BEFORE THE NEW MEXICO PUBLIC REGULATION COMMISSION

IN THE MATTER OF THE PETITION BY NEW MEXICO-AMERICAN WATER COMPANY, INC. FOR ADJUSTMENT OF WATER RATES FOR ITS CLOVIS DISTRICT AS FILED UNDER ADVICE NOTICE NO. 32, **NEW MEXICO-AMERICAN WATER COMPANY, INC., Petitioner.**	**Case No. 11-00___-UT**

DIRECT TESTIMONY
OF
DR. BENTE VILLADSEN
ON BEHALF OF
NEW MEXICO-AMERICAN WATER COMPANY

May 6, 2011

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EXECUTIVE SUMMARY

Dr. Bente Villadsen, a Principal at *The Brattle Group*, files testimony on the cost of capital for New Mexico-American Water Company. Dr. Villadsen selects two benchmark samples, water utilities and gas local distribution companies (LDC). Using two versions of the Discounted Cash Flow (DCF) method and three versions of the Capital Asset Pricing Model (CAPM), she estimates the sample companies' after-tax weighted-average cost of capital. The after-tax weighted average cost of capital is the measure that companies most commonly use to evaluate investments and the measure recommended in standard financial textbooks.

Having estimated the after-tax weighted-average cost of capital for the samples, she determines the corresponding cost of equity for New Mexico-American Water Company at its approximate 44 percent equity. In undertaking her analysis, Dr. Villadsen notes that the overall cost of capital is constant within a broad middle range of capital structures although the distribution of costs and risks among debt and equity holders is not. Because the overall cost of capital is the same in a broad range of capital structures, there are no impacts on the rates customers pay from a higher or lower percentage of equity, so ratepayers are not affected by the choice of capital structure within a broad range. However, New Mexico-American Water Company's capital structure includes only 44 percent equity, which is substantially lower than the percentage equity among comparable utilities. Therefore, its financial risk is higher and the return required by investors' increases with the level of risk they carry, but this return is paid on a smaller amount of equity than is typical in the water industry. Therefore, the dollar amount paid by customers is the same as if the Company had a lower return on equity but a higher equity percentage.

Dr. Villadsen discusses the impact of the turmoil in financial markets on utilities' cost of capital and notes that while the yield on government issued bills and bonds is currently very low, the spread between the yield on investment-grade utility bonds and government bonds remains unusually high. As utilities cannot raise debt (or equity) at the same rates as the government, it is necessary to take the yield on investment grade utility bonds into account in assessing the cost of capital for New Mexico-American Water Company. Specifically, the yields on government bills and bonds have been driven artificially down by monetary policy and a flight to safety, so that the yields on these securities are not reflective of normal economic conditions. Consequently, Dr. Villadsen bases her CAPM models on a normalized risk-free rate which consists of the observed risk-free rate plus an adjustment for the increase in the spread between risk-free rates and investment grade utility bond yields. This ensures that the risk-free rate relied upon is consistent with the consensus forecasted risk-free rate.

In addition to the cost of capital estimation discussed above, Dr. Villadsen reviewed data on New Mexico-American Water Company's financial performance in recent years and calculated various credit metrics based on these figures. She also reviewed New Mexico-American Water Company's earned return and notes that earned returns have been very low and distinctly below the allowed returns. The inability to earn the allowed return on equity and the low credit ratios show that it is vital that New Mexico-American Water Company be allowed an opportunity to earn a reasonable return on equity that would support its credit rating and provide equity investors with a reasonable return on investment.

Based on the evidence from the samples, Dr. Villadsen finds that New Mexico-American Water Company's cost of equity capital is no less than 11¾%.

I. INTRODUCTION AND SUMMARY

Q1. PLEASE STATE YOUR NAME AND ADDRESS FOR THE RECORD.

A1. My name is Bente Villadsen. My business address is *The Brattle Group*, 44 Brattle Street, Cambridge, MA 02138.

Q2. PLEASE DESCRIBE YOUR JOB AND EDUCATIONAL EXPERIENCE.

A2. I am a Principal of *The Brattle Group*, (Brattle), an economic, environmental and management consulting firm with offices in Cambridge, Washington, San Francisco, London, Brussels, and Madrid. My work concentrates on regulatory finance and accounting. I hold a B.S. and M.S. from University of Aarhus, Denmark and a Ph.D. from Yale University.

Q3. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A3. I have been asked by New Mexico-American Water Company ("New Mexico-American Water" or the "Company") to estimate the cost of equity for New Mexico-American Water Company's Clovis District. The cost of equity is the return that the New Mexico Public Regulation Commission ("Commission") should provide the Company an opportunity to earn on the portion of its rate base financed by equity.

To determine the cost of equity for New Mexico-American Water, I first estimate the overall cost of capital for two samples (and two subsamples) of regulated companies using several versions of the discounted cash flow (DCF) and risk-positioning models: Capital Asset Pricing Model ("CAPM) and Empirical CAPM ("ECAPM"). Second, I determine the cost of equity that the estimated overall cost of capital gives rise to at New Mexico-American Water's requested capital structure consisting of about 44 percent equity.[1] Third, I evaluate the relative risk of New Mexico-American Water and the sample companies to determine the recommended cost of equity for New Mexico-American Water. In doing so, I compare the characteristics of New Mexico-American Water to industry benchmarks, noting that New Mexico-American Water has been unable to earn its allowed return on equity for an extended period of time. This fact needs to be considered in setting its allowed cost of equity as both debt and equity investors ultimately look to the earned return on equity.

Q4. PLEASE SUMMARIZE ANY PARTS OF YOUR BACKGROUND AND EXPERIENCE THAT ARE PARTICULARLY RELEVANT TO YOUR TESTIMONY ON THESE MATTERS.

A4. Brattle's specialties include financial economics, regulatory economics, and the utility industry. I have worked extensively on cost of capital matters for water utilities as well as for electric, natural gas distribution, pipeline, transportation and other industries in state, federal, and foreign jurisdictions. Additionally, I have significant experience in other areas of rate regulation, credit risk in the utilities industry, energy contracts, and accounting issues. I have filed expert testimony and appeared before regulatory commissions and arbitration tribunals as well as in federal and district court concerning cost of capital, accounting questions, and damage issues. I have testified on cost of capital before the Arizona Corporation Commission, Bonneville Power Authority, and the New Mexico Public Regulation Commission as well as in litigation settings before the Federal Court of Claims and the International Center for Settlement of Investment Disputes. I have previously filed testimony before the New Mexico Public Regulation Commission in both 2008 and 2009 and also appeared before the Commission in 2009. Appendix A contains more information on my professional qualifications.

Q5. PLEASE SUMMARIZE YOUR ESTIMATION OF THE COST OF CAPITAL FOR NEW MEXICO-AMERICAN WATER.

A5. To assess the cost of capital for New Mexico-American Water, I select two benchmark samples: regulated water utilities and natural gas local distribution companies (LDC). These samples are selected to have risk characteristics comparable to those of New Mexico-American Water. I also

[1] See the Direct Testimony of Sheryl L. Hubbard, Schedule G-1.

report results for a subsample of both the water and the gas LDC sample as the subsample companies are less likely to have unique issues that may affect the cost of capital estimates. For each sample, I estimate the sample companies' cost of equity using several versions of the DCF method as well as the CAPM and ECAPM. Next, based on the cost-of-equity estimates for each company and its market costs of debt and preferred stock, I calculate each firm's overall cost of capital, i.e., its after-tax weighted-average cost of capital (ATWACC), using the company's market value capital structure. I then calculate the samples' average ATWACC and the cost of equity for a capital structure with approximately 44 percent equity. Thus, I present the cost of equity that is consistent with the samples' market information and New Mexico-American Water's regulatory capital structure. (By "regulatory capital structure", I mean the capital structure that New Mexico-American Water proposes in its application.) Looking to the CAPM and ECAPM based estimates; the gas distribution sample and subsample indicate a range of 11¾ to 12¾ percent, while the water sample and subsample is a bit higher at 12 to 12¾ percent. However, the discounted cash flow analysis provides lower numbers of approximately 10 to 11½ percent for the water sample and subsample and at 10½ to 12 percent for the gas distribution sample and subsample. Taking these figures into account, 11¾ percent return on equity is a conservative estimate. Because of the ongoing financial turmoil, I present results for both a baseline case, as described above, and for several scenarios that take the increased risk aversion among investors into account. Note that my estimates rely on the baseline case, and are thus relatively conservative given the current economic conditions.

Q6. ARE THERE ANY UNIQUE ISSUES IN ESTIMATING THE COST OF CAPITAL AT THIS POINT IN TIME?

A6. Yes. While the economic crisis may have lessened and the National Bureau of Economic Research (NBER) has declared the recession over, there is still substantial turmoil in financial markets and investors remain wary of providing capital. I discuss the impact hereof in more detail in *Section III* below, but in general, the cost of capital is higher for all companies today than it was before the crisis. Therefore, in addition to my standard cost of capital estimates, I also report the results from several benchmarks that take the impact of the financial crisis into account.

Q7. PLEASE SUMMARIZE YOUR CONCLUSIONS REGARDING NEW MEXICO-AMERICAN WATER'S COST OF EQUITY.

A7. My midpoint estimate for New Mexico-American Water's cost of equity capital is 11¾ percent with a range of 11½ to 12½ percent. The recommendation is based on analyses of the return on equity that investors expect as well as on New Mexico-American Water specific analyses. Specifically, I apply Discounted Cash Flow ("DCF") models, the Capital Asset Pricing Model ("CAPM"), and Empirical CAPMs to a sample of eight publicly traded water utilities and a sample of nine gas distribution companies to assess investors expected cost of capital and apply this information to New Mexico-American Water. In addition, I look to New Mexico-American Water's inability to earn its allowed return on equity.

Q8. WHY DO YOU NEED TO CONSIDER NEW MEXICO-AMERICAN WATER'S REGULATORY CAPITAL STRUCTURE?

A8. A firm's cost of equity is a function of both its business risk and its financial risk. The more leveraged a company is the higher its financial risk. Investors holding equity in companies with higher risk require a higher rate of return, so as a company adds debt, the cost of equity goes up at an ever increasing rate. The higher cost of equity offsets the lower cost of debt, so that the after-tax weighted-average overall cost of capital remains constant over a broad range of capital structures.

That is, the associated capital structure affects an estimated cost-of-equity estimate just as a life insurance applicant's age affects the required life-insurance premium. It is therefore necessary to calculate the cost of equity the sample companies would have had at New Mexico-American Water's regulatory capital structure to report accurately the market evidence on the cost of equity.

Q9. HOW IS THE REMAINDER OF YOUR TESTIMONY ORGANIZED?

A9. The remainder of my testimony is organized as follows:

Section II defines the cost of capital and discusses the principles that relate a company's cost of capital and its capital structure.

Section III discusses the impact on cost of capital of the current turmoil in financial markets and methods to estimate the relevant risk-free rate and market risk premium under current financial market conditions.

Section IV presents the methods used to estimate the cost of capital for the benchmark samples, and the associated numerical analyses. This section also explains the basis of my conclusions for the benchmark samples' returns on equity and overall costs of capital.

Section V focuses on New Mexico-American Water's unique situation such as its inability to earn its allowed return and earned return and the impact on credit metrics.

Section VII summarizes the analysis and discusses the recommendation for New Mexico-American Water.

Appendix A lists my qualifications.

Appendix B discusses in detail the selection procedure for each sample, and the methods used to derive the necessary capital structure market value information.

Appendix C details the risk-positioning method including the numerical analyses.

Appendix D details the DCF method, including the numerical analyses.

Appendix E discusses the effect of debt on the cost of equity.

I repeat portions of my testimony in the appendices in order to give the reader the context of the issues before I present additional technical detail and further discussion.

II. THE COST OF CAPITAL AND RISK

A. The Cost of Capital and Risk

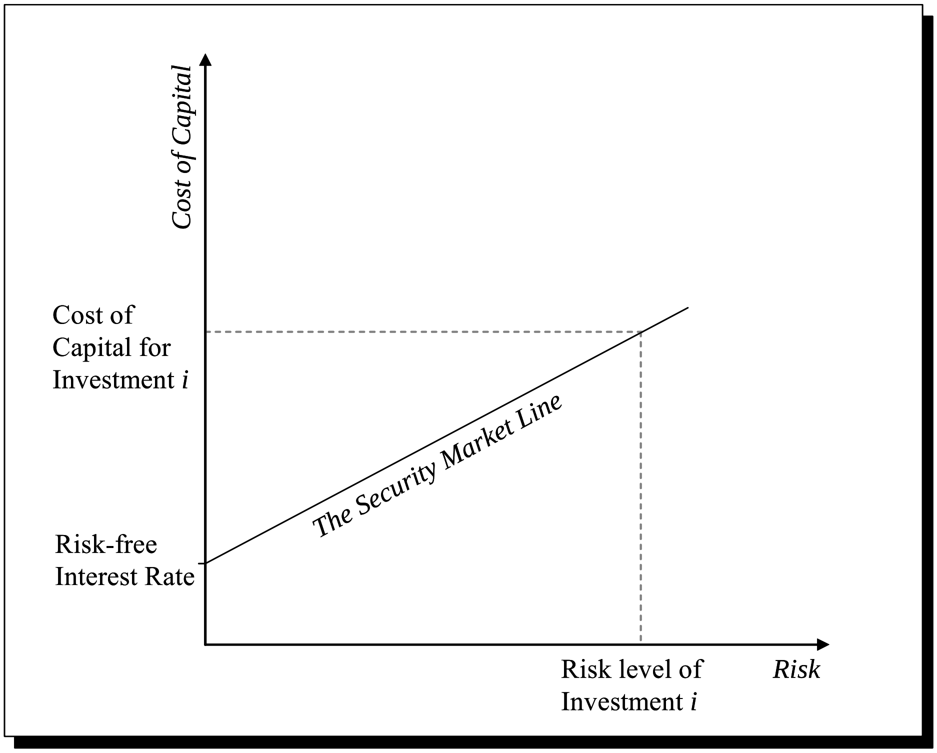
Q10. PLEASE FORMALLY DEFINE THE "COST OF CAPITAL."

A10. The cost of capital is the expected rate of return in capital markets on alternative investments of equivalent risk. In other words, it is the rate of return investors require based on the risk-return alternatives available in competitive capital markets. The cost of capital is a type of opportunity cost: it represents the rate of return that investors could expect to earn elsewhere without bearing more risk.[2]

The definition of the cost of capital recognizes a tradeoff between risk and return that is known as the "security market risk-return line," or "security market line" for short. This line is depicted in Figure 1. Figure 1 shows that the higher the risk, the higher the cost of capital. The risk depicted on the horizontal axis in Figure 1 is often measured by the security's beta, which measures the security's systematic risk in comparison to the market as a whole. The market as a whole has a beta of 1, so betas below one indicate a security with less systematic risk than the market while a beta above 1 indicates a security with higher systematic risk than the market. A version of Figure 1 applies for all investments. However, for different types of securities, the location of the line may depend on corporate and personal tax rates.

It is important to note that the security market line's slope and hence the cost of equity is impacted by systematic risk only. Risks that investors can diversify away do not impact the cost of equity.

Figure 1: The Security Market Line



Q11. WHY IS THE COST OF CAPITAL RELEVANT IN RATE REGULATION?

A11. U.S. rate regulation accepts the "cost of capital" as the right expected rate of return on utility investment.[3] This practice is normally viewed as consistent with the U.S. Supreme Court's opinions in *Bluefield Waterworks & Improvement Co. v. Public Service Commission*, 262 U.S. 678 (1923), and *Federal Power Commission v. Hope Natural Gas*, 320 U.S. 591 (1944).

From an economic perspective, rate levels that give investors a fair opportunity to earn the cost of capital are the lowest levels that compensate investors for the risks they bear. Over the long run, an expected return above the cost of capital

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[2] "Expected" is used in the statistical sense: the mean of the distribution of possible outcomes. The terms "expect" and "expected" in this testimony, as in the definition of the cost of capital itself, refer to the probability-weighted average over all possible outcomes.

[3] An early paper that links the cost of capital as defined by financial economics with the correct expected rate of return for utilities is Stewart C. Myers, "Application of Finance Theory to Public Utility Rate Cases," *The Bell Journal of Economics and Management Science*, 3:58-97 (Spring 1972).

makes customers overpay for service. Regulatory authorities normally try to prevent such outcomes, unless there are offsetting benefits (e.g., from incentive regulation that reduces future costs). At the same time, an expected return below the cost of capital does a disservice not just to investors but, more importantly, to customers as well. In the long run, such a return denies the company the ability to attract capital, to maintain its financial integrity, and to expect a return commensurate with that of other enterprises characterized by similar risks and uncertainties.

More important for customers, however, are the economic issues an inadequate return raises for them. In the short run, deviations of the expected rate of return on the rate base from the cost of capital may seemingly create a "zero-sum game"—investors gain if customers are overcharged, and customers gain if investors are shortchanged. But in fact, even in the short run, such action may adversely affect the utility's ability to provide stable and favorable rates because some potential efficiency investments may be delayed or because the company is forced to file more frequent rate cases. In the long run, inadequate returns are likely to cost customers – and society in general – far more than may be gained in the short run. Inadequate returns lead to inadequate investment, whether for maintenance or for new plant and equipment. The costs of an undercapitalized industry can be far greater than the short-run gains from shortfalls in the cost of capital. Moreover, in capital-intensive industries (such as the water industry),[4] systems that take a long time to decay cannot be fixed overnight. Thus, it is in the customers' interest not only to make sure that the return investors expect does not exceed the cost of capital, but also to make sure that it does not fall short of the cost of capital, either.

Of course, the cost of capital cannot be estimated with perfect certainty, and other aspects of the way the revenue requirement is set may mean investors

[4] Water utilities are very capital intensive and have over the last years earned revenues of only $0.26 for each $1 of property, plant of equipment. In comparison, electric utilities earn approximately $0.53 and gas utilities earn $1.09 for each $1 invested in property, plant and equipment. *Value Line Investment Survey*, Industry Sheets, 2010 data.

expect to earn more or less than the cost of capital even if the allowed rate of return equals the cost of capital exactly. However, a commission that sets rates so investors expect to earn the cost of capital on average treats both customers and investors fairly, which is in the long-run interests of both groups.

While it may seem counter-intuitive that the cost of capital has increased in a market where many companies and individuals have seen their income decline, it is important to keep two facts in mind. First, the cost of capital is an *expected* rate of return and thus a forward looking measure as opposed to a measure of the recent past. Therefore, low realized returns in, for example, 2009 do not necessarily reflect the *expected* rate of return. As market volatility and investors' risk aversion has increased, investors are likely to require a higher return for providing capital. Second, it is the expected rate of return that is available in capital markets on alternative investments of equivalent risk that are important to investors, so a key question becomes what the return on alternative investments is. As the spread between utility bond yields and government bond yields increases, the premium that investors expect to earn on utility stock over government bonds is expected to increase, too. Therefore, the cost of equity in today's financial markets is higher than it was before the financial crisis of 2008-09, when bond spreads were lower. Further, the ongoing turmoil in the oil producing countries as well as the sovereign debt crisis in Europe, and Standard & Poor's recent assignment of a negative outlook to U.S. government debt adds to financial markets' uncertainty.[5]

[5] Moody's Investor Service ("Moody's), Standard & Poor's ("S&P") and Fitch Ratings ("Fitch") have all downgraded Portugal's sovereign debt in March 2011. See, for example, Moody's Investor Service, "Moody's downgrades Portugal to A3 and assigns a negative outlook," March 15, 2011. Most recently, S&P on March 29 downgraded both Greece and Portugal; see S&P, "Greece Downgraded to 'BB-' on Confirmed ESM Borrowing Terms; Still on Watch Negative," March 29, 2011 and S&P, "Republic of Portugal Ratings Lowered to 'BBB-/A3' on ESM Borrowing Terms; Outlook Negative," March 29, 2011. Standard & Poor's, "A Closer Look At the Revision Of The Outlook On The U.S. Government Rating," April 18, 2011.

B. Business Risk and Financial Risk: Capital Structure and the Cost of Equity

Q12. WHAT IS THE DIFFERENCE BETWEEN BUSINESS RISK AND FINANCIAL RISK?

A12. Business risk is the risk of a company from its line of business assuming it used no debt financing. When a firm uses debt to finance its assets, the business risk of the assets is shared between the debt holders and the equity holders, but the equity holders bear more of the risk because debt holders have a prior claim on the company's cash flows. Equity holders are residual claimants, which simply mean that equity holders get paid last. In other words, the use of debt imposes financial risk on equity holders. The goal of selecting a sample is to choose companies whose business risk is judged to be comparable to the regulated company in the proceeding. As a result, differences in financial risk must be dealt with explicitly.

Q13. PLEASE EXPLAIN WHY IT IS NECESSARY TO REPORT THE COST OF EQUITY ADJUSTED FOR CAPITAL STRUCTURE.

A13. Rate regulation in the U.S. and Canada has traditionally focused on the components of the rates.[6] In other words, the focus of cost-of-capital estimation is usually on determining the "right" cost of equity, and to a lesser degree on setting the allowed capital structure. While the overall cost of capital depends primarily on the company's line of business, the distribution of the cost of capital among debt and equity depends on their share in total revenues. Debt holders' claim is usually a fixed amount (except in situations of default) while equity holders are residual claimants, meaning that equity holders get paid last. In other words, the use of debt imposes financial risk on the equity holders. Because a company's financial risk depends on its capital structure, the risk shareholders carry increases with the leverage of the company. As shareholders expect to be

[6] The National Energy Board of Canada in its RH-1-2008 decision, issued March 2009, allowed the after-tax weighted average cost of capital rather than a return on equity and a capital structure.

compensated for increased risk, the required rate of return increases with the company's leverage. The increased risk is caused by the fact that debt has a senior claim on a specified portion of earnings and in bankruptcy on assets. As common equity is the most junior security, it gets what is left after everyone else has been paid. In other words, common equity holders carry all residual risk. However, as explained in more detail in Appendix E, the overall cost of capital is constant within a broad middle range of capital structures, although the distribution of costs and risks among debt and equity holders is not.

C. Implications for Analysis

Q14. PLEASE EXPLAIN THE IMPLICATIONS OF THE RELATIONSHIP BETWEEN CAPITAL STRUCTURE AND THE COST OF EQUITY FOR RATE REGULATION.

A14. The risk equity holders carry, and therefore the cost of equity, depends on the capital structure. For example, if a company with $10 million in assets financed all its assets with equity, then there are $10 million to spread the equity risk over. In contrast, if the company financed its assets with $5 million in equity and $5 million in debt, then the equity risk would necessarily be spread over only $5 million.

Q15. TO ASSESS THE MAGNITUDE OF FINANCIAL RISK FOR A RATE REGULATED COMPANY, SHOULD YOU USE THE MARKET-VALUE OR THE BOOK-VALUE CAPITAL STRUCTURE?

A15. The market-value capital structure is the relevant quantity for analyzing the cost-of-equity evidence, which is based on market information.[7] New

[7] The need to use market-value capital structures to analyze the effect of debt on the cost of equity has been recognized in the financial literature for a long time. For example, the initial reconciliation of the Modigliani-Miller theories of capital structure with the Capital Asset Pricing Model, in Robert S. Hamada, "Portfolio Analysis, Market Equilibrium and Corporate Finance," *The Journal of Finance* 24: 13-31 (March 1969) works with market-value capital structures. For a more recent presentation of the concept, see, for example, Richard A. Brealey, Stewart C. Myers, and Franklin Allen, *Principles of Corporate Finance*, New York: McGraw-Hill/Irwin 9th ed. (2008) (Brealey, Myers, and Allen (2008)) pp. 530-533. Book values may

Mexico-American Water Company does not have a market value of equity since it is not publicly traded. However, the water utilities average approximately 60 percent equity, so clearly New Mexico-American Water Company carries more financial risk. As a simple everyday example, consider two homeowners, each of whom purchased a home in 2002 for $150,000, which at the time was the market price. The home is financed with an interest-only mortgage that carries an interest rate of 5 percent. Today the homeowners want to sell their homes, but the market price has dropped to $125,000. The following consider the effect of leverage on these homeowners situation.

Homeowner 1 made a down payment of 30% ($45,000) for a mortgage of $105,000 and a loan to market value of 70 percent. Assuming he sells the home for the market price of $125,000, he gets $20,000 ($125,000 - $105,000) at the time of closing. As the homeowner invested $45,000, he has lost $25,000 for a negative return on the investment of 55.5%. [8]

Homeowner 2 made a down payment of 20 percent or $30,000 for a mortgage of $130,000 and an initial loan to market value of 80 percent. Assuming he sells the home for the market price of $125,000, he gets $5,000 ($125,000 - $120,000) at closing for a loss of $25,000. This corresponds to a negative return on his investment of -83.3%.[9]

Homeowner 3 made a down payment of only 10 percent or $15,000 for a mortgage of $135,000 and an initial loan to market value of 90 percent. Assuming he sells the home for the market price of $125,000, he has to pay $10,000 to sell his home ($125,000 - $135,000). As a result, he has made a

be relevant for some issues, e.g., for covenants on individual bond issues, but as explained in the text, market values are the determinants of the impact of debt on the cost of equity.

[8] Return on Investment = -$25,000 / $45,000 = -55.5%.

[9] Return on Investment = -$25,000 / $30,000 = 16.66%.

negative return of -166.7% on his initial (equity) investment, because his investment is now under water.[10]

The example demonstrates that increasing leverage or debt relative to the market value increases risk. For the homeowners in the above examples, the important price is the market price - - what they can sell the home for. The higher the leverage, the higher their loss on the investment and in the case of the homeowner with a very large mortgage to home value, the home could not be sold at a price high enough to cover the outstanding mortgage. This illustrates the dangers of high levels of debt and the fact that it is the market price that determines the return on investment.

Q16. PLEASE EXPLAIN THE IMPLICATIONS FOR RATE REGULATION AND YOUR TESTIMONY.

A16. Because the market risk, and therefore the cost of equity, depends on the market-value capital structures, one must base the estimation of the sample companies' cost of capital on market value capital structures. An approach that estimates the cost of equity for each of the sample firms without explicit consideration of the market value capital structure (i.e. the financial risk) underlying those costs risks material errors. The cost-of-equity estimates of the sample companies at their actual market-value capital structures are not necessarily reflected in the regulatory capital structure. Therefore, using book values could lead to an incorrect rate of return. I avoid this problem by calculating each sample company's ATWACC using its market-value capital structure. I then use the sample companies' average overall cost of capital to determine the corresponding return on equity at New Mexico-American Water's regulatory capital structure. This procedure ensures that the capital structure and the estimated cost of equity are consistent.

[10] Return on Investment = -$25,000 / $15,000 = -166.7%.

In my analyses, I estimate the cost of equity for each of the sample firms using traditional estimation methods (such as the DCF and CAPM). For each estimation method, I use each sample company's estimated cost of equity, market cost of debt and market-value capital structure along with New Mexico-American Water's marginal tax rate to estimate each sample company's overall cost of capital. I then calculate the samples' average overall cost of capital for each estimation method. Finally, I determine the cost of equity that is associated with the estimated ATWACC at New Mexico-American Water's regulated capital structure. Thus, the samples' overall cost-of-capital and that of New Mexico-American Water is the same.

Q17. IS THE USE OF MARKET VALUES TO CALCULATE THE IMPACT OF CAPITAL STRUCTURE ON THE RISK OF EQUITY INCOMPATIBLE WITH USE OF A BOOK-VALUE RATE BASE FOR A REGULATED COMPANY?

A17. No. Investors buy stock at market prices and expect a reasonable return on their investment. Market-based cost-of-equity estimation methods, such as DCF or CAPM which are frequently used in rate regulation, recognize this and rely on market data. That is, the cost of capital is the fair rate of return on regulatory assets for both investors and customers. Most regulatory jurisdictions in the U.S. measure the rate base using the net book value of assets, not current replacement value or historical cost trended for inflation. But the jurisdictions still apply market-derived measures of the cost of equity to that net book value rate base.

The issue here is "what level of risk is reflected in that cost-of-equity estimate?" That risk level depends on the sample company's market-value capital structure, not its book-value capital structure. *That risk level would be different if the sample company's market-value capital structure exactly equaled its book-value capital structure, so the estimated cost of equity would be different, too.*

Q18. PLEASE SUM UP THE IMPLICATIONS OF THIS SECTION.

A18. The market risk, and therefore the cost of equity depend on the market-value capital structure of the company or asset in question. It therefore is impossible to validly compare the measured costs of equity of different companies without taking capital structure into account. Capital structure and the cost of equity are unbreakably linked, and any effort to treat the two as separate and distinct questions violates both everyday experience (e.g., with home mortgages) and basic financial principles.

Q19. HOW SHOULD A COST-OF-CAPITAL ANALYST IMPLEMENT THIS PRINCIPLE?

A19. There has been a great deal of financial research on the effects of capital structure on the value of the firm. One of the key conclusions that result from the research is that no narrowly defined optimal capital structure exists within industries, although the typical range of capital structures does vary among industries. Instead, there is a relatively wide range of capital structures within any industry in which fine-tuning the debt ratio makes little or no difference to the value of the firm, and hence to its overall after-tax cost of capital.

Accordingly, it is appropriate to treat the market-value weighted average of the cost of equity and the after-tax current cost of debt, or the "ATWACC" for short, as constant. The economically appropriate cost of equity for a regulated firm is the quantity that, when applied to the regulatory capital structure, produces the same ATWACC, as was derived from the sample companies. That value is the cost of equity that the sample would have, estimation problems aside, if the sample's market-value capital structure had been equal to the regulatory capital structure in question.

Q20. HOW DO YOU CALCULATE THE COST OF EQUITY CONSISTENT WITH THE MARKET-DETERMINED ESTIMATE OF THE SAMPLE'S AVERAGE COST OF CAPITAL?

A20. For simplicity assume that all sample companies have only common stock and debt. Then the ATWACC is calculated as:

$$ATWACC = r_D \times (1 - T_C) \times D + r_E \times E \tag{1}$$

where r_D is the market cost of debt, r_E is the market cost of equity, T_C is the marginal corporate income tax rate, D is the percent debt in the capital structure, and E is the percent equity in capital structure. The cost of equity consistent with the overall cost-of-capital estimate (ATWACC), the market cost of debt and equity, the marginal corporate income tax rate and the amount of debt and equity in the capital structure can be determined by solving equation (1) for r_E.

Q21. CAN YOU PROVIDE AN EXAMPLE OF HOW THIS FORMULA IS USED TO DETERMINE THE COST OF EQUITY?

A21. Yes. Consider a company with a 40 percent marginal corporate income tax rate and a cost of debt equal to 6 percent. For simplicity, I assume there is no difference in the company's embedded cost of debt and the cost at which it currently can issue additional debt. Further, suppose that the ATWACC estimate based on a sample of companies with comparable business risk is 7.5 percent. If the company's capital structure has 50 percent debt and 50 percent equity, equation (1) above yields a cost-of-equity estimate of 11.4 percent. If the equity ratio is lower, for example 45 percent, the cost of equity would instead be 12.3 percent. Conversely, a higher equity ratio such as 55 percent would imply a lower cost-of-equity estimate of 10.7 percent. Table 1 below summarizes these calculations as well as the dollar amount customers have to pay for financing costs.

Table 1. Example of the effect of capital structure on the estimated cost of equity.

Marginal tax rate	40%		
Cost of debt	6%		
Estimated ATWACC	7.50%		
Rate Base	$ 1,000,000		
Regulatory Equity Ratio	45%	50%	55%
Regulatory Debt Ratio	55%	50%	45%
Estimated ATWACC	7.50%	7.50%	7.50%
Cost-of-equity	12.3%	11.4%	10.7%
After Tax Cost of Financing[1)]	$ 75,000	$ 75,000	$ 75,000
Before Tax Cost of Financing[2)]	$ 125,000	$ 125,000	$ 125,000

[1)] Estimated ATWACC × Rate Base.
[2)] Estimated ATWACC × Rate Base / (1 - Tax Rate).

The important point of this example is that the overall cost of capital does not depend on the company's capital structure, as long as the capital structure is in a wide middle range of values. Therefore, the cost to customers does not depend on the capital structure either. A higher equity ratio simply means that a higher percentage return is paid to equity investors, but the fraction of the rate base to which this higher return applies is lower. The equity investors are compensated appropriately for the higher risk, but that has no effect on the overall cost borne by customers. As long as equity investors are correctly compensated for the risk of their investment, the only effect that a higher equity ratio has is on how the return is divided between debt holders and equity holders, and not on how much customers end up paying.

Q22. BUT IS IT NOT THE CASE THAT IF THE ALLOWED RATE OF RETURN ON EQUITY IS LOWER, ALL ELSE EQUAL, RATEPAYERS PAY LESS?

A22. Yes, for a given equity percentage. However, it comes at a cost: if the rate of return on equity for a capital structure with 55 percent equity were applied to a company whose equity ratio is 45 percent, the company's equity investors would not be compensated for the financial risk of their investment. In particular, in this situation the expected return on equity would be set too low. Such a result would impair the company's ability to attract investors, since they can expect higher returns elsewhere for the same risk level. This may well have negative consequences for the utility's ability to sustain an appropriate level of investment. Ultimately, this translates into a lower quality of the services that the utility can provide to its customers. Alternatively, the company could reduce its equity percentage with possible negative effects on the cost of debt or other credit factors.

III. CURRENT FACTORS TO CONSIDER WHEN SETTING THE COST OF CAPITAL

Q23. WHAT DO YOU DISCUSS IN THIS SECTION?

A23. This section addresses the effect of the recent recession and financial turmoil on the cost of capital.

Q24. HOW DOES THE FINANCIAL TURMOIL IMPACT THE COST OF CAPITAL?

A24. Although the turmoil in the financial markets has lessened, economic conditions are not back to their pre-crisis status. Of critical importance to cost of capital estimation is the two facts. First, the spread between utility bond yields and government bonds yields (yield spread) is larger than it historically has been and especially so for lower-rated bonds, including utility bonds. Second, capital markets remain volatile compared to the historical benchmarks.

Q25. HOW HAS THE YIELD SPREAD BETWEEN GOVERNMENT AND UTILITY BONDS CHANGED IN THE LAST THREE TO FOUR YEARS?

A25. During the height of the financial crisis of 2008-09, the spread between utility bond yields and government bond yields widened dramatically. Although the spread has narrowed from the height of the financial crisis, the yield spread is high relative to its historical level. Figure 2 illustrates an important point: the yield spread increases dramatically during times of financial distress, which is one reason that the credit ratings of regulated companies should not be allowed to decline to non-investment grade levels. Further, Figure 2 illustrates that the yield spread remain higher than prior to the financial crisis of 2008-09 and also illustrates the sensitivity to turmoil as spread increased in March 2011 following the turmoil in the Middle East and Northern Africa. A supportive regulatory environment coupled with an appropriate allowed ROE are important components to insure that the utility's credit rating remains investment grade.

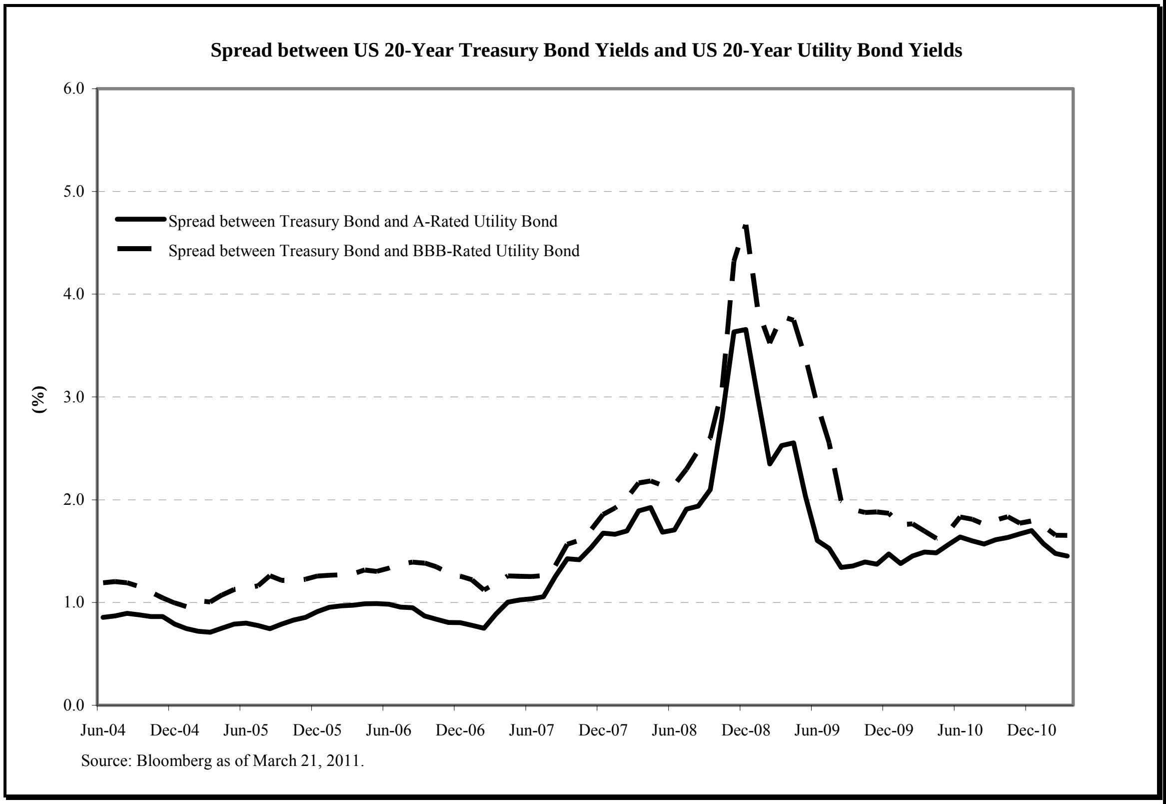

Figure 2

The current spread between the yield on utility bonds and 20-year government is unusually high as illustrated in Table 2 below. The spread between 20-year A-rated utility bond yield and the 20-year government bond yield is currently more than half a percentage point above its normal level.

Table 2

Spreads between US Utility Bond (20 year maturity) and US Treasury Bond (20 year maturity)			
Periods	A-Rated Utility and Treasury	BBB-Rated Utility and Treasury	Notes
Period 1 - Average Apr-1991 - 2007	0.93	1.23	[1]
Period 2 - Average Aug-2008 - 2011	1.84	2.35	[2]
Period 3 - Average Feb-2011	1.32	1.52	[3]
Period 4 - Average 15-Day (Feb 17, 2011 to Mar 10, 2011)	1.48	1.67	[4]
Spread Increase between Period 2 and Period 1	0.90	1.12	[5] = [2] - [1].
Spread Increase between Period 3 and Period 1	0.39	0.29	[6] = [3] - [1].
Spread Increase between Period 4 and Period 1	**0.55**	**0.44**	[7] = [4] - [1].

Source:
Spreads for the periods are calculated from Bloomberg's yield data.
Average monthly yields for the indices were retrieved from Bloomberg as of March 10, 2011.

Q26. WHAT IS THE IMPLICATION OF HIGHER THAN NORMAL YIELD SPREADS?

A26. A higher than normal yield spread is one indication of the higher cost of capital. As investors consider the risk-return tradeoff illustrated in Figure 1, they select investments based on the desired level of risk. Currently, the expected return on utility debt is elevated (relative to government debt). More risky equity is therefore also more costly relative to government debt. As a result, the cost of equity is currently elevated compared to its pre-crisis level. I discuss how to take this fact into account below.

Q27. ARE THE HIGHER THAN NORMAL YIELD SPREADS AN INDICATION OF INVESTORS' "FLIGHT TO SAFETY"?

A27. Yes. When investors become concerned about the economy, they frequently seek to reduce their exposure to investment risk.

Q28. DO REGULATED COMPANIES BENEFIT FROM THE FLIGHT TO SAFETY?

A28. To a degree. However, the required return on all risky investments, including utilities, increases during a time of flight to safety. Stock prices of regulated companies fell along with the market, although not as much in percentage terms as the market, but that is to be expected because regulated companies are of lower risk. The prices of regulated companies have recovered along with the market, but not as quickly or as much in percentage terms as the market, again as expected by the relative risk of regulated companies compared to the market.[11]

Q29. WHAT EVIDENCE DO YOU HAVE THAT FINANCIAL MARKETS ARE VOLATILE?

A29. Although the day-to-day volatility has decreased from the height of the financial crisis, it remains high by historical standards. As displayed in Figure 3 below, the VIX index is higher its historical level.[12] The VIX index is an indicator of volatility in the market, and a high value indicates substantial uncertainty among investors. The relatively high level of VIX is one important measure demonstrating that financial markets remain more volatile than in the recent past.

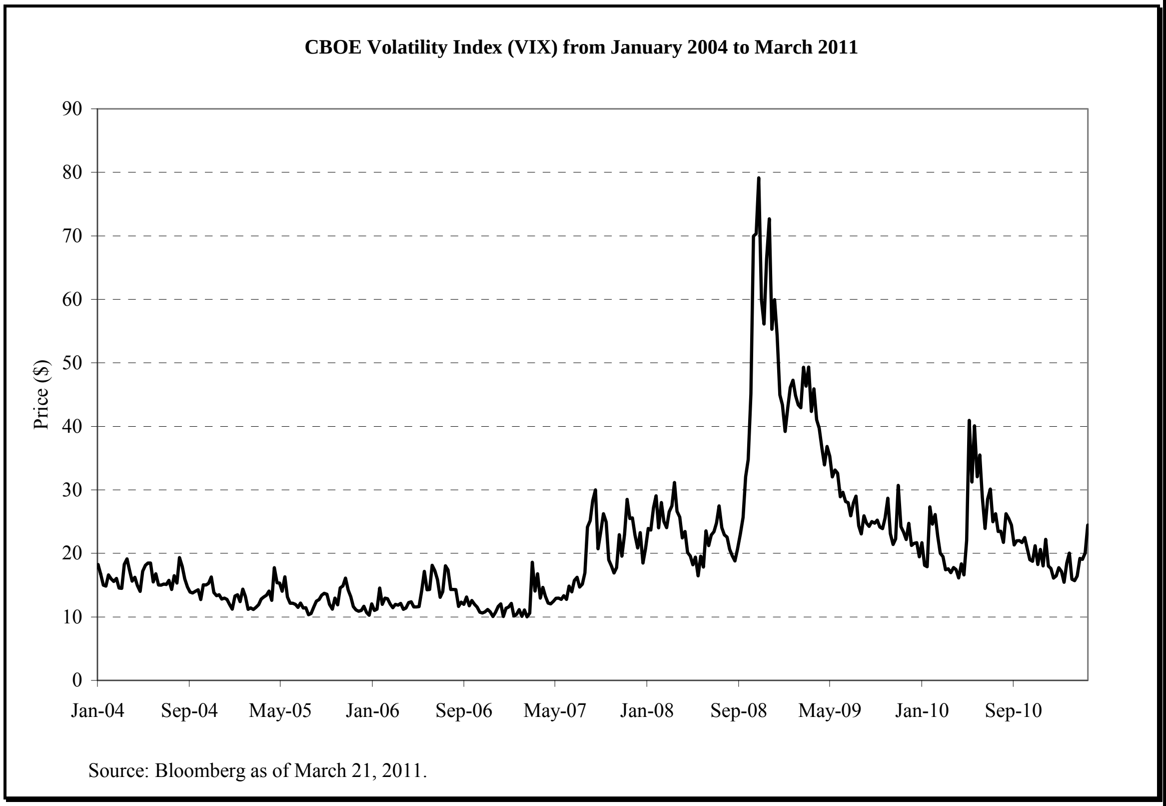

Figure 3

[11] For example, while the Dow Jones Industrial Index and the S&P 500 have gained more than 80% since their low in March 2009, the Dow Jones Utility Index has only increased approximately 40%, as of March 10, 2011.

[12] Trading in futures on the VIX index started in 2004. (http://www.cboe.com/micro/vix/introduction.aspx)

As can be seen from Figure 3, the VIX index (and thus market volatility) remains above pre-crisis levels and has recently increased again to above 20 in response to the ongoing turmoil in the Middle East, the sovereign, and bank debt crisis in Europe.[13]

Q30. PLEASE EXPLAIN WHY STOCK MARKET VOLATILITY MATTERS TO UTILITIES.

A30. Economic research has found that investor risk aversion increases during volatile periods. The higher the risk premium, the higher the required return on equity. For example, French, Schwert, and Stambaugh (1987) find a positive relationship between the expected market risk premium (MRP) and volatility:

> We find evidence that the expected market risk premium (the expected return on a stock portfolio minus the Treasury bill yield) is positively related to the predictable volatility of stock returns. There is also evidence that unexpected stock returns are negatively related to the unexpected change in the volatility of stock returns. This negative relation provides indirect evidence of a positive relation between expected risk premiums and volatility.[14]

One significant implication of this finding is that even if investors' risk aversion had not changed, the MRP would increase simply because market volatility is up.

Q31. WHAT DO YOU MEAN BY THE TERM "RISK AVERSION"?

A31. Risk aversion is the recognition that investors dislike risk. This means that for any given level of risk, investors expect to earn a higher return than before to be induced to invest. An increase in risk aversion means that investors require an even greater return for a given level of risk.

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[13] See, for example, Moody's Investor Service, "Moody's downgrades Portugal to A3 and assigns a negative outlook," March 15, 2011 and S&P, "Greece Downgraded to 'BB-' on Confirmed ESM Borrowing Terms; Still on Watch Negative," March 29, 2011 and S&P, "Republic of Portugal Ratings Lowered to 'BBB-/A3' on ESM Borrowing Terms; Outlook Negative," March 29, 2011. See also, Bloomberg News, "Ireland Prepares to Rescue Banks With Stress Tests Aimed at Ending Crisis," March 31, 2011.

[14] K. French, W. Schwert and R. Stambaugh (1987), "Expected Stock Returns and Volatility," *Journal of Financial Economics*, Vol. 19, pp 3.

Q32. HOW DOES AN INCREASE IN INVESTORS' RISK AVERSION AFFECT THE COST OF CAPITAL FOR NEW MEXICO-AMERICAN WATER?

A32. As noted above, any increase in investors' risk aversion leads to a higher required return on capital; thus, the cost of capital increases. Although I believe that some of the increase in yield spread and in the MRP may be temporary, financial markets have yet to return to pre-crisis conditions and it may take a long time to restore investors confidence in the financial markets. Therefore, an estimation of the market cost of capital needs to consider the shift in investors' attitude towards risk.

Q33. ARE THERE OTHER ISSUES THAT MAY AFFECT THE COST OF CAPITAL IN THE LONGER TERM?

A33. Yes, the federal budget deficit is at a record high with the Congressional Budget Office ("CBO") predicting the 2011 fiscal deficit at 1.5 trillion and fiscal 2010 showing a deficit of 1.3 trillion, more than triple that of 2008 and the highest since World War II.[15] The CBO estimates that the budget deficit will remain high over the foreseeable future.[16] It will be difficult to sustain such a high deficit, so it is likely that the magnitude of the federal deficit will affect the inflation and hence the cost of capital going forward. Also, the Fed now holds significant mortgage-backed securities and continues to have substantial holdings related to AIG and other institutions.[17] It is unclear how the unwinding of these positions will affect financial markets, which creates additional uncertainty and market volatility.

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[15] Congressional Budget Office: http://www.cbo.gov/ftpdocs/108xx/doc10871/BudgetOutlook2010_Jan.cfm and Douglas W. Elmendorf, Congressional Budget Office, "Outlook for the Economy and the Budget," February 2011.

[16] Congressional Budget Office: http://www.cbo.gov/

[17] Federal Reserve Statistical Release (http://www.federalreserve.gov/releases/h41/).

Q34. CAN YOU SUMMARIZE HOW THE ECONOMIC DEVELOPMENTS DISCUSSED ABOVE HAVE AFFECTED THE RETURN ON EQUITY AND DEBT THAT INVESTORS REQUIRE?

A34. Investors have been dramatically affected by the credit crisis, and companies such as New Mexico-American Water rely on these investors to support efficient business operations. Many have lost their jobs, their homes and/or their savings and some cannot retire as early as hoped or planned. As a result investors' risk aversion has increased. Figure 3 above shows that volatility has increased over its historical level and day-to-day volatility remains high as investors react to financial news. Although the bottom of the economic downturn may have been reached, the speed and duration of economic recovery are highly uncertain as are the effects of the federal budget deficit and the Fed's unwinding of its involvement in providing credit. Uncertainty in the capital markets remains high due in part to the ongoing concern over sovereign debt in Europe, turmoil in the Middle East and the potential impact on oil prices. Therefore, the required level of return is higher today than it was prior to the crisis for all risky investments.

Q35. HOW DO YOU TAKE THE CURRENT ECONOMIC CONDITIONS INTO ACCOUNT WHEN ESTIMATING THE COST OF EQUITY?

A35. Because the risk-free rate currently is unusually low and the spread between the yield on utility bonds and government bonds is high, I recognize the phenomena by adding a "yield spread adjustment" to the current long-term risk-free rate. This has the effect of increasing the intercept of the Security Market Line displayed in Figure 1 above. The normalization of the risk-free rate is consistent with forecasts on the government bond yield, where, the Federal Reserve Bank of Philadelphia recently released a survey, which expects the yield on the 10-year government bond to increase by 50-90 basis points over the next 1-2 years.[18] In addition, I present results for several estimates of the MRP, which has increased due to investors' increased risk aversion. In addition to my baseline results, which rely on an MRP of 6.5%, I also estimate the risk positioning models using an MRP of 7.0% and 7.5%.[19] The sensitivity analyses show that even a relatively small increase in the risk premium investors expect could substantially impact the estimated cost of equity.

Q36. HOW HAVE THE FINANCIAL CONDITIONS DISCUSSED ABOVE AFFECTED THE WATER INDUSTRY?

A36. There is a substantial need for ongoing investment in water industry infrastructure. The EPA has recently updated the spending needs in the water industry from $275 billion to $334.8 billion over the next 20 years.[20] These expenditures are driven by the need for upgrades to the distribution and transmission system as well as by the need to develop new water resources Thus, infrastructure investment in the water industry will require substantial external financing (i.e., new debt and equity). Access to capital requires that investors expect to earn their required return. Failure to provide adequate returns may discourage potential investors.

IV. THE COST OF CAPITAL FOR THE BENCHMARK SAMPLES

Q37. HOW IS THIS SECTION OF YOUR TESTIMONY ORGANIZED?

A37. As noted in *Section I*, I estimate the cost of capital using two samples of comparable risk companies. This section first covers preliminary matters such as sample selection, market-value capital structure determination, and the sample companies' costs of debt. It then covers estimation of the

[18] Federal Reserve Bank of Philadelphia, "Survey of Professional Forecasters: First Quarter 2011," February 11, 2011 comparing the data provided for 2011 with the forecast for 2012 and 2013. Comparing Q1 2011 to Q1 2012 and the year 2012, the forecast increase is 60 and 70 basis points, respectively.

[19] Because it is plausible that the government bond beta against the equity market is different from zero, I adjust the risk-free rate downward in the sensitivity analyses where the MRP is increased. The details of this relationship is explained in Appendix C.

[20] Rudden Energy Strategies Report, May 26, 2009 p. 6.

cost of equity for the sample companies and the resulting estimates of the sample's overall after-tax cost of capital.

A. Preliminary Decisions

Q38. WHAT PRELIMINARY DECISIONS ARE NEEDED TO IMPLEMENT THE ABOVE PRINCIPLES?

A38. I must select the benchmark samples, calculate the sample companies' market-value capital structures, and determine the sample companies' market costs of debt and preferred equity.

1. The Samples: Water Utilities and Gas Local Distribution Companies

Q39. WHY DO YOU USE TWO SAMPLES?

A39. The overall cost of capital for a part of a company depends on the risk of the business in which the part is engaged, not on the overall risk of the parent company on a consolidated basis.

Estimating the cost of capital for New Mexico-American Water's regulated assets is the subject of this proceeding. The ideal sample would be a number of companies that are publicly traded "pure plays" in the water production, storage, treatment, transmission, distribution and wastewater lines of business.[21] "Pure play" is an investment term referring to companies with operations only in one line of business. Publicly traded firms, firms whose shares are freely traded on stock exchanges, are ideal because the best way to infer the cost of capital is to examine evidence from capital markets on companies in the given line of business.

Therefore, for this case, a sample of companies whose operations are concentrated solely in the regulated portion of the water industry would be ideal. Unfortunately, the available sample of "water" utility companies in the U.S. is relatively small and has some data deficiencies.

To select my sample of comparable water and gas LDC companies, I start with those companies that are listed as a water utility or natural gas utility in *Value Line*.[22] Usually, I would apply several selection criteria to delete companies with unusual circumstances that may bias the cost-of-capital estimation and companies whose risk characteristics differ from those of the filing entity. However, the application of such criteria would eliminate many of the water utilities listed in *Value Line*. Therefore, I do not apply selection criteria to the water utility sample although I do apply my usual selection criteria to the gas LDC sample. Specifically, I would only be left with three companies (American States Water, Aqua American and California Water Service), if I were to have the following criteria for water utilities: more than $300 million in revenues, more than $500 million in market capitalization, more than 50% regulated assets, a bond rating and five years of trading data. If I further eliminated companies with substantial merger and acquisition activity as I usually do, I would also lose Aqua America. A sample of the two remaining companies is simply too small a sample. Therefore, I keep all water utilities with data in my water utility sample.[23] Note that the water sample has recently been reduced as Southwest Water has ceased to be a public company and Pennichuck Water has accepted to be acquired by the City of Nashua.

Q40. WHAT DO YOU DO TO OVERCOME THE WEAKNESSES OF THE WATER UTILITY SAMPLE DATA?

A40. To overcome the weaknesses of the water sample, I select a second sample of regulated utilities: gas local distribution companies. Gas LDCs, like water utilities, are regulated by state regulatory bodies, have large distribution investments, and serve a mix of residential, industrial, and commercial customers. In addition, the type of infrastructure operated by

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[21] Most of the water utilities in *Value Line* have operations in the water as well as wastewater business.

[22] To select the samples I include both the Standard, the Small and Mid-Cap Editions of *Value Line Investment Survey* and *Value Line Investment Survey - Plus Edition.*

[23] I exclude Pennichuck Water, which will be acquired by the City of Nashua in a few weeks.

water and gas utilities is similar in that it consists of a large distribution system and some storage.

One reason for using the gas LDC sample is to generate a sample of regulated companies whose primary source of revenues is in the regulated portion of the natural gas industry to provide a second set of results for the cost of capital in a heavily regulated distribution industry. Therefore, I start with *Value Line*'s universe of natural gas utilities, and eliminate those companies whose percentage of assets attributed to regulated activities is less than 50 percent. In addition, I only include companies with an investment grade bond rating, no recent sizable mergers or acquisitions, no recent dividend cuts, and no other activity that could cause the estimation parameters to be biased. Additionally, I require the companies to have necessary data available. The final sample includes nine companies.[24] From this sample, I create a subsample of companies that are closer to being pure plays in the regulated gas distribution industry. Additional details of the sample selection process for each sample and subsample are described briefly below with details included in Appendix B.

Q41. IF THE BUSINESS RISK OF THE GAS LDC SAMPLE DIFFERS FROM THE WATER SAMPLE, CAN YOU STILL RELY ON THE COST OF EQUITY ESTIMATED FOR THE GAS LDC SAMPLE?

A41. Yes. If the business and financial risk of the two samples differ, then a cost-of-capital analysis can still make use of the information from the more reliable sample to evaluate the reliability of the estimates from the water sample. The inference would be based on information about the relative risk of the two industries. In this instance, the business operations of water and gas LDC companies are similar, but the water companies tend to have a higher percentage of their assets and revenue subject to regulation.

[24] The number of available companies has recently been reduced as AGL Resources and Nicor Inc., two natural gas utilities, are merging. See, for example, Nicor Press Release, "AGL Resources and Nicor to Combine in $8.6 Billion Transaction," December 7, 2010.

Q42. PLEASE ELABORATE ON THE WAY TWO SAMPLES WITH DIFFERENT BUSINESS AND FINANCIAL RISKS CAN BE COMPARED.

A42. As mentioned above, the overall cost of capital for a part of a company depends on the risk of the business in which the part is engaged, not on the overall risk of the parent company on a consolidated basis. According to financial economics, the overall risk of a diversified company equals the market value weighted-average of the risks of its components.

Calculating the overall after-tax weighted average cost of capital for each sample company as described above allows the analyst to estimate the average overall cost of capital for the sample. The ATWACC captures both the business risk and the financial risk of the sample companies in one number. This allows comparison of the cost of capital between two samples on a much more informed basis. If the alternative (more reliable) sample is judged to have slightly different risk than the water sample, but the results show wide differences in the ATWACC estimates, the analyst should carefully consider the validity of the water sample estimates, whether they are materially higher or lower than the alternative sample's estimates. Of course, the alternative sample could be the source of the error, but that is less likely because the alternative sample has been selected precisely because of its expected reliability.

Q43. PLEASE COMPARE THE CHARACTERISTICS OF THE WATER UTILITY SAMPLE AND THE GAS LDC SAMPLE.

A43. The two samples differ primarily in that they operate in two different (regulated) industries, but they are relatively similar in terms of the percentage of revenues from regulated operations and the customers they serve. On average, both samples earn a large percentage of their revenue from regulated activities and serve a mix of residential, industrial, and other customers. In addition, both industries are characterized by large capital investment and both are operating a large distribution system. Because of their larger size and better data availability, the gas LDC sample has fewer estimation issues than the water sample. Also, both natural gas distribution companies and water utilities are regulated by the state in which they operate, so the regulatory environment is similar. Please refer to Appendix B for additional details on the two samples.

Q44. PLEASE DESCRIBE HOW YOU CALCULATE THE MARKET VALUES OF COMMON EQUITY, PREFERRED EQUITY AND DEBT.

A44. I estimate the capital structure for each sample company by estimating the market values of common equity, preferred equity and debt from the most recent publicly available data. The details are in Appendix B.

The market value of common equity is the price per share times the number of shares outstanding. For the CAPM and ECAPM, I use the last 15 trading days of each year to calculate the market value of equity for the year. I then calculate the average capital structure over the corresponding five-year period used to estimate the "beta" risk measures for the sample companies. This procedure matches the estimated beta to the degree of financial risk present during its estimation period. In the DCF analyses, I use the average stock price over 15 trading days ending on the release date of the BEst growth rate forecasts utilized.[25] I use 15 trading days to balance the need for a current stock price and avoiding that any one day unduly influences the results.

The market value of debt is estimated at its book value adjusted by the difference between the "estimated fair (market) value" and the "carrying cost" of long-term debt reported in each company's 10-K. The market value of preferred stock for the samples is set equal to its book value.[26]

Q45. HOW DO YOU ESTIMATE THE CURRENT MARKET COST OF DEBT?

A45. The market cost of debt for each company is set equal to the fifteen-day average yield on an index of public utility bonds that have the same credit rating, as reported by Bloomberg. The DCF analyses use the current credit

[25] BEst is Bloomberg's name for its earnings growth rate information. Bloomberg's BEst estimates are comparable to Zacks and I/B/E/S growth estimates. The BEst growth rate forecasts are as of March 2011 for the Gas LDC and the Water sample.

rating whereas the risk-positioning analyses use the current yield of a utility bond that corresponds to the five-year average debt rating of each company so as to match consistently the horizon of information used by *Value Line* to estimate each company's beta. Bond rating information was obtained from Bloomberg which reports Standard & Poor's bond ratings. I calculate the after-tax cost of debt using New Mexico-American's estimated marginal income tax rate of 39.94 percent.[27]

Q46. HOW DO YOU ESTIMATE THE MARKET COST OF PREFERRED EQUITY?

A46. For all sample companies, the preferred rating was assumed equal to the company's bond rating. The cost of a company's preferred equity was set equal to the yield on an index of preferred utility stock with the same rating. The data were obtained from the Mergent Bond Record.[28]

B. Cost-of-Equity Estimation Methods

Q47. HOW DO YOU ESTIMATE THE COST OF EQUITY FOR YOUR SAMPLE COMPANIES?

A47. As discussed earlier, the cost of capital is the expected rate of return in capital markets on alternative investments of equivalent risk. This definition leads me to address three points in my estimation procedures. First, the cost of capital is an expected rate of return – it cannot be directly observed, but must be inferred from available evidence. Second, the cost of capital is determined in capital markets (such as the New York Stock Exchange). Therefore, capital market data provide the best evidence from which to draw inferences. Third, the cost of capital depends on the return

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[26] This is unlikely to affect the results as the average percentage of preferred is close to zero for both the water and gas LDC sample.

[27] Calculated as follows: state tax rate + federal tax rate × (1 – state tax rate) = 7.6% + 35% × (1 – 7.6%) = 39.94%.

[28] Published monthly, Mergent's Bond Record offers a comprehensive review of over 68,000 bond issues including coverage of corporate, government, municipal, industrial development/environmental control revenue and international bonds, plus structured finance and equipment trust issues, medium-term notes, convertible issues, preferred stocks and commercial paper issues.

offered by alternative investments of equivalent risk. Consequently, measures of risk that matter in capital markets are part of the evidence that I need to examine. The overall cost of capital that I estimate for the samples is the primary evidence I rely on to determine New Mexico-American Water's overall cost of capital.

Q48. PLEASE EXPLAIN HOW THE DEFINITION HELPS YOU ESTIMATE THE COST OF CAPITAL.

A48. The definition of the cost of capital recognizes a tradeoff between risk and expected return; this is the security market line plotted above in Figure 1 above. Cost-of-capital estimation methods often follow one of two approaches: (1) the method establishes the location of the security market line and estimate the relative risk of the security. The security market line and the relative risk then jointly determine the cost of capital. (2) The method identifies a comparable-risk sample of companies and estimates the cost of capital directly.

The "discounted cash flow" or "DCF" model is an example of the first approach. It indirectly estimates the cost of capital as a function of observed stock price information, dividend information and expected growth. The CAPM is an example of the second type of approach, sometimes known as "equity risk premium approach." It requires an extra step – positioning the security market line. Using the second approach allows me to use information from all traded securities rather than just those included in my sample. While both approaches can work equally well if conditions are right, one may be preferable to the other under certain circumstances. In particular, approaches that rely on the entire security market line are less sensitive to deviations from the assumptions that underlie the model, all else equal. In this case, I examine both DCF and risk-positioning approach evidence for the water utility and gas LDC sample.

1. The Risk-Positioning Approach

Q49. PLEASE EXPLAIN THE RISK-POSITIONING METHOD.

A49. The risk-positioning method estimates the cost of equity as the sum of a current interest rate and a risk premium. It is therefore sometimes also known as the "risk premium" approach. This approach may sometimes be applied more or less formally. As an example of an informal application, an analyst may estimate the spread between interest rates and what is believed to be a reasonable estimate of the cost of capital at a specific time, and then apply that spread to current interest rates to get a current estimate of the cost of capital.

More formal applications of the risk-positioning approach take full advantage of the security market line depicted in Figure 1: they use information on a large number of traded securities to identify the security market line and derive the cost of capital for the individual security based on that security's relative risk. This reliance on the entire security market line makes the method less vulnerable to the kinds of problems that arise from using one stock at a time (such as the DCF method). The risk-positioning approach is widely used and underlies much of the current research published in academic journals on the nature, determinants and magnitude of the cost of capital. The most commonly used version of the formal risk-positioning models is the Capital Asset Pricing Model (CAPM). The equation for the CAPM is:

$$k_s = r_f + \beta_s \times MRP \tag{2}$$

where k is the cost of capital, r_f is the risk-free interest rate, *MRP* is the market risk premium, and β_s is the measure of relative risk.

Section I of Appendix C to this testimony provides more detail on the principles that underlie the risk-positioning approach. Section II of Appendix C provides the details of the risk-positioning approach empirical estimates I obtain.

Q50. HOW ARE THE "MORE FORMAL" APPLICATIONS OF THE RISK-POSITIONING APPROACH IMPLEMENTED?

A50. The first step is to specify the current values of the benchmarks that determine the security market line. The second is to determine the security's, or investment's, relative risk. The third is to specify exactly how the benchmarks combine to produce the security market line, so the company's cost of capital can be calculated based on its relative risk.

a) Security Market Line Benchmarks

Q51. WHAT BENCHMARKS ARE USED TO DETERMINE THE LOCATION OF THE SECURITY MARKET LINE?

A51. The essential benchmarks that determine the security market line are the risk-free interest rate and the premium that a security of average risk commands over the risk-free rate. This premium is commonly referred to as the "market risk premium" (MRP), i.e., the excess of the expected return on the average common stock over the risk-free interest rate. In the risk-positioning approach, the risk-free interest rate and MRP are common to all securities. A security-specific measure of relative risk (beta) is estimated separately and combined with the MRP to obtain the company-specific risk premium.

Q52. WHAT BENCHMARK DO YOU USE FOR THE MRP?

A52. For this proceeding I estimate only a long-term version of the risk-positioning model. This version of the risk-positioning model measures the market risk premium as the risk premium of average-risk common stocks over long-term Government bonds. I do not present a short-term version in this proceeding because monetary policy has driven the short-term risk-free rate close to zero. I also report several sensitivity analyses that take into account the increase in the MRP as discussed above in *Section III.*

Q53. HOW DO YOU ESTIMATE THE BASELINE MRP?

A53. Appendix C summarizes academic and empirical research on the MRP. However, as discussed in the appendix, there is currently little consensus on the "best practice" for estimating the MRP even pre-crisis. (Note: this is not the same as saying that all practices are equally good). For example, the leading graduate textbook in corporate finance expresse the view that a range between 5 to 8 percent is reasonable for the U.S.[29] Morningstar data from 1926 to 2010, the longest period reported, show an MRP average premium of stocks of 8.2 percent over Treasury bills and 6.7 percent over long-term Government bonds. The publication reports a premium of stocks over bonds of 6.6 percent for the period 1947 to 2010.[30] At the same time, *Credit Suisse's Global Investment Return Yearbook 2010* estimates the arithmetic market risk premium for the U.S. over the 1900 to 2009 period at 6.3 percent over bonds.[31] In a regulatory setting, the Surface Transportation Board ("STB") recently decided to use the CAPM (and the DCF) when determining the cost of capital for major railroads in the U.S. As part of its methodology, the STB decided to rely on the long-term market risk premium reported by Morningstar/Ibbotson in its implementation of the CAPM.[32]

My testimony considers both the historical evidence and the results of scholarly studies of the factors that affect the risk premium for average-risk stocks in order to estimate the benchmark risk premium investors currently expect.

Considering all the evidence, I conclude that S&P 500 stocks of average risk commanded 6.5 percent over the long-term Government rate prior to the financial crisis. This estimate is a conservative estimate of the historical average risk-premium in that it is lower than the figure reported over the longest period available and includes the unusual 2008 year. As discussed in *Section III* above, this figure has increased with the current market turmoil, so that the baseline of 6.5 percent likely underestimates the current MRP. However, I choose to use it as a benchmark to be conservative. I do, however, report sensitivity analyses that reflect an increase in the MRP I refer to models that use the 6.5 percent

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[29] Richard A. Brealey, Stewart C. Myers, and Franklin Allen, *Principles of Corporate Finance*, McGraw-Hill, 9th edition, 2008, pp. 173-180.

[30] Morningstar, *Ibbotson SBBI Valuation Yearbook 2011*, Appendix A, Tables A-1 and A-3.

[31] Credit Suisse (with E. Dimson, P. Marsh, and M. Staunton), "*Global Investment Returns Yearbook 2010*," Table 10.

[32] *STB Ex Parte No. 664*, Issued January 17, 2008, pp. 8-9.

MRP as the baseline. The estimation of the MRP is discussed in greater detail in Appendix C.

Q54. HOW DO YOU DETERMINE THE RISK-FREE RATE YOU USE?

A54. First, I calculate the yield on long-term Government bonds over a recent 15-day period. Second, I determine the increase in the spread between the yield on A-rated utility bonds and long-term (20-year) Government bonds.[33] As of March 10, 2011 this spread stood at 148 basis points (using Bloomberg's calculated yields) and were 55 basis points above the average for the period 1991 to 2007.[34] I conservatively choose to add 40 basis points to the current long-term risk-free rate and note that this is conservative compared to the increase expected in the Federal Reserve Bank of Philadelphia study cited above, which forecasted an increase in the 10-year Treasury bond yield of 50 to 90 basis points over the next few years.[35]

b) Relative Risk

Q55. WHAT MEASURE OF RELATIVE RISK DO YOU USE?

A55. I examine the "beta" of the stocks in question. Beta is a measure of the "systematic" risk of a stock — the extent to which a stock's value fluctuates more or less than average when the market fluctuates.

The basic idea behind beta is that risks that cannot be diversified away in large portfolios matter more than those that can be eliminated by diversification. Beta is a measure of the risks that cannot be eliminated by diversification. This concept is explored further in Appendix C.

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[33] I use the yield on A-rated utility bonds as they are less likely to include a default premium than are lower rated utility bonds.

[34] See Table 3 above.

[35] The Federal Reserve of Philadelphia's Survey of Professional Forecasters expects that the yield on 10-year Treasury bonds will average 4.1 – 4.9% over the 2012 to 2014 period. As the maturity premium of a 20-year Treasury bond over that of a 10-year Treasury bond has averaged 60 basis points since 2000, the corresponding yield on a 20-year Treasury bond is in the range of 4.7 – 5.5 percent (assuming the maturity yield remains constant).

Q56. WHAT DOES A PARTICULAR VALUE OF BETA MEAN?

A56. By definition, a stock with a beta equal to 1.0 has average non-diversifiable risk: it goes up or down by 10 percent on average when the market goes up or down by 10 percent. Stocks with betas above 1.0 exaggerate the swings in the market. A stock with a beta of 2.0 tends to fall 20 percent when the market falls 10 percent, for example. Stocks with betas below 1.0 understate the swings in the market. A stock with a beta of 0.5 tends to rise 5 percent when the market rises 10 percent.

Q57. HOW DO YOU ESTIMATE BETA?

A57. I estimate my betas. Beta estimates are also available from *Value Line* and Bloomberg, but because I have been unable to replicate *Value Line's* estimates for the gas LDC companies, I choose to rely on my own estimates, which are comparable to Bloomberg's estimates for the gas LDC sample and comparable to both Bloomberg's and Value Line's estimates for the water utility sample. I estimate beta using standard techniques and rely on 260 weeks of return data for the sample companies. I use the S&P 500 index as the market index. Additional details regarding the estimation procedure are included in Appendix C.

c) Cost of Equity Capital Calculation

Q58. HOW DO YOU COMBINE THE PRECEDING STEPS TO ESTIMATE THE COST OF EQUITY?

A58. The most widely used approach to combine a risk measure with the benchmark market risk premium on common stocks to find a risk premium for a particular firm or industry is the Capital Asset Pricing Model. However, the CAPM is only one risk-positioning technique.

In addition to the CAPM, I rely on an empirical variety of the model. Empirical research has long shown that the CAPM tends to overstate the actual sensitivity of the cost of capital to beta: low-beta stocks tend to have higher risk premia than predicted by the CAPM and high beta stocks tend to have lower risk premia than predicted. A number of variations on the original CAPM theory have been proposed to account for this finding.

This finding can be used directly to estimate the cost of capital, using beta to measure relative risk, without simultaneously relying on the CAPM. Here I examine results from both the CAPM and a version of the security market line based on the empirical finding that risk premia are related to beta, but are not as sensitive to beta as the CAPM predicts, to convert the betas into a risk premium. I refer to this latter model as the "ECAPM," where ECAPM stands for Empirical Capital Asset Pricing Model. The formula for the ECAPM is

$$k_s = r_f + \alpha + \beta_s \times \left(MRP - \alpha\right) \tag{3}$$

where as before *k* is the cost of capital, r_f is the risk-free interest rate, *MRP* is the market risk premium, □s is the measure of relative risk, and α is the empirical adjustment factor.

Research supports values for α ranging from one to seven percent when using a short-term interest rate. I use benchmark values of α of 0.5 percent for the long-term risk-free rate as it is in the lower range of what empirical evidence support. I also conduct sensitivity tests for different values of α. For the long-term risk-free rate I use values for α of 0, 0.5 and 1.5 percent. See Appendix C for a more detailed discussion of the ECAPM model and Table C-1 for a summary of the empirical evidence on the size of the required adjustment.

Q59. WHY IS IT APPROPRIATE TO USE THE ECAPM MODEL?

A59. Empirical tests of the CAPM have repeatedly shown that an investment's return is related to systematic risk, but that the increase in return for an increase in risk is less than is predicted. The empirical tests have also shown that the theoretical intercept, as measured by the return on Treasury bills, is too low to fit the data. In other words, the empirical tests indicate that the slope of the CAPM is too steep and the intercept is too low. The empirical data support the ECAPM. The ECAPM recognizes the consistent empirical observation that the CAPM underestimates (overestimates) the cost of capital for low (high) beta stocks. The ECAPM corrects the predictions of the CAPM to more closely match the results of the empirical tests. Ignoring the results of CAPM tests would lead to an estimate of the cost of capital that is likely to be less accurate than is possible.

Q60. IS THE USE OF THE ECAPM EQUIVALENT TO ADJUSTING THE ESTIMATED BETAS FOR THE SAMPLE COMPANIES?

A60. No. Fundamentally, this is not an adjustment (increase) in beta. This can easily be seen by the fact that the expected return on high beta stocks is lower with the ECAPM than when estimated by the CAPM. The ECAPM model is a recognition that the actual slope of the risk-return tradeoff is flatter than predicted and the intercept higher based upon repeated empirical tests of the model.[36] Even if the beta of the sample companies were estimated accurately, the CAPM would still underestimate the required return for low beta stocks. Even if the ECAPM were used, the costs of equity would be underestimated if the betas were underestimated.

2. Discounted Cash Flow Method

Q61. PLEASE DESCRIBE THE DISCOUNTED CASH FLOW APPROACH.

A61. The DCF model takes the first approach to cost-of-capital estimation, i.e., to attempt to estimate the cost of capital in one step. The method assumes that the market price of a stock is equal to the present value of the dividends that its owners expect to receive over the life of the company. The method also assumes that this present value can be calculated by the standard formula for the present value of a cash flow stream:

$$P = \frac{D_1}{(1+k)} + \frac{D_2}{(1+k)^2} + \frac{D_3}{(1+k)^3} + \cdots + \frac{D_T}{(1+k)^T} \qquad (4)$$

[36] Many investment firms make an adjustment to the beta. A commonly used adjustment is the Merrill Lynch adjustment, which adjusts betas 1/3 toward one. This type of adjustment is intended to compensate for sampling errors in the beta estimation, not for the empirical fact that CAPM tends to overestimate the sensitivity of the cost of capital to beta. See Appendix C for a more detailed explanation.

where "P" is the market price of the stock; "D_t" is the dividend cash flow expected at the end of period t (i.e., subscript period 1, 2, 3 or T in the equation); "k" is the cost of capital; and "T" is the last period in which a dividend cash flow is to be received. The formula just says that the stock price is equal to the sum of the expected future dividends, each discounted for the time and risk between now and the time the dividend is expected to be received.

Most DCF applications go even further, and make very strong (i.e., unrealistic) assumptions that yield a simplification of the standard formula, which then can be rearranged to estimate the cost of capital. Specifically, if investors expect a dividend stream that will grow forever at a steady state, the market price of the stock will be given by a very simple formula,

$$P = \frac{D_1}{(k-g)} \tag{5}$$

where "D_1" is the dividend expected at the end of the first period, "g" is the perpetual growth rate, and "P" and "k" are the market price and the cost of capital, as before. Equation (5) is a simplified version of Equation (4) that can be solved to yield the well known "DCF formula" for the cost of capital:

$$\begin{aligned} k &= \frac{D_1}{P} + g \\ &= \frac{D_0 \times (1+g)}{P} + g \end{aligned} \tag{6}$$

where "D_0" is the current dividend, which investors expect to increase at rate g by the end of the next period, and the other symbols are defined as before. Equation (6) says that if Equation (5) holds, the cost of capital equals the expected dividend yield plus the (perpetual) expected future growth rate of dividends. I refer to this as the simple DCF model. Of course, the "simple" model is simple because it relies on very strong, unrealistic, assumptions.

Q62. CAN YOU ILLUSTRATE THE DCF MODEL?

A62. Yes. For simplicity, I will illustrate the method using annual data although most companies pay dividends quarterly, so that a quarterly model is more appropriate. If, on an annual basis, a company paid \$2 in dividends, D_0, has a current stock price, P, of \$30 and an estimated growth rate, g, of 5 percent per year, then the calculations in equations (5) and (6) above are as follows

Dividends next period: $D_1 = D_0 \times (1 + g) = \$2.00 \times (1 + 5\%) = \$2.10$

Dividend Yield: $D_1 / P = \$2.10 / \$30 = 7.0\%$

Cost of equity: $k = D_1 / P + g = 7.0\% + 5\% = 12\%$.

Q63. ARE THERE OTHER VERSIONS OF THE DCF MODELS BESIDES THE "SIMPLE" ONE?

A63. Yes. There are many variations on the DCF models that may rely on less strong (more realistic) assumptions in that they allow growth rates to vary over time. I consider a variant of the DCF model that uses the companies' individual growth rates during the first five years, converges to a perpetual growth rate in years 6-10 and then uses the GDP growth rate as the perpetual growth rate after year 10 for all companies. This is a variant of the "multi-stage" DCF method. The DCF models are described in detail in Section I of Appendix D. (Section II of Appendix D provides the details of my empirical DCF analysis.)

Q64. WHAT ARE THE MERITS OF THE DCF APPROACH?

A64. The DCF approach is conceptually sound if its assumptions are met, but can run into difficulty in practice because those assumptions are so strong, and hence so unlikely to correspond to reality. Two conditions are well known to be necessary for the DCF approach to yield a reliable estimate of the cost of capital: the variant of the present value formula that is used must actually match the variations in investor expectations for the dividend growth path; and the growth rate(s) used in that formula must match current investor expectations. Less frequently noted conditions may also create problems. (See Appendix D for details.)

Q65. WHAT IS THE MOST DIFFICULT PART OF IMPLEMENTING THE DCF APPROACH?

A65. Finding the right growth rate(s) is the usual “hard part” of a DCF application. The original approach to estimation of the growth rate, *g*, relied on average historical growth rates in observable variables, such as dividends or earnings, or on the “sustainable growth” approach, which estimates g as the average book rate of return times the fraction of earnings retained within the firm. But it is highly unlikely that these historical averages over periods with widely varying rates of inflation and costs of capital will equal current growth rate expectations. This is particularly true for the water sample as many companies in the industry are growing fast, engaged in mergers, acquisitions or other restructuring activities.

Moreover, the constant growth rate DCF model requires that dividends and earnings grow at the same rate for companies that on average earn their cost of capital.[37] It is inconsistent with the theory on which the model is based to have different growth rates in earnings and dividends over the period when growth is assumed to be constant. If the growth in dividends and earnings were expected to vary over some number of years before settling down into a constant growth period, then it would be appropriate to estimate a multistage DCF model. In the multistage model, earnings and dividends can grow at different rates, but must grow at the same rate in the final, constant growth rate period. A difference between forecasted dividend and earnings rates therefore is a signal that the facts do not fit the assumptions of the simple DCF model.

[37] Why must the two growth rates be equal in a steady-growth DCF model? Think of earnings as divided between reinvestment, which funds future growth, and dividends. If dividends grow faster than earnings, there is less investment and slower growth each year. Sooner or later dividends will equal earnings. At that point, growth is zero because nothing is being reinvested (dividends are constant). If dividends grow slower than earnings, each year a bigger fraction of earnings are reinvested. That makes for ever faster growth. Both scenarios contradict the steady-growth assumption. So if you observe a company with different expectations for dividend and earnings growth, you know the company’s stock price and its dividend growth forecast are inconsistent with the assumptions of the steady-growth DCF model.

Q66. HOW DO YOU ESTIMATE THE GROWTH RATES YOU USE IN YOUR DCF ANALYSIS?

A66. I use earnings growth rate forecasts from Bloomberg and *Value Line*. Analysts' forecasts are superior to using single variables in time series forecasts based upon historical data as has been documented and confirmed extensively in academic research. Please see Section I in Appendix D for a detailed discussion on this issue.

Q67. ARE YOU AWARE OF LITERATURE THAT FINDS THAT ANALYSTS' FORECAST OF EARNINGS GROWTH HISTORICALLY HAVE OVERESTIMATED EARNINGS AND DIVIDEND GROWTH?

A67. Yes. Most of the research underlying this literature was conducted prior to the various reforms aiming to reduce analysts' bias. Thus, while academic researchers during the 1990s as well as in early 2000s found evidence of analysts' optimism bias, it appears that (1) regulatory reforms have largely if not completely eliminated the issue and (2) utilities were never subject to the level of optimism bias as other industries. To elaborate, a recent paper by Hovakimina and Saenyasiri (2010) found that recent efforts to curb analysts' incentive to provide optimistic forecasts have worked, so "the median forecast bias essentially disappeared."[38] In addition, the effect of optimism bias is least likely to affect DCF estimates for rate regulated companies in relatively stable segments of an industry. Take, for example, Chan, Karceski, and Lakonishok (2003)[39] who sort companies on the basis of the size of the I/B/E/S forecasts to test the level of optimism bias. Utilities constitute 25 percent of the companies in lowest quintile. These authors found that the I/B/E/S forecast for the 25 percent quintile showed an upward bias when measured against realized income before extraordinary items using a simple average of the companies in the

[38] A. Hovakimian and E. Saenyasiri, "Conflicts of Interest and Analyst Behavior: Evidence from Recent Changes in Regulation," *Financial Analysts Journal*, vol. 66, 2010.

[39] L. K.C. Chan, J. Karceski, and J. Lakonishok, 2003, "The Level and Persistence of Growth Rates," *Journal of Finance* 58(2):643-684.

quintile, while the same I/B/E/S forecasts showed a downward bias when measured against realized portfolio income before extraordinary items. The latter weigh the sample by company size. Thus, their finding showed mixed results for the segment that includes utilities.

In addition, the use of a two-stage DCF model, which substitutes the forecast growth of GDP, mitigates analyst optimism by substituting the GDP growth rate for the potentially optimistic (or pessimistic) earnings forecasts of analysts.

Q68. HOW WELL ARE THE CONSTANT-GROWTH RATE CONDITIONS NECESSARY FOR THE RELIABLE APPLICATION OF THE DCF LIKELY TO BE MET FOR THE SAMPLE COMPANIES AT PRESENT?

A68. The requisite conditions for the sample companies are not fully met at this time, particularly for the water sample, which include several companies that have limited data available and where acquisitions have been frequent. Of particular concern for this proceeding is the uncertainty about what investors truly expect the long-run outlook for the sample companies to be. The longest time period available for growth rate forecasts of which I am aware is five years. The long-run growth rate (i.e., the growth rate after the water industry settles into a steady state, which may be beyond the next five years for this industry) drives the actual results one gets with the DCF model. Unfortunately, this implies that unless the company or industry in question is stable – so there is little doubt as to the growth rate investors expect – DCF results in practice can end up being driven by the subjective judgment of the analyst who performs the work.

The DCF growth rates, whether estimated from historical data or from analyst forecasts, have likely been affected by several factors: many mergers and acquisitions in the water industry,[40] significant growth in many parts of the country, and a trend towards consolidation. The industry appears to be moving

[40] For example, Pennichuck Corp. has agreed to be acquired by the City of Nashua, NH and Southwest Water was taken private in 2010. In addition, Aqua America made 26 acquisitions in 2010 (*Value Line Investment Survey*, Aqua America, January 21, 2011).

towards a larger degree of consolidation – at least among the privately held water utilities. As pointed out by Value Line Investment Survey,

> Infrastructures are decaying rapidly and, in many cases, need complete overhauls. The costs to make the repairs are astronomical and many operating in this space do not have the funds on hand to foot the bill. Indeed, most are strapped for cash and will have to look to outside financiers to keep up. Although consolidation trends present unique opportunities for those with the financial capabilities to throw their hat in the ring, such as Aqua America, others are just trying to stay afloat.[41]

The American Society of Civil Engineers estimated in 2009 that "drinking water systems face an annual shortfall of at least $11 billion in funding needed to replace aging facilities that are near the end of their useful life and to comply with existing and future federal water regulations"[42] with a total investment need for drinking water and wastewater investments of $255 billion over the next five years.[43] Drinking water is mentioned as the second most important infrastructure concern for New Mexico and the required investments is estimated at $27.87 billion for drinking water and at $18.17 billion for wastewater.[44] Coupled with the rising construction costs of utility infrastructure, this creates uncertainty about future conditions and diverging expectations. The uncertainty associated with these factors increases the industry's business risk. Additionally, environmental regulations impact the industry as standards for water quality evolve over time, and there is potential for new safety and security requirements in the future. The industry has no federal regulator (other than for environmental and health issues), and state public utility commissions regulate most investor owned water utilities. Different regulatory bodies may lead to differing regulatory requirements for companies operating in adjacent parts of the country. Taken together, these

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[41] *Value Line*, Water Utility Industry, January 21, 2011.

[42] Report Card for America's Infrastructure, The American Society of Civil Engineers, 2009, p. 1.

[43] *Ibid*., Executive Summary p. 7. According to the document, the investment shortfall is about $108.6 billion for the water industry over the next five years.

[44] Report Card for America's Infrastructure: New Mexico, The American Society of Civil Engineers, 2009. (http://www.infrastructurereportcard.org/state-page/New Mexico)

factors mean that it may be some time before the water industry settles into anything investors will see as a stable equilibrium necessary for the reliable application of the DCF model.

Such circumstances imply that a commission may often be faced with a wide range of DCF estimates, none of which can be well grounded in objective data on true long-run growth expectations, *because no such objective data now exist*. DCF for firms or industries in flux is *inherently* subjective with regard to the most important parameter, the long-run growth rate that drives the answer.

In short, the unavoidable questions about the DCF model's strong assumptions cause me to view the DCF method as less reliable for the water utility sample at this point in time. Relying on historical growth rate does not make the water sample's DCF results reliable, because (1) the DCF method's strength is being forward looking and historical data violates this principle and (2) historical growth rates for the water industry vary as much as do forecasted growth rates. A number of companies in the water industry, which has a relative small number of companies, are in flux and therefore their growth rates are very volatile. Therefore, even minor variations in methodology, timing, or sample composition drives the results which is not consistent with stable rate making.

C. THE SAMPLES AND RESULTS

1. The Water Utility Sample

Q69. EARLIER YOU SAID THAT THE SAMPLE OF WATER UTILITIES HAD DATA WEAKNESSES. PLEASE ELABORATE ON THESE WEAKNESSES.

A69. Currently, only four companies have a market value of equity greater than $500 million. More important, however, is the fact that the stock of these companies trades relatively infrequently. Low trading volume causes concern because there may be a delay between the release of important information and the time that this information is reflected in prices. Such delay is well known to cause beta estimates to be statistically insignificant and possibly biased.

In addition to lack of data and the small size of the companies, there are firm-specific events that render the water utility sample less reliable than would be ideal. First, Aqua America (the second largest of the companies) has gone through a large number of mergers and acquisitions in recent years. Normally, I would not include companies with significant merger or acquisition activity in a sample because the individual information about the progress of the proposed merger is so much more important for the determination of the company's stock price than day-to-day market fluctuations. In practice, beta estimates for such companies tend to be too low. The growth rates for such companies may also be affected. Second, American Water Works, the largest publicly traded water utility, has only been publicly traded since 2008 and therefore has less than five years of data available for examination. In addition, American Water has announced a sale of its Arizona and New Mexico assets. I therefore report my results for both the full sample and for a subsample of companies that differ in the risk positioning and DCF method. Specifically, I exclude Connecticut Water Service from the DCF subsample, because it has a negative growth rate from Value Line. I exclude American Water from the subsample in the CAPM / ECAPM analyses because it has less than five years of trading data.

Q70. HOW IS THIS SECTION OF YOUR TESTIMONY ORGANIZED?

A70. This section first describes the input data used in the CAPM and ECAPM models, then reports the resulting cost-of-equity estimates for the samples. The second section of Appendix C details the empirical analysis.

a) Interest Rate Estimate

Q71. HOW DID YOU DETERMINE THE EXPECTED RISK-FREE INTEREST RATE?

A71. I reviewed current constant maturity U.S. Government bond yield data available from the St. Louis Federal Reserve Bank. For the 15-day period ending March 10, 2011, the average yield on long-term government bonds was 4.34 percent. To that figure I added 40 basis points in the baseline case as an adjustment for the increase in yield spread.[45] I note that in the sensitivity analyses, I reduce the adjustment for yield spread by 25 basis points for each 1 percent increase in the MRP. This intends to take into account the fact that bond betas may be positive and .25 is a conservative estimate hereof - - i.e., bond betas are likely to be lower, so that a .25 percent adjustment is in the upper end of the needed adjustment.

b) Betas and the Market Risk Premium

Q72. WHAT BETA ESTIMATES DID YOU USE IN YOUR ANALYSIS FOR THE SAMPLES?

A72. I estimate betas for the sample companies using total return data for the most recent 260 weeks. I use the S&P 500 as the market index. The estimated betas are shown in Workpaper #1 to Tables No. BV-10 and BV-20. The tables also show Bloomberg and Value Line betas.

Q73. HOW DO YOU CALCULATE YOUR BETAS?

A73. I use 260 weekly observations of the total return on the sample companies' stock as well as S&P 500 and standard statistical procedures to estimate beta. Consistent with most commercial providers of betas and the academic literature that demonstrate that raw betas tend to underestimate the slope of the market line for low beta stocks (and overestimate the slope of the market line for high beta stocks), I rely on adjusted betas. This is consistent with both Value Line and Bloomberg's standard beta procedure. The average beta for the water sample is .78 while the average beta for the gas LDC sample is .75.

Q74. PLEASE EXPLAIN THE METHOD TO ADJUST FOR DIFFERENCES IN CAPITAL STRUCTURE.

[45] See Table No. BV-9.

A74. Starting with the ATWACC, the cost of equity for any capital structure within a broad range of capital structures can be determined by the following formula:

$$\text{Return on equity} = \frac{\text{ATWACC} - \text{Return on debt} \times \%\ \text{debt in capital structure} \times (1 - \text{tax rate})}{\%\ \text{equity in capital structure}}$$

This is the calculation that is displayed in Tables No. BV-12 and BV-22.[46] The tables display the result of converting the sample average ATWACC to a return on equity for a specific capital structure. It is straightforward to use this method to determine the cost of equity consistent with the capital structure.

c) Risk-Positioning Results

Q75. WHAT ARE THE COST-OF-EQUITY ESTIMATES DERIVED FROM THE RISK-POSITIONING APPROACH FOR THE WATER AND GAS LDC SAMPLE?

A75. Table 3a and Table 3b below display the results for both samples and for the three scenarios. The results for the water sample are slightly higher than for the gas LDC sample.

[46] For companies that have preferred equity, an additional term equal to (Return on preferred equity × % preferred in capital structure) is subtracted from the numerator of this fraction.

Table 3a

Gas LDC Sample Return on Equity Summary and Sensitivity Analysis Using Brattle Betas			
Estimated Return on Equity	Baseline [1]	Scenario 2 [2]	Scenario 3 [3]
Full Sample			
CAPM	11.9%	12.3%	12.6%
ECAPM (α = 0.5%)	12.1%	12.5%	12.8%
ECAPM (α = 1.5%)	12.5%	12.9%	13.2%
Sub-Sample			
CAPM	12.2%	12.6%	12.9%
ECAPM (α = 0.5%)	12.4%	12.8%	13.1%
ECAPM (α = 1.5%)	12.8%	13.1%	13.5%

Sources and Notes:
Baseline: Long-Term Risk Free Rate of 4.74%, Long-Term Market Risk Premium of 6.50%.
Scenario 2: Long-Term Risk Free Rate of 4.61%, Long-Term Market Risk Premium of 7.00%.
Scenario 3: Long-Term Risk Free Rate of 4.49%, Long-Term Market Risk Premium of 7.50%.

Table 3b

Water Utility Sample Return on Equity Summary and Sensitivity Analysis Using Brattle Betas			
Estimated Return on Equity	Baseline [1]	Scenario 2 [2]	Scenario 3 [3]
Full Sample			
CAPM	12.5%	12.9%	13.3%
ECAPM (α = 0.5%)	12.7%	13.1%	13.4%
ECAPM (α = 1.5%)	13.0%	13.4%	13.7%
Sub-Sample			
CAPM	13.1%	13.5%	14.0%
ECAPM (α = 0.5%)	13.3%	13.7%	14.1%
ECAPM (α = 1.5%)	13.5%	14.0%	14.4%

Sources and Notes:
Baseline: Long-Term Risk Free Rate of 4.74%, Long-Term Market Risk Premium of 6.50%.
Scenario 2: Long-Term Risk Free Rate of 4.61%, Long-Term Market Risk Premium of 7.00%.
Scenario 3: Long-Term Risk Free Rate of 4.49%, Long-Term Market Risk Premium of 7.50%.

These ROE estimates are based upon the Company's current regulatory capital structure of 44 percent equity. Of the equity risk premium results, the CAPM values deserve the least weight, because this method does not adjust for the empirical finding that the cost of capital is less sensitive to beta than predicted by the CAPM (which my written evidence considers by using the ECAPM). Conversely, the ECAPM numbers deserve the most weight, because this method adjusts for the empirical findings. For my analysis, I conservatively rely on the baseline scenario, which makes no upward adjustment to the MRP. Relying on the baseline case, the CAPM and ECAPM models show a range of 12 to 12¾ percent for the gas LDC sample / subsample and 12½ to 13½ percent for the water sample / subsample with the subsamples being a bit higher than the full sample.[47,48]

2. The DCF Cost-of-Capital Estimates

Q76. WHAT STEPS DO YOU TAKE IN YOUR DCF ANALYSES?

A76. Given the above discussion of DCF principles, the steps are to collect the data, estimate the sample companies' costs of equity at their current capital structures, and then to adjust the sample's estimates to New Mexico-American Water's 44 percent equity ratio.

a) Growth Rates

Q77. WHAT GROWTH RATE INFORMATION DO YOU USE?

A77. For reasons discussed above and in Appendix D, historical growth rates today are not as relevant as forecasts of current investor expectations for these samples. I therefore use rates forecast by security analysts.

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[47] Reliance on Value Line betas would reduce the gas LDC sample estimates by 25-50 basis points, but the water sample's estimates would be almost unaffected.

[48] I specify the cost of capital estimate to the nearest ¼ percent because I do not believe that it is possible to estimate the cost of capital more precisely than that. All calculations supporting my analyses are presented in the attached tables labeled Table No. BV-1 to Table No. BV-22.

The ideal in a DCF application would be a detailed forecast of future dividends, year by year well into the future until a true steady state (constant) dividend growth rate was reached, based on a large sample of investment analysts' expectations. I know of no source of such data. Dividends are ultimately paid from earnings, however, and earnings forecasts from a number of analysts are available for a few years. Investors do not expect dividends to grow in lockstep with earnings, but for companies for which the DCF approach can be used reliably (*i.e.*, for relatively stable companies whose prices do not include the option-like values described in Appendix D), they do expect dividends to track earnings over the long-run. Thus, use of earnings growth rates as a proxy for expectations of dividend growth rates is a common practice.

Accordingly, the first step in my DCF analysis is to examine a sample of investment analysts' forecast earnings growth rates from Bloomberg and *Value Line* to the degree such forecasts are available. The details are in Appendix D. At present, *Value Line* data runs through the 2014-2016 time period, representing an average of about four years from the current earning forecasts available for 2011. Bloomberg also provides a long-term earnings growth rate estimate. The longest-horizon forecasted growth rates from these sources underlie the simple DCF model (*i.e*., the standard perpetual-growth model associated with the "DCF formula," dividend yield plus growth). Unfortunately, the longest growth forecast data only go out four to five years, which is too short a period to make the DCF model completely reliable.

b) Dividend and Price Inputs

Q78. WHAT VALUES DO YOU USE FOR DIVIDENDS AND STOCK PRICES?

A78. Dividends are either for the first or second quarter of 2011, depending on the most recent dividend information available at the time of estimation for each company.[49] This dividend is grown at the estimated growth rate and

[49] The dividend information was obtained from Bloomberg.

divided by the price described below to estimate the dividend yield for the simple DCF model.

Stock prices are an average of closing stock prices for the 15-day trading period ending on the day the BEst forecast was obtained from Bloomberg. A 15-day stock price average is used to guard against anomalous price changes in any single day.

c) DCF Results

Q79. WHAT ARE THE DCF ESTIMATES FOR THE SAMPLES?

A79. Following the procedures outlined earlier, simple and multistage DCF estimates of the cost of equity are obtained for the water and gas LDC sample companies, and are presented in Table 4a and 4b below.[50]

Table 4a

Water Utility Sample
DCF Return on Equity Summary

	DCF	
	Simple	Multi-stage
Full Sample		
Cost of Equity	11.6%	10.0%
Sub-Sample		
Cost of Equity	11.6%	10.1%

[50] See *Section III.B* of above for details of DCF estimation.

Table 4b

Gas LDC Sample DCF Return on Equity Summary		
	DCF	
	Simple	Multi-stage
Full Sample		
Cost of Equity	12.1%	10.6%
Sub-Sample		
Cost of Equity	12.4%	10.5%

For the water sample and subsample, the simple DCF cost estimate is 11.6 percent. The multistage DCF estimates are lower at 10 percent and 10.1 percent for the full sample and subsample, respectively. For the gas LDC sample and subsample, the simple DCF cost estimate is 12.1 percent and 12.4 percent, respectively. The multistage DCF estimates are lower at 10.6 percent and 10.5 percent for the full sample and subsample, respectively.

V. NEW MEXICO-AMERICAN WATER'S UNIQUE CIRCUMSTANCES AND THE REQUIRED RETURN ON EQUITY

Q80. WHAT ARE SOME OF THE CHALLENGES THAT NEW MEXICO-AMERICAN WATER IS FACING?

A80. New Mexico-American Water is facing financial challenges. The Company has been unable to earn its allowed return on equity for an extended period of time. As a result, the Company's financial metrics are challenging.[51] Further, American Water Works recently agreed to sell its Arizona and New Mexico assets to EPCOR. As a multi-state organization, American Water, represents a microcosm of the investment community discussed throughout this testimony and as such, American Water Works, the parent, needs to make decisions about the investment of limited resources. As a prudent investor, it needs to ensure that its operating companies meet

[51] See Table 5 below for a history of New Mexico-American Water's earned return on equity.

environmental and other regulatory requirements **and** also invest its resources where it can achieve the highest returns with the lowest risk, just like the investment community at large. As a result New Mexico-American Water finds itself in competition for capital within the American Water Works organization with operations in states that expect to earn a higher and more predictable return. American Water Works stated in its press release regarding the sale that it allows American Water Works to "direct our focus to those operations where we can best serve customers and meet business objectives.[52]

Q81. PLEASE ELABORATE ON NEW MEXICO-AMERICAN WATER'S FINANCIAL CHALLENGES.

A81. Table 5 below shows the earned return on equity for New Mexico-American Water since 2000 and clearly shows that only in 2000 did New Mexico-American earn its allowed return on equity. In all other years, it has seen a substantially lower earned return on equity.

Table 5

Historical ROE %										
2010	**2009**	**2008**	**2007**	**2006**	**2005**	**2004**	**2003**	**2002**	**2001**	**2000**
4.39%	4.18%	1.48%	1.98%	1.23%	1.61%	1.44%	9.46%	9.22%	7.56%	15.43%

For 10 years, New Mexico-American Water has been unable to earn its allowed return on equity and since 2004, the earned return on equity has been at or below the yield on government bonds. This is a fundamental problem as New Mexico-American Water cannot raise capital on the terms available to the U.S. government - - its cost of capital is inherently higher and the cost of equity is higher than the cost of debt. On a stand-alone basis, the low realized return means that New Mexico-American Water cannot raise capital on reasonable terms or fund needed investments from internally-generated funds.

[52] American Water Works Press Release January 24, 2011. See also, American Water Works, "Institutional Investor Meeting," April 2011 (www.amwater.com).

Q82. WHY IS THE EARNED RETURN ON EQUITY IMPORTANT TO A COMPANY?

A82. Both debt and equity investors receive their return on investments from the earned return, so investors as well as credit rating agencies look to the earned return to evaluate the value of the investment and the credit worthiness of the company. For example, it is usually necessary for a company to obtain a credit rating to place its bonds (or other debt) with the public. In general, the higher the credit rating, the lower the yield investors require, and the required yield increases at an increasing rate as the credit rating declines. For example, the difference between the yields on BBB and BB rated bonds is larger than is the difference in yield between A and BBB rated bonds. Recently and especially during the height of the financial crisis, the yields on BBB- rated bonds (the lowest investment grade) and on non-investment grade bonds increased much more than did the yields on higher-rated bonds. This observation is illustrated in Figure 4 below for four investment grade bond ratings. From Figure 4, it is clear that while utility bond yields have declined in recent months, the spreads between categories such as between BBB and BBB- rated utility bonds and especially between BBB and BB rated utility bonds have not returned to their pre-crisis levels. The yield spread on BB rated utility debt remains very high, about 315 basis points, compared to less than 160 basis points in April 2007. Thus, a downgrade to the BBB- or worse, the BB range, could result in a substantial increase in the expected cost of debt. Given the ongoing volatility in capital markets, yield spreads for bonds rated BBB- or lower may not return to a more normal range for an extended period of time.

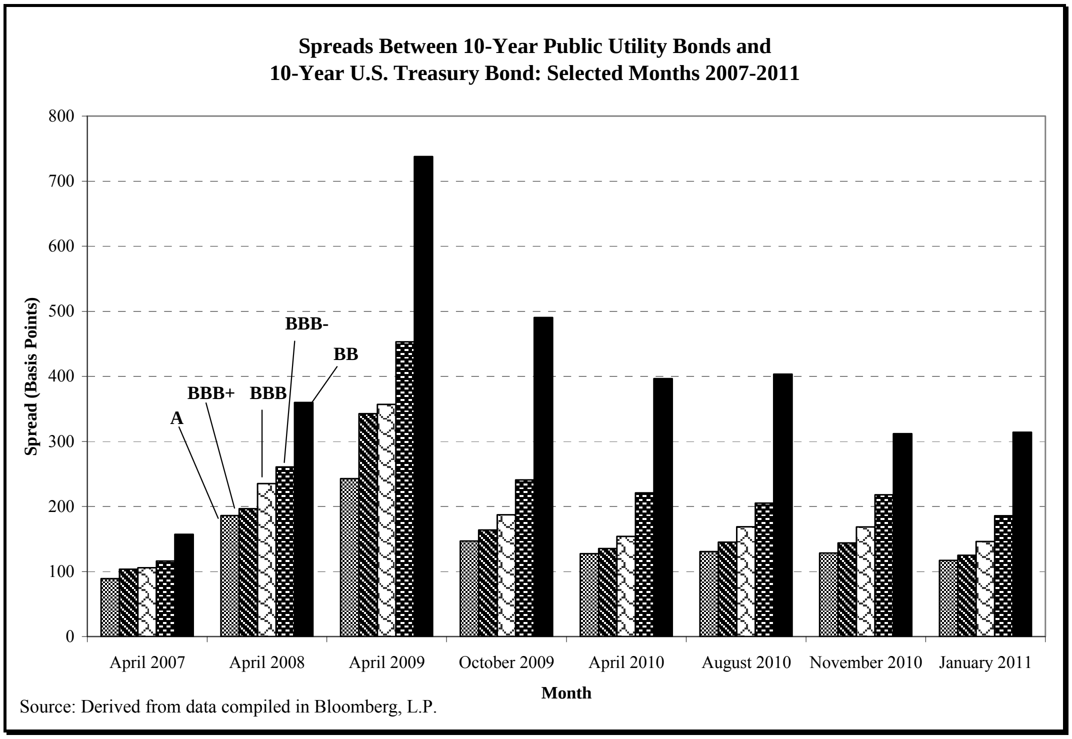

Figure 4

For a company such as New Mexico-American Water, the impact of the widening yield could be very significant. If New Mexico-American Water were to issue debt on a stand alone basis, the difference between issuing debt as a BBB and a BB rated entity is currently about 125 basis points for 10-year bonds. More importantly, BB-rated or even BBB- rated entities have difficulty accessing credit markets during times of limited liquidity, and if they do, they must pay very high interest rates, as illustrated in the April and October 2009 data in Figure 4.

Q83. ARE THERE OTHER COSTS TO HAVING A BORDERLINE INVESTMENT GRADE CREDIT RATING?

A83. Yes. Mutual fund and many other financial institutions cannot hold non-investment grade paper and cannot acquire bonds with a rating below BBB- and some cannot acquire BBB- rated debt. If an entity's debt were downgraded to non-investment grade, many financial institutions are required by their charters to sell all such bonds. The effect of forced sales by financial institutions is likely to be an increase in the required yield on non-investment grade debt. BBB- rated entities are more vulnerable to economic turmoil because they are 'closer to the edge' than other investment grade rated entities. As a result, yields on BBB- rated debt increase more when financial markets are in turmoil. In addition, companies with non-investment grade credit ratings are considered to be in financial distress and experience additional costs not borne by investment grade companies. These factors underline the importance of improving New Mexico-American Water's credit metric. [53]

Q84. ARE THERE OTHER ISSUES THAT MIGHT NEED CONSIDERATION IN LIGHT OF THE DATA IN TABLE 5?

A84. Yes. Table 5 shows that New Mexico-American Water has been unable to earn its allowed return on equity for a number of years. This indicates that the company may be facing asymmetric risk, which exists when the possibility of a large negative outcome is not balanced by the possibility of a large positive outcome, or if the regulated company consistently fails to earn its allowed return because of the manner in which rates are set. With the presence of asymmetric risk, the regulated entity will expect to earn less than its allowed return on equity. The solution to this problem would be to either add an amount to the allowed ROE to compensate the utility for the asymmetric risk or to remove the source of the asymmetric risk. If an amount is added to the allowed ROE, the amount should be set so as to allow investors to again expect to earn their cost of capital on average in the face of asymmetric risk.

For illustrative purposes, consider the following example of how to compensate for asymmetric risk. Assume that the cost of equity equals the allowed ROE and is set at 11.25 percent. Also assume that the equity portion of the rate base is $100, so that the regulator allows the entity a return on equity of $11.25. Now assume that there is 90 percent chance that the utility will earn 100 basis points

[53] See, for example, Moody's "Global Regulated Water Utilities," December 2009.

below the cost of equity and only 10 percent chance the utility will earn its allowed return on equity. Specifically, with 90 percent chance, a return of $10.25 will be realized and with 10 percent chance the return will be equal to the allowed return on equity, $11.25. Thus, the expected return is

$$90\% \times \$10.25 + 10\% \times \$11.25 = \$10.35.$$

The expected return is equivalent to only 10.35% ($10.35/$100) rather than the cost of equity of 11.25 percent.

One manner in which the asymmetric risk can be mitigated is to increase the allowed return on equity exactly enough to offset the asymmetric risk. In this example, the asymmetric risk is equivalent to 0.9%. Therefore, the project's asymmetric risk can be mitigated by allowing an ROE adder of 0.9% for a total return of 12.15%. To see this, note that

$$12.15\% \times \$100 = \$12.15 \text{ and } 11.15\% \times \$100 = \$11.15$$

And

$$10\% \times \$12.15 + 90\% \times \$11.15 = \$11.25.$$

Increasing the return on equity by 0.9% in this example offsets the asymmetric risk the company faces.

Q85. WHAT IS THE IMPLICATION OF THE ASYMMETRIC RISK EXAMPLE FOR NEW MEXICO-AMERICAN WATER?

A85. As a company subject to asymmetric risk cannot expect to earn its allowed rate of return, it is important that either (1) the asymmetric risk is removed or (2) the company's allowed return on equity is raised. In the case of New Mexico-American Water, the continual inability to earn the allowed return on equity could be offset by allowing New Mexico-American Water a higher return on equity. For example, a number of basis points (e.g., 25 – 75 basis points) could be added to the allowed return on equity.

Q86. PLEASE SUMMARIZE THIS SECTION OF YOUR TESTIMONY AS IT PERTAINS TO NEW MEXICO-AMERICAN WATER.

A86. It is important that New Mexico-American Water is able to earn a reasonable return on its water utility investments to be able to attract capital on a stand alone basis and thus be able to continue to fund its infrastructure investment programs. The recent acquisition of Arizona-American Water and New Mexico-American Water's assets for approximately $470 million speaks to this issue. EPCOR paid approximately $470 million for American Water Works' approximately $450 million equity investment in Arizona-American Water's and New Mexico-American Water's assets. Thus, EPCOR paid approximately $1.04 for each $1 of book equity. In turn, American Water Works market-to-book value was approximately 1.07 at year-end. Thus, EPCOR discounted the Arizona and New Mexico water assets. If the Company consistently is unable to earn a reasonable return on equity, shareholders will question investing in the Company. Therefore, the Commission should consider allowing an ROE at the upper end of the range of reasonableness or add to the ROE for the industry to strengthen the Company's credit metrics and to improve the chance that the ROE actually earned will equal its cost of capital.

VI. NEW MEXICO-AMERICAN WATER'S COST OF EQUITY

Q87. WHAT CONCLUSIONS DO YOU DRAW FROM THE ABOVE DATA REGARDING EACH SAMPLE'S COST OF EQUITY?

A87. The risk-positioning estimates from the water and the gas LDC samples are reasonably in line and indicate a return on equity in the range of 11¾ to above 13 percent, while the DCF estimates quite a bit lower and indicate a range from 10 to 12 percent. I believe the DCF estimates for the water sample deserve little to no weight due to the ongoing merger and acquisition activity and the lack of analysts' following in the industry. Both the M&A activity and the lack of analysts following the water industry is likely to impact the growth estimates although the direction of the potential bias cannot be predicted. However, the DCF estimates generally point to a lower cost of equity than do the CAPM and ECAPM estimates. Therefore, I believe the best midpoint estimate for the water industry is around 11¾ percent. This estimate does not take into account the potential impact of the financial turmoil or New Mexico-American Water's financial challenges. Thus, the cost of equity for New Mexico-American Water is more likely to be higher than the 11¾ percent midpoint estimate than lower.

Q88. DO YOU HAVE ANY COMMENTS REGARDING THE RESULTS OF THE MODELS?

A88. Yes. If any increase in investors' risk aversion and thus the market risk premium is taken into account, the estimates are well above the baseline figures. Also, as noted in Section V above, the fact that New Mexico-American Water has been unable to earn its allowed return on equity in recent years. Therefore, the allowed return on equity should be placed in the upper end of the reasonable range at no less than 11¾ percent.

Q89. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A89. Yes.