward-looking estimates of the market risk premium, he

23 relies on the returns associated with the Value Line universe and the S&P universe of

stocks. Neither of these groups is truly representative of the market returns as modeled by Value Line in its estimation of betas. This can be verified, for example, by examining the average beta for the stocks in Value Line, which is currently at 1.13 and riskier than the market beta of 1. Likewise, even with respect to the S&P 500 universe of stocks, the beta most likely is not representative of the market beta. He also makes an upward adjustment in the beta for the proxy to account for leverage adjustment, which, in Staff's view, is not justifiable as explained in section II above.

Q. Mr. Moul recommends an upward adjustment to the CAPM cost of equity estimate on account of the size of the firm. Do you agree with that?

A. I do not. Mr. Moul cites some evidence to that effect. But there is also counter-evidence that the small-firm effect is too dependent on the time-period chosen for analysis, and is dependent on the month of January for high returns. There is also counter-evidence that the size effect may not apply to regulated utility operations. See for example, Block S.B., "*A Study of Financial Analysts: Practice and Theory*", Association for Investment Management Research (July/August 1999) and Wong, A, "*Utility Stocks and the Size Effect: An Empirical Analysis*," Journal of the Midwest Finance Association (1993). Importantly, Mr. Moul's reliance on Professor Brigham's treatise of the small-firm effect is rather dated. The cite Mr. Moul provides for Professor Brigham's textbook is from 1989. In Brigham's later versions, for example the 11th edition of *Fundamentals of Financial Management* (2007), he completely drops the section on cost of equity capital for small firms. Even in his other contemporary textbooks, Brigham does not include the section on cost of equity for small firms. See for

example the 11th Edition of *Financial Management Theory and Practice* (2005). The evidence on small-firm effect is not sufficiently persuasive that I can recommend the adjustment as proposed by Mr. Moul.

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

A. I have. I attempt to correct for the difference in market returns between the Value Line universe of stocks and the universe of stocks that truly is associated with the market beta of one. Also, I have not made any leverage or small-firm effect adjustments and I rely on a forward-looking approach to the extent possible.

Q. Briefly describe the CAPM method.

A. The CAPM method recognizes that common equity capital is more risky than debt from an investor's standpoint, and that investors require higher returns on stocks than on bonds to be compensated for the additional risk. The cost of common equity is represented 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 on risk free securities, R_M is the required return on the overall market and $(R_M - R_f)$ is the equity risk premium demanded by shareholders to accept equity relative to debt. β_s is the average beta of a group of comparable-risk companies that is used to adjust the risk premium to measure risks specific to the regulated utility in question.

Q. What beta measure do you use for your sample?

A. I use Value Line beta estimates for the companies in my DCF sample (see Attachment XII). I also report the current median beta for the Value Line universe of companies, as it is an essential element of my estimation of the cost of equity using CAPM.

Q. How do you calculate the equity risk premium?

A. The two key elements in the determination of the equity risk premium are the risk-free rate and the expected return on the market portfolio. As a proxy for the risk-free rate, I use the current yield on the 10-Ycar Treasury bond observed over the last month. The average yield over September 19th to October 21st was 3.80 percent.[19] To derive the market equity risk premium, we first note that the return on a representative Value Line portfolio can be expressed as $R_{VL} = R_f + \beta_{VL} * (R_M - R_f)$, where R_{VL} is the total return on a representative Value Line portfolio and β_{VL} is the representative beta for the Value Line portfolio. That can be rearranged to express the market risk premium, $R_M - R_f$, as $(R_{VL} - R_f)/\beta_{VL}$. The expected return on the Value Line portfolio, the risk-free rate, and Value Line beta can be used to derive the estimate of market equity risk premium. The market cost of equity is a forward-looking concept, and I rely on the DCF construct to derive an estimate of the return expected for a representative Value Line portfolio, i.e. R_{VL}. The approach I have used relies in part on the DCF approach that Mr. Moul applied on S&P data to yield one forward-looking estimate of the market risk premium, even though my estimation builds on Value Line information. Succinctly, R_{VL} can be represented as

[19] See www.snl.com.

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

where DY_{VL} is the current dividend yield, and g_{VL} is the growth component of the representative Value Line portfolio, whose description follows later. As for assuming that the next period's growth rate is half of g_{VL}, I accept the formulation that Mr. Moul proposed in estimating S&P total returns, but I apply it to Value Line stocks. Before I delve into the calculations, it is useful to discuss Mr. Moul's approach and the Staff's view of it.

Q. Please comment on Mr. Moul's approach to determining the market risk premium.

A. I will not comment on the specifics of the historical estimates as I do not rely on them, essentially because the cost of equity is a forward-looking estimate. My approach depends to the extent possible on forward-looking information. With respect to the approach used by Mr. Moul, the forward-looking estimate he derives using Value Line data hinges on the median of estimated dividend yields for the next year for *dividend-paying* stocks and the expected price appreciation data from *all* of the 1700 stocks that Value Line covers. Of the currently reported Value Line stocks, 721 stocks do not pay dividends. To use data on dividend yield and the growth component that come from a very distinct set of stocks and derive the estimate for total returns is fundamentally flawed. Also, his presumption about the returns on Value Line stocks being the market return is not substantiated by an examination of the beta associated with the Value Line portfolio, as is discussed later.

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

A. Given the noted inconsistency in the use of two different groups of stocks to determine the dividend yield and growth inputs, I have used a couple of approaches.

First, I have used the latest available data from the entire set of Value Line stocks. To ascertain the dividend yield, I have used the median dividend yield and the median beta for that portfolio. For the growth component, I have first used the entire Value Line data set to determine the medians of the five-year projections on EPS, BVPS and DPS growth. I have then averaged those medians to derive an estimate of the growth component. For ease of exposition, I will call this approach, CAPM Method 1.

As an alternative approach, I have selected only those Value Line dividend-paying stocks for which data is available for at least one of the EPS, BVPS and DPS five-year projected growth rates, as well as for beta. As in Method 1, I have first used the data set to determine the medians of the five-year projections on EPS, BVPS and DPS growth. I have then averaged those medians to derive an estimate of the growth component. I have again used the medians of the level of beta and dividend yield to characterize the representative Value Line portfolio. For ease of exposition, I will call this approach, CAPM Method 2.

Q. What are your estimates for the market-risk premium?

A. Under CAPM Method 1, the input data for DY_{VL} and g_{VL} are respectively 1.19 and 10 percent. This yields 11.25 percent for R_{VL}. With β_{VL} being 1.1, the forward-looking

1 market risk premium is (11.25-3.80)/1.1, i.e. 6.77 percent. Under CAPM Method 2, the
2 input data for DY_{VL} and g_{VL} are respectively 3.17 and 9.33 percent. This yields 12.65
3 percent for R_{VL}. With β_{VL} being 1.05, the forward-looking market risk premium is
4 (12.65-3.80)/1.05, i.e. 8.43 percent.
5
6 **Q. What are your CAPM cost of equity estimates for National Grid NH?**
7 A. Using the market risk-premiums as derived above as well as a proxy beta of 0.81, we
8 can derive the CAPM cost of equity estimates for National Grid NH as 3.80 + 0.81*6.77,
9 i.e. 9.28 percent under CAPM Method 1, and 3.80 + 0.81*8.43, i.e. 10.63 percent under
10 CAPM Method 2.
11
12 **Q. Do you have additional comments on your CAPM estimates for cost of equity?**
13 A. Yes, I do. While I have tried as much as possible to rely on forward looking
14 information in employing CAPM, beta used in my estimations are based on historical
15 data. According to Value Line, "the 'Beta coefficient' is derived from a regression
16 analysis of the relationship between weekly percentage changes in the price of a stock
17 and weekly percentage changes in the NYSE Index over a period of five years."[20] This
18 certainly renders CAPM less favorable as a method for estimating a forward-looking
19 concept like the cost of equity. Also, given how the market-to-book ratio has been
20 significantly higher than one in the recent past, the method is apt to produce estimates for
21 the cost of equity that are biased upward. The comparison between the DCF estimates
22 and the CAPM estimates generally does confirm that bias.

[20] Value Line Investment Survey for Windows v. 3.0, Page 140.

1

2 **III.d Additional Observations**

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

4 **of equity?**

5 A. Staff recommends using the DCF approach to estimating the cost of equity, for

6 reasons that I have discussed above. I find delving into RPM inappropriate because RPM

7 is largely not forward-looking. The reliance on historical data exposes the method to

8 considerable subjective manipulation. Also, RPM is conceptually similar to the CAPM

9 method as it too models a higher return for higher risk and purports to model the risk

10 premium associated with equity capital over a risk-free debt instrument. For all these

11 reasons, I do not find it useful to conduct any analysis to estimate the cost of equity using

12 the RPM.

13

14 **Q. Do you have any observations on Mr. Moul's use of RPM to estimate the cost of**

15 **equity?**

16 A. Yes, I do. I have a comment on his estimate for the prospective yield on A-rated

17 public utility debt. Even though he assumes that this estimate is forward-looking, his

18 reliance on historical data to measure the yield spread using data reported in his

19 Attachment PRM-18 (see Moul testimony, Pages 105-107) raises the question of whether

20 the estimate for the prospective yield on A-rated public utility bond is truly prospective.

21 In essence such estimation is still strongly influenced by historical data, and therefore

22 cannot be considered forward-looking in my opinion.

23

1 **Q. Please summarize your cost of equity estimates?**

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

Summary of National Grid NH Cost-of-Equity Estimates	
DCF (traditional: EPS, BVPS & DPS average/ EPS)	8.24/9.82
DCF ($g=br+sv$ Method)	8.95
Market-to-book Method	8.76
CAPM (Method 1/Method 2)	9.28/10.63

3

4 **Q. What is your recommendation on the allowed rate of return on equity for**

5 **National Grid NH?**

6 A. As I have already indicated, my preferred approach is the DCF approach. I therefore

7 find it reasonable to use the average of estimates derived from the DCF methods to

8 determine my recommended point-estimate of the appropriate allowed rate of return on

9 equity, which is 9.01 percent. Also, since all but the CAPM estimates are primarily

10 based on the DCF construct, it is also reasonable to look at the average of the traditional

11 DCF methods as well as the market-to-book method. The estimate in that case is 8.95

12 percent. Further, while the CAPM estimates are influenced by historical betas and are

13 therefore not as forward-looking as I would like the approach to be, to the extent that I

14 tailored the approach to be somewhat forward-looking by using in part a DCF construct,

15 it is instructive to look at the average of all the estimates above, i.e. including the CAPM

16 estimates, which turns out to be 9.28 percent. In view of all of these, I would consider a

17 range between 8.95 and 9.28 percent to be reasonable for the allowed rate of return on

18 equity.

19

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

21 A. Yes, it does.

Attachment I

Percentage of Assets Regulated by State

	Percentage regulated assets 07	Percentage regulated assets 06	State Regulated Assets: Average Percentage 2006-07	Pecentage >85%
AGL Resources	77.07	74.26	75.67	
Atmos Energy	95.85	95.50	95.68	√
Laclede Group	87.10	88.12	87.61	√
New Jersey Resources	70.18	66.15	68.17	
Nicor Inc.	95.17	95.06	95.12	√
Northwest Nat. Gas	96.36	97.71	97.04	√
Piedmont Natural Gas	96.52	97.16	96.84	√
South Jersey Inds.	80.24	78.07	79.16	
Southern Union	13.79	14.99	14.39	
Southwest Gas	95.86	96.19	96.03	√
UGI Corp.	29.70	31.68	30.69	
WGL Holdings Inc.	93.11	92.22	92.67	√
Average for the proxy			94.42	

Attachment II

Stock Ratings		
Company	S&P Stock Ranking	S&P Organizational Rating
Atmos Energy	A-	BBB
Laclede Group	B+	A
Nicor Inc.	B	AA
Northwest Nat. Gas	A-	AA-
Piedmont Natural Gas	A	A
Southwest Gas	B+	BBB-
WGL Holdings Inc.	B+	AA-
Average	Between B+ and A-	around A

Attachment III

Common Equity Ratios

Company	2002	2003	2004	2005	2006	Average (2002-06)
Atmos Energy	46.1	49.8	56.8	42.3	43	47.6
Laclede Group	52.3	49.4	48.3	51.8	50.4	50.44
Nicor Inc.	64.5	60.3	60.1	62.5	63.7	62.22
Northwest Nat. Gas	51.5	50.3	54	53	53.7	52.5
Piedmont Natural Gas	56.1	57.8	56.4	58.6	51.7	56.12
Southwest Gas	34.1	34	35.8	36.2	39.4	35.9
WGL Holdings Inc.	52.4	54.3	57.2	58.6	61.5	56.8
Source: Value Line				**Average for the proxy**		**51.65**

Attachment IV

Average State-wise Coincident Indices for June-Aug 08 (Three Month Change)	
Arizona	-1.21
California	-0.27
Colorado	0.25
Georgia	-0.67
Illinois	-0.96
Kansas	0.02
Kentucky	-1.04
Louisiana	0.60
Maryland	-0.40
Mississippi	-0.41
Missouri	-0.87
Nevada	-2.00
New Hampshire	0.34
North Carolina	-0.41
Oregon	-1.97
South Carolina	-0.87
Tennessee	-0.29
Texas	0.73
Virginia	0.19
Washington	-1.58
USA	0.03

The shaded cells represent negative growths

Attachment V

STOCK PRICES

Date	ATMOS	LACLEDE	NICOR	NW Natural Gas	Piedmont	Southwest Gas	WGL
10/20/2008	22.84	48.56	45.57	47.37	32.4	26.47	29.33
10/17/2008	21.56	44.64	42.57	44.05	30.23	24.6	26.68
10/16/2008	21.95	47.66	42.06	45.26	30.98	24.99	26.95
10/15/2008	21.61	41.81	38.4	42.59	28.2	23.68	25.11
10/14/2008	24.08	42.86	41.4	46.91	30.15	26.68	27.11
10/13/2008	23.12	43.11	41.64	46.95	31.25	26.73	27.05
10/10/2008	21.17	39.8	38.73	43.86	27.65	23.6	24.84
10/9/2008	22.32	38.69	39.2	42.16	25.97	24.41	25.16
10/8/2008	25.62	45.64	43.45	47.4	28.92	26.82	28.85
10/7/2008	26.85	46.63	43.85	49	29.14	27.68	29.85
10/6/2008	27.48	49.64	45.02	50.89	30.33	29.01	31.06
10/3/2008	27.62	49.28	46.25	51.28	32.67	29.52	32.13
10/2/2008	27.88	50.18	47.33	52.06	32.83	29.74	32.61
10/1/2008	27.37	50.77	46	52.16	32.69	30.57	32.54
9/30/2008	26.62	48.49	44.35	52	31.96	30.26	32.07
9/29/2008	26.31	44.93	44.16	50.58	31.09	29.63	31.26
9/26/2008	27.46	49.04	48.49	51.99	32.27	31.26	32.91
9/25/2008	27.21	50.23	48.78	51.84	32.15	30.96	33.38
9/24/2008	27.11	48.09	47.48	50.61	31.26	30.54	32.41
9/23/2008	26.84	48.15	47.24	51.15	31.73	30.94	33.08
9/22/2008	27.09	48.05	47.47	51.09	31.26	31	32.97
Mean Price	**25.24333**	**46.4881**	**44.25905**	**48.62857**	**30.72048**	**28.051905**	**29.87380952**

Source: Yahoo Finance

Attachment VI

Dividend Yield Estimate for the Next Period

Company	Average Stock Price	2009 Dividend	Div. Yield(1)
Atmos Energy	25.24	1.32	5.23%
Laclede Group	46.49	1.53	3.29%
Nicor Inc.	44.26	1.86	4.20%
Northwest Nat. Gas	48.63	1.6	3.29%
Piedmont Natural Gas	30.72	1.07	3.48%
Southwest Gas	28.05	0.94	3.35%
WGL Holdings Inc.	29.87	1.44	4.82%

Source: Yahoo Finance and Value Line

Growth Components

Company	Value Line 5-yearly projections			Consensus EPS	Zachs EPS	Average EPS	Average of Average EPS, DPS and BPS	Internal growth	External Growth	Internal plus External growth
	EPS growth rate	DPS growth rate	BPS growth rate							
Atmos Energy	4.5	2.00	3.50	5.00	5.40	4.97	3.49%	3.64%	0.00%	3.64%
Laclede Group	4.5	2.50	5.50	3.50	10.00	6.00	4.67%	4.85%	5.23%	10.08%
Nicor Inc.	5	0.00	4.50	4.25	5.80	5.02	3.17%	5.19%	0.00%	5.19%
Northwest Nat. Gas	7	5.00	3.00	4.83	6.50	6.11	4.70%	4.84%	1.44%	6.28%
Piedmont Natural Gas	7	4.00	4.00	7.93	5.60	6.84	4.95%	4.70%	-0.55%	4.15%
Southwest Gas	7.5	4.00	3.50	6.00	8.00	7.17	4.89%	5.32%	0.24%	5.56%
WGL Holdings Inc.	3.5	2.50	5.00	4.00	7.50	5.00	4.17%	4.39%	0.12%	4.51%
Average	**5.57**	**2.86**	**4.14**	**5.07**	**6.97**	**5.87**	**4.29%**	**4.70%**	**0.93%**	**5.63%**

Attachment VIII

"External Component" of COE					
	current market to book ratio	# of shares from 2008	# of shares from 2012	growth rate in # of shares	sv
Atmos Energy	1	91	115	6.03%	0.00%
Laclede Group	2.39	22	25.5	3.76%	5.23%
Nicor Inc.	2.16	45	45	0.00%	0.00%
Northwest Nat. Gas	2.04	26.5	28	1.39%	1.44%
Piedmont Natural Gas	2.61	73	72	-0.34%	-0.55%
Southwest Gas	1.11	44	48	2.20%	0.24%
WGL Holdings Inc.	1.48	49.5	50	0.25%	0.12%
Average	1.83	50.14	54.79	1.90%	0.93%

Source: Value Line

Expected Return on Equity

EXPECTED ROE	2008	2009	2011-13	
Atmos Energy	8.50%	8.50%	9.50%	9.10%
Laclede Group	12.00%	11.00%	11.50%	11.50%
Nicor Inc.	11.50%	12.00%	14.00%	13.10%
Northwest Nat. Gas	11.50%	11.50%	11.00%	11.20%
Piedmont Natural Gas	12.50%	12.50%	13.00%	12.80%
Southwest Gas	8.50%	8.50%	9.50%	9.10%
WGL Holdings Inc.	12.00%	11.50%	10.50%	11.00%
Average				11.11%

Retention Ratio (b)

	2008			2009			2011-13			
	earnings pershare	dividends pershare	b	earnings pershare	dividends pershare	b	earnings pershare	dividends pershare	b	Average Retention ratio (b)
Atmos Energy	1.98	1.3	0.34	2.1	1.32	0.37	2.45	1.4	0.43	0.40
Laclede Group	2.75	1.49	0.46	2.5	1.53	0.39	2.85	1.65	0.42	0.42
Nicor Inc.	2.4	1.86	0.23	2.6	1.86	0.28	3.65	1.86	0.49	0.40
Northwest Nat. Gas	2.6	1.52	0.42	2.8	1.6	0.43	3.35	1.88	0.44	0.43
Piedmont Natural Gas	1.55	1.03	0.34	1.6	1.07	0.33	1.95	1.19	0.39	0.37
Southwest Gas	2	0.9	0.55	2.2	0.94	0.57	2.65	1.06	0.60	0.58
WGL Holdings Inc.	2.4	1.4	0.42	2.45	1.44	0.41	2.55	1.56	0.39	0.40
Average										0.43

Source: Value Line

ENERGYNORTH NATURAL GAS, INC.
D/B/A NATIONAL GRID NH
DG 08-009

National Grid NH's Response to
STAFF Set 1

Date Request Received: May 1, 2008
Request No. Staff 1-127

Date of Response: May 22, 2008
Witness: Paul R. Moul

REQUEST: Moul's Testimony, Page 6, lines 7-10. Please explain why you believe that "the determination of the cost of equity for an individual company has become increasingly problematic."

RESPONSE: Mr. Moul's experience reveals that when individually calculated equity returns are established on a company-by-company basis, some results are prone to be outside a range of reasonableness. For example, in the recently concluded rate case before the Pennsylvania Public Utility Commission for PPL Gas Utilities Corporation at Docket No. R-00061398, the evidence submitted by the witness appearing on behalf of the Office of Consumer Advocate produced DCF returns of 6.1%, 7.4% and 8.1% for individual companies. Similarly, Staff testimony submitted in the Illinois Commerce Commission rate cases at Docket Nos. 07-0241 and 07-0242 for North Shore Gas Company and The Peoples Gas Light and Coke Company contained DCF returns as low as 5.91%. Such results were clearly unrealistic because they were well outside the bounds of what one could observe in the marketplace at the time. Such calculated returns demonstrate that individually calculated returns can produce entirely unrealistic results.

DCF ROE Estimates

Company	Average of EPS, DPS, and BPS growth rates	br and sv	EPS growth rates
Atmos Energy	8.72%	8.87%	10.20%
Laclede Group	7.96%	13.37%	9.29%
Nicor Inc.	7.37%	9.39%	9.22%
Northwest Nat. Gas	7.99%	9.57%	9.40%
Piedmont Natural Gas	8.43%	7.63%	10.33%
Southwest Gas	8.24%	8.91%	10.52%
WGL Holdings Inc.	8.99%	9.33%	9.82%
Average	*8.24%*	*9.58%*	*9.82%*
Average plus 2*SD	9.31%	13.16%	10.89%
Average minus 2*SD	7.17%	6.00%	8.76%
Cost of Equity estimate	**8.24%**	**8.95%**	**9.82%**

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

Average of the three estimates 9.01%

Market to Book Ratio ROE Estimate

Company	Internal cost of equity	external component	Cost of equity: Mkt./Book method
Atmos Energy	9.10%	0.00%	9.10%
Laclede Group	7.63%	5.23%	12.86%
Nicor Inc.	8.85%	0.00%	8.85%
Northwest Nat. Gas	7.96%	1.44%	9.40%
Piedmont Natural Gas	7.80%	-0.55%	7.25%
Southwest Gas	8.73%	0.24%	8.97%
WGL Holdings Inc.	8.85%	0.12%	8.98%
Average			9.34%
Average plus 2*SD			12.74%
Average minus 2*SD			5.94%
Cost of Equity estimate			**8.76%**

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

Attachment XII

PROXY BETA	
Company	VL Betas
Atmos Energy	0.8
Laclede Group	0.8
Nicor Inc.	0.9
Northwest Nat. Gas	0.75
Piedmont Natural Gas	0.8
Southwest Gas	0.8
WGL Holdings Inc.	0.85
Proxy Average	**0.81**
Current Median Beta for VL companies	1.11
Current Median Beta for Dividend Paying VL companies	1.05

Source: Value Line