BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Application of California-American Water Company (U210W) for an Authorized Cost of Capital for Utility Operations for 2012-2014	Application No. 11-05- (Filed May 2, 2011)

DIRECT TESTIMONY OF BENTE VILLADSEN

TABLE OF CONTENTS

EXECUTIVE SUMMARY

Dr. Bente Villadsen, a Principal at *The Brattle Group*, files testimony on the cost of capital for California-American Water Company ("California American Water"). 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 California American Water at its 49.69 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, California American Water's capital structure includes only 49.69 percent equity, which is lower than the percentage equity among many 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 California American Water. 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 California American Water's financial performance over the past six years and calculated various credit metrics based on these figures. She also reviewed California American Water'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 California American Water 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.

A fundamental principle of finance is that only systematic risk affects the cost of equity capital. Therefore, the Water Revenue Adjustment Mechanism ("WRAM") will only impact the cost of equity capital to the extent that it affects the systematic risk. Based on the nature of the mechanism, it is not clear that it impacts systematic risk. Further, a recent empirical study shows that decoupling mechanism in the gas distribution industry do not have an impact on the cost of capital. As these mechanisms are similar to the WRAM, it is unlikely that the WRAM has a measurable effect on the cost of equity. Thus, the WRAM should be ignored in setting the allowed return on equity.

Based on the evidence from the samples, Dr. Villadsen finds that California American Water's cost of equity capital is no less than 11.50%.

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. California-American Water Company ("California American Water" or the "Company") has asked me to estimate the cost of equity for the Company. The cost of equity is the return that the California Public Utilities 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 California 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, specifically, the 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 California American Water's requested capital structure consisting of about 50 percent equity provided the Commission accepts California American Water's special requests #4 and #33.[1] Third, I evaluate the relative risk of California American Water and the sample companies to determine the recommended cost of equity for California American Water. In doing so, I compare the characteristics of California American Water to both the samples and benchmarks provided by rating agencies.

[1] See the Direct Testimony of Mr. David P. Stephenson ("Stephenson Testimony") for information about this issue.

I review how credit rating agencies rate utilities such as California American Water and discuss the critical importance placed on cash flow by credit rating agencies and creditors. The development of credit ratings and generic financial strength is important because debt investors, as well as equity investors, are concerned about the financial strength of companies and investors have become increasingly concerned about the credit worthiness of companies following the financial crisis. For a regulated entity such as California American Water, the revenue requirement to a large degree determines the cash flow that will accrue to the utility. A utility's financial strength is linked to cash flow, so a utility is clearly very dependent upon (1) the allowed rate of return and (2) its ability to earn the allowed rate of return. It is important that a utility remains credit worthy and maintains a solid credit rating, because the lack of creditworthiness reduces and possibly eliminates the utility's access to credit markets and hence to financing. Further, a reduction in, for example, a utility's credit rating implies a higher cost of debt and because the cost of debt increases very dramatically as the credit rating drops. In addition, I review California American Water specific issues such as the very low earned return on equity relative to the allowed return on equity. I then consider how these factors impact the Company's cost of equity.

I also discuss the impact on the cost of capital of California's Water Revenue Adjustment Mechanism ("WRAM"). My discussion emphasizes three points. First, the WRAM was implemented in anticipation of the revenue drop off that water utilities in California would face after they put water conservation measures into practice. I.e., the WRAM cannot be viewed separately from the context in which it was implemented. Second, only systematic (non-diversifiable) risk impact the cost of capital, so ***only if*** systematic risk is affected by the implementation of the WRAM could there be an impact on the cost of capital. I have seen no evidence that systematic risk is affected and a recent empirical study finds no meaningful correlation between the cost of capital for gas utilities and decoupling mechanisms similar to the WRAM. Third, if the companies used to estimate the cost of equity capital have a WRAM-like mechanism, then any effect of decoupling mechanisms is already included in the cost of capital estimates.

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

A4. 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 not previously filed testimony before the California Public Utilities Commission. Appendix A contains more information on my professional qualifications.

Q5. PLEASE SUMMARIZE YOUR ESTIMATION OF THE COST OF CAPITAL FOR CALIFORNIA AMERICAN WATER.

A5. To assess the cost of capital for California American Water, I select two benchmark samples: regulated water utilities and natural gas local distribution companies (LDC).[2] These samples are selected to have risk characteristics comparable to those of California American Water. I also 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 and of the CAPM as well as 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 49.7 percent equity. Thus, I present the cost of

[2] In Decision 09-05-019, issued May 7, 2009 ("Decision 09-05-019"), the Commission expressed concern about using gas LDC companies as proxy companies for water utilities. I address this concern in *Section IV*.

equity that is consistent with the samples' market information and California American Water's regulatory capital structure. (By "regulatory capital structure," I mean the capital structure that California American Water proposes in its application.) Using the CAPM and ECAPM methods, the best point estimates of the ROE for the samples are the following: 11½ and 12¼ percent ROE for the water sample and subsample, respectively, while the gas LDC sample and subsample shows an ROE of 11¼ and 11½ percent, respectively. However, the analyses result in a range of estimates for each sample: 11½ to 12½ percent ROE for the water sample / subsample and 11 to 11¾ percent ROE for the gas LDC sample / subsample. The DCF results for the gas LDC sample are a bit lower than the CAPM / ECAPM results at 9¾ to 11¼ for the gas LDC sample and subsample, respectively, while the water sample and subsample is lower at 9¼ to 10¾ percent for the water sample and subsample.

Based on this evidence I conclude that the best midpoint estimate for California American Water's cost of equity capital is 11½ percent. This estimate is included in the CAMP and ECAPM range for both the water and gas LDC sample and subsample and takes the lower DCF estimates into account. As California American Water has experienced low credit metrics and difficulty in earning its allowed rate of return, the estimate is more likely to be too low than too high. Further, because of the ongoing financial turmoil, I also present results for several scenarios that take the increased risk aversion among investors into account although my recommendation relies on the baseline case, which does not make any adjustments for increases in investor risk aversion.

Q6. DOES THE WATER REVENUE ADJUSTMENT MECHANISM ("WRAM") AFFECT THE COST OF CAPITAL?

A6. Not in any measurable fashion. First, the WRAM was implemented in response to the revenue impact of water conservation efforts in California. As water utilities are very capital intensive, the majority of a water utility's costs are fixed and hence not affected by a reduction in water volumes. However, revenues are affected. The revenue effect is magnified by the presence of inclining block rates. Specifically, inclining block rates results in a relatively large fraction of "conserved" volumes comes from highest prices, so a 1% decrease in water volumes result in much more than a 1% decline in revenues.

The WRAM intends to offset this effect and cannot be viewed in isolation from the water conservation initiatives and their impact on water utilities' finances. Second, the cost of capital is only affected by systematic risk, so the WRAM only impacts the cost of capital if it changes the systematic risk. I have seen no evidence that it does. A recent empirical study finds no substantial effect on the cost of capital from decoupling mechanisms in the gas utility industry. As the WRAM resembles many decoupling mechanism already in place in the gas industry, I believe the results carry over to California's water utilities. Third, many utilities included in my comparable samples have decoupling mechanism in place for at least a portion of their service territory, so for these utilities, any impact is already incorporate in the market data I rely on to estimate the cost of capital.

Q7. ARE THERE ANY UNIQUE ISSUES IN ESTIMATING THE COST OF CAPITAL AT THIS POINT IN TIME?

A7. 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.

Q8. ARE THERE ANY SPECIAL CIRCUMSTANCES FOR CALIFORNIA-AMERICAN WATER THAT NEEDS TO BE CONSIDERED?

A8. Yes. California American Water has earned a negative income in three of the last six years and earned a very low return on equity on the remaining three years. At no point in recent years has California American Water earned its allowed return on equity. Further, on a stand-alone basis, California American Water's credit metrics show that the Company is generating too little cash flow to meet credit rating agencies' expected metric for a solid investment grade rating. In particular, several key metrics are below those expected for an investment grade rating from Moody's. Both of these facts indicate that it is imperative that California American Water be allowed a reasonable return on its equity capital and that there are no regulatory barriers that prevent the Company from

being able to, on average, earn its allowed return on equity. Examples of barriers to earn the allowed rate of return include delayed recognition of increases in expenses or an inadequate return on regulatory assets.[3] Similarly, any delays in including expenses in the revenue requirement would create barriers to earn the allowed return.

Q9. PLEASE SUMMARIZE YOUR CONCLUSIONS REGARDING CALIFORNIA AMERICAN WATER'S COST OF EQUITY.

A9. My midpoint estimate for California American Water's cost of equity capital is 11½ percent with a range of 11¼ to 12. The recommendation is based on analyses of the return on equity that investors expect as well as on California American Water specific analyses. The range is asymmetric because the ongoing financial turmoil is more likely to result in an increase in the return on equity than a decline. 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 California American Water. In addition, I take California American Water's credits metrics and the discrepancy between its earned and allowed return on equity into consideration to determine the point estimate for the Company.

Q10. WHY DO YOU NEED TO CONSIDER CALIFORNIA AMERICAN WATER'S REGULATORY CAPITAL STRUCTURE?

A10. 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.

[3] The regulatory treatment of revenues, costs and rate base vary by jurisdiction. See the National Association of Water Companies surveys at http://www.nawc.org/ for a discussion hereof. The return treatment of California American Water's regulatory asset is discussed in the Direct Testimony of Mr. Jeffrey T. Linam ("Linam Testimony") as well as in *Section V* of my testimony.

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 California American Water's regulatory capital structure to report accurately the market evidence on the cost of equity.

Q11. HOW IS THE REST OF YOUR TESTIMONY ORGANIZED?

A11. The rest 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 California American Water's unique situation such as its inability to earn its allowed return and earned return and the impact on credit metrics.

Section VI discusses the Water Revenue Adjustment Mechanism or WRAM and its impact on the cost of capital, if any.

Section VII summarizes the analysis and discusses the recommendation for California 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.

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

Q12. PLEASE DEFINE YOU USE OF THE TERM "COST OF CAPITAL."

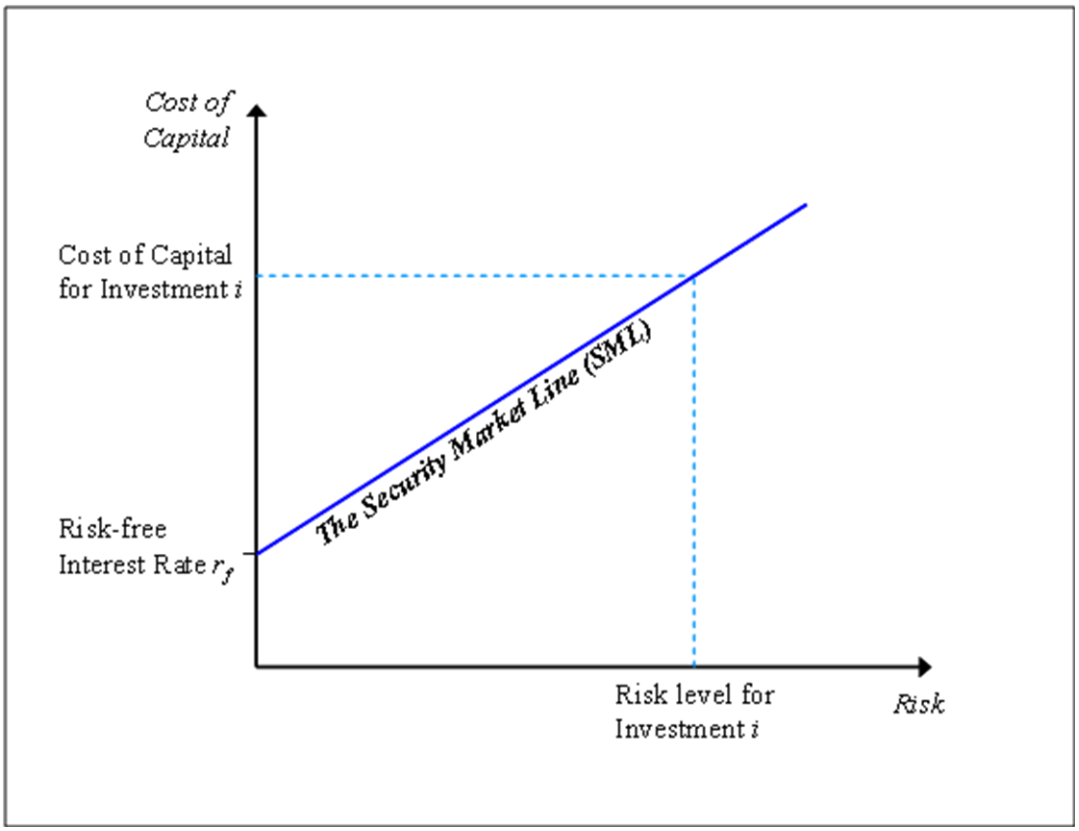
A12. The cost of capital is the expected rate of return in capital markets on alternative investments of equivalent risk. In other words, it is the rate of return investors require based on the risk-return alternatives available in competitive capital markets. The cost of capital is a type of opportunity cost: it represents the rate of return that investors could expect to earn elsewhere without bearing more risk.[4]

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.

[4] "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.

Figure 1: The Security Market Line



Q13. WHY IS THE COST OF CAPITAL RELEVANT IN RATE REGULATION?

A13. U.S. rate regulation normally accepts the "cost of capital" as the right expected rate of return on utility investment.[5] This practice is generally 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).

Viewed from an economic perspective, the rate that provides investors a fair opportunity to earn the cost of capital are the lowest levels that compensate investors for the investment risk they take on. Over the long run, an expected return above the cost of capital makes customers overpay for service. Regulatory authorities normally try to prevent such outcomes, unless there are offsetting benefits (e.g., from incentive

[5] 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).

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 commensurate 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. However, 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),[6] 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 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.

[6] Water utilities are very capital intensive and have over the last years earned only about $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.

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, where bond spreads were lower. Further, the ongoing turmoil in the oil producing countries as well as questions about European countries' credit and U.S. budget worries add to financial markets' uncertainty.[7]

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

Q14. WHAT IS THE DIFFERENCE BETWEEN BUSINESS RISK AND FINANCIAL RISK?

A14. 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

[7] 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 RatingsDirect, "A Closer Look At The Revision Of The Outlook On The U.S. Government Rating," April 18, 2011.

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.

Q15. PLEASE EXPLAIN WHY IT IS NECESSARY TO REPORT THE COST OF EQUITY ADJUSTED FOR CAPITAL STRUCTURE.

A15. Rate regulation in the U.S. and Canada usually focuses on the components of the rates.[8] 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 between 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 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. 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.

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

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

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

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 California 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 California American Water's regulated capital structure. Thus, the samples' overall cost-of-capital and that of California American Water is the same.

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

A17. Yes. 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. However, 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. 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.

Q19. HOW DO YOU CALCULATE THE COST OF EQUITY CONSISTENT WITH THE MARKET-DETERMINED ESTIMATE OF THE SAMPLE'S AVERAGE COST OF CAPITAL?

A19. For simplicity, assume that all sample companies have only common stock and debt. Then the ATWACC is calculated as:

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

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.

Q20. CAN YOU PROVIDE AN EXAMPLE OF HOW THIS FORMULA IS USED TO DETERMINE THE COST OF EQUITY?

A20. 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.

Q21. IS THE ATWACC COMMONLY USED IN RATE PROCEEDINGS?

A21. While it is common to set the allowed return on equity, the allowed cost of debt, and the capital structure separately in the U.S., the ATWACC is commonly used in other jurisdictions. In Europe, the U.K. regulators (e.g., Ofgem and the Competition Commission),[9] the Danish, the Dutch, and the French regulators generally set returns using an ATWACC-like method.[10,11] Similarly, the Australian Energy Regulator and the New Zealand Commerce Commission determines the after-tax weighted-average cost of capital in order to regulate their utilities.[12] Recently, the Canadian National Energy Board also used the ATWACC to set the allowed rate of return for Trans Québec & Maritimes pipeline.[13] Thus, using the ATWACC to determine the allowed rate of return is the standard method in many jurisdictions.

Q22. ARE YOU SUGGESTING THE COMMISSION USE THE ATWACC IN THIS PROCEEDING?

A22. No. In this proceeding, I am merely using the ATWACC as a tool to ensure consistency between the sample companies capital structures and the recommended return on equity

[9] Smithers, "Report on the Cost of Capital provided to Ofgem," September 1, 2006; Competition Commission, "Cost of Capital for BAA: Appendix F," January 2008.

[10] Examples are provided in the following documents: Danish Energy Regulatory Authority, "Indtægtsrammeregulering af naturgasdistributionsselskaberne – fastsættelsen af forrentningssatser for 2005 samt udmelding af indtægtsrammer for 2005," August 28, 2005; Netherlands Competition Authority, "Method Decision Case Number 102135-46 (non-certified translation)," September 5, 2006; Nederlandse Mededingingsautoriteit, "Methodebesluit Algemene Transporttaken TenneT," September 13, 2010; "Determination of Appropriate Cost of Capital Rates for the Regulated Fixed Services of France Telecom," Djibril Diakité for the AFORST, October 2005.

[11] The fact that I do not cite all European countries does not mean that they do not rely on an ATWACC-like methodology, but simply that I do not have a current decision handy or that it is written in a language other than English. Also, the documents above are cited to evidence the use of ATWACC-like methodologies rather than as a source of data or estimation techniques.

[12] Australian Energy Board, "Electricity transmission and distribution network service providers: Review of the weighted average cost of capital (WACC) parameters," May 2009; New Zealand Commerce Commission, Determination of the Cost of Capital for Services Regulated under Part 4 of the Commerce Act 1986," March 3, 2011.

[13] National Energy Board, "Reason for Decision: Trans Québec & Maritimes Pipelines Inc., RH-1-2008," issued March 2009.

for California American Water. I.e., I am recommending a return on common equity as is standard in proceedings before the Commission.

Q23. PLEASE EXPLAIN THE INTEREST RATE THAT IS USED TO DETERMINE THE WEIGHTED COST OF CAPITAL?

A23. To estimate the weighted-average cost of capital, I use the market-based yield on bonds of the same rating as that of the sample companies.[14] This is the relevant market cost of debt that is being issued today. However, standard regulatory practice is to allow utilities to recover their embedded cost of debt and my estimation techniques do not change that. I.e., I recommend that California American Water be allowed to recover its embedded cost of debt.

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

Q24. WHAT DO YOU DISCUSS IN THIS SECTION?

A24. This section addresses the effect of the recent recession and financial turmoil on the cost of capital.

Q25. HOW DOES THE FINANCIAL TURMOIL IMPACT THE COST OF CAPITAL?

A25. 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 are 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 BBB or lower rated bonds, including lower-rated utility bonds. Second, capital markets remain volatile compared to historical benchmarks.

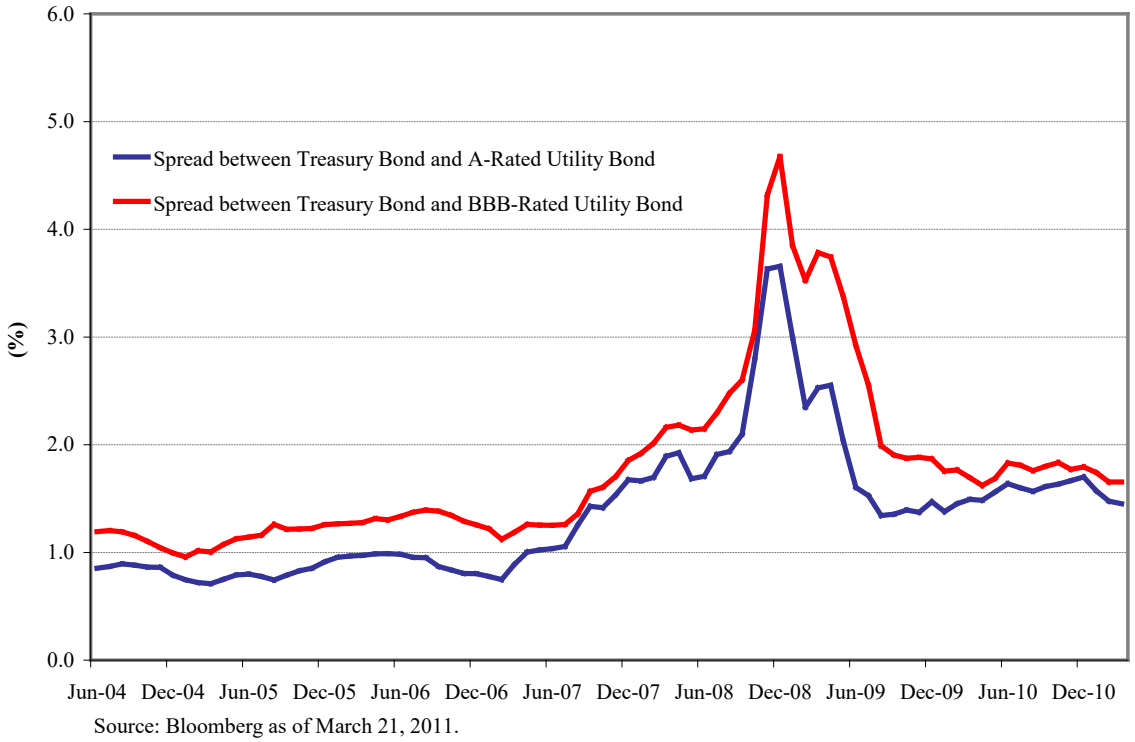
Q26. HOW HAS THE YIELD SPREAD BETWEEN GOVERNMENT AND UTILITY BONDS CHANGED IN THE LAST THREE TO FOUR YEARS?

A26. During the height of the financial crisis in 2008-09, the spread between the yield on utility bonds and government bonds widened dramatically. Although the spread has

[14] Workpaper 1 to Table BV-11 and BV-21 show the long-term issuer rating by S&P as reported by Bloomberg.

narrowed, the yield spread is high relative to its historical level. Figure 2 illustrates this fact as well as 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 shows that the yield spread remain higher than prior to the financial crisis of 2008-09. A supportive regulatory environment coupled with an appropriate allowed ROE are important components to insure that the utility's credit rating remains investment grade.

Spread between US 20-Year Treasury Bond Yields and US 20-Year Utility Bond Yields



Source: Bloomberg as of March 21, 2011.

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.

Q27. WHAT IS THE IMPLICATION OF HIGHER THAN NORMAL YIELD SPREADS?

A27. 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.

Q28. ARE THE HIGHER THAN NORMAL YIELD SPREADS AN INDICATION OF INVESTORS' "FLIGHT TO SAFETY"?

A28. Yes. When investors become concerned about the economy, they frequently seek to reduce their exposure to investment risk. U.S. Government debt is generally considered to be the least risky available investment − in effect it is considered to be risk-free − so U.S. Government debt is in high demand during times of economic uncertainty. The recent change from stable to negative outlook for U.S. government debt does not change that although downgrades might.

Q29. DO REGULATED COMPANIES BENEFIT FROM THE FLIGHT TO SAFETY?

A29. 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.[15]

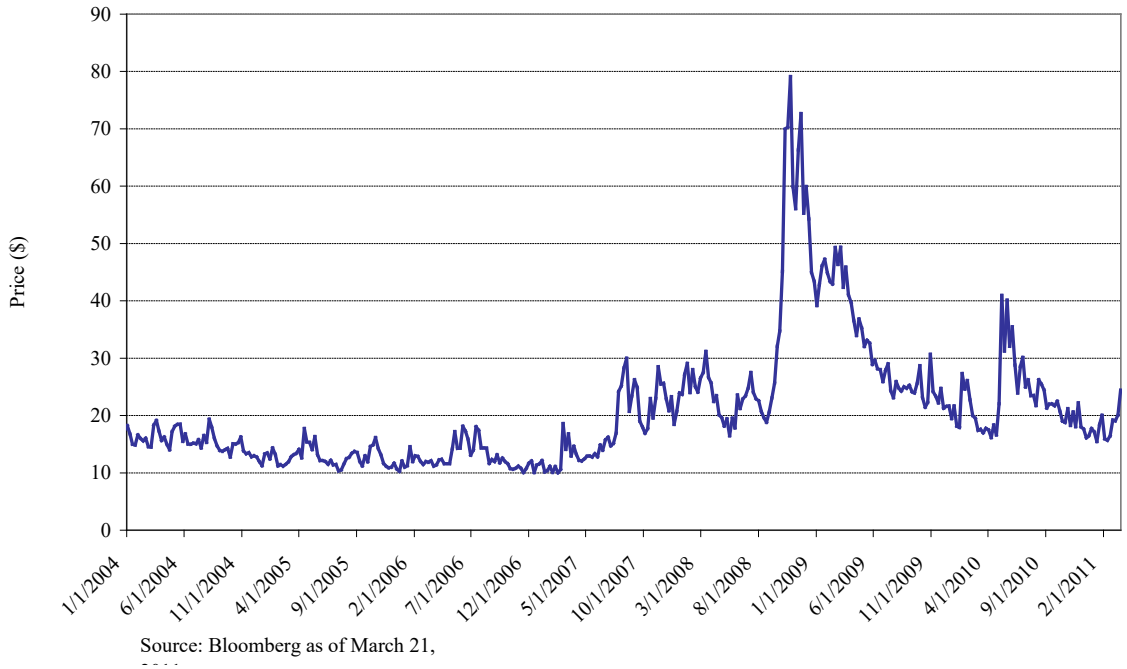
Q30. WHAT EVIDENCE DO YOU HAVE THAT FINANCIAL MARKETS ARE VOLATILE?

A30. 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.[16] 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.

[15] 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.

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

CBOE Volatility Index (VIX) from January 2004 to March 2011



Source: Bloomberg as of March 21,

Figure 3

As can be seen from Figure 3, the VIX index and thus market volatility remains above the pre-crisis level and has very recently again increased to above 20 in response to the ongoing turmoil in the Middle East and the sovereign and bank debt crisis in several European countries.[17]

Q31. PLEASE EXPLAIN WHY STOCK MARKET VOLATILITY MATTERS TO UTILITIES.

A31. Academic research has found that investors expect a higher risk premium during periods that are more volatile. 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:

[17] 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.

> 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.[18]

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.

Q32. WHAT DO YOU MEAN BY THE TERM "RISK AVERSION"?

A32. Risk aversion is the recognition that investors dislike risk, which 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.

Q33. HOW DOES AN INCREASE IN INVESTORS' RISK AVERSION AFFECT THE COST OF CAPITAL FOR CALIFORNIA-AMERICAN WATER?

A33. As noted above, any increase in investors' risk aversion lead to a higher required return on capital and 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 financial markets. Therefore, an estimation of the market cost of capital needs to consider the shift in investors' attitude towards risk.

Q34. ARE THERE OTHER ISSUES THAT MAY AFFECT THE COST OF CAPITAL IN THE LONGER TERM?

A34. 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

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

of $1.3 trillion, more than triple that of 2008 and the highest since World War II.[19] The CBO estimates that the budget deficit will remain high over the foreseeable future.[20] 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.

Q35. CAN YOU SUMMARIZE HOW THE ECONOMIC DEVELOPMENTS DISCUSSED ABOVE HAVE AFFECTED THE RETURN ON EQUITY AND DEBT THAT INVESTORS REQUIRE?

A35. The credit crisis has dramatically affected investors, and companies such as California 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.

Q36. HOW DO YOU TAKE THE CURRENT ECONOMIC CONDITIONS INTO ACCOUNT WHEN ESTIMATING THE COST OF EQUITY?

A36. 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

[19] Congressional Budget Office: http://www.cbo.gov/ftpdocs/108xx/doc10871/BudgetOutlook2010_Jan.cfm.

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

the next 1-2 years.[21] 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 and MRP of 7.0% and 7.5%.[22] The sensitivity analyses show that even a relatively small increase in the risk premium investors expect could substantially impact the estimated cost of equity.

Q37. HOW HAVE THE FINANCIAL CONDITIONS DISCUSSED ABOVE AFFECTED THE WATER INDUSTRY?

A37. 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.[23] 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.

Q38. IS THIS DISCUSSION RELEVANT TO CALIFORNIA-AMERICAN WATER?

A38. Yes. The American Society of Civil Engineers list drinking water as one of the top three infrastructure concerns in California and estimates that the California drinking water system is in need of $27.87 billion over the next 20 years. California American Water has invested $40-50 million annually over the last several year and these capital investments constitute almost 3 times the depreciation. Importantly, the California Water Plan calls for substantial investments in infrastructure over the coming years to ensure a

[21] 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.

[22] 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 are explained in Appendix C.

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

reliable, sustainable, and high quality water supply for the state.[24] In turn, California-America Water plans to invest $400 million in infrastructure over the next five years,[25] which corresponds to almost a doubling of its current capital expenditures. I.e., the Company is undertaking significant net investments and therefore has a substantial cash outflow. At the same time, California American Water shows credit ratios that are below or borderline investment grade. These credit ratios are likely to further weaken as California American Water takes on debt to finance its infrastructure investments.[26] Thus, on a stand-alone basis capital attraction could be challenging and expensive.

IV. THE COST OF CAPITAL FOR THE BENCHMARK SAMPLES

Q39. HOW IS THIS SECTION OF YOUR TESTIMONY ORGANIZED?

A39. 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 cost of equity for the sample companies and the resulting estimates of the sample's overall after-tax cost of capital.

A. Preliminary Decisions

Q40. WHAT PRELIMINARY DECISIONS ARE NEEDED TO IMPLEMENT THE ABOVE PRINCIPLES?

A40. I must select the benchmark sample(s), calculate the sample companies' market-value capital structures, and determine the sample companies' market costs of debt and preferred equity.

[24] For example, the California Water Plan, 2009 Update Table 2-1 calls for over a billion in new bond financing to update water supply and reduce demand.

[25] Direct Testimony of Jeffrey L. Linam.

[26] If, alternatively, California American Water leases some of the needed infrastructure, it will either become a capital lease and be considered debt or perhaps an operating lease, which credit rating agencies consider debt-equivalent, so it impact credit ratios much like debt.

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

Q41. WHY DO YOU USE TWO SAMPLES?

A41. 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 California American Water's regulated assets is the subject of my testimony. 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.[27] "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. Therefore, I choose to include additional information from a group of companies with similar business risks; namely another group of distribution utilities characterized by a high percentage of regulated activities, a pipe and main based distribution system, and a mix of residential, commercial, and industrial customers.

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*.[28] Usually, I 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

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

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

the water utility sample although I do apply my usual selection criteria to the gas LDC sample. Specifically, if I were to include only utilities with revenues in excess of $300 million, in excess of $500 million market cap, more than 50% regulated assets, a bond rating and five years of trading data, I would be left with only three companies (American States Water, Aqua American and California Water Service). If I further eliminated companies with substantial merger and acquisition activity as I usually do, I would also lose Aqua America. The remaining sample of two companies is simply too small. Therefore, I keep all water utilities with data in my water utility sample.[29] 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.

Q42. WHAT DO YOU DO TO OVERCOME THE WEAKNESSES OF THE WATER UTILITY SAMPLE DATA?

A42. 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 water and gas utilities is similar in that it consists of a large distribution system and some storage.

Therefore, I use 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. 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 although the average gas LDC company in my sample has 85 percent of its assets devoted to regulated activities.[30] 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

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

[30] The water utilities on average have 97% of their assets subject to regulation.

sample includes nine companies.[31] 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.

Q43. ARE YOU AWARE THAT THE COMMISSION IN THE PAST HAS BEEN CRITICAL OF USING GAS DISTRIBUTION COMPANIES IN WATER COST OF CAPITAL PROCEEDINGS?

A43. Yes. I recognize that the Commission in the past has been critical of a gas LDC sample being used to assess the cost of capital for water utilities.[32] However, I respectfully submit that additional information is helpful and especially so when only a limited number of sample companies are available in the target industry and /or when these companies have characteristics that may make the cost of capital estimates less stable. In the water utilities industry, companies are traded less frequently than ideal for statistical analysis and several companies only have earnings forecasts for one year out. In addition, several of the companies have engaged in merger or acquisition activities and the sample has recently been reduced as Southwest Water ceased to be a publicly traded company and Pennichuck Water has agreed to be acquired by the City of Nashua.

Q44. 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?

A44. 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.

[31] The number of available companies has recently been reduces 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.

[32] Decision 09-05-019 pp. 15-17.

Q45. PLEASE ELABORATE ON THE WAY TWO SAMPLES WITH DIFFERENT BUSINESS AND FINANCIAL RISKS CAN BE COMPARED.

A45. 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.

Q46. PLEASE COMPARE THE CHARACTERISTICS OF THE WATER UTILITY SAMPLE AND THE GAS LDC SAMPLE.

A46. 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. Thus, the business risk of the two industries is similar. Because of their larger size and better data availability, the Gas LDC sample has fewer estimation issues than the water sample. In addition, 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.

Q47. PLEASE DESCRIBE HOW YOU CALCULATE THE MARKET VALUES OF COMMON EQUITY, PREFERRED EQUITY AND DEBT.

A47. 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.

Briefly, 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.[33] 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.[34]

Q48. HOW DO YOU ESTIMATE THE CURRENT MARKET COST OF DEBT?

A48. 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 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

[33] BEst is Bloomberg's name for its earnings growth rate information. BEst growth rate forecasts are as of March 2011 for the Gas LDC and the Water sample.

[34] 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.

cost of debt using California American Water's estimated marginal income tax rate of 40.746 percent.[35]

Q49. HOW DO YOU ESTIMATE THE MARKET COST OF PREFERRED EQUITY?

A49. 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.[36]

B. Cost-of-Equity Estimation Methods

Q50. HOW DO YOU ESTIMATE THE COST OF EQUITY FOR YOUR SAMPLE COMPANIES?

A50. As discussed earlier, the cost of capital is the expected rate of return in capital markets on alternative investments of equivalent risk. Three issues regarding the estimation procedure merits discussion. 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 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 California American Water's overall cost of capital.

Q51. PLEASE EXPLAIN HOW COST OF CAPITAL DEFINITION HELPS YOU ESTIMATE THE COST OF CAPITAL.

[35] Calculated as follows: state tax rate + federal tax rate × (1 – state tax rate) = 8.84% + 35% × (1 – 8.84%) = 40.746%.

[36] 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.

A51. 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 the following approaches: (1) the method establish 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

Q52. PLEASE EXPLAIN THE RISK-POSITIONING METHOD.

A52. 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. The method can be implemented more or less formal. 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. I.e., 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:

$$k_s = r_f + \beta_s \times MRP \qquad \textbf{(2)}$$

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.

Appendix C to this testimony provides more detail on the CAPM / ECAPM approach.

Q53. HOW IS THE CAPM (OR ECAPM) IMPLEMENTED?

A53. 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

Q54. WHAT BENCHMARKS ARE USED TO DETERMINE THE LOCATION OF THE SECURITY MARKET LINE?

A54. 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.

Q55. WHAT BENCHMARK DO YOU USE FOR THE MRP?

A55. For this proceeding, I estimate only a long-term version of the CAPM (and ECAPM). This long-term version of the CAPM (ECAPM) measures the market risk premium as the risk premium of average-risk common stocks over long-term Government bonds. I report several sensitivity analyses that take into account the increase in the MRP as discussed above in *Section III.*

Q56. HOW DO YOU ESTIMATE THE BASELINE MRP?

A56. 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, 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.[37] 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.[38] 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.[39]

I consider 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

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

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

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

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

Q57. HOW DO YOU DETERMINE THE RISK-FREE RATE YOU USE?

A57. 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.[40] As of March 10, 2011, this spread stood at 148 basis points (using Bloomberg's yields) and were 55 basis points above the average for the period 1991 to 2007.[41] 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.[42]

b) Relative Risk

Q58. WHAT MEASURE OF RELATIVE RISK DO YOU USE?

A58. 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.

[40] 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.

[41] See Table 3 above and Workpaper #2 to Table No. BV-9, Panel B.

[42] 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).

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.

Q59. WHAT DOES A PARTICULAR VALUE OF BETA MEAN?

A59. 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.

Q60. HOW DO YOU ESTIMATE BETA?

A60. 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. Like Bloomberg and Value Line, I report adjusted betas. Additional details regarding the estimation procedure are included in Appendix C.

c) Cost of Equity Capital Calculation

Q61. HOW DO YOU COMBINE THE PRECEDING STEPS TO ESTIMATE THE COST OF EQUITY?

A61. 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

$$k_s = r_f + \alpha + \beta_s \times (MRP - \alpha) \qquad \textbf{(3)}$$

where as before *k* is the cost of capital, r_f is the risk-free interest rate, *MRP* is the market risk premium, β_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.

Q62. WHY IS IT APPROPRIATE TO USE THE ECAPM MODEL?

A62. 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.

Q63. IS THE USE OF THE ECAPM EQUIVALENT TO ADJUSTING THE ESTIMATED BETAS FOR THE SAMPLE COMPANIES?

A63. 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.[43] 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

Q64. PLEASE DESCRIBE THE DISCOUNTED CASH FLOW APPROACH.

A64. 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:

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

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,

[43] 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.

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,

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

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:

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

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.

Q65. CAN YOU ILLUSTRATE THE DCF MODEL?

A65. 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: $k = D_1 / P + g = 7.0\% + 5\% = 12\%$.

Q66. ARE THERE OTHER VERSIONS OF THE DCF MODELS BESIDES THE "SIMPLE" ONE?

A66. 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.)

Q67. WHAT ARE THE MERITS OF THE DCF APPROACH?

A67. 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.)

Q68. WHAT IS THE MOST DIFFICULT PART OF IMPLEMENTING THE DCF APPROACH?

A68. 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. However, 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. 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.

Q69. HOW DO YOU ESTIMATE THE GROWTH RATES YOU USE IN YOUR DCF ANALYSIS?

A69. 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.

Q70. ARE YOU AWARE OF LITERATURE THAT FINDS THAT ANALYSTS' FORECAST OF EARNINGS GROWTH HISTORICALLY HAVE OVERESTIMATED EARNINGS AND DIVIDEND GROWTH?

A70. Yes. Most of the research underlying this literature was conducted prior to the various reforms aimed at reducing analyst 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 that "the median

forecast bias essentially disappeared."[44] 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)[45] 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 while 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 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.

Q71. 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?

A71. 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 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 and for some water companies the available forecasts have a shorter horizon than that. 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.

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

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

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,[46] significant growth in many parts of the country, and a trend towards consolidation. The industry appears to be moving towards a larger degree of consolidation – at least among the privately held water utilities. The consolidation of the industry may well increase as the industry needs significant infrastructure investments and the capital expenditures exceed funds available internally to the companies.[47] 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"[48] with a total investment need for drinking water and wastewater investments of $255 billion over the next five years.[49] Drinking water is mentioned as the second most important infrastructure concern for California and the required investments is estimated at $27.87 billion for drinking water and at $18.17 billion for wastewater.[50] 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 factors mean that it may be some

[46] 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).

[47] See, for example, *Value Line*, Water Utility Industry, July 23, 2010.

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

[49] *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.

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

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. For these reasons, I view the DCF method as less reliable for the water utility sample at this point in time.

C. THE SAMPLES AND RESULTS

1. The Water Utility Sample

Q72. EARLIER YOU SAID THAT THE SAMPLE OF WATER UTILITIES HAD SOME DATA WEAKNESSES. PLEASE ELABORATE ON THESE WEAKNESSES.

A72. 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. Similarly, companies with low trading often have low analyst following and hence few growth forecasts are available to generate a consensus forecast.

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 exclude companies with significant merger or acquisition activity because the individual information about the progress of the proposed merger is 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 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, New Mexico and Texas assets and Connecticut Water has a negative growth rate from *Value Line*. To ensure that the lack of data does not drive the results, I report my results for both the full sample and for a subsample of companies. Specifically, I exclude Connecticut Water Service from the DCF subsample, because of it's negative growth rate. I exclude American Water from the subsample in the CAPM / ECAPM analyses because it has less than five years of trading data.

Q73. HOW IS THIS SECTION OF YOUR TESTIMONY ORGANIZED?

A73. 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

Q74. HOW DID YOU DETERMINE THE EXPECTED RISK-FREE INTEREST RATE?

A74. 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.[51] 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.

[51] See Table No. BV-9.

b) Betas and the Market Risk Premium

Q75. WHAT BETA ESTIMATES DID YOU USE IN YOUR ANALYSIS FOR THE SAMPLES?

A75. 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-21. The tables also show Bloomberg and Value Line betas.

Q76. HOW DO YOU CALCULATE YOUR BETAS?

A76. 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.

Q77. PLEASE EXPLAIN THE METHOD TO ADJUST FOR DIFFERENCES IN CAPITAL STRUCTURE.

A77. 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:

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

This is the calculation that is displayed in Tables No. BV-12 and BV-22.[52] 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.

[52] 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.

c) Risk-Positioning Results

Q78. WHAT ARE THE COST-OF-EQUITY ESTIMATES DERIVED FROM THE RISK-POSITIONING APPROACH FOR THE WATER AND GAS LDC SAMPLE?

A78. 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.

Table 3a

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	11.5%	11.9%	12.2%
ECAPM (α = 0.5%)	11.6%	12.0%	12.3%
ECAPM (α = 1.5%)	11.9%	12.3%	12.6%
Sub-Sample			
CAPM	12.0%	12.4%	12.8%
ECAPM (α = 0.5%)	12.2%	12.5%	12.9%
ECAPM (α = 1.5%)	12.4%	12.8%	13.2%

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

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	11.0%	11.3%	11.6%
ECAPM (α = 0.5%)	11.2%	11.5%	11.8%
ECAPM (α = 1.5%)	11.5%	11.8%	12.1%
Sub-Sample			
CAPM	11.2%	11.5%	11.9%
ECAPM (α = 0.5%)	11.4%	11.7%	12.0%
ECAPM (α = 1.5%)	11.8%	12.1%	12.4%

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 49.7 percent equity (assuming California American Water's special requests #4 and #33 are granted). Focusing on the ECAPM (0.5%) and the Baseline case, which makes no adjustments to the MRP, the best point estimates for the two samples are 11½ and 12¼ percent for the water sample and subsample, while the gas LDC sample and subsample are a bit lower at 11¼ and 11½ percent, respectively. However, the analyses result in a range of estimates for each sample: 11½ to 12½ percent ROE for the water sample / subsample and 11 to 11¾ percent ROE for the gas LDC sample / subsample with the subsamples showing a higher ROE than the full samples.

2. The DCF Cost-of-Capital Estimates

Q79. WHAT STEPS DO YOU TAKE IN YOUR DCF ANALYSES?

A79. 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 ensure the estimates are consistent with California American Water's 49.69 percent equity ratio.

a) Growth Rates

Q80. WHAT GROWTH RATE INFORMATION DO YOU USE?

A80. For reasons discussed above and in Appendix D, historical growth rates today are not relevant as forecasts of current investor expectations for these samples. I therefore use rates forecast by security analysts.

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), 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 2013-15 period for the gas LDC sample and through the 2014-16 period for the water sample. This represents an average of 3 and 4 years, respectively from the current earning forecasts 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 three to five years, which is too short a period to make the DCF model completely reliable.

b) Dividend and Price Inputs

Q81. WHAT VALUES DO YOU USE FOR DIVIDENDS AND STOCK PRICES?

A81. 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.[53] This dividend is grown at the estimated growth rate and 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

Q82. WHAT ARE THE DCF ESTIMATES FOR THE SAMPLES?

A82. 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.[54]

Table 4a

Water Utility Sample
DCF Return on Equity Summary

	DCF	
	Simple	Multi-stage
Full Sample		
Cost of Equity	10.7%	9.3%
Sub-Sample		
Cost of Equity	10.7%	9.3%

[53] The dividend information was obtained from Bloomberg.

[54] 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	11.2%	9.9%
Sub-Sample		
Cost of Equity	11.4%	9.7%

For the water sample and subsample, the simple DCF cost estimate is 10.7 percent. The multistage DCF estimates are lower at 9.3 percent. For the gas LDC sample and subsample, the simple DCF cost estimate is 11.2 percent and 11.4 percent, respectively. The multistage DCF estimates are lower at 9.9 percent and 9.7 percent for the full sample and subsample, respectively.

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

Q83. WHAT ARE SOME OF THE CHALLENGES THAT CALIFORNIA-AMERICAN WATER IS FACING?

A83. California American Water is facing several financial challenges. First, the Company has for many years been unable to earn its allowed return on equity. Second, California American Water has for period of time invested substantially in infrastructure, so that its capital expenditure exceeds depreciation by 200 to 300 percent and the Company expects to continue a substantial investment program to ensure water supply for it's customers, comply with environmental regulations, etc.[55] One of the consequences of these financial challenges is that the Company's credit metrics are in the very low end of investment grade. On a stand-alone basis, California American Water has several credit ratios that are below the level Moody's consider appropriate for an investment grade water utility.

[55] The specifics of California American Water's investment needs and the associated risks are described in detail in the Direct Testimony of Jeffrey L. Linam and the implications of cost of capital are discussed below.

Q84. PLEASE BRIEFLY DESCRIBE SOME OF THE BACKGROUND FOR CALIFORNIA-AMERICAN WATER'S FINANCIAL CHALLENGES.

A84. The low realized return on equity reflects several factors. First, California American Water has large regulatory assets, which earn a return well below the weighted average cost of capital California American Water faces. For example, approximately half of the regulatory asset earns a return comparable to the return on commercial paper.[56] As California American Water cannot finance long-term assets at a low commercial paper rate, the Company's financing costs exceed its return. Consequently, revenues and hence income are low compared to the assets employed by the Company. Second, California American Water has seen expenses increase faster than rates leading to a reduction in income. Third, California American Water has undertaken substantial infrastructure investments in recent years and expects to continue its heavy investment program.[57] The sheer magnitude of the capital expenditure program is readily seen by noting that California American Water as of year-end had net utility property, plant and equipment of approximately $485 million (rate base approximately $421 million) and it expects to spend approximately $400 million over the next five years.[58] Thus, the Company will almost double its property, plant and equipment. That is an unusually large capital expenditure program, which will require significant cash flow outlays over a short time period. At the same time, the associated cash inflows will occur over a very long period. As credit rating agencies and credit metrics focus on cash flow, the combination of a low return on its regulatory asset, increasing expenses and capital expenditures lead to challenging credit metrics.

[56] See Rebuttal Testimony of Jeffrey T. Linam before the Public Utilities Commission of the State of California in A.10-07-007, filed July 1, 2010.

[57] The investment risk faced by California American Water pertains to, among other, the Regional Desalination Project in Monterey, San Clemente Dam, meter installations, and aging infrastructure. These risks are described in the Direct Testimony of Jeffrey T. Linam.

[58] California-American Water 2010 Annual Report, Balance Sheet, Direct Testimony of David P. Stephenson and Direct Testimony of Jeffrey T. Linam.

Q85. PLEASE BRIEFLY DESCRIBE CREDIT RATINGS AND WHY THEY MATTER FOR A UTILITY SUCH AS CALIFORNIA-AMERICAN WATER.

A85. Credit rating agencies, such as Standard & Poor's (S&P), Moody's Investors Service (Moody's) and FitchRatings (Fitch), evaluate the default risk of debt issued by companies, government agencies, municipalities, state agencies, and others. As part of the rating process, the agencies assign a credit rating to the debt and to the issuing company (or other entity).[59] Using S&P's designations (Moody's equivalent in parentheses), the highest rating is AAA (Aaa), followed by AA (Aa), A (A), BBB (Baa), BB (Ba), B, CCC (Caa), CC (Ca), C, and D.[60] At times these ratings are designated with a '+' or '-', where a plus indicates higher than average and a minus indicates a lower than average rating for the category.[61] Thus, among all BBB rated entities, BBB+ rated entities are viewed more favorably than the average BBB rated entity and BBB- rated entities are viewed less favorably from a credit perspective. Ratings below BBB- are considered non-investment grade, and many institutional investors are prohibited from investing in those instruments. Investors in non-investment grade debt instruments bear substantial default risk and usually require a much higher yield to invest in such instruments; hence, non-investment grade bonds are also referred to as high-yield bonds.

Q86. WHAT ARE CALIFORNIA-AMERICAN WATER'S CREDIT METRICS AND HOW DO THEY COMPARE TO CREDIT AGENCIES' BENCHMARKS?

A86. Table 3 below shows four key credit ratios that credit rating agencies typically rely on, as well as three ratios that adjust Funds From Operations ("FFO")[62] for the net change in regulatory assets ("Adjusted FFO"). First, FFO to Interest Coverage metric measures the number of times the Company can pay its interest obligation and a solid coverage is vital for debt holders to have confidence in the company. This metric is border line within

[59] An issue of debt may have a different credit rating than the unsecured credit rating of the issuing entity because of differences in collateral or in claims to cash flow of different debt issues.

[60] Fitch Ratings uses a designation similar to that of S&P.

[61] Moody's use the designation 1, 2, and 3 to indicate a higher than average, average, and lower than average rating for the category.

[62] Funds from Operations or FFO is calculated as operating income plus depreciation, amortization and Allowance for Funds Used During Construction ("AFUDC"). It resembles the cash flow that is generated from operations.

Moody's guideline range for a Baa (BBB) rating except for in 2010 when it clearly is in the Baa range. However, this calculation does not take the fact that California American Water reports revenues from the WRAM mechanism that result in an increase in the regulatory asset rather than cash. Thus, the cash receipts associated with this mechanism are delayed. To consider the impact hereof, I also calculate the credit metrics using an adjusted FFO measure that takes increases / decreases in the regulatory asset into account. If the adjusted FFO is relied upon, the interest coverage ratio has been well below investment grade every year since 2005. Second, the FFO to Net debt ratio is calculated. This ratio has been close to the bottom of Moody's guideline range for several years and taking the non-cash nature of the change in regulatory asset into account brings the ratio well below investment grade level. Third, the FFO to capital expenditure ratios is computed and clearly below Moody's guideline range for an investment grade rating. The Adjusted FFO to capital expenditure ratios are substantially lower across all years but 2008. I also calculate the Debt to Capitalization ratio for the Company, which is in Moody's Baa range. Lastly, California American Water has not earned anywhere near it's allowed return in recent years and has seen negative return on equity in some years.

Key Metrics	2010	2009	2008	2007	2006	2005	Moody's A-range	Moody's Baa-range
FFO Interest Coverage	4.09	2.96	2.68	2.64	3.36	2.68	4.5-7.0	2.5-4.5
Adjusted FFO Interest Coverage*	1.80	1.80	2.68	1.08	2.67	2.31		
FFO to Net Debt	15.4%	11.7%	9.4%	9.6%	12.2%	8.6%	15-25%	10-15%
Adjusted FFO to Net Debt*	4.0%	4.8%	9.4%	0.5%	8.7%	6.7%		
FFO to Capex	1.49	0.71	0.52	0.47	0.75	0.50	1.5-2.5**	1.0-1.5**
Adjusted FFO to Capex*	0.39	0.29	0.52	0.02	0.53	0.39		
Debt to Capitalization	58.3%	57.2%	60.6%	63.0%	63.9%	63.8%	40-55%	55-70%
Earned ROE	4.64%	-0.11%	-0.54%	0.13%	1.01%	-2.38%		

Table 3: Key Credit Ratios and Earned RoE

Q87. WHY IS A CREDIT RATING IMPORTANT TO A COMPANY?

A87. 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.

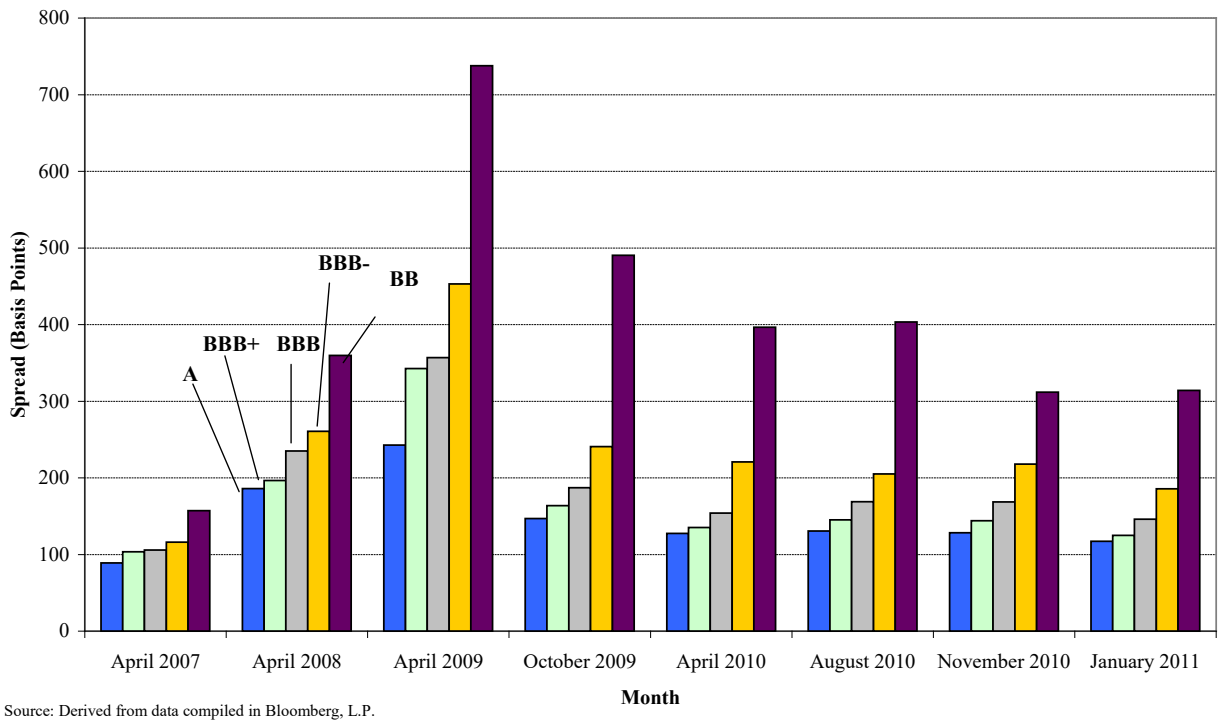


Figure 4

For a company such as California American Water, the impact of the widening yield could be very significant. If California 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 110 basis points for 20-year bonds.[63] 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.

Q88. ARE THERE OTHER COSTS TO HAVING A BORDERLINE INVESTMENT GRADE CREDIT RATING?

A88. 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 California American Water's credit metric.

Q89. WHAT FACTORS DO CREDIT RATING AGENCIES CONSIDER IN DETERMINING THE RATING OF A REGULATED WATER AND WASTEWATER UTILITY SUCH AS CALIFORNIA -AMERICAN?

A89. The three major credit rating agencies, Fitch, Moody's and S&P, all look at both qualitative and quantitative measures. The qualitative measures include the utility's regulatory environment and its ability to recover all capital expenditures and expenses in

[63] Currently, the longest BB-rated utility bonds for which Bloomberg consistently provides a yield are the 20-year bonds.

a timely fashion. The quantitative measures include interest coverage and leverage ratios. For example, Moody's assign 40% weight to credit ratios when evaluating water utilities.[64] As noted above, Moody's and other credit rating agencies look to metrics such as interest coverage as measured by Funds from Operations (FFO) to Interest or Adjusted Interest Coverage. S&P also looks to FFO to interest. In addition, Moody's assigns weight to (1) net debt to assets or net debt to capitalization, (2) FFO to net debt and (3) retained cash flow to capital expenditures. S&P and Fitch look to similar ratios.[65]

A key input to these credit ratios is FFO, which measures operating profits from continuing operations, after tax, plus depreciation and amortization, plus deferred income tax (during the period), plus other major recurring noncash items. Thus, operating profit is a key component to several ratios.

Q90. DO THE CREDIT RATING AGENCIES FOCUS ON THE ALLOWED ROE OR ON THE EARNED ROE?

A90. Earned or realized returns are the key. S&P is explicit in saying that it focuses on actual earned returns because cash flow depends upon what is actually earned, not what is allowed.[66] The implication is that treating the regulated company (and customers) fairly requires not only that allowed return be set equal to the cost of capital but also that the company have a fair opportunity to earn the allowed return.

Q91. ARE THERE OTHER ISSUES THAT MIGHT NEED CONSIDERATION IN LIGHT OF THE DATA IN TABLE 3?

A91. Yes. California American Water has been unable to earn its allowed rate of return since 2000. 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

[64] Moody's, "Global Regulated Water Utilities," December 2009, p. 7.

[65] See, for example, FitchRatings, "Credit Rating Guidelines for Regulated Utility Companies," July 2007 and Standard & Poor's, "Corporate Ratings Criteria 2008," April 2008.

[66] S&P, "Assessing U.S. Utility Regulatory Environments," March 11, 2010, p. 4.

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 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. As the example demonstrate, if asymmetric risk is present, the allowed rate of return needs to be increased over the cost of equity. Thus, the estimated cost of equity that obtains from a comparable sample is too low and needs to be increased.

Q92. WHAT ARE SOME OF THE SPECIFIC RISK FACTORS THAT CALIFORNIA-AMERICAN WATER FACES?

A92. California American Water will likely see its credit metrics decline in coming years given that a large proportion of its planned capital expenditures will likely be financed by debt. Specifically, the Company's FFO to debt ratio in 2010 approached the upper end of the range for a BBB rating at 15% (ignoring the non-cash nature of the regulatory asset). However, the addition of just $200 million in debt will, everything else equal, reduce the FFO to debt metric to below 10% even if interest rates remain low. At the same time, the debt to capitalization ratio would increase to almost 70%. At an FFO to debt ratio below 10% and a debt to capitalization ratio of almost 70%, California American Water would, on a stand-alone basis, be well-below Moody's guideline range for an investment grade rating.

In addition, its significant investment program puts California American Water at risk for timely recovery and potentially for stranded costs. At the same time, California American Water faces water supply risk and uncertainty regarding future environmental regulation. Environmental risks are amplified by California American Water being regulated by multiple agencies and an evolving water policy at both the federal and state level.[67]

Q93. PLEASE SUMMARIZE THIS SECTION OF YOUR TESTIMONY AS IT PERTAINS TO CALIFORNIA AMERICAN WATER.

A93. Earning a solid cash flow is critical to maintenance of a strong, investment grade credit rating, which in turn is essential for access to capital markets. A regulated company, such as California American Water, must raise debt and equity in the capital markets to finance its capital investment program. Anything that adversely affects cash flow will weaken the Company's credit metrics and thus, on a stand-alone basis, increase the cost of debt and possible equity as well. In the case of California American Water, the Commission in D.09-05-019 expressed concern about California American Water's low equity ratio, and the Company has responded by having American Water infuse equity

[67] For example, the California Water Plan is in the process of being revised for 2013 and until completed, there is uncertainty about it impact on California water utilities such as California American Water.

into California American Water. For shareholders to continue to support California American Water with equity, it is important that the Company has a fair opportunity to earn its allowed return on equity. As an investor, American Water Works, the parent of California American Water, needs to make prudent investment decisions. Specifically, any investor will make a risk – return tradeoff and allocate limited funds to investments, where this tradeoff makes sense. If the Company consistently is unable to earn a reasonable return on equity, shareholders will question investing in the Company. For example, American Water Works has agreed to sell its water assets in Arizona and New Mexico to EPCOR after these entities for an extended period of time showed a very low or even negative return. The Commission should consider allowing a 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. THE WATER REVENUE ADJUSTMENT MECHANISM AND THE COST OF CAPITAL

Q94. HOW DO YOU UNDERSTAND THE WATER REVENUE ADJUSTMENT MECHANISM ("WRAM") AND THE MODIFIED COST BALANCING ACCOUNT ("MCBA") TO WORK?

A94. The WRAM is intended to offset the loss of revenue caused by tiered rates, where increasing prices for high volume users result in a reduction in the sold water volumes. As the sold volumes decline, California American Water, everything else equal, earns lower revenues. Because a water utility's costs are mostly fixed and not linked to volumes, the utility would not recover its cost unless a regulatory mechanism is put in place to take the effect into account. The WRAM is intended to provide the water utilities in California with recovery of revenue shortfalls caused by conservation. Specifically, the WRAM ensures recovery of revenues lost due to differences between forecast and actual sales. The MCBA in turn captures the cost savings and cost increases associated with purchased water, purchases power, and pump taxes by tracking the difference between actual variable costs and the variable costs used for ratemaking purposes. I.e., it ensures that the utility is compensated for incurred costs but for costs

that declined due to conservation. Together the WRAM and the MCBA are intended to keep the water utilities whole from lost revenues from conservation and at the same time ensure that any reductions in costs associated with water services are reflected in rates.

Q95. UNDER WHAT CIRCUMSTANCES DOES THE WRAM AFFECT THE COST OF EQUITY?

A95. As noted in *Section II* above, only systematic risk affects the cost of equity. Thus, the WRAM will only affect the cost of equity if it affects the systematic risk of the utilities to which it applies. Put differently, the WRAM will only affect the cost of capital if it affects non-diversifiable risks. For example, if the WRAM removes California American Water's weather-related risks, it does not affect the cost of capital, because weather-related risks generally are assumed to be diversifiable. Further**, if** there is an impact on the systematic risk, the degree to which this impact is already incorporated in the estimated cost of capital has to be determined. For example, if there is an impact on the systematic risk of companies with a WRAM, but many sample companies have a WRAM-like mechanism in place, then the impact on the cost of capital is already incorporated in the estimated figures. Therefore, the discussion below addresses both the impact on systematic risk and the presence of WRAM-like mechanism among water and gas utilities.

Q96. DO YOU HAVE ANY EVIDENCE ON WHETHER WRAM AFFECTS THE COST OF CAPITAL?

A96. Yes, a recent empirical study by Drs. Wharton, Vilbert, Goldberg, and Brown found little to no impact of decoupling on the cost of capital.[68] Relying on data for gas distribution utilities during the period 2005-2010, the authors determine the degree of decoupling each publicly traded entity has as a function of the decoupling mechanism in the states in which they operate and the volume of gas sold in those states. To determine the cost of capital for these gas utilities, the authors used DCF estimates of the cost of equity for

[68] Joe B. Wharton, Michael J. Vilbert, Richard E. Goldberg, and Toby Brown, "The Impact of Decoupling on the Cost of Capital: An Empirical Investigation," *The Brattle Group*, Discussion paper, March 2011. ("Wharton et al. (2010)")

each utility at several points in time during the period. The authors then relied on five different statistical tests to determine whether there was empirical evidence to suggest that the cost of capital was affected by decoupling. They found that companies with a decoupling mechanism had a slightly higher cost of capital than those without a decoupling mechanism.

Q97. CAN RESULTS FROM THE GAS UTILITIES INDUSTRY BE APPLIED TO WATER UTILITIES IN CALIFORNIA?

A97. Yes. As noted above, water utilities and gas distribution companies share many similarities as both industries are capital intensive, subject to substantial regulation, and serve a mixture of residential, industrial, and commercial customers. Furthermore, both industries are commonly regulated by state regulators and often operate in a number of states. In addition, the companies in the water and gas industry have similar levels of systematic risk as evidenced by betas being quite similar for the two industries. Thus, the empirical evidence suggests that for water utilities, a WRAM-like mechanism would not impact the cost of capital.

Q98. DO YOU HAVE ANY ADDITIONAL COMMENTS ON THE IMPACT OF WRAM ON THE COST OF CAPITAL?

A98. Yes. As mentioned above, if the sample companies already have a WRAM-like mechanism in place, then any impact on the systematic risk and hence the cost of capital is already incorporated in the estimated cost of capital. In this case, the water utilities with operations in California (American States Water, American Water Works, California Water and SJW Corp) have a WRAM in place for their California-based operations. Thus, the impact on the cost of capital is partly included in the cost of capital estimates for those companies.

For the gas LDC sample, the paper by Wharton et al. shows that six of the nine utilities included in my gas LDC sample have a substantial portion of their natural gas sales

subject to decoupling.[69] Thus, even if there was an impact of decoupling on the cost of capital, it would largely be captured in the estimated cost of capital as six of the nine sample companies already have a comparable mechanism in place. The American Gas Association also notes that a large fraction of U.S. states have some form of non-volumetric rate design in place. Thus, financial markets will, to a large degree, already have incorporated any effect of such mechanisms.[70]

Lastly, but not least, the WRAM was implemented to handle specific risks associated with water conservation. Therefore, the impact on the cost of capital from implementing a WRAM mechanism cannot be viewed separately from the potentially increased risk that existed prior to the implementation.

Q99. WHAT DO YOU CONCLUDE FROM THE DISCUSSION ABOVE?

A99. WRAM does not reduce the cost of capital for water utilities. I base this conclusion on several facts. First, the WRAM was put in place to address specific factors - - i.e., it was intended to offset increasing risks, so to the extent WRAM works as intended there is no effect. Second, only factors that impact the systematic risk of a utility affect the cost of capital and there is no evidence that WRAM impacts California water utilities' systematic risk. Second, empirical evidence suggests that decoupling mechanisms like WRAM have no impact on the cost of capital. In addition, several utilities in the sample groups already have decoupling mechanisms in place, so even if there was an impact on the systematic risk, it would already have been captured in the estimated cost of capital.

VI. CALIFORNIA AMERICAN WATER'S COST OF EQUITY

[69] Wharton et al. (2010) Table 2 shows that Laclede, New Jersey Resources, Northwest, Piedmont, South Jersey Industries, and Southwest Gas sell more than 50% of their natural gas in jurisdictions with some type of decoupling mechanism in place.

[70] The American Gas Association, "States with Non-Volumetric Rate Designs" January 2010 indicate that 29 of the 48 mainland states have some form of decoupling, flat monthly fee, or rate stabilization plan.

Q100. WHAT CONCLUSIONS DO YOU DRAW FROM THE ABOVE DATA REGARDING EACH SAMPLE'S COST OF EQUITY?

A100. The risk-positioning estimates from the water sample, the gas LDC sample and the gas subsample are reasonably in line and indicate an industry return on equity in the range of 11 to 12 percent with the midpoint estimate around 11½ percent. The water subsample indicates a higher cost of equity of 12 to 12½ percent. The constant growth DCF estimates for the gas LDC sample are in line with these estimates, but the estimates for the gas LDC subsample as well as for the water sample and subsample are lower. I do not believe the DCF estimates for the water sample deserve much weight because of the substantial merger and acquisition activity in the industry, which is likely to impact the current growth rates. However, the DCF estimates for the gas LDC sample point to a lower cost of equity than do the CAPM and ECAPM estimates. Therefore, I believe the best midpoint estimate for California American Water is 11½ percent, which looks to the lower end of the water sample and the midpoint of the gas LDC sample. This estimate does not take into account the potential impact of investors' higher risk aversion or California American Water's financial challenges. Both of these would point towards a higher ROE and certainly, California American Water's relatively low credit metrics point to a higher ROE.

Q101. DO YOU HAVE ANY COMMENTS REGARDING THE RESULTS OF THE MODELS?

A101. Yes. If any of the specific risk factors discussed above or if the increase in investors' risk aversion and thus the market risk premium is taken into account, the estimates are well above the baseline figures. Thus, the estimates are conservatively low meaning that if any of the Company-specific risks are considered, the estimates would increase. Further, the Company faces pressure from low credit metrics and needed infrastructure investments. Therefore, the allowed return on equity should be placed in the upper end of the reasonable range at no less than 11½ percent.

Q102. BASED ON THE EVIDENCE WHAT IS YOUR CONCLUSION REGARDING CALIFORNIA AMERICAN WATER'S RETURN ON EQUITY?

A102. Based on the results from my cost-of-capital estimation procedures, I conclude that 11½ percent return on equity is a conservative estimate of California American Water's current cost of equity capital.

Q103. DOES THIS CONCLUDE YOUR TESTIMONY?

A103. Yes.

300248772.1