STATE OF RHODE ISLAND

BEFORE THE

PUBLIC UTILITIES COMMISSION

IN THE MATTER OF:	)
	)
National Grid – Request for Change in Gas Distribution Rates	)

DOCKET No. 3943

DIRECT TESTIMONY

AND SCHEDULES

OF

JAMES A. ROTHSCHILD

ON BEHALF OF THE

DIVISION OF PUBLIC UTILITIES AND CARRIERS

July 25, 2008

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I. STATEMENT OF QUALIFICATIONS

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is James A. Rothschild and my address is 115 Scarlet Oak Drive, Wilton, Connecticut 06897.

Q. WHAT IS YOUR OCCUPATION?

A. I am a financial consultant specializing in utility regulation. I have experience in the regulation of electric, gas, telephone, sewer, and gas utilities throughout the United States and Nova Scotia, Canada.

Q. PLEASE SUMMARIZE YOUR UTILITY REGULATORY EXPERIENCE.

A. I have been a consultant specializing in utility ratemaking since 1972. Initially, I was employed by Touche Ross & Co. Touche Ross & Co. later merged to form Deloitte Touche. I then provided similar consulting services while with J. Rothschild Associates, Georgetown Consulting Group, and Rothschild Financial Consulting. While associated with the above firms, I have worked for various state utility commissions, attorneys general, and public advocates on regulatory matters relating to regulatory and financial issues. These have included rate of return, financial issues, and accounting issues. (See my resume at Appendix C.)

Q. WHAT IS YOUR EDUCATIONAL BACKGROUND?

A. I received an MBA in Banking and Finance from Case Western University (1971) and a BS in Chemical Engineering from the University of Pittsburgh (1967).

Q.WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. I am testifying on behalf of the Division of Public Utilities and Carriers to respond to National Grid witness Paul Moul's prefiled direct testimony and to provide my recommendations to the Commission regarding the determination of (1) the cost of capital; (2) the cost of equity; and (3) the appropriate capital structure for National Grid's Rhode Island gas operations.

II. SUMMARY OF CONCLUSIONS

Q. PLEASE SUMMARIZE YOUR TESTIMONY

A. Subject to the possible revision of the cost of debt requested by the Company, I recommend an overall cost of capital of 8.56% for National Grid ("NG") based upon a cost of equity of 9.95%. This 9.95% cost of equity is only applicable to the cost of capital computed based upon the actual capital structure of National Grid, PLC which contains 37.77% common equity[1]. If the hypothetical capital structure containing 47.71% common equity that was recommended by Company Witness Mr. Moul were to be used to compute the overall cost of capital, then the applicable cost of equity would decline to 9.50%. Even though the applicable cost of equity is lower based on Mr. Moul's proposed hypothetical capital structure, the revenue requirement impact of the higher percentage of common equity in the capital structure results in a higher revenue requirement than if the actual capital structure and associated higher cost of equity are both used. They would be higher because of the greater amount of common equity and the larger amount of income taxes associated with the capital structure proposed by Mr. Moul. The derivation of my recommended 9.95% cost of equity is summarized on my JAR Schedule 2 and is based on a DCF result of between 9.42% and 9.43% and is confirmed by a Risk Premium/CAPM result of 9.37%.

NG has proposed a "Revenue Decoupling" mechanism which would keep the revenues collected to pay its fixed costs relatively stable irrespective of weather or economic conditions. (See Direct Testimony of James D. Simpson, pages 95-97 and 103). Such a proposal, if adopted, would cause a substantial reduction in the risk borne by

[1] JAR Schedule 8

equity holders. The primary risk left for equity holders would be that there would be no guarantee how long such a plan might actually be in effect. Consequently, if such a plan were to be adopted by the Commission, it would be appropriate to recognize a substantial reduction in the cost of equity during the time the plan were to be in effect. As explained later in this testimony, that cost of equity could be as low as 4.89%. I am actually recommending a 9.2% cost of equity which is a 75 basis point reduction off my 9.95% cost of equity recommendation if the commission adopts the proposed decoupling mechanism.

NG has requested a cost of equity of 11.25%, which is 0.25% lower than the 11.50% return on equity proposed by Company Witness Mr. Paul Moul. Mr. Moul proposed an allowed return on equity of 11.50%. He arrives at this result by placing equal weight on his four cost of equity methods: DCF, risk premium, CAPM and Comparable Earnings. If Mr. Moul had relied solely on his DCF analysis, his cost of equity conclusion would have been 9.11%[2].

Rather than base his recommended capital structure on the actual capital structure being used by National Grid, PLC, Mr. Moul based his recommended capital structure on the average actual capital structure of his group of comparative gas companies. He did this without either providing any reasons why he chose to reject the actual capital structure or without proposing any adjustments to lower the cost of debt even though a higher common equity ratio would result in a lower cost of debt. The management of National Grid, PLC has chosen a capital structure with a much lower common equity ratio than the average of Mr. Moul's group. It would be inappropriate to assign a higher

[2] 9.84% less 0.54% leverage adjustment and less 0.19% financing cost adder.

level of common equity to the capital structure of National Grid than it is actually using unless such an assignment could be shown to result in a lower, not higher, revenue requirement. The ability of a company to react to future risks and to raise capital is a function of the actual, not hypothetical, capital structure. Therefore, Mr. Moul's proposal would overly burden ratepayers with a higher weighted cost of equity than if the actual capital structure were used, a higher embedded cost of debt than if the company had been using the hypothetical capital structure, and a company with less financial flexibility than would be available to a company that actually had Mr. Moul's group average capital structure. In other words, Mr. Moul's hypothetical capital structure recommendation charges ratepayers for benefits that they have not and would not obtain.

III. CAPITAL STRUCTURE

Q. WHAT IS CAPITAL STRUCTURE?

A. The capital structure of a company is the percentage mix of debt and equity that a company uses to finance its assets. For example, if a company has total capital of $15 million that was obtained by selling $10 million of debt and $5 million of equity, the capital structure of this company would be 67% debt and 33% common equity.

Q. WHY DOES CAPITAL STRUCTURE MATTER?

A. It is important for a company to have the right capital structure because if the company has too much equity it will be paying more to raise funds than it has to – the cost of equity is more than the cost of debt. However, if a company has too much debt in its capital structure then that company risks not being able to meet its interest payments and potentially going bankrupt.

Q. WHAT CAPITAL STRUCTURE SHOULD BE USED TO DETERMINE THE OVERALL COST OF CAPITAL FOR NATIONAL GRID?

A. I recommend that the appropriate capital structure to use to determine the overall cost of capital for National Grid is one that contains 37.77% common equity, 59.06% long-term debt and 3.17% short- term debt. See JAR Schedule 8. This capital structure is based upon the 2007 balance sheet from National Grid's 2006/2007 Annual Report using U.S. GAAP standards (See page 166 of National Grid's 2006/2007 annual report).

This is the appropriate capital structure to use for National Grid in this proceeding because National Grid raises equity capital through its parent.

Q. JAR SCHEDULE 8 SHOWS THAT NATIONAL GRID, PLC LOWERED ITS COMMON EQUITY RATIO FROM 43.6% AS OF THE END OF 2006 TO 37.77% BY THE END OF 2007. WHY DID THIS DROP OCCUR?

A. According to a Standard and Poors report (see Attachment DIV 3-22(r)) during 2007, National Grid, Plc acquired KeySpan Energy. Management decided to accomplish the acquisition by issuing new debt and no new equity. Also, again according to the same Standard and Poors report, National Grid, Plc decided to put further downward pressure on its common equity ratio by increasing its dividend. These changes resulted in a decrease in National Grid, Plc's common equity ratio from 43.6% as of the end of 2006 down to 37.77% as of the end of 2007. In response to these changes Standard and Poors concluded "NG'S acquisition of U.S.-based KeySpan will increase the group's unadjusted debt to approximately 19.5 billion (pounds) by 2008, from 11.8 billion (pounds) in 2007" (Attachment DIV 3-22 (r)) , while Moody's said " The negative rating outlook for NEC mirrors the negative rating outlook for its ultimate parent National Grid plc and all the other rated entities in the group…". (see Attachment DIV 3-22 (c))

IV. COST OF DEBT

Q. WHAT COST OF DEBT IS THE COMPANY REQESTING?

A. The Company has requested a 7.99% cost for long-term debt (See Attachment NG-PRM-11) and a 2.58% cost for short-term debt (See National Grid's Response to Division Data Request 10-2).

V. DISCOUNTED CASH FLOW METHOD

Q. WHAT IS THE DISCOUNTED CASH FLOW (DCF) METHOD?

A. The DCF method is a mathematical formula that is used to value a stock and to calculate the cost of equity. It recognizes that investors who buy a stock due so to receive cash dividends and/or capital gains in the future, considering the time value of money.

Q. WHAT IS THE TIME VALUE OF MONEY?

A. The time value of money is just another way of saying that money can earn interest. The concept recognizes that because money can earn interest, a dollar received today is worth more than a dollar received tomorrow, a dollar received tomorrow is worth more than a dollar next year, and so on. For example, if an investor puts $100 in a bank account that offers a 3% annual compounded interest rate, the investor will have $103 a year later and $106.09 in two years. If the only investment opportunity is to put money in this bank offering a 3% interest rate then that $103 next year is worth $100 today.

If a company offers an investor $100 in ten years or $80 today, the DCF method helps answer the question of which amount the investor should take. If the only investment opportunity for the investor is to put the money in a bank earning 3% interest, it is known that $100 in ten years is equivalent to $74.40 today ($100/(1.03)^10). The DCF method guides the investor to the correct answer, which is to take the $80 because it is higher than the $74.40.

In the above example the discounted cash flow (DCF) method discount rate was 3%.

Q. IS THE DISCOUNT RATE HIGHER WHEN AN INVESTOR VALUES A STOCK THAN WHEN INVESTING IN AN FDIC INSURED BANK ACCOUNT?

A. Yes. The FDIC insured bank account is virtually certain to pay the interest and not default on the investor's deposit. On the other hand investing in stocks involves risk because the quality of management, competitive surprises or overall economic conditions all impact a company's ability to generate cash flow in the future.

Q. WHAT IS THE RELATIONSHIP BETWEEN THE DISCOUNT RATE AND THE COST OF EQUITY?

A. The discount rate investors use when calculating the value of a stock is equal to the cost of equity.

Q. HOW ARE INVESTORS PAID THE COST OF EQUITY?

A. In addition to receiving dividends the investor has the option to sell the stock. The profit investors receive from selling stock is generally referred to as capital gains.

Q. WHAT ARE CAPITAL GAINS?

A. A capital gain, or loss, is the difference between what an investor pays for a stock and the final selling price. For example, if an investor pays $20 for a stock this year and sells it for $21 in three years time, the capital gain is equal to $21 - $20 or $1.

Q. IS IT ACCEPTABLE TO ARRIVE AT A COST OF EQUITY FROM THE DCF MODEL THAT COULD CAUSE THE STOCK PRICE OF A COMPANY TO CHANGE?

A. Yes. This principle is a key point of the City of Cleveland vs. Hope Natural Gas U.S. Supreme Court decision. In this landmark case, the U.S Supreme Court said:

> The fixing of prices, like other applications of the police power, may reduce the value of property which is being regulated. But the fact that the value is reduced does not mean that the regulation is invalid. It does, however, indicate that "fair value" is the end product of the process of rate-making not the starting point.... The heart of the matter is upon "fair value" when the value of the going enterprise depends on earnings under whatever rates may be anticipated.

Q. WHAT IS THE PRINCIPLE BEHIND THE DCF METHOD?

A. An investor parts with his or her money to receive dividends and then sells the stock to someone else. The price the new owner is willing to pay for the stock is related to the future flow of dividends and future selling price he or she expects to receive. The value of a company is recognized to be the discounted value of all future dividends continuing until the stock is sold, plus the value of the stock sale proceeds when it is eventually sold.

For example, if the cost of equity is 9% and the dividend is $1 per share then that one-dollar dividend paid out next year is worth $1/(1+.09) or $0.92 today. This means that the $0.92 of the current stock price is accounted for by the dividend expected to be paid one year from today. In addition to receiving a dividend for next year an investor might also expect a dividend in the second year of owning the investment. If that dividend were also $1 then in terms of today's value of that dividend in the second year that $1 is now worth $1/ (1.09) ^2 = $0.84. If by the third year it's expected the dividend will jump to $1.50 then the contribution to today's stock price from this $1.50 is

$1.50(1.09)^3 = $1.16. This analysis continues year by year for as many years as the investor expects to own the stock. This relationship can be generalized by the following mathematical equation:

The current stock price P is equal to: D1/(1+k) + D2/(1+k)^2 + D3/(1+k)^3 +.... (Dn + Pn) X (1+k)^n.

P = Current stock price
D1 = Dividend paid out in the first year
D2 = Dividend paid out in the second year
D3 = Dividend paid out in the third year
Dn = Dividend paid out in the nth year
k = the opportunity cost of capital or the require return.
Pn = the sale price of the stock

This complex version of the DCF equation can be used to solve for the cost of equity by estimating the dividend each year and what price the stock will be sold for and then having the computation solve for the cost of equity, k.

Q. DOES THE POTENTIAL FOR A CHANGE IN THE FUTURE EXPECTED RETURN ON BOOK EQUITY MAKE THE DCF MODEL CIRCULAR?

A. No. It is not circular because the DCF computations are all taken from a point in time before investor expectations change. Such an approach is therefore no more circular than a ship captain who, by looking at his compass, determines that his ship is sailing 10 degrees too far South, so he turns the ship to have the very same compass turn back to the true course.

Q. IS IT ALWAYS NECESSARY TO USE THIS COMPLEX FORM OF THE DCF METHOD?

A. No. If the best estimate for future growth in earnings, book value, dividends and stock price is the same estimate then and only then does the complex formula becomes mathematically identical to the answer obtained by the following equation:

$k = D/P + g.$

Q. WHAT IS THE SIMPLIFIED VERSION OF THE DCF METHOD?

A. In the simplified version the cost of equity k is equal to the dividend yield plus growth.

$k = D/P + g$

k = Cost of equity
D/P = Dividend Yield (D = dividend and P = stock price)
g = Growth in earnings, dividends, book value and stock price expected by investors.

In the mathematical duration of this simplified DCF model growth, g = Future Expected Return on Book Equity (ROE) X Retention Rate + SV. SV is the growth caused by the sale of new common stock at a price different from book value.

The retention rate is the percentage of earnings not paid out as a dividend.

If a stock price is $20 per share and the investor receives a $1 dividend per year the dividend yield is 5% ($1/$20).

$k = 5\% + g$

If there was no growth then we could say that k = 5%.

$k = 5\% + 0\%$

When a company generates earnings, it chooses how much to pay out to stockholders and how much to re-invest in the company. In the above example the retention rate is zero and 100% of the earnings are paid out as a dividend.

Companies usually do not pay 100% of earnings as a dividend. The percentage of earnings not paid out as a dividend benefits investors because this portion is re-invested in the company. Whatever percentage of earnings that are re-invested in the company is called the retention rate. For example, if half the earnings are re-invested the retention rate is 50%. The retained earnings are re-invested in the company because management presumably believes there are good investments they can make with that money. The investors' expectation of the returns on this re-invested money is the Return on Book Equity (ROE), not the cost of equity r.

As stated earlier, growth is equal to ROE X Retention Rate. For example if investors expect an ROE of 8% and a 50% retention rate, the growth is equal to 4% (50% X 8%).

Q. IS IT ALWAYS APPROPRIATE TO USE THE SIMPLIFIED VERSION OF THE DCF METHOD?

A. No. In order to use the simplified version, our best estimate must be that the following factors will grow at the same rate:

a) Earnings

b) Book Value

c) Dividends

d) Stock Price

If these are all expected to grow at the same rate, then growth (g) will be equal to ROE X retention rate.

Q. CAN YOU PROVIDE AN EXAMPLE WHERE IT IS NOT APPROPRIATE TO USE THE SIMPLIFIED VERSION OF THE DCF METHOD?

A. Yes. If our best estimate is that earnings per share and stock price will grow at 6% per year while dividends per share will grow at 3% per year and book value per share will grow at 4% per year then the simplified version of the DCF method should not be used.

In the table below the dividend yield decreases from 5.30% in 2007 to 4.73% in 2011. In this case it is not proper to use either the 5.30% or the 4.73% in the simplified formula. Taking an average over any given time period is also improper because the dividend yield keeps decreasing in the future.

In Table 1 below, return on book equity increases from 10.19% in 2007 to 11.00% by 2011. It is unrealistic to expect any company, let alone a regulated public utility, to have a return on book equity that increases indefinitely.

TABLE 1

DIFFERENT GROWTH RATES	**Value**	**Growth**
Earnings Per Share	$ 1.00	6%
Dividends Per Share	$ 0.60	3%
Book Value Per Share	$ 10.00	4%
Stock Price	$ 11.00	6%

Growth at 6% per share	**2007**	**2008**	**2009**	**2010**	**2011**
Earnings Per Share	$ 1.06	$ 1.12	$ 1.19	$ 1.26	$ 1.34
Dividends Per Share	$ 0.62	$ 0.64	$ 0.66	$ 0.68	$ 0.70
Book Value Per Share	$ 10.40	$ 10.82	$ 11.25	$ 11.70	$ 12.17
Stock Price	$ 11.66	$ 12.36	$ 13.10	$ 13.89	$ 14.72
Dividend Yield	**5.30%**	**5.15%**	**5.00%**	**4.86%**	**4.73%**
Market to Book Ratio	1.12	1.14	1.16	1.19	1.21
Return on Book Equity	**10.19%**	**10.39%**	**10.59%**	**10.79%**	**11.00%**
P/E Ratio	11.00	11.00	11.00	11.00	11.00

Q. PLEASE PROVIDE AN EXAMPLE OF A CONDITION WHERE IT IS APPROPRIATE TO USE THE SIMPLIFIED VERSION OF THE DCF METHOD.

A. In the table 2 below, the growth rate is equal to 4% for earnings per share, book value per share, stock price and dividend per share. The 4% is calculated by multiplying ROE X Retention Rate. The starting point of the table shows earnings per share at $1, book value per share is $10, stock price is $11 and dividends per share is $0.60. The retention rate r is equal to 40%. It was calculated by taking $1 (earnings per share) minus $0.60 (dividends per share) and then dividing by $1 earnings per share. The ROE is equal to 10%, $1 (earnings per share) divided by $10 (book value per share). So, ROE X Retention Rate is equal to 4% (40% retention rate X 10% ROE).

The table below shows that if earnings per share, book value per share, stock price and dividends per share all grow at 4%, then book value per share grown at 4% is equal to earnings per share minus dividends per share plus the last year's book value for every year.

Table 2

Growth at ROE X Retention Rate	**Value**	**Growth**
Earnings Per Share	$ 1.00	4%
Book Value Per Share	$ 10.00	4%
Stock Price	$ 11.00	4%
Dividends Per Share	$ 0.60	4%

Growth at 6% per share	**2007**	**2008**	**2009**	**2010**	**2011**
Earnings Per Share	$ 1.04	$ 1.08	$ 1.12	$ 1.17	$ 1.22
Book Value Per Share	**$ 10.40**	**$ 10.82**	**$ 11.25**	**$ 11.70**	**$ 12.17**
Stock Price	$ 11.44	$ 11.90	$ 12.37	$ 12.87	$ 13.38
Dividends Per Share	$ 0.62	$ 0.65	$ 0.67	$ 0.70	$ 0.73
Dividend Yield	5.45%	5.45%	5.45%	5.45%	5.45%
Market to Book Ratio	1.10	1.10	1.10	1.10	1.10
Return on Book Equity	10.00%	10.00%	10.00%	10.00%	10.00%
P/E Ratio	11.00	11.00	11.00	11.00	11.00
Book Value Per Share Calculated	**$ 10.40**	**$ 10.82**	**$ 11.25**	**$ 11.70**	**$ 12.17**
Growth Rate					

All of the components must grow at a rate equal to ROE X Retention Rate. If any of these components grow at a different rates, or anything other than ROE X Retention Rate, then problems such as permanently increasing or decreasing dividend yield can occur, creating problems that ensure an inaccurate answer from the DCF model.

Q. IS IT ALWAYS NECESSARY TO REJECT THE CONSTANT GROWTH FORM OF THE DCF METHOD FOR A COMPANY WITH ANY FORECASTED NON-CONSTANT GROWTH FACTORS?

A. No. It can be possible to still arrive at a reasonable estimate for the cost of equity using the constant growth form of the DCF model so long as the inputs are treated in a manner consistent with constant growth. For example, if the dividend rate used to compute the dividend yield is used to determine the retention rate, then the computation is the same as if dividends were to grow at the same rate as earnings, dividends and book value.

Q. IS THE APPROACH YOU HAVE DESCRIBED TO MAKE THE INPUTS INTO THE CONSTANT GROWTH DCF AN ABSOLUTELY PERFECT SOLUTION?

A. No. However, it is the most accurate way to fit a non-constant growth situation into a constant growth DCF formula. It is considerably more accurate than haphazard approaches such as adding a five-year earnings per share growth rate to the current dividend yield. Being true to the mathematical demands of the constant growth DCF model is an essential step to using it properly and therefore maximizing its accuracy.

Note the self-correcting nature of the approach to the constant growth DCF that I have described:

A) Suppose a company is expected to grow dividends less rapidly than earnings simply because management plans to invest a larger portion of earnings in the future. This change would lower the expected dividend yield and raise future growth. The least accurate way to handle this situation would be to use the higher expected growth without making a corresponding reduction to the dividend yield. The approach I have used does not make that mistake, while a simplistic approach of merely adding a five-year earnings per share growth rate to an historical dividend yield does make that mistake.

B) Suppose a company is expected to undergo a temporary rapid increase because the base period has a lower than sustainable earned return on book equity, by equating the retention rate based not only on the actual dividend but on the earnings rate that would have existed if the future expected earned return on equity had been earned, the higher and more sustainable growth rate is computed. However, unsustainable transitional growth derived from a time when return on equity is changing substantially, i.e. earnings on book is non-constant. The approach I have used remains correct, while a simplistic

approach of merely adding a five-year earnings per share growth rate to an historical dividend yield would be invalid.

Q. DOES THE CONSTANT FORM OF THE DCF MODEL ASSUME THAT THE STOCK PRICE WILL BE EQUAL TO BOOK VALUE?

A. No. Stock price and book value are modeled to grow at the same rate. If book value and stock price grow at the same rate, the market-to-book ratio must be expected in the DCF model to remain constant rather than gravitate to some higher or lower value in the future.

Q. IS THE ACCURACY OF THE ANSWER OBTAINED FROM THE DCF MODEL INFLUENCED BY THE MARKET –TO-BOOK RATIO PREVAILING AT THE TIME OF THE ANALYSIS?

A. No. The accuracy of the DCF result is driven by the accuracy of future cash flow estimates. There is no reason to believe the accuracy of a future cash flow projection is inherently more or less difficult to make for a company with a market-to-book ratio of 0.80,1.0 or 2.0.

Q. IF THE COST OF EQUITY COMPUTED BY THE DCF MODEL IS DIFFERENT THAN THE RETURN ON EQUITY USED TO COMPUTE GROWTH, DOES THIS CAUSE ANY PROBLEMS?

A. No. The cost of equity is the return investors expect to receive on their investment at market price, while the return on equity used to compute growth is equal to the return

investors expect a company will be able to earn on its book value at the time the DCF computation was being made. Since market-to-book ratios are rarely exactly equal to 1.0, the return on market price expected by investors is rarely equal to the return on equity investors expect will be achieved on book value.

Q. COULD A COMMISSION'S COST OF EQUITY DECISION CHANGE INVESTOR'S EXPECTATION FOR THE FUTURE RETURN ON BOOK VALUE?

A. Yes. However, it is highly unlikely that any one commission's decision could have a material impact on the future expected return on equity for a comparative group of utility companies. Nevertheless, if a commission's decision were to change investors' expectation of future return on book equity, it could cause numerous inputs in the DCF model to change. The stock price would change in response to a higher or lower dividend rate and an increased or decreased expected growth could cause investors to change their future expected return on book equity.

Q. WHY DID YOU USE THE GAS COMPANY GROUP PROPOSED BY MR. MOUL FOR THE PURPOSES OF COMPUTING THE COST OF EQUITY IN THIS CASE?

A. The group of gas companies Mr. Moul has proposed is not ideal because there are some unregulated businesses owned by members of the group. These unregulated activities are likely to be more risky and therefore increase the cost of equity indicated by the group. Nevertheless, I used this same group because it is not feasible to compile a group of companies that are 100% regulated gas utilities.

Q. HOW DID YOU CALCULATE THE DIVIDEND YIELD, D/P?

A. I obtained the most recent quarterly dividend for each of the gas companies. For each company I estimated their annual dividend payments by multiplying the most recent quarterly dividend by 4.

From Yahoo Finance I obtained the monthly closing prices for all of the comparative gas companies. For every company, I divided the annual dividend payments by their closing stock price for the year ending 5/31/08 to get the dividend yield per company. The dividend yields for these gas companies based on the year end stock price averaged 3.60% (See JAR Schedule 4, page 1).

I also calculated the average dividend yield for the year for the gas company group by dividing the same dividend payment by the average of the high and low monthly closing stock prices of the past 12 months to get dividend yields. The average dividend yield computed on this basis was 3.70% (See JAR Schedule 4, page 1)

Q. HOW DID YOU CALCULATE THE GROWTH (g) PORTION OF YOUR DCF ANALYSIS?

A. For each company I calculated growth component by solving for Future Expected Return on Book Equity multiplied by Retention Rate. I then added an allowance for growth caused by the sale of new common stock above book value.

Q. HOW DID YOU ESTIMATE THE FUTURE RETURN ON BOOK EQUITY EXPECTED BY INVESTORS?

A. I estimated the future expected return on book equity by reviewing the return on book equity published by Value Line, and considering that forecast in the context of historic actual returns on equity.

Q. HOW DID YOU DETERMINE THE RETENTION RATE?

A. I calculated the dividend yield on book by multiplying the dividend yield on market price by the market to book ratio. I multiplied this dividend yield on book number by the future expected return on book equity to get the retention rate. (See JAR Schedule 3)

Q. HOW DID YOU DETERMINE THE SALE OF NEW COMMON STOCK?

A. I used the most current issue of Value Line to obtain the amount of stock outstanding in 2007 and the number of shares forecasted to be outstanding in 2011-2013. I calculated the compound annual growth rate between 2007 and the 2011-2013 time frame for the comparative gas group. (See JAR Schedule 5.)

Q. PLEASE SUMMARIZE YOUR DCF RESULTS?

A. The results of my DCF analysis can be seen on JAR Schedule 2

The average dividend yield for the comparative gas companies is 3.60% to 3.70%. The average growth rate of these companies is between 5.62% and 5.73%. To account for dividend growth for next year, 0.10 is added. The DCF method is indicating a cost of equity of between 9.42% and 9.43%. (See JAR Schedule 3)

VI. CAPTAL ASSET PRICING MODEL

Q. WHAT IS THE CAPITAL ASSET PRICING MODEL (CAPM)?

A. The capital asset pricing model is a method for calculating the cost of equity for a stock by adding a risk premium to a risk free rate. The risk premium appropriate for a group of companies is proportional to the "beta" of that group.

$COE = Rf + B \times (Rm - Rf)$

COE = Cost of equity

Rf = Risk free rate

B = Beta

Rm = the expected return on the market

Q. WHAT IS A RISK FREE RATE?

A. The risk free rate is theoretically a rate that investors receive for investing in a security that has no chance of unexpected price fluctuations. Short-term U.S. government treasury bills are often used to estimate this risk free rate because their default risk is close to zero and because the time to maturity is so short that unexpected price fluctuations from changes in the interest rates are minimal.

Q. CAN THE RATE OF A LONGER TERM BOND YIELD LIKE A 20-YEAR TREASURY BILL, ALSO BE USED AS A RISK FREE RATE?

A. While a longer-term Treasury bond could be used in a risk premium analysis, a 20-year Treasury bond is not truly risk free because it is subject to interest rate risk. For example, an investor buys a 20-year U.S. Treasury bond that is yielding 5% and then interest rates rise to 6%, the price of a 20-year Treasury bond will decrease, substantially. Therefore, if a 20-year Treasury bond is used in a CAPM analysis, it should be used in a way that recognizes the non-risk-free nature of this 20-year U.S. Treasury bond.

Q. WHAT IS A RISK PREMIUM?

A. The risk premium is the return that investors demand to take on additional risk. The risk premium can be the difference between any financial instrument in different risk categories such as the difference between U.S. Treasury bonds, corporate bonds, preferred stock or common stock.

Q. WHY DO INVESTORS DEMAND A RISK PREMIUM TO INVEST IN STOCKS?

A. Investors prefer avoiding uncertainty. They will seek investments with uncertainty if an opportunity is perceived to receive adequate compensation for taking on the additional risk.

Q. FOR WHAT TYPE OF RISK DO INVESTORS DEMAND COMPENSATION?

A. The only type of risk that investors demand compensation for is the risk that cannot be eliminated through diversification. Investors buy stocks as part of a diversified portfolio. The portfolio effect causes the diversifiable risks of each company to cancel out – unexpected problems are offset by unexpected success. After all of the

diversifiable risks of all the companies in an investor's portfolio cancel out, then only non-diversifiable risk remains. Even a well-diversified portfolio can be harmed by a worldwide recession or a sudden shortage of oil.

Q. WHAT IS BETA?

A. Beta is a measurement of the correlation between a given stock and the market as a whole. A portfolio made up of companies with a beta that averages 1.0 tends to have price swings that match the market in magnitude. A portfolio with an average beta of 1.5 tends to move 1.5% for every 1% the market moves. A portfolio with average beta of 0.8 tends to move 0.8% for every 1% the market moves.

Q. DO ALL COMPANIES REQUIRE THE SAME RISK PREMIUM?

A. No. There are companies that are more sensitive than others to non-diversifiable risks such as changes in the economy. A portfolio more heavily weighted with companies that are especially impacted by the market will generally require a higher risk premium than a low risk portfolio. For example, a portfolio heavily weighted with stocks that sell luxury items may be harmed dramatically if disposable income goes down because such products are the first to go in hard times. Conversely, a portfolio heavily investing in companies that make staple products like utilities, corn flakes or soap is likely to be less susceptible to changes in the economy, have more stable stock prices and therefore require a lower risk premium.

Q. HOW DID YOU APPLY THE CAPM?

A. I compared the actual compounded annual returns earned by each of 10 groups of companies from 1926-2007 with an average beta of each group. In this way, I effectively examined the returns on ten different portfolios, each with a different average beta. Graph 1 shows that on average from 1926-2007, companies with a beta of 1.0 earned a compounded annual return of 10.40% for its equity investors. The average beta for the comparative gas companies chosen by the company witness is 0.88, indicating that the non-diversifiable risk for these gas companies is 88% of the average risk. The least squared equation indicates that the earned return to stockholders who invested in a portfolio with a beta of 0.88 earned a compounded annual return of 9.72% from 1926-2007.

The 10.40% compounded annual average historical actual return earned by companies with a beta of 1.0 and a 9.72% historical actual return earned by companies with 0.88 occurred over a time when the compound annual rate of inflation averaged 3.0%. However, the current inflation expectation demanded by investors is 2.65% (see JAR Schedule 6, page 1), or 0.35% lower than the inflation rate embedded in the historical actual return numbers. Therefore, to make the historical returns consistent with investors' current inflation expectations, the 9.72% should be reduced by 0.35%. This 9.72% return adjusted for the current inflation expectation results in a 9.37% CAPM indicated cost of equity for gas companies with a beta of 0.88.

Q. ARE COMPOUNDED ANNUAL RETURNS THE SAME AS THE GEOMETRIC MEAN?

A. Yes

Q. IS THE COMPOUND ANNUAL AVERAGE RETURN, OR GEOMETIC MEAN, A BETTER MEASURE OF ACTUAL HISTORICAL RETURNS AND WHAT INVESTORS EXPECT TO EARN IN THE FUTURE THAN THE ARITHMETIC MEAN?

A. Yes.

Page 24 of Stocks for the Long Run, Third Edition contains the following:

> Investors can be expected to realize geometric returns only over long periods of time. The average geometric return is always less than the average arithmetic return except when all yearly returns are exactly equal. The difference is related to the volatility of yearly returns.
>
> A simple example demonstrates the difference. If a portfolio falls by 50 percent in the first year and then doubles (up 100 percent) in the second year, "buy and hold" investors are back to where they started, with a total return of zero. The compound or geometric return rG, defined earlier as (1-.5)(1+1)-1, accurately indicates the zero total return of this investment over two years.
>
> The average annual arithmetic return rA is +25percent =(-50 percent + 100 percent)/2. Over 2 years, this average return can be turned into a compound or total return only by successfully "timing" the market, specifically increasing the funds invested in the second year and hoping for a recovery in stock prices. Had the market dropped again in the second year, the strategy would have been unsuccessful and would have resulted in lower total returns than achieved by the buy-and-hold investor.

Q. WHAT GROUP OF COMPANIES DID YOU USE IN YOUR CAPM ANALYSIS?

A. I relied on the Ibbotson Associates data from their 2008 Yearbook that includes 3,901 companies.

Q. HOW DID YOU DIVIDE THESE COMPANIES INTO TEN PORTFOLIOS?

A. The only data available in the Ibbotson Associates report with the companies it covers divided into separate portfolios are these ten groups that were divided by size.

Since these ten groups all had significantly different betas and because the actual historical earned returns for these groups was also quantified, it was possible to use these groups to show how beta related to the actual earned return earned by each of these groups. It was acceptable to use the portfolios consisting of different size companies in this analysis because:

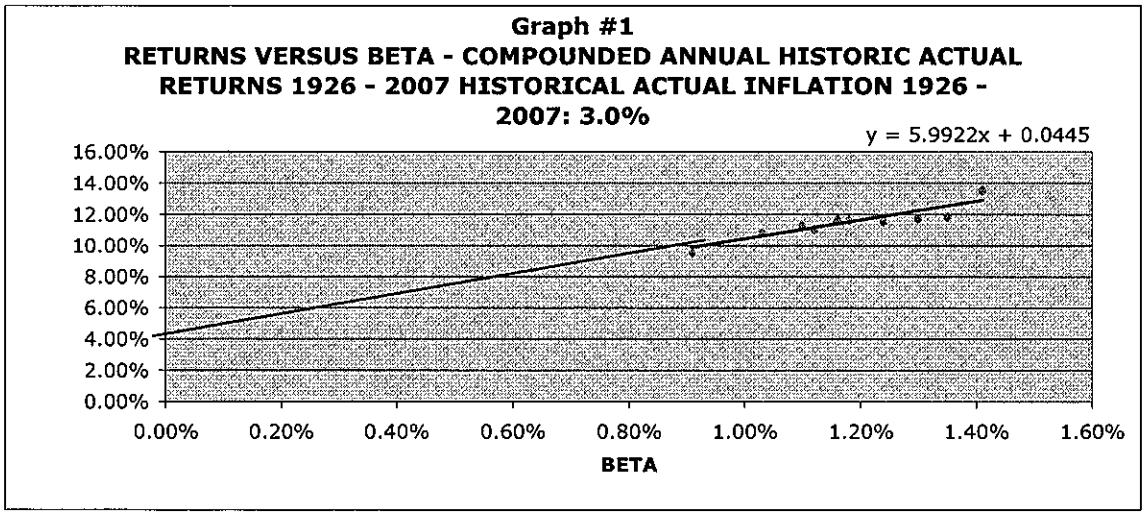
1) By CAPM theory, size is a diversifiable risk and therefore does not impact the cost of equity.

2) The results themselves confirm that size does not matter because the least squares trend line projects to a credible risk-free rate. If size, in addition to beta, did actually influence the cost of equity, then the projection of the data would be substantially different than the cost rate expected for a zero risk security (i.e., a security with a beta of zero.)

Q. WHAT DID YOU USE FOR A RISK FREE RATE?

A. The most accurate risk free rate to use with this analysis is the one that is defined by the data itself. That way, the true historical actual relationship between beta and the cost of equity is maintained.

Q. WHAT IS THE RELATIOSHIP BETWEEN THE COMPOUNDED ANNUAL EARNED RETURN AND BETA FOR THE GROUP OF COMPANIES YOU SELECTED?



1

2 A. The data points in the graph below are numbered from highest to lowest beta, with
3 number 1 being the group with the lowest beta and number 10 being the group with the
4 highest beta. A least squared line was used to fit a line to the data points and the derived
5 equation was used to calculate the returns for a given beta. Historically a company with a
6 beta of 1 has earned a return of about 10.40%. A company with a beta equal to 0.88, the
7 average beta of the comparative gas companies, has earned approximately 9.72%.

8

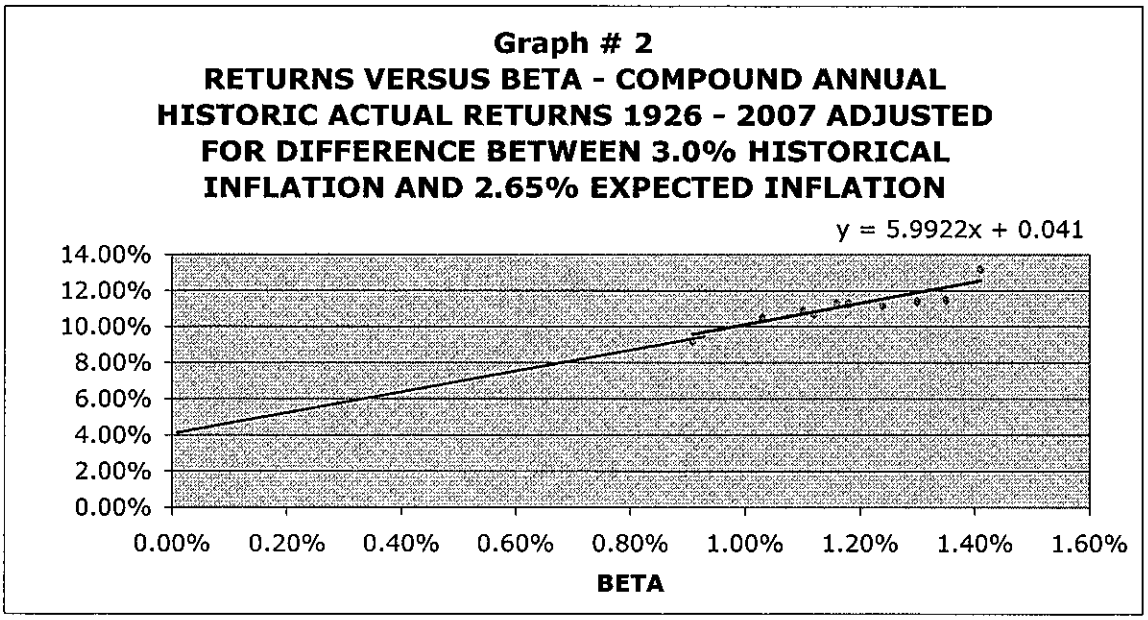
9

Q. DOES THE ABOVE GRAPH OF THE RELATIONSHIP BETWEEN BETA AND RETURNS HELP CONFIRM THE CAPM THEORY?

A. Yes. The equation of the least squares line is Y = .059922 X + 0.0445 so the line indicates a y-intercept (or security with a zero beta) of 4.45%. Theoretically a firm with a zero beta is a risk free security. The compound annual return actually achieved by investors in U.S. Treasury Bills from 1926-2007 was 4.70%, or only 25 basis points higher than the result consistent with the actual return versus actual beta data used in my CAPM analysis. This small difference is an excellent confirmation of the integrity of the CAPM theory.

Q. DO THESE HISTORICAL ACTUAL RETURNS FROM 1926-2007 AUTOMATICALLY EQUATE TO THE COST OF EQUITY?

A. No. The cost of equity at any given risk level is directly influenced by investors' expectations of future inflation rates, while the historical data is a product of the inflation rates that existed in the past. The compounded annual rate of inflation between 1926 and 2007, the time period from which that data used to construct this graph was compiled, inflation averaged 3.0%. Currently however the bond market shows that investor's inflation expectation is 2.65%. Since the returns demanded by investors include an allowance for inflation, it is appropriate to update the historical actual returns to be consistent with what investors currently demand for inflation. Since inflation expectation is 0.35% lower than it was from 1926-2007, the cost of equity is appropriately estimated to be 0.35% lower at all risk levels than it was on average from 1926 to 2007. The current cost of equity for the gas group with a beta of 0.88 is 9.37%.



Q. HOW DID YOU CALCULATE WHAT THE MARKET EXPECTS INFLATION TO BE AS OF DECEMBER 5/29/08?

A. I took the difference between 20-year US treasury bonds and the long-term inflation indexed treasury bonds. The yield on the 30-year US Treasury bonds is 4.70%[3] and the yield on the inflation-indexed bonds is 2.05%[4]. Since the market is willing to accept a 2.05% yield instead of a 4.70% yield in return for protection against inflation, the market expects inflation to be 2.65% (4.70% - 2.05%).

Q. DOES THEORY AND EMPIRICAL DATA SUPPORT YOUR FINDINGS?

A. Yes. The term Security Market Line (SML) is given to the expected return-beta relationship. In the financial textbook *Investments* (McGraw-Hill/Irwin 2005), by Bodie, Kane and Marcus it states on page 290 that "...fairly priced' assets plot exactly on the

[3] www.bloomberg.com/markets/rates/index.html, 5/29/08
[4] www.bloomberg.com/markets/rates/index.html, 5/29/08

SML..."[5] and, "...all securities must lie on the SML in market equilibrium." As seen in Graph #1, the stock-based empirical data is consistent with the theory that higher betas correlate with higher returns.

If this historical actual return is consistent with what investors expected and if the CAPM theory is correct, it is possible to estimate the risk-free rate that existed on average over the 1926-2007 period by making a linear projection of the historical stock returns. As shown on my graph #1, the stock-based empirical data results in a computed risk-free rate of 4.45% (note: because of the limitations of the graph, it appears to be 4.00% but the formula clearly shows the intercept to be 4.45%). This projection is very close to the actual 4.6% compounded annual return of U.S. Treasury Bills.

Q. IS THE U.S. TREASURY BILL YIELD A GOOD ESTIMATE OF THE RISK FREE RATE?

A. On average for the long-term, it is. However spot distortions are common. The current rate on the 60-day U.S. Treasury is 2.03%[6] lower than the long-run average because Fed Chairman, Ben Bernanke, has been reducing interest rates in an attempt to stimulate the economy.

Q. HOW DOES YOUR CAPM RESULT COMPARE TO THE RESULTS STATED IN IBBOTSON ASSOCIATES?

A. On page 179 of "Stocks, Bonds, Bills and Inflation" Ibbotson SBBI/Morningstar 2008 yearbook, the authors conclude:

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[6] www.bloomberg.com/markets/rates/index.html, 5/29/08

> The supply side model estimates that stocks will continue to provide significant returns over the long run, averaging around 9.66% per year, assuming historical inflation rates. The equity risk premium, based on the supply side earnings model, is calculated to be 4.24% on a geometric basis and 6.23% on an arithmetic basis.

In the above statement, the 9.66% return expected by Ibbotson SBBI/Morningstar is based on a stock of average risk. Based on historical inflation rates the expected return I calculate for a company of average risk at 10.4% is higher than the 9.66% concluded by Ibbotson SBBI/Morningstar. Considering that inflation expectations are lower than the historical average and the group of 7 gas companies has a lower risk than the company of average risk, my finding of a 9.37% CAPM cost of equity is conservatively high.

Q. IS THERE ANOTHER IMPORTANT VERIFICATION OF THE CAPM CONCLUSION YOU HAVE RECOMMENDED?

A. Yes. Page 12 of Stocks for the Long Run by Wharton Professor, Jeremy Siegel, concludes that "... the real after-inflation, compound annual rate of return on stocks...real return on stocks... averaged 6.9 percent per year since 1926." The book also points out that this real after-inflation return on stocks has been "...extraordinarily stable..., averaging 6.6 percent from 1871 through 1925..." and the book mentions that the return since World War II was 7.1 percent. Recognizing that the return data prior to 1926 contains many fewer companies and is in a much less mature economy than the data since 1926, I will concentrate on the inflation premium data after 1926 and will therefore conclude that the equity premium in excess of inflation for the average common stock in the U.S. is 7.1%. Adding the current inflation expectation derived from the bond market of 2.65% results in a cost of equity estimate of 9.67% for a company of average risk.

This result is virtually identical to the 9.66% estimate made by Ibbotson Associates, further confirming that my 10.4% CAPM estimate based on the results for the average stock is conservatively high.

VII. POSSIBLE DECOUPLING MECHANISM.

Q. PLEASE DESCRIBE NATIONAL GRIDS PROPOSED REVENUE DECOUPLING PROPOSAL.

A. If implemented the proposal would increase rates for all rate classes, increase C&I demand charges and decouple revenues from revenue per customer from usage. The purpose is to "...remove the Company's dependency on gas consumption..."[7] The Company would calculate target billing per customer and on an annual basis customers would be charged or credited based on their cumulative short fall, including interest[8]. It is proposed by the Company that this would not apply to new commercial and industrial customers.

Q. HOW WOULD THE PROPOSED DECOUPLING MECHANISM ("RDM") AFFECT THE RISK OF INVESTING IN NG'S COMMON EQUITY?

A. It would significantly reduce the non-diversifiable risks exposure to NG investors. by a revenue stream that would be essentially unaffected by swings in economic conditions within the service territory. Consequently, the risk faced by NG's investors would begin to take on the essential characteristics of low-risk securitized debt.

Q. WHY DO YOU FOCUS ON THOSE RISKS THAT ARE NON-DIVERSIFIABLE?

A. As explained earlier in my testimony, investors are only compensated for non-diversifiable risks such as the risks associated with the economy as a whole. A way of

[7] See page 2, lines 8-9 of James D. Simpson's direct testimony
[8] See page 3, lines 7-17 or James D. Simpson's direct testimony

understanding the impact of diversification is to look at potential gambling on one or more flips of an unbiased coin. Assume that someone was planning to gamble a total of $1,000, betting on heads. If the gambler bet the entire $1,000 on a single flip, the bet would be highly risky, with exactly a 50% chance of losing the entire $1,000 and a 50% chance of walking away with a profit of $1,000. However, if the gambler instead bet $1 per flip on a series of 1,000 flips, the outcome would be much more predictable and thus less risky. By spreading the same stake over many wagers, the gambler would have only a 2.5% chance of losing more than $32 (and, by the same unbiased coin, only a 2.5% chance of gaining more than $32). By separating the $1,000 into separate bets, the gambler has gained substantial assurance that the loss would be no worse than $32, which is a small fraction of the $1,000 loss for which the un-diversified approach would have yielded even odds.

Q. WHY DO YOU SAY THE RDM WOULD SIGNIFICALTY REDUCE NON-DIVERSIFIABLE RISK?

A. Investors can and do minimize the effect of risk of events that are unique to an individual company. For example, just because one company in an investor's portfolio may encounter serious business problems because of a mechanical problem at a key factory does not make it any more likely that another company in the portfolio would or would not have a similar problem. However, events that impact the overall economy, such as interest rate levels, do tend to impact most if not all of the companies in a portfolio When the economy goes into recession, most companies are negatively impacted. Other things being equal, a recession would cause NG's customers to use less

gas. But the RDM would almost completely insulate NG from losing revenues as a result. The RDM therefore would attenuate the correlation of overall economic growth to NG's earnings and stock price.

Q. WOULD THE RDM ELIMINATE ALL THE RISKS TO NG INVESTORS'?

A. No. It would not eliminate risks such as serious malfunction at a plant, operating cost overruns and a host of other possible problems, but since these risks are independent of the overall economy an investor can eliminate these risk by investing in a portfolio of many stocks. Some of the companies in a portfolio will have positive surprises and others will have negative surprises. For example, unexpectedly high maintenance expenses caused by surprise breakdowns, if they were to occur, would not change the likelihood of such events occurring to other companies in the portfolio and are therefore diversifiable.

Some non-diversifiable risk would remain. The main one would be the risk of cost escalations due to general economic conditions, that is, the risk that NG will have to pay higher prices for labor and materials inputs due to boom-time high demands. However, this inflation risk is already factored into the cost of high-rated corporate debt, because such inflation would reduce the purchasing power of the stream of payments that debtors make to their lenders.

Q. IF THE RDM IS APPROVED, WOULD NG'S COST OF EQUITY RESEMBLE THE COST OF HIGH-RATED CORPORATE DEBT?

A. Yes, for the reasons previously discussed, high-rated corporate debt would have similar risks to that of NG equity. Consequently, the costs of NG equity, which are not directly observable, would resemble the cost of comparable-risk high-rated corporate debt, which is directly observable.

Q. WHAT SPECIES OF DEBT WOULD HAVE COMPARABLE RISKS AND COSTS TO THOSE OF NG EQUITY?

A. With the proposed RDM, AA-rated corporate debt would have comparable risks and costs to those of NG equity.

Q. WHAT BENCHMARKS LEAD YOU TO THAT CONCLUSION?

A. In recent years, numerous utilities have issued securitized debt. The securitized debt has been issued at relatively low interest rates because investors in these bonds have been assured that funds will be collected from ratepayers to service this securitized debt. As a result, the cost of capital associated with assets financed by securitized debt has been determined to be based on the cost of AAA rated debt. I say this based upon my direct experience in having participated in evaluating and testifying on securitization issuances in New Jersey. The very highly rated debt and the ability to finance the securitized assets with 100% debt rather than a traditional mix of debt and equity is possible for securitization because investors have been assured that if there should be a revenue shortfall to service the debt financing the securitized assets, ratepayers will be required to quickly make up the shortfall. The proposed RDM accomplishes a very similar outcome. Therefore, if implemented, the RDM would drive NG's cost of equity down to the cost of

very highly rated debt. However, securitized debt would receive an AA bond rating were it not for insurance purchased to provide still more protection for the debt issuance. Because the RDM will not provide this extra increment of security, I conclude that AA-rated corporate debt would have comparable risks and costs to those of NG equity.

Q. WHAT WOULD NG'S COST OF EQUITY BE IF THE RDM WERE REMOVED IN THE FUTURE?

A. If for any reason the Commission were to remove the RDM, it should recognize that NG's cost of equity would instantly increase by whatever downward adjustment to the cost of equity the Commission may find appropriate if it were to decide to implement the RDM.

Q. PLEASE SUMMARIZE YOUR PROPOSED COST OF EQUITY FOR NG IF THE RDM WERE TO BE IMPLEMENTED.

A. During the time the RDM is in effect, the cost of financing NG's used and useful assets serving Rhode Island would be closer in risk as the debt financing the securitized utility assets. However, because of the rating increase from AA to AAA brought about by insurance typically purchased to further protect investors of securitized debt, the AA rather than the AAA rate should be used to determine the cost of equity for NG's Rhode Island operations in the event the RDM were to be implemented. Additionally, because the Commission could remove the RDM at a future time, NG should not be expected to finance its used and useful assets with 100% debt as is done for assets financed with

securitized debt. NG's allowed cost of equity would be increased appropriately at the same time that the RDM were to be revoked.

Currently, the cost of AA rated debt is **4.89%**[9]. This cost rate is roughly half of the cost of equity. Unlike securitization, a commission could withdraw its approval of an RDM at any time. Therefore, while the cost of equity assuming the RDM would be approved should be less than the cost of equity without an RDM, the reduction should not be as large as it was in the case of securitization financing.

Q. WHAT COST OF EQUITY DO YOU RECOMENED IF THE RDM IS ADOPTED?

A. I suspect the reduction in the cost of equity caused by the implementation of an RDM would increase over time as investors' confidence that the RDM would remain in effect. While it is not possible to quantify exactly how much the cost of equity would drop in response to such a major reduction in non-diversifiable risk, it is hard for me to imagine the cost of equity reduction would be any less than 0.50%, and could be considerably more than 1.00% at least during the time that the RDM remains in effect. I therefore recommend to the Commission that it lower the cost of equity by 0.75% if it were to decide to implement the RDM.

[9] Yahoo Finance, June 26, 2008

Q. WHAT IS YOUR OVERALL COST OF CAPITAL RECOMMENDATION IF THE RDM IS ADOPTED?

A. If the RDM is adopted I recommend an overall cost of capital of 8.28% (10.15% pre-tax) for NG based upon a 9.20% cost of equity, 7.99% cost of long-term debt and a 2.58% cost of short-term debt. See JAR Schedule 1.

VIII. EVALUATION OF THE TESTIMONY OF MR. MOUL

Q. PLEASE SUMMARIZE THE TESTIMONY OF MR. MOUL.

A. Mr. Moul has recommended that NG be allowed a return on equity of between 11.5% and 12.5%. The Company has requested 11.25%. Based upon this 11.25% return on equity, he calculated an overall cost of capital of 9.27%. He arrived at this recommendation based upon his own versions of the DCF model, risk premium analysis, CAPM, and comparable earnings.

Mr. Moul's implementation of the DCF method resulted in him concluding that, when applied to his selected group of comparative gas companies, the average dividend yield was 3.86%, and the growth rate was 5.25% which totals 9.11%. He then added 0.54% for what he called a "leverage adjustment", and another 0.19% as a flotation adjustment for a total DCF indicated cost of equity of 9.84%. When I applied the DCF method to the same companies, but based upon more current stock price data, I obtained a dividend yield of between 3.70% and 3.80%[10], a result that is very similar to the 3.86% dividend yield used by Mr. Moul. The slight difference between his dividend yield and the one I have used could easily be explained just by my having done the analysis after the time Mr. Moul had already prepared his testimony. The growth rate I found appropriate is 5.62% to 5.73%, which is higher than the 5.25% growth rate used by Mr. Moul. My growth rate is based on a long-term sustainable growth rate calculation that is required by the DCF method and is therefore more accurate than the short-term growth rate basis utilized by Mr. Moul. Because of the higher growth rate, my DCF result of

[10] JAR Schedule 3, the 3.60% and 3.70% dividend yield rates shown on JAR Schedule 3 plus the 0.10% increment to dividend yield for growth to next year shown on line 6.

9.42% to 9.43% is more accurate than the 9.11% DCF result obtained by Mr. Moul.

Tthe reason Mr. Moul's 9.84% DCF result is higher than my recommended 9.42% to 9.43% DCF result is driven by Mr. Moul's DCF adders for what he calls "leverage" and "flotation." Therefore, the Commission could choose to concentrate its analysis on those differences between our two positions.

Q. ARE THE RESULTS OF MR. MOUL'S CAPM APPROACH AND YOURS AS SIMILAR AS THE DCF RESULTS?

A. No. A properly applied CAPM approach is currently indicating a cost of equity of 9.37% (see JAR Schedule 6, Page 1), a result that is consistent with the 9.42% to 9.43% cost of equity indicated by the DCF method. This 9.37% is in sharp contrast to the high 13.45% result obtained by Mr. Moul at his attempt at a CAPM approach. (See page 7 of Mr. Moul's direct testimony).

Q. PLEASE SUMMARIZE THE FLAWS IN MR. MOUL'S CAPM ANALYSIS.

A. Mr. Moul obtained his sky-high result from his CAPM method by:

- Overstating historic actual performance by giving weight to arithmetic rather than giving exclusive weight to the geometric averaging method.
- Overstating the risk premium based on projected data by using short-term projections made by Value Line and a short-term growth rate from First Call as proxies for long-term growth.
- Further exaggerating the results of the CAPM models by making an upward adjustment to the average beta of his comparable group with the use of the "Hamada

Model."

Q. IS MR. MOUL'S APPROACH TO CAPM THE ONLY METHOD HE PRESENTED THAT PRODUCED AN ANSWER MUCH HIGHER THAN HIS DCF?

A. No. Mr. Moul also presented a method he calls "Risk Premium." In this approach, he obtained 11.44% as his indicated cost of equity.

- Like in his CAPM method, he overstates historic actual performance by giving weight to arithmetic average and rather than giving exclusive weight to the geometric averaging method.
- He uses arbitrary sub-periods instead of the use of returns from 1928.

Q. WERE THERE ANY OTHER COST OF EQUITY APPROACHES PRESENTED BY MR. MOUL IN THIS CASE?

A. Yes. Mr. Moul also presented what he calls a "Comparable Earnings Method". He concluded that this method is indicating to him a cost of equity of 13.90%.

Q. IS MR. MOUL'S COMPARABLE EARNINGS RESULT WORTHY OF INFLUENCING THE COST OF EQUITY RESULT IN THIS CASE?

A. No. The "Comparable Earnings" method as presented by Mr. Moul in this case is not an equity costing method. All it does is assume that whatever is the future expected return on book equity is automatically the cost of equity. As such, it provides absolutely no input from investors on whether the expected earned return on book is or is not

consistent with the returns they demand to attract capital.

Primarily as a result of the flaws in Mr. Moul's non-DCF analyses, Mr. Moul has recommended a cost of equity that is substantially excessive.

Q. IS THE HIGH COST OF EQUITY THE ONLY WAY MR. MOUL HAS ARRIVED AT SUCH A HIGH REQUEST FOR AN OVERALL COST OF CAPITAL?

A. No. Mr. Moul further exaggerates the overall cost of capital that is fair and reasonable for NG by applying his excessive cost of equity to a capital structure that contains a much higher percentage of common equity than is being used by NG. NG's parent National Grid, PLC is financing its operations with a capital structure that contained 37.77% common equity on 12/31/07 based on U.S. GAAP accounting principles. Yet, Mr. Moul ignores this actual capital structure by proposing that the average capital structure of his comparative gas group companies form the basis for the overall cost of capital. Such a capital structure would be especially unfair to NG's ratepayers because the cost of debt they experience will be a function of the credit worthiness of National Grid, PLC and NOT the average capital structure of the comparative group. Furthermore, since National Grid, PLC will not be actually using the group average capital structure, any benefits in terms of a lower risk company that would come along with the actual implementation of the more equity rich capital structure would not be obtained.

B. DCF Method

Q. DOES MR. MOUL CONSIDER THE DCF METHOD HIS PRIMARY METHOD FOR DETERMINING THE COST OF EQUITY?

A. No. He claims that the DCF method has limitations.

Q. DOES THE DCF METHOD HAVE THE LIMITATIONS THAT MR. MOUL CLAIMS?

A. No. The DCF method properly implemented is capable of a far greater accuracy than implied by Mr. Moul.

On page 22, lines 2-3 of Mr. Moul's testimony he says, "Among other limitations of the model, there is a certain element of circularity in the DCF method when applied in rate cases." Presumably, Mr. Moul means that the cost of equity determined in a rate case influences what investors expect for cash flow in the future. However, this is not a cause of circularity because the stock price used in the DCF method is related to the return on equity investors expect as of the time the stock price is measured. Furthermore, NG is not in the comparative group of gas companies used in this proceeding. Therefore, whatever return the Commission allows to NG in this case will not impact the earnings investors expect to obtain from the gas companies in the comparative group.

On page 22, lines 8-10 of Mr. Moul's testimony he states that "...the DCF approach has other limitations that diminish its usefulness in the rate setting process when the market capitalization diverges significantly from the book value capitalization." This criticism is precisely opposite from the truth. The DCF method was developed as an improvement to the use of Price/Earnings, or P/E ratios. To understand why P/E ratios and not DCF results are distorted when market to book ratios deviate from unity it is

helpful to keep in mind why a stock price deviates from book value in the first place. The price exceeds book because the future expected earned return on book is higher than the return rate demanded by investors. This happens because of simple supply and demand. Other things being equal, the higher the return a company is perceived to be able to earn on book, the more valuable the investment. This value causes more and more investors to want to own the stock. The stock is eventually owned by the highest bidders. High returns on book, therefore, are the cause of high market-to-book ratios. Companies that are perceived to be able to earn high returns on book are especially valuable to investors because earnings that are reinvested in the business earn at a higher rate when reinvested than in a company with a low market to book ratio. This makes earnings reinvested in the business more valuable than can be measured by a simple P/E ratio computation. The DCF method, however, when properly applied with a growth rate determinant such as the "b x r" (or retention x expected return on book equity) method does not suffer from the flaw experienced by the P/E ratio method. The DCF method equates the current stock price, irrespective of the market to book ratio, to the future cash flows expected by investors. As long as the proper stock price is input, and the future expected cash flows are properly estimated, the DCF method is capable of producing an accurate result.

Q. WHAT IS THE FORUMULA THAT MR. MOUL USES IN HIS DCF ANALYSIS?

A. (Dividend Yield (D/P) + Growth Rate (g) + leverage Adjustment (lev)) X floatation cost adjustment (flot.). See page 36. lines 11-12 of Mr. Moul's direct testimony.

Q. DOES MR. MOUL PROPERLY APPLY THE SIMPLIFIED OR CONSTANT DCF METHOD?

A. No. Strictly speaking, Mr. Moul has not really applied the DCF method at all. Just because he adds a number to a dividend yield does not make it a DCF method. It is only a DCF method if the dividend yield is computed properly, and the growth rate used is derived from a careful study of what future sustainable growth in cash flow is anticipated by investors.

Q. HOW DID MR. MOUL CALCULATE HIS GROWTH RATE FOR HIS DCF METHOD?

A. Mr. Moul says in his NG-PRM-5, page 8 of 14 that because EPS, DPS, BVPS and Stock price can not be expected to actually prevail that EPS is the best measure of expected growth. On 25 of his direct testimony Mr. Moul says that he considers many financial variables in determining his growth rate but on his NG-PRM-17 he focuses on the earnings per share forecasts by the stock analysts and chooses a growth rate near the middle of the range. Below are the five-year projected earnings per share rates by the four investment research firms he chose:

Value Line:	5.03%
IBES/First Call:	5.18%
Reuters:	5.24%
Zacks:	5.50%

Source: NG-PRM-17

On page 29, lines 2-4 of Mr. Moul's direct testimony he says, "...it is my opinion that an investor-expected growth rate of 5.25% is within the array of earnings per share growth rates shown by analysts' forecasts."

Q. IS MR. MOUL'S METHODOLOGY TO DETERMINE THE GROWTH RATE TO USE IN HIS DCF MODEL APPROPRIATE?

A. No. These analysts' growth rates are merely five-year forecasts from a point in history to a point five years into the future. Such a short time period is susceptible to end-point error and are therefore not reliable indicators of what investors' expect for future sustainable long-term growth in cash flow.

Q. DOES MR. MOUL USE THE "B X R" METHOD TO CALCULATE THE GROWTH RATE IN HIS DCF ANALYSIS?

A. No. Mr. Moul mentions the "B X R" method on page 24 of his direct testimony but he does not use it. As stated above, Mr. Moul makes the all too common error of using analyst five-year earnings per share growth without even attempting to reconcile the retention rate used for computing growth with the retention rate he used to compute the dividend yield. This is analogous to not trying to reconcile the money you are taking out of your checking account with your future balance, i.e. basic balancing of a check book 101.

Q. CAN YOU PLEASE SUMMARIZE WHY A FUTURE ORIENTED "B X R" METHOD IS SUPERIOR TO A FIVE-YEAR EARNINGS PER SHARE GROWTH

RATE FORECAST IN PROVIDING A LONG-TERM SUSTAINABLE GROWTH RATE?

A. Yes. The primary cause of sustainable earnings growth is the retention of earnings. A company is able to create higher future earnings by retaining a portion of the prior year's earnings in the business and purchasing new business assets with those retained earnings. There are many factors that can cause short-term swings in earnings growth rates, but the long-term sustainable growth is caused by retaining earnings and reinvesting those earnings. Factors that cause short-term swings include anything that causes a company to earn a return on book equity at a rate different from the long-term sustainable rate. Assume, for example, that a particular utility company is regulated so that it is provided with a reasonable opportunity to earn 9.0% on its equity. If the company should experience an event such as the loss of several key customers, or unfavorable weather conditions which cause it to earn only 6.0% on equity in a given year, the drop from a 9% earned return on equity to a 6% earned return on equity would be concurrent with a very large drop in earnings per share. In fact, if a company did not issue any new shares of stock during the year, a drop from a 9% earned return on book equity to a 6% earned return on book equity would result in a 33.3% decline in earnings per share over the period[11]. However, such a drop in earnings would not be any indication of what is a long-term sustainable earnings per share growth rate. If the drop were caused by weather conditions, the drop in earnings would be immediately offset once normal weather conditions return. If the drop is from the loss of some key

[11] By definition, earned return on equity is earnings divided by book value. Therefore, whatever level of earnings is required to produce earnings of 6% of book would have to be 33.3% lower than the level of earnings required to produce a return on book equity of 9%.

customers, the company would replace the lost earnings by filing for a rate increase to bring revenues up to the level required for the company to be given a reasonable opportunity to recover its cost of equity.

For the above reasons, changes in earnings per share growth rates that are caused by non-recurring changes in the earned return on book equity are inconsistent with long-term sustainable growth, but changes in earnings per share because of the reinvestment of additional assets is a cause of sustainable earnings growth. The "b x r" term in the DCF equation computes sustainable growth because it measures only the growth which a company can expect to achieve when its earned return on book equity "r" remains in equilibrium. If analysts have sufficient data to be able to forecast varying values of "r" in future years, then a complex or multi-stage DCF method must be used to accurately quantify the effect. Averaging growth rates over sub-periods, such as averaging growth over the first five years with a growth rate expected over the subsequent period will not provide an appropriate representation of the cash flows expected by investors in the future and, therefore, will not provide an acceptable method of quantifying the cost of equity using the DCF method. The choices are either a constant growth DCF, in which one "b x r" derived growth rate should be used, or a complex DCF method in which the cash flow anticipated in each future year is separately estimated.

Q. WHY ARE ANALYSTS FIVE-YEAR CONSENSUS GROWTH RATES NOT INDICATIVE OF LONG-TERM SUSTAINABLE GROWTH RATES?

A. Analysts' five–year earnings per share growth rates are earnings per share growth rates that measure earnings growth from the most currently completed fiscal year to

projected earnings five years into the future. These growth rates are not indicative of future sustainable growth rates in part because the sources of cash flow to an investor are dividends and stock price appreciation. While both stock price and dividends are impacted in the long-run by the level of earnings a company is capable of achieving, earnings growth over a period as short as five years is rarely in synchronization with the cash flow growth from increases in dividends and stock price. For example, if a company experiences a year in which investors perceive that earnings temporarily dipped below normal trend levels, stock prices generally do not decline at the same percentage that earnings decline, and dividends are usually not cut just because of a temporary decline in a company's earnings. Unless both the stock price and dividends mirror every down swing in earnings, they cannot be expected to recover at the same growth rate that earnings recover. Therefore, growth rates such as five-year projected growth in earnings per share are not indicative of long- term sustainable growth rates in cash flow. As a result, they are inapplicable for direct use in the simplified DCF method.

Q. IS THERE A WAY FOR AN ANALYST TO KNOW WHETHER OR NOT THE EARNINGS FOR ANY PERIOD ARE REFLECTIVE OF NORMAL EARNINGS?

A. Yes. In order for earnings to be reflective of normal conditions, the company has to earn a return on book equity in that year at a level that is equal to the long-term sustainable return on book equity.

Q. PLEASE ELABORATE ON WHY THE USE OF FIVE-YEAR EARNINGS PER SHARE GROWTH RATES IN THE DCF MODEL IS IMPROPER?

A. A raw, unadjusted, five-year earnings per share growth rate is usually a very poor proxy for either short-term or long-term cash flow growth that an investor expects to receive. When implementing the DCF method, the time value of money is considered by equating the current stock price of a company to the present value of the future cash flows that an investor expects to receive over the entire time that he or she owns the stock. The discount rate required to make the future cash flow stream, on a net present value basis, equal to the current stock price is the cost of equity. The only two sources of cash flow to an investor are dividends and the net proceeds from the sale of stock at whatever time in the future the investor finally sells. Therefore, the DCF method is discounting future cash flows that investors expect to receive from dividends and from the eventual sale of the stock. Five-year earnings growth rate forecasts are especially poor indicators of cash flow growth even over the five years being measured by the five-year earnings growth rate number. This is because, for different reasons, the five-year earnings per share growth rate is not indicative of growth in either of the two cash flow sources to an investor.

Q. WHY IS A FIVE-YEAR EARNINGS PER SHARE GROWTH RATE A POOR INDICATOR OF THE FIVE-YEAR CASH FLOW EXPECTATION FROM DIVIDENDS?

A. The board of directors changes dividend rates based upon long-term earnings expectations combined with the capital needs of a company. Most companies do not cut the dividend simply because a company has a year in which earnings were below sustainable trends, and similarly they do not increase dividends simply because earnings

for one year happened to be above long-term sustainable trends. Therefore, over any given five-year period, earnings growth is frequently very different from dividend growth. In order for earnings growth to equal dividend growth, at a minimum, earnings per share in the first year of the five-year earnings growth rate period would have to be exactly on whatever long-term earnings trend line that is expected by investors. Since earnings in most years are either above or below the trend line, the earnings per share growth rate over most five-year periods is different than what is expected for earnings growth.

Q. WHY IS A FIVE-YEAR EARNINGS PER SHARE GROWTH RATE A POOR INDICATOR OF FUTURE STOCK PRICE GROWTH?

A. If a company happens to experience a year in which earnings decline below what investors believe are consistent with the long-term trend, then the stock price does not drop anywhere near as much as earnings drop. Similarly, if a company happens to experience a year in which earnings are higher than the investor-perceived long-term sustainable trend, then the stock price will not increase as much as earnings. In other words, the P/E (price/earnings) ratio of a company will increase after a year in which investors believe earnings are below sustainable levels, and the P/E ratio will decline in a year in which investors believe earnings are higher than expected. Since it is stock price that is one of the important cash flow sources to an investor, a five-year earnings growth rate is a poor indicator of cash flow both because it is a poor indicator of stock price growth over the five years being examined and is equally a poor predictor of dividend growth over the period.

Q. ARE YOU SAYING THAT ANALYSTS' CONSENSUS EARNINGS PER SHARE GROWTH RATES ARE USELESS AS AN AID TO PROJECTING THE FUTURE?

A. No. Analysts' EPS growth rate are, however, very dangerous if used in a simplified DCF without proper interpretation. While they are not useful if used in their "raw" form, they can be useful in computing estimates of what earned return on equity investors expect will be sustained in the future, and as such, are useful in developing long-term sustainable growth rates. But, the growth rate from an arbitrary starting year is, in and of itself, as useless as attempting to measure the average slope of a mountain based upon the slope encountered over the last five minutes of hiking on a jagged trail up the mountain. In my implementation of the simplified DCF method, I use the Zacks five-year earnings per share growth only to help determine what earned return on book equity investors anticipate will be achieved in five years. Then, I consider the resultant earned return on book equity as one of the inputs to determine the value of "r" that I use in the "b x r" growth rate computation. In this way, I give consideration to analysts' consensus growth rate, but do so in a way that results in a long-term sustainable cash flow growth rate rather than making the erroneous assumption that a five-year earnings per share growth rate is somehow an indicator of cash flow growth. Remember, cash flow received by an investor is in the form of either dividends or stock price appreciation.

Q. BESIDES GROWTH RATE, ARE THERE ANY OTHER DCF ANALYSIS INPUTS THAT MR. MOUL HAS ESTIMATED INCORRECTLY?

A. Yes. Mr. Moul made an unjustifiable "leverage adjustment"

Q. PLEASE EXPLAIN WHY MR. MOUL'S LEVERAGE ADJUSTMENT IS UNJUSTIFIABLE.

A. On page 30, lines 21-23 of Mr. Moul's direct testimony he says, "...the DCF model must be modified to account for differences in risk when the book value capital structure contains more financial leverage than the market value capital structure." As shown on NG-PRM-5 Mr. Moul increases his DCF by 0.54% to account for this difference in financial leverage. This line of reasoning is counterintuitive – he is saying that as the stock prices increase, the cost of equity also increases, i.e. the more an investor is willing to pay for the same cash flow, the higher the yield the investor demands.

If this adjustment were to make sense for a regulated utility, investors would expect earned returns to decline. It is this decrease in earnings that could rationally be argued to increase the level of financial risk Mr. Moul's leverage adjustment is attempting to capture. However, if investors really expected this to occur they would also be expecting a decline in the market price. A decline in the market price would therefore have to be modeled simultaneously with the anticipated decrease in the coverage ratios. The anticipated decrease in the market price would most likely more than substantially offset the upward risk adjustment when making cost of capital computations. In reality, investors do not expect stock prices to decline (or they already would have declined); thus, neither the downward adjustment for the stock price decline nor the upward adjustment for the alleged increase in financial risks has any place in the quantifications for the cost of equity.

C. Risk Premium Method

Q. PLEASE EXPLAIN MR. MOUL'S VERSION OF THE RISK PREMIUM METHODS AS PRESENTED IN HIS DIRECT TESTIMONY.

A. Mr. Moul calculates an equity risk premium of S&P Utility index over public utility bonds for four periods, all of which include the period 1979-2006:

Time Period	Equity Risk Premium
1928 to 2006	5.37%
1952 – 2006	6.40%
1974 – 2006	5.61%
1979 – 2006	5.83%

See page 41 of Mr. Moul's direct testimony.

He calculates his risk premium by averaging the midpoint of the range of: 1) The geometric mean and median, and 2) The arithmetic mean and median. He calculates the average of the 1952 – 2006 and the 1974 – 2006 data to get a risk premium of 5.72% (5.61% + 5.83%)/2. See page 41 of Mr. Moul's direct testimony. Mr. Moul adjusts this 5.72% risk premium calculation down to 5.25% because of "...various differences in fundamentals between the Gas Group and the S&P Utilities..." See page 43, lines 6-7 of Mr. Moul's direct testimony.

Q. PLEASE COMMENT ON MR. MOUL'S RISK PREMIUM METHOD.

A. There are two very serious problems with Mr. Moul's risk premium method. One is a

problem with his financial theory, and the other is a mathematical mistake. The problem with his financial theory is that he incorrectly assumes that the risk premium between debt and equity are constant, when they are not. The risk premium as measured against interest rates has been anything but constant. Formal Federal Reserve Chairman Alan Greenspan said, "A hall-mark of the past two decades has been a persistent fall in risk premiums[12]." It is risk premiums measured against the inflation rate, not interest rates, which have shown to be reasonably constant. I will discuss Mr. Moul's mathematical mistakes below.

Q. PLEASE EXPLAIN THE MATHEMATICAL MISTAKES MADE BY MR. MOUL.

A. Mr. Moul made mathematical errors when he quantified the historic earned returns actually achieved by both common stocks and by bonds. Mr. Moul used the arithmetic mean. The arithmetic mean is specifically identified by several sources as a method that will specifically result in an answer that is upwardly biased. In addition to using the "known-to-be-biased" arithmetic mean, Mr. Moul also presented a risk premium study based upon a comparison of median returns. The use of the median overstates the risk premium merely because there is a different distribution of the returns on bonds than the returns on stocks. The distribution happens to vary such that there is a larger difference between the median and the geometric mean return on bonds than there is on common stocks. The actual return achieved by real investors is not based upon a median return, but is based upon the actual aggregate return. Therefore, Mr. Moul is wrong to have even considered using the median analysis in a risk premium context.

[12] Greenspan, Alan. The Age of Turbulence. New York: The Penguin Press, 2007

Q. DOES IBBOTSON SBBS/MORNINGSTAR RECOMMEND USING THE ARITHMETIC AVERAGE?

A. Ibbotson SBBS/Morningstar does present the same flawed arithmetic averaging relied upon by Mr. Moul in his testimony. However, when actually making predictions for the future, Ibbotson SBBS/Morningstar's conclusion is a result consistent with the compounded annually, or the geometric average returns. Other sources recognize that the compound annual average (geometric return) is correct. For example: Value Line, in an article "The Difference in Averaging" states "the arithmetic average has an upward bias though it is the simplest to compute. The geometric average doesn't have a bias and thus is the best to use compound (over a number of years)." A copy of the entire Value Line article is included as Appendix A to this testimony. Additionally, the U.S. Securities and Exchange Commission specifically prohibits mutual funds from reporting returns on an arithmetic average basis. They are required to report returns using the compounded annual average or the geometric average.

An article that appeared in the Wall Street Journal entitled "Financial Advisor and Fuzzy Math" starts out by saying the following

> Some financial advisors rely too heavily on a formula known as arithmetic average, which can be misleading when investing for the long term. Financial advisers who use this formula may be overstating your potential profit and leading you to take risks you might otherwise avoid.

A copy of this entire article is included in Appendix B of my testimony.

Q. CAN YOU PROVIDE A MATHEMATICAL EXAMPLE THAT SHOWS WHY

RISK PREMIUM BASED UPON HISTORIC ARITHMETIC RETURNS ARE IMPROPER?

A. Yes. As previously stated, arithmetic average returns overstate the actual returns received by investors because arithmetic returns measure volatility, not actual returns earned by investors. The more variable historic growth rates have been, the more his method exaggerates actual growth rates. Arithmetic average returns ignore the impact of compound interest. For example, if a company were to have a stock price of $10.00 in the beginning of the first year of the measurement period and a $5.00 stock price at the end of the first year, an arithmetic average approach would conclude that the return earned by the investor would be a loss of 50% [($5- $10)/($10)]. If, in the second year, the stock price returned to $10.00, then the arithmetic average would compute a gain of 100% in the second year [($10-$5)/($5)]. The arithmetic average approach would naively average the 50% loss in the first year with the 100% gain in the second year to arrive at the conclusion that the total return received by the investor over this two year period would be 25% per year [(-50% +100%)/2 years]. In other words, the arithmetic average approach is so inaccurate that it would conclude the average annual return over this two year period was 25% per year even though the stock price started at $10.00 and ended at $10.00. The geometric average would not make such an error. It would only consider the compound annual return from the beginning $10.00 to the ending $10.00, and correctly determine that the annual average of the total returns was not 25%, but was zero.

In order to protect investors from misleading data, the SEC requires mutual funds to report historic returns by using the geometric average only. The arithmetic average is not

permitted. The geometric average, or SEC method, has the compelling advantage of providing a true representation of the performance that would have actually been achieved by an investor who made an investment at the beginning of a period and re-invested dividends at market prices prevailing at the time the dividends were paid.

Q. HOW MUCH DOES THE USE OF THE ARITHMETIC AVERAGE INCREASE MR. MOUL'S RISK PREMIUM COST OF EQUITY CALCULATION?

A. Mr. Moul's recommended common equity risk premium of 5.25% (see page 43, lines 9-11 of Mr. Moul's direct testimony) is 90 basis points higher than if he used solely the geometric mean for the same two time periods he selected.

For the two sub-periods he chose, the geometric average is 4.24% between 1974 to 2006 and 4.46% between 1979 and 2006. The average of these two sub-periods is 4.35%. The 5.25% risk premium less the geometric mean of those time periods of 4.35% is 0.90, or 90 basis points higher than the actual return.

The geometric average of the S&P Public Utilities from 1928 to 2006 is 3.35% (See NG-PRM-10 of Mr. Moul's direct testimony) which is 190 basis lower than the risk premium used by Mr. Moul.

Q. HAVE RISK PREMIUMS BEEN STABLE OVER THE YEARS?

A. No. As stated earlier, former Federal Reserve Chairman Alan Greenspan said, "A hall-mark of the past two decades has been a persistent fall in risk premiums."[13] This is yet another important problem with Mr. Moul's approach to the risk premium method.

[13] Greenspan, Alan. The Age of Turbulence. New York: The Penguin Press, 2007

Mr. Moul has ignored this clear down trend in risk premiums and as a result, he over estimates the cost of equity for NG.

D. CAPM Method.

Q. PLEASE BRIEFLY DESCRIBE THE CAPM METHOD.

A. As stated earlier in my testimony, the capital asset pricing model is a method for calculating the cost of equity for a stock by adding a risk premium to a risk free rate. The risk premium appropriate for a group of companies is proportional to the "beta" of that group. The beta is a measure of how correlated the movement of a stock, or in this case the proxy group of 7 gas companies, is to the overall market.

Q. PLEASE EXPLAIN HOW MR. MOUL IMPLEMENTED THE CAPM.

A. Mr. Moul implemented his CAPM method by determining what he believes to be the return earned by common stocks in excess of the risk free rate of interest. He attempted to quantify the return earned by common stocks by presenting two different versions of projected returns and one historical analysis. He then averaged those results to arrive at his recommended risk premium of 8.28% for use with a company of average risk. He considers the .86 beta published by Value Line but he adjusts this up to 1.02 because Value Line betas are based on market value. He used the interest rate on 20-year treasury bonds of 4.75%. See page 46 and 47 of Mr. Moul's direct testimony.

Q. HOW DID MR. MOUL ARRIVE AT THE PORTION OF HIS RISK PREMIIUM BASED UPON PROJECTED RESULTS?

A. Mr. Moul used both what Value Line projects for total return on stocks over the next five years and used a DCF method applied to the S&P 500. He found that the compound annual return projected by Value Line for its basket of stocks is 12.57% over the next five years. Additionally, he found that if he added the dividend yield on the S&P 500 to the five-year earnings per share growth rate forecast by First Call, he obtained a "DCF" result of 13.49%. He averaged these two results to obtain a projected earned return of 13.03%. He then subtracted the 4.75% interest rate on 20-year treasury bonds to obtain a risk premium of 8.28%.

Q. HOW DID MR. MOUL OBTAIN THE RISK PREMIUM BASED UPON HISTORICAL RETURNS?

A. Mr. Moul noted that the arithmetic average of annual returns on the S&P 500 from 1926 through 2007 was an average of 12.30%. From this, he subtracted the historical arithmetic average of 5.80% earned on government bonds from 1926-2007 to arrive at a risk premium of 6.50%.

Q. HOW DID MR. MOUL COMBINE THE PROJECTED RETURN WITH THE HISTORICAL RETURNS TO ARRIVE AT THE RISK PREMIUM FOR USE IN HIS CAPM MODEL?

A. Mr. Moul averaged the 8.28% obtained from the average of his two projected methods with the 6.50% obtained from his historical method to arrive at an average result

of 7.39% for his risk premium. He then multiplied this 7.39% by his upwardly adjusted beta of 1.02[14] to arrive at a claimed risk premium applicable to the gas company group of 7.538%. He then further adds another 0.97% to this 7.538% risk premium to add an additional premium for "size". After adding for size, the risk premium Mr. Moul uses is then 8.508%. To this, he then adds 0.19% for flotation costs and 4.75% as his "risk free rate" to obtain his CAPM indicated cost of equity of 13.45%. See page 49 of Mr. Moul's direct testimony.

Q. PLEASE COMMENT ON MR. MOUL'S CAPM METHOD?

A. Mr, Moul's CAPM method is an anthology of errors all combined to arrive at an indicated cost of equity so high that it can easily be seen to be lacking credibility. His use of the arithmetic average is wrong for the reasons stated earlier in my testimony; the DCF approach to compute the risk premium makes the same error he did in his DCF analysis by using short-term analyst forecasts as a proxy for long-term sustainable growth; the use of Value Line's five-year projection of total returns on the stock market as if it were intended to be a reflection of investor expectations when, in fact Value Line has no such intention in mind; the inflation of the beta as applied to the risk premium to repeat the conceptual error he made when applying the leverage adjustment to his DCF method.

[14] Mr. Moul uses the Hamada Model to increase the beta applied to his CAPM analysis to account for "...the financial risk associated with the ratesetting capital structure that is measured at book value" (See page 45, lines 15-16 of Mr. Moul's direct testimony)

Q. IS MR. MOUL'S PREMIUM ADDER FOR A SMALL SIZE EFFECT AN APPROPRIATE PART OF A CAPM ANALYSIS?

A. No. Mr. Moul's premium adder for the relative small size the Gas Group is unjustifiable. A proper analysis of the data from Ibbotson SBBI/Moriningstar shows that size is a diversifiable risk and therefore does not impact the cost of equity. (See my CAPM-based equity cost computation discussed earlier in this testimony). In any event, even if someone were to believe, however incorrectly, that size impacted risk above and beyond the risk reflected in a company's beta, National Grid, PLC is hardly a small company. As shown on JAR Schedule 8, National Grid, PLC has a total capitalization of 24.7 billion pounds sterling, and total book equity of 9.33 billion pounds sterling. This equates to roughly $50 billion of total capital and $18 billion of total common equity.

E. Comparable Earnings Method

Q. PLEASE EXPLAIN THE COMPARABLE EARNINGS METHOD PRESENTED BY MR. MOUL.

A. Mr. Moul selected a group of non-utility companies that he believes to be of comparable risk to NG. After selecting the companies, he presents the historic and Value Line expected return on book equity. See NR-PRM- 22, page 2 of Mr. Moul's testimony. The final column of numbers on this table is the "Projected 2011-13." However, what he labels as the projected 2011-13 return is actually the return on book equity that Value Line forecasts, not the return that Value Line projects investors will receive on their investment as a result of purchasing the common stock at current prices. According to

Mr. Moul's NR-PRM-22 the total return expected by Value Line on the book equity of these industrial companies is between a 7.5% and a high of 44.0%, for an average of 16.7%, and a median of 13.5%.

Q. IS THIS METHOD VALID?

A. No. Mr. Moul has attempted to determine the cost of equity that would be demanded by investors on the market price of a company comparable to NG by comparing it to the historic and projected returns on book equity of a selection of industrial companies. Leaving aside the problems with actually being able to select companies that are comparable, the overriding problem with Mr. Moul's comparable earnings analysis is that it did not address the cost of equity at all. It simply considered the returns on book equity that were achieved, and are expected to be achieved by Value Line in the next 3 to 5 years. **The earned return on book equity is an entirely different concept from the cost of equity.**

Q. PLEASE SUMMARIZE YOUR ANALYSIS OF MR. MOUL'S TESTIMONY.

A. Mr. Moul recommends that the Company be allowed a return on equity of 11.5%. This is his recommendation even though his own DCF analysis produced an indicated cost of equity of 9.11% before making his inappropriate adjustments for leverage (0.54% adder) and flotation (0.19% adder). Even after making additions for these two improper adjustments, Mr. Moul's DCF still arrives at a result of 9.84%, or a full 1.66% lower than Mr. Moul's cost of equity recommendation.

Mr. Moul's Risk Premium method was developed based upon an improper

mathematical approach to quantifying historic actual returns. Mr. Moul's CAPM approach relies on invalid implementations of the DCF method to quantify the projected cost of equity, an improper inflation of the "beta[15]" because of a high market-to-book ratio, and he adds the invalid "size premium." The elusion of a "size premium" is manufactured by the use of a mathematical error. Mr. Moul's Comparable Earnings method is not really an equity costing method at all, as no consideration was given to investors' reactions to the earned returns on book equity.

[15] beta is a measure of non-diversifiable risk.

IX. CONCLUSION

Q. PLEASE SUMMARIZE YOUR RECOMMENDATIONS IN THIS CASE.

A. The overall cost of capital that should be allowed to NG in this proceeding is 8.56% assuming further review does not uncover any problems with the cost of debt that has been requested by the Company and assuming the Commission does not approve an RDM. This 8.56% (10.59% pre tax) declines to 8.28% (10.15% pre tax) if the RDM were to be approved. See JAR Schedule 1. This 8.56% overall cost of capital is based upon a cost of equity of 9.95% with a 37.77% common equity ratio.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

JAR SCHEDULE 1

National Grid – Request for Change in Gas Distribution Rates
DOCKET No. 3943
OVERALL COST OF CAPITAL

Capital Structure and Cost Rates Recommended Capital Structure	Ratios		Cost Rate		Weighted Cost Rate [D]	Pre Tax Cost Rate [E]
Long-Term Debt	59.06%	[A]	7.99%	[B]	4.72%	4.72%
Short-Term Debt	3.17%	[A]	2.58%	[C]	0.08%	0.08%
Common Equity	37.77%	[A]	9.95%	[D]	3.76%	5.79%
	100.0%				8.56%	10.59%

Capital Structure and Cost Rates Recommended Capital Structure **WITH REVENUE DECOUPLING**	Ratios		Cost Rate		Weighted Cost Rate [D]	Pre Tax Cost Rate [E]
Long-Term Debt	59.06%	[A]	7.99%	[B]	4.72%	4.72%
Short-Term Debt	3.17%	[A]	2.58%	[C]	0.08%	0.08%
Common Equity	37.77%	[A]	9.20%		3.47%	5.35%
	100.0%				8.28%	10.15%

Capital Structure and Cost Rates Company Requested Capital Structure	Ratios		Cost Rate		Weighted Cost Rate [F]	Pre Tax Cost Rate [G]
Long-Term Debt	40.63%	[E]	7.99%	[B]	3.25%	3.25%
Short-Term Debt	11.66%	[E]	2.58%	[C]	0.30%	0.30%
Common Equity	47.71%	[E]	9.50%	[D]	4.53%	6.98%
	100.0%				8.08%	10.53%

Sources:

[A] JAR SCHEDULE 8
[B] Attachment NG-PRM-11
[C] National Grid's Division Data Request DIV 10-2
[D] JAR SCHEDULE 2
[E] Paul R. Moul's Direct Testimony, page 4 of 53
[F] Cost Rate x Ratio
[G] 1.53 X Cost Rate for Common Equity. Source: Attachment NG-MDL-6 of Michael D. Laflamme's Direct Testimony

JAR SCHEDULE 2

NATIONAL GRID - RI GAS
COST OF EQUITY SUMMARY

	Average for Year ending 5/31/08	As of 5/31/08
SIMPLIFIED, OR CONSTANT GROWTH DCF (D/P +g) RESULTS: Based upon Electric Companies From Company Witness	9.42% [A]	9.43% [A]
Risk Premium		
Capital Asset Pricing Model		9.37% [B]

Recommended Equity Cost Rate Finding	9.50% [C]
Indicated Cost of Equity	9.50%

Recommended Equity Cost Rate Finding	9.50%
Allowance for risk for Capital Structure with 37.77% Common Equity instead of 49.12%.	0.45% [C]
Indicated Cost of Equity	9.95%

Sources:
[A] JAR SCHEDULE 3
[B] JAR SCHEDULE 6, Page 1
[C] Based on estimate of 0.04% change in cost of equity for each 1% change in common equity ratio.

JAR SCHEDULE 3

DISCOUNTED CASH FLOW (DCF) INDICATED COST OF EQUITY

		BASED ON MONTHLY MIDPOINT MARKET PRICE FOR Year Ending 5/31/08	BASED ON MARKET PRICE AS OF 5/31/08
1 Dividend Yield On Market Price	[B]	3.70%	3.60%
2 Retention Ratio:			
a) Market-to-book	[B]	2.37	2.45
b) Div. Yld on Book	[C]	8.78%	8.80%
c) Return on Equity	[A]	12.00%	12.00%
d) Retention Rate	[D]	26.79%	26.66%
3 Reinvestment Growth	[E]	3.22%	3.20%
4 New Financing Growth	[F]	2.41%	2.53%
5 Total Estimate of Investor Anticipated Growth	[G]	5.62%	5.73%
6 Increment to Dividend Yield for Growth to Next Year	[H]	0.10%	0.10%
7 Indicated Cost of Equity	**[I]**	9.42%	9.43%

Some of the Considerations for Determining Future Expected Return on Equity:

Sources:		Median	Mean	Source:
[A]	Value Line Expectation	12.00%	12.80%	JAR SCHEDULE 4, Page 2
	Return on Equity to Achieve Zacks' Growth	13.11%	13.72%	JAR SCHEDULE 4, Page 3
	Earned Return on Equity in 2007	12.18%	12.40%	JAR SCHEDULE 4, Page 2
	Earned Return on Equity in 2006	12.03%	14.60%	JAR SCHEDULE 4, Page 2
	Earned Return on Equity in 2005	11.89%	13.44%	JAR SCHEDULE 4, Page 2

[B] JAR SCHEDULE 4, Page 1

[C] Line 1 x Line 2a

[D] 1- Line 2b/Line 2c

[E] Line 2c x Line 2d

[F] S X V

[M/B X (Ext. Fin Rate+1]/(M/B + Ext. Fin. Rate-1) Ext. Fin. rate used = 1.75% [J]

[G] Line 3 + Line 4

[H] Line 1 x one-half of line 5

[I] Line 1 + Line 5 + Line 6

[J] JAR SCHEDULE 5

COMPARATIVE COMPANIES
SELECTED FINANCIAL DATA

		VL Issue	[1] Book Per Sh. Dec. 04 [A]	[2] Book Per Sh. Dec. 05 [A]	[3] Book Per Sh. Dec. 06 [A]	[4] Book Per Sh. Dec. 07 VL Est. [A]	[5] Market Price At 05/31/08 [B]	[6] Market Price High for Year [B]	[7] Low for Year [B]	[8] Market to Book At 05/31/08 [C]	[9] Avg. for Year [C]	[10] Div. Rate [A]	[11] Dividend Yield At 5/31/08 [D]	[12] Avg. for Year [D]
COMPANY WITNESS ELECTRIC GROUP EXCLUDING TXU														
AGL	ATG		$18.06	$19.29	$20.71	$21.74	$35.70	$42.80	$33.45	1.64	1.80	$1.68	4.71%	4.41%
ATMOS Energy Corp.	ATO		$18.05	$19.90	$20.16	$22.01	$27.39	$32.60	$25.00	1.24	1.37	$1.30	4.75%	4.51%
Equitable Res.	EQT		$7.17	$2.96	$7.78	$8.98	$76.23	$76.14	$44.57	7.82	7.20	$0.88	1.25%	1.46%
Laclede Group	LG		$16.98	$17.31	$18.85	$19.79	$40.00	$41.57	$28.84	2.02	1.82	$1.50	3.75%	4.26%
Nicor, Inc.	GAS		$16.99	$18.36	$19.43	$20.58	$40.83	$47.47	$32.35	1.98	2.00	$1.86	4.56%	4.66%
N. W. National Gas	NWN		$20.64	$21.28	$21.97	$22.52	$45.58	$56.89	$40.98	2.02	2.06	$1.50	3.29%	3.27%
Piedmont National Gas	PNY		$11.15	$11.53	$11.83	$11.99	$27.03	$27.98	$22.00	2.25	2.10	$1.04	3.85%	4.16%
South Jersey Inds.	SJI		$12.41	$13.50	$15.11	$16.25	$38.25	$39.28	$31.20	2.35	2.25	$1.08	2.82%	3.06%
Southwest Gas	SWX		$19.18	$19.10	$21.58	$22.98	$31.18	$38.52	$25.14	1.36	1.43	$0.90	2.89%	2.83%
WGL Holdings	WGL		$16.95	$17.80	$18.28	$19.63	$34.89	$35.91	$29.79	1.76	1.72	$1.44	4.13%	4.38%
		AVERAGE	$15.76	$16.10	$17.57	$18.67	$39.11	$43.32	$31.33	2.45	2.37	$1.32	3.60%	3.70%
		MEDIAN								2.00	1.91		3.80%	4.21%

e= Estimated by Value Line

Sources:

[A] Most current Value Line at time of prep. of schedule. Most current quarterly dividend rate X 4
Note: For South Jersey Inds. There is no dividend for Q1 2008 so used 3Q 2007 X 1.10 X 4 (Note: never pay dividend in Q1, Q3 dividend have been increasing at an increasing rate (a bout 8% btw 2006 and 2007) Q4 has been about 2 X Q3
[B] Yahoo Finance -- Historical Prices, 2/15/07
[C] Market price divided by book value
[D] Dividend rate divided by market price

COMPARATIVE COMPANIES
EARNINGS PER SHARE AND RETURN ON EQUITY

	[1] EPS 2005	[2] EPS 2006	[3] EPS 2007	[4] Return on Eq. 2006	[5] Return on Eq. 2007	[6] Value Line Future Exp. Return on Eq.	[7] Return on Equity 2005
COMPANY WITNESS ELECTRIC GROUP EXCLUDING TXU	[A]	[A]	[A]	[B]	[B]	[A]	[B]
AGL	$2.48	$2.72	$2.72	13.60%	12.82%	13.00%	13.26%
ATMOS Energy Corp.	$1.72	$2.09	$1.94	9.99%	9.20%	9.50%	9.06%
Equitable Res.	$1.75	$1.86	$1.49	34.64%	17.78%	21.50%	34.55%
Laclede Group	$1.90	$2.37	$2.31	13.11%	11.96%	11.50%	11.09%
Nicor, Inc.	$2.27	$2.87	$2.99	15.19%	14.95%	14.00%	12.84%
N. W. National Gas	$2.11	$2.35	$2.76	10.87%	12.41%	11.00%	10.07%
Piedmont National Gas	$1.32	$1.28	$1.40	10.96%	11.75%	12.50%	11.64%
South Jersey Inds.	$1.71	$2.46	$2.09	17.20%	13.33%	14.50%	13.20%
Southwest Gas	$1.25	$1.98	$1.95	9.73%	8.75%	10.00%	6.53%
WGL Holdings	$2.11	$1.94	$2.10	10.75%	11.02%	10.50%	12.14%
	$1.86	$2.18	$2.18	14.60%	12.40%	12.80%	13.44%
				12.03%	12.18%	12.00%	11.89%

e= Estimated by Value Line

Source:

Source:

[A] Most current Value Line at time of prep. of schedule.
[B] Earnings Per Share divided by average book value. Book value shown on JAR SCHEDULE 4, Page 1

RETURN ON EQUITY IMPLIED IN
YAHOO FINANCE COVERING BROKER'S GROWTH RATES

COMPANY WITNESS ELECTRIC GROUP EXCLUDING TXU		Dec. 07 Y/E Book [3] [A]	Earnings 2007 [A]	Dividends [A]	Analyst 5 Year Growth Rate 10/ [B]	Y/E Book in 2011 at Zack's Growth [C]	Y/E Book in 2012 at Zack's Growth [C]	Earnings 2012 at Zack's Growth [C]	Return on Equity to achieve Analysts' Growth [C]	VALUE LINE BETA [A]
AGL	ATG	$21.74	$2.72	$1.68	4.89%	$26.42	$27.74	$3.44	12.70%	0.85
ATMOS Energy Corp.	ATO	$22.01	$1.94	$1.30	5.30%	$24.93	$25.76	$2.51	9.91%	0.85
Equitable Res.	EQT	$8.98	$1.49	$0.88	9.80%	$12.08	$13.05	$2.38	18.92%	0.95
Laclede Group	LG	$19.79	$2.31	$1.50	10.00%	$23.93	$25.23	$3.72	15.14%	0.90
Nicor, Inc.	GAS	$20.58	$2.99	$1.86	10.00%	$26.35	$28.17	$4.82	17.67%	0.95
N. W. National Gas	NWN	$22.52	$2.76	$1.50	6.20%	$28.39	$30.09	$3.73	12.75%	0.80
Piedmont National Gas	PNY	$11.99	$1.40	$1.04	6.00%	$13.66	$14.14	$1.87	13.48%	0.85
South Jersey Inds.	SJI	$16.25	$2.09	$1.08	7.90%	$21.16	$22.64	$3.06	13.96%	0.85
Southwest Gas	SWX	$22.98	$1.95	$0.90	8.00%	$28.09	$29.63	$2.87	9.93%	0.90
WGL Holdings	WGL	$19.83	$2.10	$1.44	7.30%	$22.99	$23.93	$2.99	12.73%	0.90
		$18.67	$2.18	$1.32	7.53%	$22.80	$24.04	$3.14	13.72%	0.88
					7.60%				13.11%	0.88

[A] Must Current Value Line at time of prep of schedule
[B] Zacks.com, 5/29/08
[C] Projected return on equity is obtained by escalating both dividends and earnings per share by the stated growth rate, and adding earnings and subtracting dividends in each year to determine the book value.

EXTERNAL FINANCING RATE
(Millions of Shares)

S&P DISTRIBUTION ELECTRIC UTILITIES COMPANY WITNESS GROUP	Common Stock Outstanding 2007	2011-13	Compound Annual
AGL	76.40	80.00	1.16%
ATMOS Energy Corp.	89.33	115.00	6.52%
Equitable Res.	122.16	119.00	-0.65%
Laclede Group	21.65	25.50	4.18%
Nicor, Inc.	45.90	46.00	0.05%
N. W. National Gas	26.41	28.00	1.47%
Piedmont National Gas	73.23	72.00	-0.42%
South Jersey Inds.	29.61	32.00	1.96%
Southwest Gas	42.81	48.00	2.90%
WGL Holdings	49.45	50.00	0.28%
		Average	1.74%
		Median	1.32%
		Round to	**1.75%**

External financing rate adjusted for change in common equity ratio

Source: Most current Value Line at time of prep. of schedule.

CAPITAL ASSET PRICING MODEL
BASED ON HISTORICAL ACTUAL COMPOUND ANNUAL RETURNS

1	Historical Actual Return - beta = 1	10.40%	[A]
2	Historical Actual Return - beta = 0.88	9.72%	[B]
3	Interest Rate on 30-Year Treasury Bonds	4.70%	[C]
4	Interest Rate on Long-Term Inflation Indexed Treasury Bonds	2.05%	[C]
5	Current Market Inflation Expectation	2.65%	Line 3 minus Line 4
6	Historical Actual Inflation	3.00%	[D]
7	Difference From Historical Actual Inflation	0.35%	
8	Adjusted Returns For Current Market Inflation Expectation Beta = 1	10.05%	

CAPITAL ASSET PRICING MODEL

7	Indicated Cost of Equity for Portfolio of Companies with a beta of 0.88	9.37%

Sources:
[A] Ibbotson Associates 2008 Yearbook, page 295
[B] JAR SCHEDULE 6, Page 2
[C] www.bloomberg.com/markets/rates/index.html, 5/29/08
[D] Ibbotson Associates 2008 Yearbook, page 331

JAR SCHEDULE 6, Page 2

GAS COMPANIES

CAPITAL ASSET PRICING MODEL
HISTORIC ACTUAL COMPOUND RETURNS
and HISTORIC ACTUAL COMPOUND ANNUAL RETURNS ADJUSTED FOR
DIFFERENCE BETWEEN CURRENT AND HISTORICAL ACTUAL INFLATION RATE

	Portfolio by Size Decile	1	2	3	4	5	6	7	8	9	10
[A]	Beta	0.91%	1.03%	1.10%	1.12%	1.16%	1.18%	1.24%	1.30%	1.35%	1.41%
[B]	Historic Actual Compounded Annual Return	9.60%	10.90%	11.30%	11.10%	11.70%	11.70%	11.60%	11.80%	11.90%	13.60%
[C]	Reduced Compounded Annual Returns	9.25%	10.55%	10.95%	10.75%	11.35%	11.35%	11.25%	11.45%	11.55%	13.25%

[D] **Least Squared Line derived from compounded annual returns per decile**

Beta	Slope	Y-Intercept	Return
0.88	5.9922	4.45	**9.72%**

See graph on JAR Schedule 6, page 4

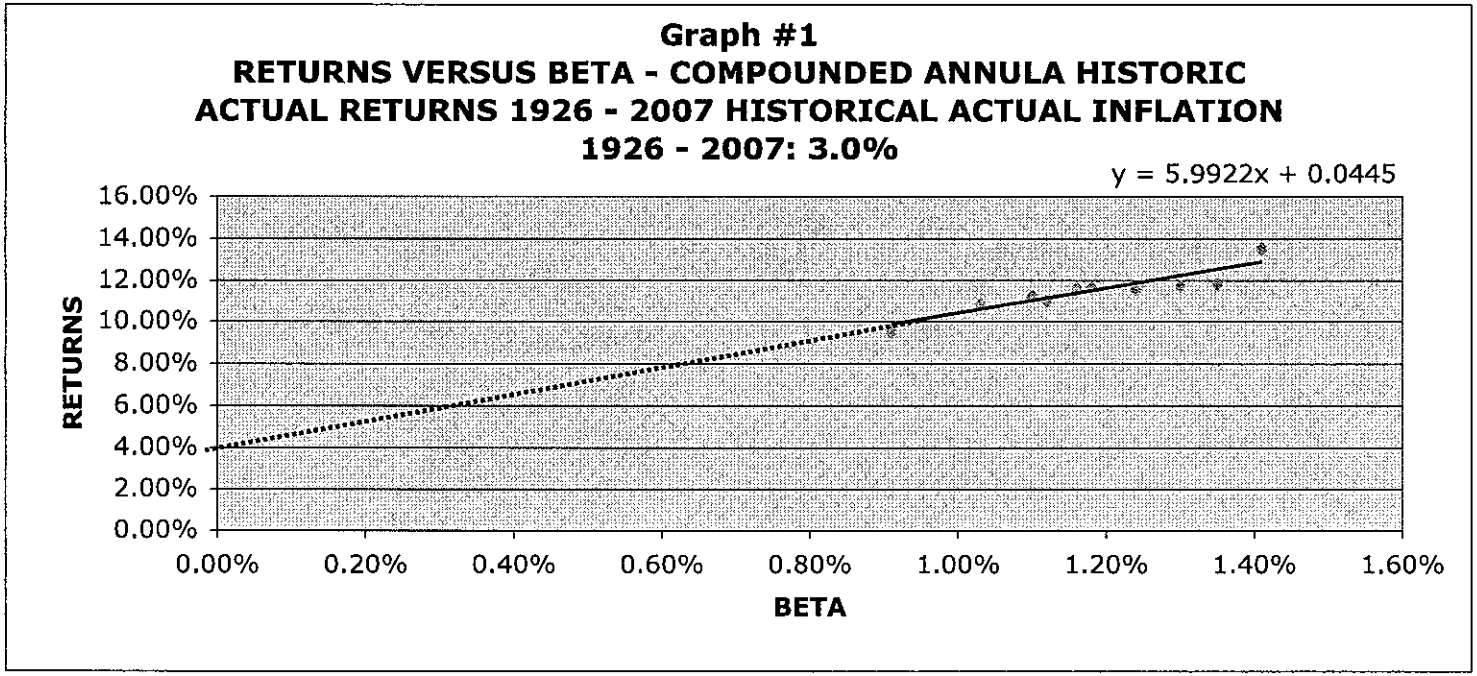
Least Squared Line

	Beta	Slope	Y-Intercept	Return
[E]	0.88	5.9922	4.1	**9.37%**

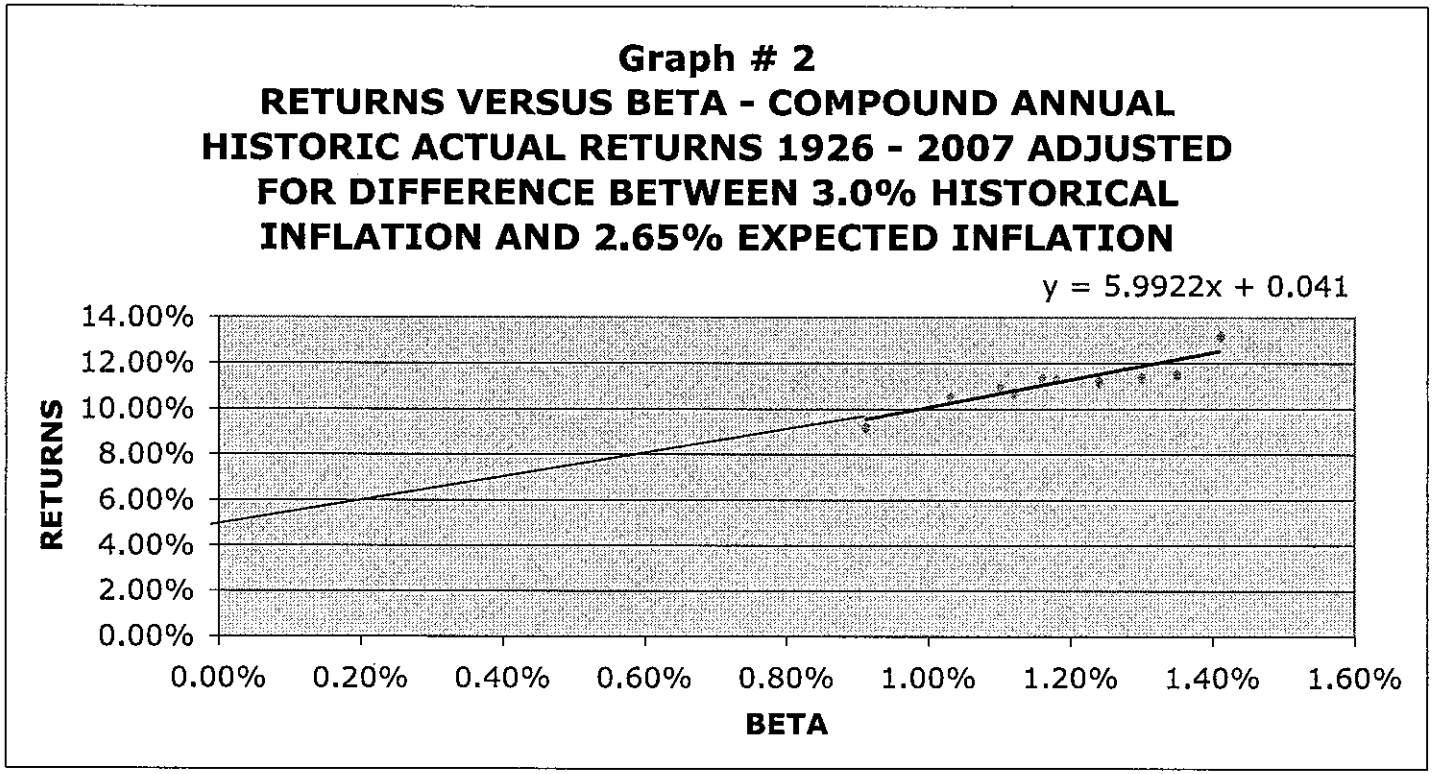
See graph on JAR Schedule 6, page 5

[A] Ibbotson Associates 2008 Yearbook, page 142
[B] Ibbotson Associates 2008 Yearbook, page 130
[C] by 0.35% actual difference between 3.00% historical and 2.65% current expected long-term inflation rate.
[D] Least Squared Line derived from Historical Actual Compounded Annual Return
[E] Least Squared Line derived from Reduced Compouned Annual Return

Beta	0.91%	1.03%	1.10%	1.12%	1.16%	1.18%	1.24%	1.30%	1.35%	1.41%
Historic Actual Compounded Annual Return	9.60%	10.90%	11.30%	11.10%	11.70%	11.70%	11.60%	11.80%	11.90%	13.60%



Beta	0.91%	1.03%	1.10%	1.12%	1.16%	1.18%	1.24%	1.30%	1.35%	1.41%
Reduced Compounded Annual Returns	9.25%	10.55%	10.95%	10.75%	11.35%	11.35%	11.25%	11.45%	11.55%	13.25%



JAR SCHEDULE 7

Actual Capital Structure

	% Common Equity w/out Short Term Debt					($000,000s)	Quantity					Percentage			
	2003	2004	2005	2006	2007	Total Debt	LT Debt	ST Debt	Pfd Stock	Equity	Total Capital	LT Debt	ST Debt	Pfd Stock	Equity Ratio With ST Debt
AGL	49.7%	46.0%	48.1%	49.8%	49.8%	$ 1,885.0	$ 1,516.0	$ 369.0	$ -	$ 1,503.9	$ 3,388.9	44.7%	10.9%	0.0%	**44.4%**
ATMOS Energy Corp.	49.8%	56.8%	42.3%	43.0%	48.0%	$ 2,128.2	$ 2,119.7	$ 8.5	$ -	$ 1,956.6	$ 4,084.8	51.9%	0.2%	0.0%	**47.9%**
Equitable Res.*						$ 1,280.5	$ 1,253.5	$ 27.0	$ -	$ 1,100.0	$ 2,380.5	52.7%	1.1%	0.0%	**46.2%**
Laclede Group	49.4%	48.3%	51.8%	50.4%	54.6%	$ 527.4	$ 355.6	$ 171.8	$ 0.5	$ 428.3	$ 956.2	37.2%	18.0%	0.1%	**44.8%**
Nicor, Inc.	60.3%	60.1%	62.5%	63.7%	69.0%	$ 526.4	$ 373.4	$ 153.0	$ 0.6	$ 832.5	$ 1,359.5	27.5%	11.3%	0.0%	**61.2%**
N. W. National Gas	50.3%	54.0%	53.0%	53.7%	53.7%	$ 571.6	$ 512.0	$ 59.6	$ -	$ 593.8	$ 1,165.4	43.9%	5.1%	0.0%	**51.0%**
Piedmont National Gas	57.8%	56.4%	58.6%	51.7%	51.6%	$ 1,113.8	$ 824.8	$ 289.0	$ -	$ 879.3	$ 1,993.1	41.4%	14.5%	0.0%	**44.1%**
South Jersey Inds.	49.0%	51.0%	55.1%	55.3%	57.3%	$ 389.8	$ 357.9	$ 31.9	$ -	$ 480.3	$ 870.1	41.1%	3.7%	0.0%	**55.2%**
Southwest Gas	34.0%	35.8%	36.2%	39.4%	41.9%	$ 1,301.0	$ 1,263.6	$ 37.4	$ -	$ 911.3	$ 2,212.3	57.1%	1.7%	0.0%	**41.2%**
WGL Holdings	54.3%	57.2%	58.6%	61.5%	60.3%	$ 742.4	$ 597.4	$ 145.0	$ 28.2	$ 950.2	$ 1,720.8	34.7%	8.4%	1.6%	**55.2%**
Average	**50.5%**	**51.7%**	**51.8%**	**52.1%**	**54.0%**	**$ 10,466**	**$ 9,174**	**$ 1,292**	**$ 29**	**$ 9,636**	**$ 20,132**	**43.22%**	**7.48%**	**0.17%**	**49.12%**
											Median	**42.66%**	**6.77%**	**0.00%**	**47.05%**

Source: Most current Value Line at time of prep.

*Value Line does not provide a common equity ratio for Equitable Res
The amount of equity is directly from Value Line "Shr. Equity ($mill)"

JAR SCHEDULE 8

NATIONAL GRID

In millions of pounds	2007		2006	
Long Term Borrowings	14,586	59.06%	10,059	45.0%
Short-term borrowings	783	3.17%	2,565	11.5%
Equity	9,330	37.77%	9,747	43.6%
Total Capital	24,699		22,371	

Source: page 166 of National Grid's Annual Report
Numbers are for U.S. GAAP accounting.

The Differences in Averaging

One of the frequent questions we receive is related to the proper procedure to calculate the average return of an investment (stock, mutual fund, or anything else). This article will briefly examine how to compute the average change of a specific investment 1) over a set period of time, 2) over a number of years, and 3) annualizing returns over a period shorter than a year.

Averaging Calculations
There are actually three averaging methods: arithmetic, geometric, and harmonic. These formulas are shown below:

Arithmetic: $(y_1 + y_2 + \ldots + y_n)/n$

Geometric: $(((1+y_1) * (1+y_2) * \ldots * (1+y_n)) - 1)^{1/n}$

Harmonic: $(1 / ((1/n) * ((1+y_1) + (1+y_2) + \ldots + (1+y_n)))) - 1$

In each case *n* is the number of years of data and each *y* is the ending price divided by the beginning price minus 1. Stated simply, the geometric mean is the n^{th} root of the product of the individual averages. Since there are often negative returns involved in this sort of calculation, one is added to each term. At the end, the one is subtracted to get back to the decimal fraction number.

The arithmetic average has an upward bias, though it is the simplest to calculate. The geometric average does not have any bias, and thus is best to use when compounding (over a number of years) is involved. Lastly, the harmonic average has a downward bias. But since it is rarely used, we will focus on the arithmetic and geometric averages in the following discussion.

Over a Set Period of Time
The simplest way to compute the price change is to take the ending price and divide it into the beginning price. After subtracting one from the result, you are left with the holding period yield. This calculation produces the decimal fraction equivalent of the percentage change. A change in price from 4 to 5, would be computed as (5 ÷ 4) - 1, which yields .25, or 25%.

The holding period return is independent of time. That means that it can be computed on an annual basis, over a ten-year period, or any other time frame.

Compounding: Averages Over a Number of Years
Now assume we have been watching a stock for two years, and we want to compute the annual return for each year, and the average annual return for the two-year period. Let's say this stock was initially priced at $10, rose to $20 by the end of year 1, but fell back down to $10 by the end of year two. From the above-mentioned example, we know how to find the price change for the first and second year. Then we can also find the total price change over the two year period. These figures are shown in the table below:

Year	Price	% Price Change
0	$10	—
1	20	100%
2	10	-50%

Price change from year 0 to year 2: 0%

Arithmetic Average:	25%
Geometric Average:	0%

One of the more interesting observations that arises from such an example is the asymmetric nature of the returns. Notice that in this example, the stock only has to fall half as much in year two as it rose in year one to completely wipe out any paper gains the investor had during the interim. This nature highlights the importance of using the geometric return. As shown, the arithmetic average indicates that the stock had an average annual return of 25% over the past two years. However, the true return, which is corroborated by the geometric mean, is zero.

Another interesting point is that the asymmetry magnifies as the price changes increase in size. For example, let's say the stock price increased to $50 before falling back to $10.

Year	Price	% Price Change
0	$10	—
1	50	400%
2	10	-80%

Price change from year 0 to year 2: 0%

Arithmetic Average:	160%
Geometric Average:	0%

Originally, the stock had to fall 50% to wipe a 100% gain. But in the second scenario, the stock had to drop only 80% to wipe out a phenomenal 400% gain. This growing discrepancy between the different averaging techniques highlights the importance of accurately measuring and portraying investment results. Again we see that the geometric average portrays the true return accurately.

Annualizing Returns

An annualized holding period return figure can be computed by taking the $1/n^{th}$ root of the holding period return, where n is the length of the sub-period relative to the year. (For a three-month period, n would equal .25, or one-fourth of the year. For a two-year period, n would equal 2.) Below are two examples that show how this operation is performed.

Let's say you wanted to figure out the annualized return of a stock that rose 5% in the first quarter. The annualized return would then be computed as $(1.05)^{1/.25}$, or 21.6%.

We can also compute an average annualized return figure from a period longer than a year. For example, if the stock rose 20% for two straight years, the cumulative growth rate would be 44% (1.20 * 1.20). This figure could be dissected into the average annual rate using the same formula shown above $(1.44)^{1/2}$, which we can verify as 1.20, or 20%.

Roger J. Bos
Analyst

Timely Income Stocks

For equity investors with more of an eye for current income, we've screened our database for issues that combine high estimated dividend yields and above-average relative year-ahead performance potential, without undue investment risk.

This roster includes only those equities whose dividend yields are at least 2.7%, which is 70 basis points above the 2.0% median for all stocks in Value Line's universe. Ranks here must be no less than 2 (Above Average) for Timeliness and no less than 3 (Average) for Safety.

Although the focus here is on current income and near-term price performance, we shape our criteria to ensure solid potential returns for longer-term investors as well. Accordingly, we require a minimum projected three- to five-year total return potential of 15%, compared with the median of 14.6% for all stocks under our review. In addition, our analyst's projection for capital appreciation had to be at least 55%, which is in line with the current median price appreciation potential for all stocks in the Value Line universe.

Given the relatively stringent criteria applied here, this is a fairly short list which encompasses stocks from a fairly diverse group of industries. This list would seem to be a good starting point for income-minded investors with both short- and long-term investment perspectives. As always, though, we urge investors to consult the individual and supplementary analyses in *Ratings & Reports* before committing to any of the issues listed in the table below.

Ratings & Reports Page	Ticker	Company Name	Div'd Yld.	Recent Price	Timeliness	Safety	3-5 Yr. App. Pot.	3-5 Yr. Avg. Ret.	P/E
2141	AC	Alliance Capital Mgmt.	8.9%	27	2	3	75%	19%	10.3
816	ARV	Arvin Ind.	3.0	26	2	3	65	16	13.0
535 1580	MO	Philip Morris	4.6	39	2	3	65	18	13.4
525	KWR	Quaker Chemical	4.4	16	2	3	55	15	13.1
315	TBY	TCBY Enterprises	3.4	5¼	2	3	70	17	17.6
802	CTC	Telecom. de Chile ADR	2.8	32	1	3	70	17	15.0
591	TRN	Trinity Inds.	2.9	26	2	3	130	25	8.3
429	MRO	USX-Marathon Group	2.7	28	2	3	80	18	13.3
1401	X	USX-U.S. Steel Group	3.4	29	2	3	105	22	6.8
575	UIC	United Industrial Corp.	3.9	7⅛	2	3	60	16	9.6

The following appeared in DOW JONES NEWSWIRES October 8, 2003:

TO FINANCIAL ADVISORS AND FUZZY MATH

BY KAJA WHITEHOUSE

Next time your financial adviser makes a prediction for an average rate of return during an investment pitch, you might want to doublecheck the math.

Some financial advisers rely too heavily on a formula known as arithmetic average, which can be misleading when investing for the long term. Financial advisers who use this formula may be overstating your potential profit and leading you to take risks you might otherwise avoid, academics and other financial professionals say. Errors tend to widen when it comes to very volatile securities like emerging-markets stocks.

Arithmetic math involves a very simple formula, which is probably why so many people rely on it. To decide an average return, you add up all the return percentages and divide the results by the number of percentages.

It's a perfectly valid way to determine an average, as long as it's used to frame a stand-alone one-year return, said Knut Larsen, a partner with Brigus Group, a Toronto education service for financial advisers.

The classic example to illustrate the flaws with arithmetic math goes like this: You start with an investment of $100 and it grows 100% the first year and loses 50% the next year. To calculate the total return using arithmetic math, you would add the returns from both years -- in this case 100 minus 50 -- and divide them by two, or the number of returns.

That leaves you with the illusion of a 25% profit, when in reality you're right back where you started -- with $100. After rising 100% the first year, you had $200; but a drop of 50% cut that in half, back down to $100.

The alternative is known as geometric average, or compound annual return. This takes compounding and volatility into consideration.

Unfortunately, geometric average is a complicated formula, involving cube roots, so it may not be possible to figure out the results without a spreadsheet. But the point is to educate yourself on the issue, not to memorize complex formulas, Mr. Larsen said. Simply understanding when one formula should be used over the other, and knowing the flaws of arithmetic math is a good start, he said.

When comparing the two results, the arithmetic average generally ends up being higher than the geometric average, said Campbell Harvey, a finance professor with Duke University's Fuqua School of Business. For example, annual returns on the S&P 500 index from 1927 until now are about 12% using arithmetic math, and 10% using geometric math. That's a two percentage point difference.

The deviation isn't always enough to get worked up about, but it depends on factors such as volatility, and even fees and interest. For example, the greater the volatility of the security in question, the greater the spread will be between the two results, Mr. Harvey said.

He recalls feeling struck once by an advertisement touting Brazilian stocks attached to data showing "incredible returns" of about 50% a year. Knowing Brazil is a volatile market, Mr. Harvey went back and applied geometric math to the returns. His findings produced an average return closer to zero.

Volatility can affect the portfolio in negative ways because a severe drop makes it that much harder to catch up on the reduced amount, even if returns are phenomenal thereafter. But when

using arithmetic average, all that is known is the one-year average return, not total results.

Misleading return projections using arithmetic math are common in the insurance world, said Peter Katt, an insurance analyst in Mattawan, Mich. Some products require high return forecasts to make the products work, and this is one way to get around that, he said, adding that consumers need to educate themselves.

"I deal with very bright clients and advisers, and they have no idea what I'm talking about" when referring to the different formulas for calculating results, he said.

It may seem like a lot of financial hocus-pocus, but sometimes the misrepresentations aren't intentional, Mr. Larsen said. He published a primer on the subject this summer after bumping into a financial adviser who legitimately didn't know the effects arithmetic math was having on his planning. The adviser had a client who suffered a portfolio loss of 45%, and the adviser believed the client would need an annual return of 15% a year to get back to the original investment in three years. In reality, he would have to prepare for a return of more like 22% a year, according to Mr. Larsen's calculations.

RESUME OF JAMES A. ROTHSCHILD

UTILITY REGULATION EXPERIENCE

- Filed expert testimony on rate of return, accounting and/or financial issues with regard to electric, telephone, gas, water, health care and insurance rate setting matters in the following jurisdictions:

Alabama	Kentucky	Oklahoma
Arizona	Maryland	Oregon
Connecticut	Maine	Pennsylvania
Delaware	Massachusetts	Rhode Island
FERC	Minnesota	South Carolina
Florida	New Jersey	Vermont
Georgia	New York	Washington, DC
Illinois	Ohio	

OTHER BUSINESS EXPERIENCE

- Economic Analyst - Evaluated profitability of expansion and new venture proposals and provided financial support material for contract negotiations.

- Process Engineer - Responsible for process design and invented process improvements, which included a device that reduced a major water pollution problem.

EMPLOYMENT HISTORY

June 1967-May 1972	Olin Corporation
May 1972-August 1976	Touche Ross & Company
August 1976-May 1979	J. Rothschild Associates
May 1979-January 1985	Georgetown Consulting Group, Inc.
February 1985-Present	Rothschild Financial Consulting

EDUCATION

- University of Pittsburgh, BS, Chemical Engineering, 1967
- Case Western Reserve University, MBA, Banking& Finance, 1971

APPENDIX A TESTIFYING EXPERIENCE OF ROTHSCHILD FINANCIAL CONSULTING

ALABAMA

Continental Telephone of the South; Docket No. 17968, Rate of Return, January, 1981

ARIZONA

Southwest Gas Corporation; Rate of Return, Docket No. U-1551-92-253, March, 1993
Sun City West Utilities; Accounting, January, 1985

CONNECTICUT

Aquarion Water Company, Docket No. 04-02-14, Rate of Return, June 2004
Connecticut American Water Company; Docket No. 800614, Rate of Return, September, 1980
Connecticut American Water Company, Docket No. 95-12-15, Rate of Return, February, 1996
Connecticut Light & Power Company; Docket No. 85-10-22, Accounting and Rate of Return, February, 1986
Connecticut Light & Power Company; Docket No. 88-04-28, Gas Divestiture, August, 1988
Connecticut Light & Power Company, Docket No. 97-05-12, Rate of Return, September, 1997
Connecticut Light & Power Company, Docket No. 98-01-02, Rate of Return, July, 1998
Connecticut Light & Power Company, Docket No. 99-02-05, Rate of Return, April, 1999
Connecticut Light & Power Company, Docket No. 99-03-36, Rate of Return, July, 1999
Connecticut Light & Power Company, Docket No. 98-10-08 RE 4, Financial Issues, September 2000
Connecticut Light & Power Company, Docket No. 00-05-01, Financial Issues, September, 2000
Connecticut Light & Power Company, Docket No. 01-07-02, Capital Structure, August, 2001
Connecticut Light & Power Company, Docket No. 03-07-02 , Rate of Return, October, 2003
Connecticut Natural Gas; Docket No. 780812, Accounting and Rate of Return, March, 1979
Connecticut Natural Gas; Docket No. 830101, Rate of Return, March, 1983
Connecticut Natural Gas; Docket No. 87-01-03, Rate of Return, March, 1987
Connecticut Natural Gas, Docket No. 95-02-07, Rate of Return, June, 1995
Connecticut Natural Gas, Docket No. 99-09-03, Rate of Return, January, 2000
Southern Connecticut Gas, Docket No. 97-12-21, Rate of Return, May, 1998
Southern Connecticut Gas, Docket No. 99-04-18, Rate of Return, September, 1999
United Illuminating Company; Docket No. 89-08-11:ES:BBM, Financial Integrity and Financial Projections, November, 1989.
United Illuminating Company; Docket No. 99-02-04, Rate of Return, April, 1999
United Illuminating Company, Docket No. 99-03-35, Rate of Return, July, 1999
United Illuminating Company, Docket No. 01-10-10-DPUC, Rate of Return, March 2002
United Water Connecticut – Docket No. 07-05-44, Rate of Return, November 2007
Valley Water Systems, Docket No. 06-10-07, Rate of Return, May 2007

DELAWARE

Artesian Water Company, Inc.; Rate of Return, December, 1986

Artesian Water Company, Inc.; Docket No. 87-3, Rate of Return, August, 1987
Diamond State Telephone Company; Docket No. 82-32, Rate of Return, November, 1982
Diamond State Telephone Company; Docket No. 83-12, Rate of Return, October, 1983
Wilmington Suburban Water Company; Rate of Return Report, September, 1986
Wilmington Suburban Water Company; Docket No. 86-25, Rate of Return, February, 1987

FEDERAL ENERGY REGULATORY COMMISSION (FERC)

Koch Gateway Pipeline Company, Docket No. RP97-373-000 Cost of Capital, December, 1997
Maine Yankee Atomic Power Company, Docket No. EL93-22-000, Cost of Capital, July, 1993
New England Power Company; CWIP, February, 1984. Rate of return.

New England Power Company; Docket No.ER88-630-000 & Docket No. ER88-631-000, Rate of Return, April, 1989
New England Power Company; Docket Nos. ER89-582-000 and ER89-596-000, Rate of Return, January, 1990
New England Power Company: Docket Nos. ER91-565-000, ER91-566-000 , FASB 106, March, 1992. Rate of Return.
Philadelphia Electric Company - Conowingo; Docket No. EL-80-557/588, July, 1983. Rate of Return.
Ocean State Power Company, Ocean States II Power Company, Docket No. ER94-998-000 and ER94-999-000, Rate of Return, July, 1994.
Ocean State Power Company, Ocean States II Power Company, Docket No ER 95-533-001 and Docket No. ER-530-001, Rate of Return, June, 1995 and again in October, 1995.
Ocean State Power Company, Ocean State II Power Company, Docket No. ER96-1211-000 and ER96-1212-000, Rate of Return, March, 1996.
Southern Natural Gas, Docket No. RP93-15-000. Rate of Return, August, 1993, and revised testimony December, 1994.
Transco, Docket No. RP95-197-000, Phase I, August, 1995. Rate of Return.

Transco, Docket Nos. RP-97-71-000 and RP97-312-000, June, 1997, Rate of Return.

FLORIDA

Alltel of Florida; Docket No. 850064-TL, Accounting, September, 1985
Aqua Utilities Florida; Docket No. 060369-WS
Florida Power & Light Company; Docket No. 810002-EU, Rate of Return, July, 1981
Florida Power & Light Company; Docket No. 82007-EU, Rate of Return, June, 1982
Florida Power & Light Company; Docket No. 830465-EI, Rate of Return and CWIP, March, 1984
Florida Power Corporation; Docket No. 830470-EI, Rate Phase-In, June, 1984
Florida Power Corp.; Rate of Return, August, 1986
Florida Power Corp.; Docket No. 870220-EI, Rate of Return, October, 1987
Florida Power Corp; Docket No. 000824-EI, Rate of Return, January, 2002
Florida Power Corp; Docket No. 060001 Rate of Return, September, 2007

GTE Florida, Inc.; Docket No. 890216-TL, Rate of Return, July, 1989

Gulf Power Company; Docket No. 810136-EU, Rate of Return, October, 1981
Gulf Power Company; Docket No. 840086-EI, Rate of Return, August, 1984
Gulf Power Company; Docket No. 881167-EI, Rate of Return, 1989
Gulf Power Company; Docket No. 891345-EI, Rate of Return, 1990
Gulf Power Company; Docket No.010949-EI, Rate of Return, December 2001
Rolling Oaks Utilities, Inc.; Docket No. 850941-WS, Accounting, October, 1986
Southern Bell Telephone Company; Docket No. 880069-TL, Rate of Return, January, 1992
Southern Bell Telephone Company, Docket No. 920260-TL, Rate of Return, November, 1992
Southern Bell Telephone Company, Docket No. 90260-TL, Rate of Return, November, 1993
Southern States Utilities, Docket No. 950495-WS, Rate of Return, April, 1996
Tampa Electric Company; Docket No. 820007-EU, Rate of Return, June, 1982
Tampa Electric Company; Docket No. 830012-EU, Rate of Return, June, 1983
United Telephone of Florida; Docket No. 891239-TL, Rate of Return, November, 1989
United Telephone of Florida; Docket No. 891239-TL, Rate of Return, August, 1990
Water and Sewer Utilities, Docket No 880006-WS, Rate of Return, February, 1988.

GEORGIA

Georgia Power Company; Docket No. 3397-U, Accounting, July, 1983
BellSouth; Docket No. 14361-U, Rate of Return Rebuttal Testimony, October 2004.

ILLINOIS

Ameritech Illinois, Rate of Return and Capital Structure, Docket 96-0178, January and July, 1997.
Central Illinois Public Service Company; ICC Docket No. 86-0256, Financial and Rate of Return, October, 1986.
Central Telephone Company of Illinois, ICC Docket No. 93-0252, Rate of Return, October, 1993.
Commonwealth Edison Company; Docket No. 85CH10970, Financial Testimony, May, 1986.
Commonwealth Edison Company; Docket No. 86-0249, Financial Testimony, October, 1986.
Commonwealth Edison Company; ICC Docket No. 87-0057, Rate of Return and Income Taxes, April 3, 1987.
Commonwealth Edison Company; ICC Docket No. 87-0043, Financial Testimony, April 27, 1987.
Commonwealth Edison Company; ICC Docket Nos. 87-0169, 87-0427,88-0189,880219,88-0253 on Remand, Financial Planning Testimony, August, 1990.
Commonwealth Edison Company; ICC Docket Nos. 91-747 and 91-748; Financial Affidavit, March, 1991.
Commonwealth Edison Company; Financial Affidavit, December, 1991.
Commonwealth Edison Company, ICC Docket No. 87-0427, Et. Al., 90-0169 (on Second Remand), Financial Testimony, August, 1992.
Genesco Telephone Company, Financial Testimony, July, 1997.
GTE North, ICC Docket 93-0301/94-0041, Cost of Capital, April, 1994
Illinois Power Company, Docket No. 92-0404, Creation of Subsidiary, April, 1993
Illinois Bell Telephone Company, Dockets No. ICC 92-0448 and ICC _____, Rate of Return, July, 1993
Northern Illinois Gas Company; Financial Affidavit, February, 1987.

Northern Illinois Gas Company; Docket No. 87-0032, Cost of Capital and Accounting Issues, June, 1987.
Peoples Gas Light and Coke Company; Docket No. 90-0007, Accounting Issues, May, 1990.

KENTUCKY

Kentucky- American Water Company, Case No. 97-034, Rate of Return, June, 1997.
Kentucky Power Company; Case No. 8429, Rate of Return, April, 1982.
Kentucky Power Company; Case No. 8734, Rate of Return and CWIP, June, 1983.
Kentucky Power Company; Case No. 9061, Rate of Return and Rate Base Issues, September, 1984.
West Kentucky Gas Company, Case No. 8227, Rate of Return, August, 1981.

MAINE

Bangor Hydro-Electric Company; Docket No. 81-136, Rate of Return, January, 1982.
Bangor Hydro-Electric Company; Docket No. 93-62, Rate of Return, August, 1993
Maine Public Service Company; Docket No. 90-281, Accounting and Rate of Return, April, 1991.

MARYLAND

C & P Telephone Company; Case No. 7591, Fair Value, December, 1981

MASSACHUSETTS

Boston Edison Company; Docket No. DPU 906, Rate of Return, December, 1981
Fitchburg Gas & Electric; Accounting and Finance, October, 1984
Southbridge Water Company; M.D.P.U., Rate of Return, September, 1982

MINNESOTA

Minnesota Power & Light Company; Docket No. EO15/GR-80-76, Rate of Return, July, 1980

NEW JERSEY

Atlantic City Sewage; Docket No. 774-315, Rate of Return, May, 1977
Atlantic City Electric Company, Docket Nos. EO97070455 and EO97070456, Cost of Capital, Capital Cost Allocation, and Securitization, December, 1997.
Atlantic City Electric Company, Docket Nos. ER 8809 1053 and ER 8809 1054, Rate of Return, April, 1990
Atlantic City Electric Company, Securitization, 2002
Atlantic City Electric Company, BPU Docket No. ER03020121, Securitization, August, 2003
Bell Atlantic, Affidavit re Financial Issues regarding merger with GTE, June, 1999.

Bell Atlantic-New Jersey, Docket No. TO99120934, Financial Issues and Rate of Return, August 2000

Consumers New Jersey Water Company, BPU Docket No. WR00030174, September 2000

Conectiv/Pepco Merger, BPU Docket No. EM01050308, Financial Issues, September 2001

Elizabethtown Gas Company. BRC Docket No. GM93090390. Evaluation of proposed merger with Pennsylvania & Southern Gas Co. April, 1994

Elizabethtown Water Company; Docket No. 781-6,Accounting, April, 1978

Elizabethtown Water Company; Docket No. 802-76, Rate of Return, January, 1979

Elizabethtown Water Company; Docket No. PUC 04416-90, BPU Docket No. WR90050497J, Rate of Return and Financial Integrity, November, 1990.

Elizabethtown Water Company; Docket No. WR 9108 1293J, and PUC 08057-91N, Rate of Return and Financial Integrity, January, 1992.

Elizabethtown Water Company, Docket No. WR 92070774J, and PUC 06173-92N, Rate of Return and Financial Integrity, January, 1993.

Elizabethtown Water Company, Docket No. BRC WR93010007, OAL No. PUC 2905-93, Regulatory treatment of CWIP. May, 1993.

Elizabethtown Water Company, BPU Docket No. WR 95110557, OAL Docket No. PUC 12247-95, Rate of Return, March, 1996.

Elizabethtown Water Company, BPU Docket No. WR01040205, Cost of Capital, September 2001.

Elizabethtown Water Company, BPU Docket No. WR060307511, Cost of Capital, December 2003.

Essex County Transfer Stations; OAL Docket PUC 03173-88, BPU Docket Nos. SE 87070552 and SE 87070566, Rate of Return, October, 1989.

GPU/FirstEnergy proposed merger; Docket No. EM 00110870, Capital Structure Issues, April 2001

GPU/FirstEnergy securitization financing, Docket No.EF99080615, Financial issues, January 2002

Hackensack Water Company; Docket No. 776-455, October, 1977 and Accounting, February, 1979

Hackensack Water Company; Docket No. 787-847, Accounting and Interim Rate Relief, September, 1978

Hackensack Water Company; AFUDC & CWIP, June, 1979

Hackensack Water Company; Docket No. 804-275, Rate of Return, September, 1980

Hackensack Water Company; Docket No. 8011-870, CWIP, January, 1981

Inquiry Into Methods of Implementation of FASB-106, Financial Issues, BPU Docket No. AX96070530, September, 1996

Jersey Central Power & Light Company, Docket No. EO97070459 and EO97070460, Cost of Capital, Capital Cost Allocation, and Securitization, November 1997

Jersey Central Power & Light Company, Docket No. EF03020133, Financial Issues, January 2004.

Middlesex Water Company; Docket No. 793-254, Tariff Design, September, 1978

Middlesex Water Company; Docket No. 793-269, Rate of Return, June, 1979

Middlesex Water Company; Docket No. WR890302266-J, Accounting and Revenue Forecasting, July, 1989

Middlesex Water Company; Docket No. WR90080884-J, Accounting, Revenue Forecasting, and Rate of Return, February, 1991

Middlesex Water Company, Docket No. WR92070774-J, Rate of Return, January, 1993

Middlesex Water Company, Docket No. WR00060362, Rate of Return, October, 2000

Mount Holly Water Company; Docket No. 805-314, Rate of Return, August, 1980

Mount Holly Water Company, Docket No. WR0307059, Rate of Return, December, 2003.
National Association of Water Companies; Tariff Design, 1977
Natural Gas Unbundling Cases, Financial Issues, August 1999
New Jersey American Water Company, BPU Docket No. WR9511, Rate of Return, September, 1995
New Jersey American Water Company buyout by Thames Water, BPU Docket WM01120833, Financial Issues, July 2002,
New Jersey American Water Company, BPU Docket No. WR03070510, Rate of Return, December 2003.
New Jersey Bell Telephone; Docket No. 7711-1047, Tariff Design, September, 1978
New Jersey Land Title Insurance Companies, Rate of Return and Accounting, August and November, 1985
New Jersey Natural Gas; Docket No. 7812-1681, Rate of Return, April, 1979
New Jersey Water Supply Authority, Ratemaking Issues, February, 1995
Nuclear Performance Standards; BPU Docket No. EX89080719, Nuclear Performance Standards policy testimony
Pinelands Water Company and Pinelands Wastewater Company, Rate of Return, BPU Dockets WR00070454 and WR00070455, October, 2000.
Public Service Electric & Gas Company, Docket No. EX9412058Y and EO97070463, Cost of Capital, Capital Cost Allocation, and Securitization, November 1997
Public Service Electric & Gas Company, BPU Docket No. GR01050328, OAL Docket No. PUC-5052-01, Cost of Capital, August, 2001.
Rockland Electric Company; Docket No. 795-413, Rate of Return, October, 1979
Rockland Electric Company, Docket Nos. EO97070464 and EO97070465, Cost of Capital, Capital Cost Allocation, and Securitization, January, 1998
Rockland Electric Company, Docket No. , Cost of Capital, January 2003
Rockland Electric Company, Docket No. EF02110852, Financial Issues, January, 2004.
Salem Nuclear Power Plant, Atlantic City Electric Company and Public Service Electric & Gas Company, Docket No. ES96030158 & ES96030159, Financial Issues, April, 1996.
South Jersey Gas Company; Docket No. 769-988, Accounting, February, 1977
South Jersey Gas Company, BRC Docket No. GU94010002, June, 1994
South Jersey Gas Company, BPU Docket No. GR00050295, February, 2004
United Artists Cablevision; Docket No. CTV-9924-83, Rate of Return, April, 1984
Verizon, Rate of Return, BPU Docket No. TO 00060356, October, 2000
Verizon, Rate of Return, BPU Docket No. TO 01020095, May 2001
Verizon, Rate of Return, BPU Docket No. TO00060356, January 2004
West Keansburg Water Company; Docket No. 838-737, Rate of Return, December, 1983

NEW HAMPSHIRE

Verizon New Hampshire, DT 02-110, Rate of Return, January, 2003.
Generic Proceeding Regarding Carrying Charge Rate, Docket 07-072, 2008

NEW YORK

Consolidated Edison Company; Case No.27353, Accounting and Rate of Return, October, 1978
Consolidated Edison Company; Case No. 27744, Accounting and Rate of Return, August 1980
Generic Financing Case for Electric & Gas Companies; Case No. 27679, May, 1981

Long Island Lighting Company; Case No. 27136, Accounting and Rate of Return, June, 1977
Long Island Lighting Company; Case No. 27774, Rate of Return, November, 1980
Long Island Lighting Company; Case No. 28176 and 28177, Rate of Return and Revenue Forecasting, June, 1982
Long Island Lighting Company, Case No. 28553, Rate of Return and Finance, March, 1984
Long Island Lighting Company, Case No. 93-E-1123, Rate of Return and Finance, May, 1994
New York Telephone, Case No. 27469, April, 1979
New York Telephone, Case No. 27710, Accounting, September, 1981

NOVA SCOTIA

Nova Scotia Power Company, UARB 257-370, Rate of Return, March 2002
Nova Scotia Power Company, UARB 62-113, Rate of Return, October 2004.

OHIO

Columbia Gas Company of Ohio; Case No. 77-1428-GA-AIR, March, 1979
Columbia Gas Company of Ohio; Case No. 78-1118-GA-AIR, Accounting and Rate of Return, May, 1979
Ohio Utilities Company; Case No. 78-1421-WS-AIR, Rate of Return, September, 1979

OKLAHOMA

Oklahoma Natural Gas Company, Case PUD No. 94000047, Rate of Return, May, 1995

OREGON

PacifiCorp, Case UE 116, Rate of Return, May 2001
Portland General Electric, Case UE 102, Rate of Return, July 1998
Portland General Electric, Case UE 115, Rate of Return, May 2001
Northwest Natural Gas Company, Docket No. UG-132, July 1999

PENNSYLVANIA

Allied Gas, Et. Al., Docket No. R-932952, Rate of Return, May, 1994
ATTCOM - Pennsylvania; Docket No. P-830452, Rate of Return, April, 1984
Borough of Media Water Fund; Docket No. R-901725, Rate of Return, November 1990
Bethel and Mt. Aetna Telephone Company; Docket No. LR-770090452, Accounting and Rate of Return, January, 1978
Big Run Telephone Company; Docket No. R-79100968, Accounting and Rate of Return, November, 1980.
Bloomsburg Water Company; Docket Nos. R-912064 and R-912064C001-C003, Rate of Return, December, 1991.
Citizens Utilities Water Company of Pennsylvania and Citizens Utilities Home Water Company; Docket No. R-901663 and R-901664, Rate of Return, September, 1990
Citizens Utilities Water Company of Pennsylvania, Docket No. R-00953300, Rate of Return, September, 1995

City of Bethlehem, Bureau of Water, Docket No. R-943124, Rate of Return, October, 1994
City of Lancaster-Water Fund, Docket R-00984567, Rate of Return, May, 1999
Columbia Gas of Pennsylvania; Docket No. R-78120724, Rate of Return, May, 1979
Dallas Water Co., Harvey's Lake Water Co., Noxen Water Co., Inc. & Shavertown Water Co. Inc., Docket Nos R-922326, R-922327, R-922328, R-922329, Rate of Return, September, 1992
Dauphin Consolidated Water Company; Docket No. R-780-50616, Rate of Return, August, 1978
Dauphin Consolidated Water Company; Docket No. R-860350, Rate of Return, July, 1986
Dauphin Consolidated Water Company; Docket No. R-912000, Rate of Return, September, 1991
Duquesne Light Company; Docket No. RID-373, Accounting and Rate of Return,
Duquesne Light Company; Docket No. R-80011069, Accounting and Rate of Return, June, 1979
Duquesne Light Company; Docket No. R-821945, Rate of Return, August, 1982
Duquesne Light Company; Docket No. R-850021, Rate of Return, August, 1985
Emporium Water Company, Docket No. R-00005050, Rate of Return, October 2000
Equitable Gas Company; Docket No. R-780040598, Rate of Return, September, 1978
General Telephone Company of Pennsylvania; Docket No. R-811512, Rate of Return
Mechanicsburg Water Company; Docket No. R-911946;Rate of Return, July, 1991
Mechanicsburg Water Company, Docket No. R-922502, Rate of Return, February, 1993
Metropolitan Edison and Pennsylvania Electric Company; Rate of Return, December, 1980
National Fuel Gas Company; Docket No. R-77110514, Rate of Return, September, 1978
National Fuel Gas Company, Docket No. R-953299, Rate of Return, June, 1995
North Penn Gas Company, Docket No. R-922276, Rate of Return, September, 1992
North Penn Gas Company, Docket No. R-00943245, Rate of Return, May, 1995
Pennsylvania American Water Company, Docket R-922428, Rate of Return, October, 1992
Pennsylvania Electric Company; Rate of Return, September, 1980
Pennsylvania Gas & Water Company, Docket No. R-80071265, Accounting and Rate of Return
Pennsylvania Gas & Water Company; Docket No. R-78040597, Rate of Return, August, 1978
Pennsylvania Gas & Water Company; Docket No. R-911966; Rate of Return, August, 1991
Pennsylvania Gas & Water Company, Docket No. R-922404; Rate of Return, October, 1992
Pennsylvania Gas & Water Company; Docket No. R-922482; Rate of Return, January, 1993
Pennsylvania Gas & Water Company; Docket No. R-932667; Rate of Return, July, 1993
Pennsylvania Power Company; Docket No. R-78040599, Accounting and Rate of Return, May, 1978
Pennsylvania Power Company; Docket No. R-811510, Accounting, August, 1981
Pennsylvania Power Company; Case No. 821918, Rate of Return, July, 1982
Pennsylvania Power & Light Company; Docket No. R-80031114, Accounting and Rate of Return
Pennsylvania Power & Light Company; Docket No. R-822169, Rate of Return, March, 1983
Peoples Natural Gas Company; Docket No. R-78010545, Rate of Return, August, 1978
Philadelphia Electric Company; Docket No. R-850152, Rate of Return, January, 1986
Philadelphia Suburban Water Company; Docket No. R-79040824, Rate of Return, September, 1979
Philadelphia Suburban Water Company; Docket No. R-842592, Rate of Return, July, 1984
Philadelphia Suburban Water Company; Docket No. R-911892, Rate of Return, May, 1991
Philadelphia Suburban Water Company, Docket No. R-00922476, Rate of Return, March, 1993
Philadelphia Suburban Water Company, Docket No. R-932868, Rate of Return, April, 1994
Philadelphia Suburban Water Company, Docket No. R-00953343, Rate of Return, August, 1995.
Roaring Creek Water Company, Docket No. R-911963, Rate of Return, August, 1991
Roaring Creek Water Company, Docket No. R-00932665, Rate of Return, September, 1993
Sewer Authority of the City of Scranton; Financial Testimony, March, 1991
UGI Luzerne Electric; Docket No. R-78030572, Accounting and Rate of Return, October, 1978

United Water, Pennsylvania Inc., Docket No. R-00973947, Rate of Return, August, 1997
West Penn Power, Docket No. R-78100685, July, 1979
West Penn Power; Docket No. R-80021082, Accounting and Rate of Return
Williamsport vs. Borough of S. Williamsport re Sewage Rate Dispute
York Water Company, Docket No. R-850268, Rate of Return, June, 1986
York Water Company, Docket No. R-922168, Rate of Return, June, 1992
York Water Company, Docket No. R-994605, July, 1999
York Water Company, Docket No. R-00016236, Rate of Return, June 2001

RHODE ISLAND

Blackstone Valley Electric Company; Rate of Return, February, 1980
Blackstone Valley Electric Company; Docket No. 1605, Rate of Return, February, 1982
Blackstone Valley Electric Company, Docket No. 2016, Rate of Return, October, 1991
Block Island Power Company, Docket No. 1998, Interim Relief, Oral testimony only, March, 1991, Permanent relief accounting testimony , August, 1991
Bristol & Warren Gas Company; Docket No. 1395, Rate of Return, February, 1980
Bristol & Warren Gas Company; Docket No. 1395R, Rate of Return, June, 1982
FAS 106 Generic Hearing; Docket No. 2045, Financial Testimony, July, 1992
Interstate Navigation, Financial Testimony, March, 2004.
Narragansett Electric Corporation; Docket No. 1591, Accounting, November, 1981
Narragansett Electric Corporation; Docket No. 1719, Rate of Return, December, 1983
Narragansett Electric Corporation; Docket No. 1938, Rate of Return, October, 1989.
Narragansett Electric Corporation; Docket No. 1976, Rate of Return, October, 1990
Newport Electric Corporation; Docket No. 1410, Accounting, July, 1979
Newport Electric Corporation; Docket No. 1510, Rate of Return
Newport Electric Corporation; Docket No. 1801, Rate of Return, June, 1985
Newport Electric Corporation; Docket 2036, Rate of Return, April, 1992
Providence Gas Company; Docket No. 1971, Rate of Return, October, 1990
Providence Gas Company, Docket No. 2286, Rate of Return, May, 1995
South County Gas Company, Docket No. 1854, Rate of Return, December, 1986
Valley Gas and Bristol & Warren Gas Co., Docket No. 2276, April, 1995
Wakefield Water Company, Docket No. 1734, Rate of Return, April, 1984

SOUTH CAROLINA

Small Power Producers & Cogeneration Facilities; Docket No. 80-251-E, Cogeneration Rates, August, 1984
South Carolina Electric & Gas Company; Docket No. 79-196E, 79-197-G, Accounting, November, 1979

VERMONT

Central Vermont Public Service Corp., Docket No. 7321, Rate of Return, September, 2007
Green Mountain Power Company, Docket No. 4570, Accounting, July, 1982
New England Telephone Company; Docket No. 3806/4033, Accounting, November, 1979
New England Telephone Company; Docket No. 4366, Accounting

WASHINGTON, D.C.

PEPCO/BGE Merger Case, Formal Case No. 951, Rate of Return, September, 1996
Bell Atlantic- DC, Formal Case No. 814, Phase IV, Rate of Return, September, 1995
Chesapeake and Potomac Telephone Company;Formal Case No. 850; Rate of Return, July, 1991.
Chesapeake and Potomac Telephone Company, Formal Case No. 814-Phase III, Financial Issues, October, 1992.
Chesapeake and Potomac Telephone Company, Formal Case 926, Rate of Return, July, 1993.
PEPCO; Formal Case No. 889, Rate of Return, January, 1990.
PEPCO; Formal Case No. 905, Rate of Return, June, 1991.
PEPCO; Formal Case No. 912, Rate of Return, March, 1992.
PEPCO; Formal Case No. 929, Rate of Return, October, 1993.
PEPCO; Formal Case No. 951, Rate of Return, September, 1996
PEPCO; Formal Case No. 945, Phase I, Rate of Return, June, 1999.
PEPCO; Formal Case No. 1053, Rate of Return June, 2007
Washington Gas Light Company, Case No. 922, Rate of Return, April, 1993.
Washington Gas Light Company, Case No. 934, Rate of Return, April, 1994.
Washington Gas Light Company, Case No.989, Rate of Return, March, 2002.
Washington Gas Light Company, Case No. 1016, Rate of Return, March, 2003
Washington Gas Light Company, Case No. 1054, Rate of Return, June 2007.

WASHINGTON, STATE OF

Verizon Northwest, Docket No. UT-040788, Rate of Return, November 2004.
PacifiCorp, Docket No. UE-05____, Rate of Return, October, 2005

OTHER

Railroad Cost of Capital, Ex Parte No. 436, Rate of Return, January 17, 1983 (Submitted to the Interstate Commerce Commission)
Report on the Valuation of Nemours Corporation, filed on behalf of IRS, October, 1983 (Submitted to Tax Court)