BEFORE THE TENNESSEE REGULATORY AUTHORITY

DIRECT TESTIMONY OF JAMES H. VANDER WEIDE

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I. WITNESS IDENTIFICATION

Q. 1 What is your name and business address?

A. 1 My name is James H. Vander Weide. I am Research Professor of Finance and Economics at Duke University, the Fuqua School of Business. I am also President of Financial Strategy Associates, a firm that provides strategic and financial consulting services to business clients. My business address is 3606 Stoneybrook Drive, Durham, North Carolina.

Q. 2 Would you please describe your educational background and prior academic experience?

A. 2 I graduated from Cornell University with a Bachelor's Degree in Economics and from Northwestern University with a Ph.D. in Finance. After joining the faculty of the School of Business at Duke University, I was named Assistant Professor, Associate Professor, and then Professor. I have published research in the areas of finance and economics and taught courses in corporate finance, investment management, and management of financial institutions at Duke for more than 35 years. My research publications and teaching experience are described in Appendix 1. I am now retired from my teaching duties at Duke.

Q. 3 Have you previously testified on financial or economic issues?

A. 3 Yes. As an expert on financial and economic theory and practice, I have participated in more than 400 regulatory and legal proceedings before the U.S. Congress, the Canadian Radio-Television and Telecommunications Commission, the Federal Communications Commission, the National Telecommunications and Information Administration, the Federal Energy Regulatory Commission, the National Energy Board (Canada), the public service commissions of 43 states and three Canadian provinces, the insurance commissions of five states, the Iowa State Board of Tax Review, the National Association of Securities Dealers, and the North Carolina Property Tax Commission. In addition, I have prepared expert testimony in proceedings before the U.S. District Court for the District of Nebraska; the U.S. District Court for the District of New Hampshire; the U.S. District Court for the District of Northern Illinois; the U.S. District Court for the Eastern District of North Carolina; the U.S. District Court for the Northern District of California; Montana Second Judicial District Court, Silver Bow County; the Superior Court, North Carolina; the U.S. Bankruptcy Court for the Southern District of West Virginia; and the U.S. District Court for the Eastern District of Michigan.

II. PURPOSE OF TESTIMONY

Q. 4 What is the purpose of your testimony?

A. 4 I have been asked by Tennessee American Water Company (TAWC) to prepare an independent appraisal of its cost of equity capital and to recommend a rate of return on equity that is fair, that allows TAWC to attract capital on reasonable terms, and that allows TAWC to maintain its financial integrity.

Q. 5 How do you estimate TAWC's cost of equity?

A. 5 I estimate TAWC's cost of equity by applying several standard techniques, including the discounted cash flow (DCF) model, the risk premium method, and the Capital Asset Pricing Model (CAPM) to groups of comparably risky companies.

Q. 6 Do you generally give equal weight to the results of these standard cost of equity methods?

A. 6 I generally give equal weight to the results of these standard cost of equity methods when the average Value Line beta for the proxy companies is relatively close to 1.0, and the average company in my proxy group has a relatively large market value capitalization. If the average Value Line beta for the proxy companies is significantly less than 1.0, as it is in this present case, and/or the average market value capitalization for the proxy companies is relatively small, I generally give little or no weight to the results of the application of the CAPM.

Q. 7 Why do you give little or no weight to the result of the CAPM when the average Value Line beta is significantly less than 1.0?

A. 7 I give little or no weight to the result of the CAPM when the average Value Line beta is significantly less than 1.0 because financial research provides strong support for the conclusion that the CAPM underestimates the cost of equity for companies whose betas are significantly less than 1.0. I present a summary of this research in the CAPM section of my testimony.

Q. 8 Why is it appropriate to give less weight to the result of the CAPM when the companies in the proxy group have small market capitalization?

A. 8 It is appropriate to give less weight to the result of the CAPM in those instances because financial research also supports the conclusion that the CAPM underestimates the cost of equity for small market capitalization companies.

Q. 9 What cost of equity do you find for your comparable companies in this proceeding?

A. 9 I find that the cost of equity for my comparable companies is in the range 10.9 percent to 12.3 percent. Because the average beta of my proxy companies is significantly less than 1.0, my conclusion is based principally on the results of my DCF and risk premium studies.

Q. 10 What is your recommendation regarding TAWC's cost of equity?

A. 10 I conservatively recommend that TAWC be allowed a fair rate of return on common equity in the range 10.9 percent to 12.3 percent. My recommended return on equity is conservative in that I use: (1) the lower simple average DCF result for the proxy water companies, even though a market-value weighted average is generally more appropriate for estimating the cost of equity; and (2) the lower average result for the proxy group of publicly-traded natural gas distribution companies ("LDCs") obtained by eliminating outlier low and high results.

Q. 11 Do you have an exhibit to accompany your testimony?

A. 11 Yes. I have an Exhibit___(JVW-1), consisting of eight schedules and five appendices that were prepared by me or under my direction and supervision.

III. ECONOMIC AND LEGAL PRINCIPLES

Q. 12 How do economists define the required rate of return, or cost of capital, associated with particular investment decisions such as the decision to invest in water treatment, storage, and distribution facilities?

A. 12 Economists define the cost of capital as the return investors expect to receive on alternative investments of comparable risk.

Q. 13 How does the cost of capital affect a firm's investment decisions?

A. 13 The goal of a firm is to maximize the value of the firm. Thus, a firm should continue to invest in plant and equipment only to the extent that the rate of return on such investment is greater than or equal to the cost of capital.

Q. 14 How does the cost of capital affect investors' willingness to invest in a company?

A. 14 The cost of capital measures the return investors can expect on investments of comparable risk. The cost of capital also measures the investor's required rate of return on investment because rational investors will not invest in a particular opportunity if the expected return on that opportunity is less than the cost of capital. Thus, the cost of capital is a hurdle rate for both investors and the firm.

Q. 15 Do all investors have the same position in the firm?

A. 15 No. Debt investors have a fixed claim on a firm's assets and income that must be paid prior to any payment to the firm's equity investors. Because the firm's equity investors have only a residual claim on the firm's assets and income, their investments are riskier than debt investments. Thus, the cost of equity exceeds the cost of debt.

Q. 16 What is the economic definition of the cost of equity?

A. 16 As I note above, the cost of equity is the return investors expect to receive on alternative equity investments of comparable risk. Since the return on an equity investment of comparable risk is not a contractual return, the cost of equity is more difficult to measure than the cost of debt. However, as I have already noted, the cost of equity is greater than the cost of debt. The cost of equity, like the cost of debt, is both forward looking and market based.

Q. 17 How do economists measure the percentages of debt and equity in a firm's capital structure?

A. 17 Economists measure the percentages of debt and equity in a firm's capital structure by first calculating the market value of the firm's debt and the market value of its equity. Economists then calculate the percentage of debt by the ratio of the market value of debt to the combined market value of debt and equity, and the percentage of equity by the ratio of the market value of equity to the combined market values of debt and equity. For example, if a firm's debt has a market value of $25 million and its equity has a market value of $75 million, then its total market capitalization is $100 million, and its capital structure contains 25 percent debt and 75 percent equity.

Q. 18 Why do economists measure a firm's capital structure in terms of the market values of its debt and equity?

A. 18 Economists measure a firm's capital structure in terms of the market values of its debt and equity because: (1) the weighted average cost of capital is defined as the return investors expect to earn on a portfolio of the company's debt and equity securities; (2) investors measure the expected return and risk on their portfolios using market value weights, not book value weights; and (3) market values are the best measures of the amounts of debt and equity investors have invested in the company on a going forward basis.

Q. 19 Why do investors measure the expected return and risk on their investment portfolios using market value weights rather than book value weights?

A. 19 Investors measure the expected return and risk on their investment portfolios using market value weights because market values are the best measure of the amounts the investors currently have invested in each security in the portfolio. From the point of view of investors, the historical cost or book value of their investment is irrelevant to the current risk and required return on their portfolios; if they were to sell their investments, they would receive market value, not historical cost. Thus, the return can only be measured in terms of market values.

Q. 20 Is the economic definition of the weighted average cost of capital consistent with regulators' traditional definition of the average cost of capital?

A. 20 No. The economic definition of the weighted average cost of capital is based on the market costs of debt and equity, the market value percentages of debt and equity in a company's capital structure, and the future expected risk of investing in the company. In contrast, regulators have traditionally defined the weighted average cost of capital using the embedded cost of debt and the book values of debt and equity in a company's capital structure.

Q. 21 Does the required rate of return on an investment vary with the risk of that investment?

A. 21 Yes. Since investors are averse to risk, they require a higher rate of return on investments with greater risk.

Q. 22 Are these economic principles regarding the fair return for capital recognized in any Supreme Court cases?

A. 22 Yes. These economic principles, relating to the supply of and demand for capital, are recognized in two United States Supreme Court cases: (1) *Bluefield Water Works and Improvement Co. v. Public Service*

Comm'n.; and (2) *Federal Power Comm'n v. Hope Natural Gas Co.* In the *Bluefield Water Works* case, the Court states:

> A public utility is entitled to such rates as will permit it to earn a return upon the value of the property which it employs for the convenience of the public equal to that generally being made at the same time and in the same general part of the country on investments in other business undertakings which are attended by corresponding risks and uncertainties, but it has no constitutional right to profits such as are realized or anticipated in highly profitable enterprises or speculative ventures. The return...should be reasonably sufficient to assure confidence in the financial soundness of the utility, and should be adequate, under efficient and economical management, to maintain and support its credit, and enable it to raise the money necessary for the proper discharge of its public duties. [*Bluefield Water Works and Improvement Co. v. Public Service Comm'n.* 262 U.S. 679, 692 (1923)].

The Court clearly recognizes here that: (1) a regulated firm cannot remain financially sound unless the return it is allowed an opportunity to earn on the value of its property is at least equal to the cost of capital (the principle relating to the demand for capital); and (2) a regulated firm will not be able to attract capital if it does not offer investors an opportunity to earn a return on their investment equal to the return they expect to earn on other investments of the same risk (the principle relating to the supply of capital).

In the *Hope Natural Gas* case, the Court reiterates the financial soundness and capital attraction principles of the *Bluefield* case:

> From the investor or company point of view it is important that there be enough revenue not only for operating expenses but also for the capital costs of the business. These include service on the debt and dividends on the stock... By that standard the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks. That return,

> moreover, should be sufficient to assure confidence in the financial integrity of the enterprise, so as to maintain its credit and to attract capital. [*Federal Power Comm'n v. Hope Natural Gas Co.*, 320 U.S. 591, 603 (1944)]

IV. BUSINESS AND FINANCIAL RISKS IN THE WATER UTILITY INDUSTRY

Q. 23 What are the major factors that affect business risk in the water utility industry?

A. 23 Business risk in the water utility industry is affected by the following economic factors:

1. High Operating Leverage. The water utility business requires a large commitment to fixed costs in relation to variable costs, a situation called high operating leverage. The relatively high degree of fixed costs in the water utility business arises because of the average water company's large investment in fixed, long-lived water treatment, storage, and distribution facilities. High operating leverage causes the average water company's net income to be highly sensitive to sales fluctuations.

2. Demand Uncertainty. The business risk of the water utility business is increased by the high degree of demand uncertainty in the industry. Demand uncertainty is caused primarily by: (i) wide fluctuations in average temperature and rainfall from year to year; (ii) the state of the economy; and (iii) customer growth in the service territory.

3. Supply Uncertainty. The risk of the water utility business is further increased by the need to assure a safe and reliable supply of

water to meet customer needs on any given day of the year. The Safe Drinking Water Act Amendments of 1996 authorize the Environmental Protection Agency (EPA) to periodically test the drinking water for impurities and to issue regulations requiring water utilities to reduce drinking water contaminants to an acceptable level. The EPA has exercised its authority by requiring the water utilities to meet increasingly stringent drinking water standards over time. The rising costs and uncertainty of meeting ever more stringent drinking water standards is a major risk facing the water utilities.

V. COST OF EQUITY ESTIMATION METHODS

Q. 24 What methods do you use to estimate the cost of common equity capital for TAWC?

A. 24 I review the results of three generally accepted methods for estimating the cost of common equity. These are the Discounted Cash Flow (DCF), the risk premium method, and the Capital Asset Pricing Model (CAPM). The DCF method assumes that the current market price of a firm's stock is equal to the discounted value of all expected future cash flows. The risk premium method assumes that the investor's required return on an equity investment is equal to the interest rate on a long-term bond plus an additional equity risk premium to compensate the investor for the risks of investing in equities compared to bonds. The CAPM assumes that the investor's required rate of return on equity is equal to a risk-free rate of interest plus the product of a company-specific risk factor, beta, and the expected risk premium on the market portfolio.

VI. DISCOUNTED CASH FLOW (DCF) APPROACH

Q. 25 Please describe the DCF model.

A. 25 The DCF model is based on the assumption that investors value an asset on the basis of the future cash flows they expect to receive from owning the asset. Thus, investors value an investment in a bond because they expect to receive a sequence of semi-annual coupon payments over the life of the bond and a terminal payment equal to the bond's face value at the time the bond matures. Likewise, investors value an investment in a firm's stock because they expect to receive a sequence of dividend payments and, perhaps, expect to sell the stock at a higher price sometime in the future.

A second fundamental principle of the DCF approach is that investors value a dollar received in the future less than a dollar received today. A future dollar is valued less than a current dollar because investors could invest a current dollar in an interest earning account and increase their wealth. This principle is called the time value of money.

Applying the two fundamental DCF principles noted above to an investment in a bond leads to the conclusion that investors value their investment in the bond on the basis of the present value of the bond's future cash flows. Thus, the price of the bond should reflect the timing, magnitude, and relative risk of the expected cash flows. Algebraically this can be expressed as:

EQUATION 1

$$P_B = \frac{C}{(1+i)} + \frac{C}{(1+i)^2} + \cdots + \frac{C+F}{(1+i)^n}$$

where:

P_B	=	Bond price;
C	=	Cash value of the constant coupon payment (assumed for notational convenience to occur annually rather than semi-annually);
F	=	Face value of the bond;
i	=	The rate of interest investors could earn by investing their money in an alternative bond of equal risk; and
n	=	The number of periods before the bond matures.

Applying these same principles to an investment in a firm's stock suggests that the price of the stock should be equal to:

EQUATION 2

$$P_s = \frac{D_1}{(1+k)} + \frac{D_2}{(1+k)^2} + \cdots + \frac{D_n + P_n}{(1+k)^n}$$

where:

P_S	=	Current price of the firm's stock;
$D_1, D_2 \ldots D_n$	=	Expected annual dividend per share on the firm's stock;
P_n	=	Price per share of stock at the time the investor expects to sell the stock; and
k	=	Return the investor expects to earn on alternative investments of the same risk, i.e., the investor's required rate of return.

Equation (2) is frequently called the annual discounted cash flow model of stock valuation. Assuming that dividends grow at a constant annual rate, g, this equation can be solved for k, the cost of equity. The resulting cost of equity equation is $k = D_1/P_s + g$, where k is the cost of equity, D_1 is the expected next period annual dividend, P_s is the current price of the stock, and g is the constant annual growth rate in earnings, dividends, and book value per share. The term D_1/P_s is called the dividend yield component of the annual DCF model, and the term g is called the growth component of the annual DCF model. As in the case of the price of a bond, the price of a stock is related to the timing, magnitude, and relative risk of the expected cash flows.

Q. 26 Are you recommending that the annual DCF model be used to estimate TAWC's cost of equity?

A. 26 No. The DCF model assumes that a company's stock price is equal to the present discounted value of all expected future dividends. The annual DCF model is only a correct expression for the present discounted value of future dividends if dividends are paid annually at the end of each year. Since the companies in my proxy group all pay dividends quarterly, the current market price that investors are willing to pay reflects the expected quarterly receipt of dividends. Therefore, a quarterly DCF model must be used to estimate the cost of equity for these firms. The quarterly DCF model differs from the annual DCF model in that it expresses a company's price as the present discounted value of a quarterly stream of dividend payments. A complete analysis of the implications of the quarterly payment of dividends on the DCF model is provided in Exhibit__(JVW-1), Appendix 2. For the reasons cited there, I employed the quarterly DCF model throughout my calculations.

Q. 27 Please describe the quarterly DCF model you use.

A. 27 The quarterly DCF model I use is described on Schedule 1 and in Appendix 2. The quarterly DCF equation shows that the cost of equity is: the sum of the future expected dividend yield and the growth rate, where the dividend in the dividend yield is the equivalent future value of the four quarterly dividends at the end of the year, and the growth rate is the expected growth in dividends or earnings per share.

Q. 28 In Appendix 2, you demonstrate that the quarterly DCF model provides the theoretically correct valuation of stocks when dividends are paid quarterly. Do investors, in practice, recognize the actual timing and magnitude of cash flows when they value stocks and other securities?

A. 28 Yes. In valuing long-term government or corporate bonds, investors recognize that interest is paid semi-annually. Thus, the price of a long-term government or corporate bond is simply the present value of the semi-annual interest and principal payments on these bonds. Likewise, in valuing mortgages, investors recognize that interest is paid monthly. Thus, the value of a mortgage loan is simply the present value of the monthly interest and principal payments on the loan. In valuing stock investments, stock investors correctly recognize that dividends are paid quarterly. Thus, a firm's stock price is the present value of the stream of quarterly dividends expected from owning the stock.

Q. 29 When valuing bonds, mortgages, or stocks, would investors assume that cash flows are received only at the end of the year, when, in fact, the cash flows are received semi-annually, quarterly, or monthly?

A 29 No. Assuming that cash flows are received at the end of the year when they are received semi-annually, quarterly, or monthly would lead investors to make serious mistakes in valuing investment opportunities. No rational investor would make the mistake of assuming that dividends or other cash flows are paid annually when, in fact, they are paid more frequently.

Q. 30 How do you estimate the growth component of the quarterly DCF model?

A. 30 I use both the average analysts' estimates of future earnings per share (EPS) growth reported by I/B/E/S Thomson Reuters (I/B/E/S) and the estimate of future earnings per share growth reported by Value Line.

Q. 31 Do you generally rely on EPS growth estimates from both I/B/E/S and Value Line?

A. 31 In applying the DCF model, I generally rely on the analysts' estimates reported by I/B/E/S. However, as I discuss in this testimony, the water companies have such small market capitalization that there are generally only one or two I/B/E/S analysts' long-term growth forecasts available. To supplement the available I/B/E/S growth forecasts, I therefore also rely on the earnings growth forecasts reported by Value Line for American States, Aqua America, California Water, Connecticut Water, Middlesex Water, and York.

Q. 32 What are the analysts' estimates of future EPS growth?

A. 32 As part of their research, financial analysts working at Wall Street firms periodically estimate EPS growth for each firm they follow. The EPS forecasts for each firm are then published. Investors who are contemplating purchasing or selling shares in individual companies review the forecasts. These estimates represent five-year forecasts of EPS growth.

Q. 33 What is I/B/E/S?

A. 33 I/B/E/S is a division of Thomson Reuters that reports analysts' EPS growth forecasts for a broad group of companies. The forecasts are expressed in terms of a mean forecast and a standard deviation of forecast for each firm. Investors use the mean forecast as an estimate of future firm performance.

Q. 34 Why do you use the I/B/E/S growth estimates?

A. 34 The I/B/E/S growth rates: (1) are widely circulated in the financial community, (2) include the projections of reputable financial analysts who develop estimates of future EPS growth, (3) are reported on a timely basis to investors, and (4) are widely used by institutional and other investors.

Q. 35 Why do you rely on analysts' projections of future EPS growth in estimating the investors' expected growth rate rather than looking at historical growth rates?

A. 35 I rely on analysts' projections of future EPS growth because there is considerable empirical evidence that investors use analysts' forecasts to estimate future earnings growth.

Q. 36 Have you performed any studies concerning the use of analysts' forecasts as an estimate of investors' expected growth rate, g?

A. 36 Yes, I prepared a study in conjunction with Willard T. Carleton, Professor Emeritus of Finance at the University of Arizona, on why analysts' forecasts are the best estimate of investors' expectation of future long-term growth. This study is described in a paper entitled "Investor Growth Expectations and Stock Prices: the Analysts versus History," published in the Spring 1988 edition of *The Journal of Portfolio Management*.

Q. 37 Please summarize the results of your study.

A. 37 First, we performed a correlation analysis to identify the historically oriented growth rates which best described a firm's stock price. Then we did a regression study comparing the historical growth rates with the average analysts' forecasts. In every case, the regression equations containing the average of analysts' forecasts statistically outperformed the regression equations containing the historical growth estimates. These results are consistent with those found by Cragg and Malkiel, the early major research in this area (John G. Cragg and Burton G. Malkiel, *Expectations and the Structure of Share Prices*, University of Chicago Press, 1982). These results are also consistent with the hypothesis that investors use analysts' forecasts, rather than historically oriented growth calculations, in making stock buy and sell decisions. They provide overwhelming evidence that the analysts' forecasts of future growth are superior to historically oriented growth measures in predicting a firm's stock price.

Q. 38 Has your study been updated to include more recent data?

A. 38 Yes. Researchers at State Street Financial Advisors updated my study using data through year-end 2003. Their results continue to confirm that analysts' growth forecasts are superior to historically-oriented growth measures in predicting a firm's stock price.

Q. 39 What price do you use in your DCF model?

A. 39 I use a simple average of the monthly high and low stock prices for each firm for the three-month period ending March 2010. These high and low stock prices were obtained from Thomson Reuters.

Q. 40 Why do you use the three-month average stock price in applying the DCF method?

A. 40 I use the three-month average stock price in applying the DCF method because stock prices fluctuate daily, while financial analysts' forecasts for a given company are generally changed less frequently, often on a quarterly basis. Thus, to match the stock price with an earnings forecast, it is appropriate to average stock prices over a three-month period.

Q. 41 Do you include an allowance for flotation costs in your DCF analysis?

A. 41 Yes. I include a five percent allowance for flotation costs in my DCF calculations.

Q. 42 Please explain your inclusion of flotation costs.

A. 42 All firms that have sold securities in the capital markets have incurred some level of flotation costs, including underwriters' commissions, legal fees, printing expense, etc. These costs are withheld from the proceeds of the stock sale or are paid separately, and must be recovered over the life of the equity issue. Costs vary depending upon the size of the issue, the type of registration method used and other factors, but in general these costs range between three and five percent of the proceeds from the issue [see Lee, Inmoo, Scott Lochhead, Jay Ritter, and Quanshui Zhao, "The Costs of Raising Capital," *The Journal of Financial Research*, Vol. XIX No 1 (Spring 1996), 59-74, and Clifford W. Smith, "Alternative Methods for Raising Capital," *Journal of Financial Economics* 5 (1977) 273-307]. In addition to these costs, for large equity issues (in relation to outstanding equity shares), there is likely to be a decline in price associated with the sale of shares to the public. On average, the decline due to market pressure has been estimated at two to three percent [see Richard H. Pettway, "The Effects of New Equity Sales Upon Utility Share Prices," *Public Utilities Fortnightly*, May 10, 1984, 35—39]. Thus, the total flotation cost, including both issuance expense and market pressure, could range anywhere from five to eight percent of the proceeds of an equity issue. I believe a combined five percent allowance for flotation costs is a conservative estimate that should be used in applying the DCF model in this proceeding.

Q. 43 Does TAWC issue equity in the capital markets?

A. 43 No. Although TAWC does not issue equity in the capital markets, its parent must issue equity to provide TAWC the necessary financing to make investments in its water supply operations. If the parent is not able to recover its flotation costs through TAWC's rates, it will have no incentive to invest in TAWC.

Q. 44 Is a flotation cost adjustment only appropriate if a company issues stock during the test year?

A. 44 No. As described in Exhibit__(JVW-1), Appendix 3, a flotation cost adjustment is required whether or not a company issued new stock during the test year. Previously incurred flotation costs have not been recovered in previous rate cases; rather, they are a permanent cost associated with past issues of common stock. Just as an adjustment is made to the embedded cost of debt to reflect previously incurred debt issuance costs (regardless of whether additional bond issuances were made in the test year), so should an adjustment be made to the cost of equity regardless of whether additional stock was issued during the test year.

Q. 45 How do you apply the DCF approach to obtain the cost of equity capital for TAWC?

A. 45 I apply the DCF approach to the publicly-traded water companies shown on Schedule 1 and the publicly-traded LDCs shown on Schedule 2.

Q. 46 How do you select your group of publicly-traded water companies?

A. 46 I select all the water companies included in the Value Line Investment Survey that: (1) pay dividends; (2) did not decrease dividends during any quarter of the past two years; (3) have at least one analyst's long-term growth forecast; and (4) have not announced a merger. In addition, all of the companies included in my group have a Value Line Safety Rank of 3, where 3 is the average Safety Rank of the Value Line universe of companies.

Q. 47 Why do you eliminate companies that have either decreased or eliminated their dividend in the past two years?

A. 47 The DCF model requires the assumption that dividends will grow at a constant rate into the indefinite future. If a company has either decreased or eliminated its dividend in recent years, an assumption that the company's dividend will grow at the same rate into the indefinite future is questionable.

Q. 48 Why do you eliminate companies that do not have any analyst's long-term growth forecasts?

A. 48 As noted above, my studies indicate that the analysts' growth forecasts best approximate the growth forecasts used by investors in making stock buy and sell decisions; and thus, the average of the analysts' growth forecasts is the best available estimate of the growth term in the DCF Model. In my opinion, it is difficult to apply the DCF model to companies that do not have any analysts' long-term growth estimates.

Q. 49 Are the Value Line water companies widely followed by analysts in the investment community?

A. 49 No. As a result of their small size and low investor turnover, the water companies are generally followed by very few analysts. The number of analysts' estimates for each of the Value Line water companies is shown below in Table 1.

TABLE 1

NUMBER OF LONG-TERM GROWTH FORECASTS FOR WATER COMPANIES

LINE NO.	COMPANY	I/B/E/S ANALYSTS' ESTIMATES	VALUE LINE ESTIMATE	VALUE LINE EDITION
1	Amer. States Water	1	1	Standard
2	Amer. Water Works	4	NA	Standard
3	Aqua America	3	1	Standard
4	Artesian Res. 'A'	1	NA	Plus
4	California Water	2	1	Standard
5	Connecticut Water	NA	1	Plus
6	Middlesex Water	NA	1	Plus
7	Pennichuck	NA	NA	Plus
8	SJW Corp.	NA	NA	Plus
9	Southwest Water	NA	1	Standard
10	York Water	1	1	Plus

Q. 50 Do you normally include companies in your proxy groups that have only one or two analysts' long-term growth forecasts?

A. 50 No. I normally include a company in my proxy group only if there are at least three analysts' estimates of long-term growth. On the basis of my professional judgment, I believe that cost of equity estimates based on three or more analysts' estimates are more reliable than cost of equity estimates based on just one or two forecasts.

Q. 51 Recognizing the greater uncertainty associated with DCF results based on just one or two analysts' forecasts, do you supplement your DCF results for the water companies with a DCF analysis of an additional proxy group?

A. 51 Yes. Given the greater uncertainty in applying the DCF model to companies with only one or two analysts' growth forecasts, as noted above, I also apply the DCF model to an additional proxy group consisting of LDCs, and each of the companies in the LDC proxy group has at least two analysts' estimates of long-term growth.

Q. 52 You note above that you also eliminate from your proxy groups companies that have announced mergers. Why do you eliminate companies that have announced mergers that are not yet completed?

A. 52 A merger announcement can sometimes have a significant impact on a company's stock price because of anticipated merger-related cost savings and new market opportunities. Analysts' growth forecasts, on the other hand, are necessarily related to companies as they currently exist, and do not reflect investors' views of the potential cost savings and new market opportunities associated with mergers. The use of a stock price that includes the value of potential mergers in conjunction with growth forecasts that do not include the growth enhancing prospects of potential mergers produces DCF results that tend to distort a company's cost of equity.

Q. 53 Please summarize the result of your application of the DCF model to your water company proxy group.

A. 53 As shown in Schedule 1, my application of the DCF model to the Value Line water companies produces a market-weighted average DCF result of 13.3 percent and a simple average DCF result of 12.3 percent.

Q. 54 Is it generally more appropriate to use a market-weighted average DCF result or a simple average DCF result to estimate a company's cost of equity?

A. 54 It is generally more appropriate to refer to a market value weighted average result, as I do in reporting the average result for the proxy group of LDCs. However, two companies in the water company group, American Water Works and Aqua America, represent nearly three-fourths of the market value of all companies in the water company group. Thus, referring to a market-weighted average result would effectively cause a market-weighted average result to depend primarily on the result for two companies, American Water Works and Aqua America, which, in this case, have higher than average DCF results than the smaller companies. I therefore conservatively use the 12.3 percent simple average rather than the 13.3 percent market-weighted average DCF result for the water companies to arrive at my recommendation in this proceeding.

Q. 55 You note above that you also apply your DCF method to a proxy group of LDCs. Why do you apply your DCF model to a proxy group of LDCs?

A. 55 I apply my DCF model to a proxy group of LDCs because: (1) the companies in the water company group are generally followed by only one or two analysts; (2) the LDCs are a conservative proxy for the risk of investing in water companies; and (3) it is useful to examine the cost of equity results for a larger group of companies of similar risk that have a wider following in the investment community in order to test the reasonableness of the results obtained by applying cost of equity methodologies to the small group of publicly-traded water companies. Financial theory does not require that companies be in exactly the same industry to be comparable in risk.

Q. 56 How do you select your proxy group of LDCs?

A. 56 I select all the companies in Value Line's natural gas industry groups that: (1) are in the business of natural gas distribution; (2) paid dividends during every quarter of the last two years; (3) did not decrease dividends during any quarter of the past two years; (4) have at least two analysts included in the I/B/E/S consensus growth forecast;[1] and (5) have not announced a merger. In addition, all of the LDCs included in my group have an investment grade bond rating and a Value Line Safety Rank of 1, 2, or 3. The LDCs in my DCF proxy group and the average DCF result are shown on Schedule 2.

Q. 57 How are the LDCs similar to TAWC?

A. 57 Like TAWC, the LDCs are regulated public utilities that: (1) invest primarily in a capital-intensive physical network that connects the customer to the source of supply; and (2) sell their products and

[1] As I note above, on the basis of my professional judgment, I normally specify that the I/B/E/S long-term earnings growth forecast must include the forecasts of at least three analysts. However, in March 2010 there are only five natural gas companies with growth forecasts from at least three analysts. In this study, therefore, I also include results for companies that have growth forecasts based on two analysts' growth forecasts.

services at regulated rates to customers whose demand is primarily dependent on weather and the state of the economy.

Q. 58 Does your LDC proxy group meet the standards of the *Hope* and *Bluefield* cases you cite above?

A. 58 Yes. The *Hope* and *Bluefield* standard states that a public utility should be allowed to earn a return on its investment that is commensurate with the returns investors are able to earn on investments having similar risk. The LDCs are a group of companies that meet the standards of the *Hope* and *Bluefield* cases because they are a conservative proxy for the risk of investing in TAWC.

Q. 59 Do you have any empirical evidence that the LDCs in your proxy group are a conservative proxy for TAWC?

A. 59 Yes. The average Value Line Safety Rank for my proxy group of LDCs is approximately 2, on a scale where 1 is the most safe and 5 is the least safe, whereas the water companies have an average Value Line Safety Rank of 3.

Q. 60 Please summarize the results of your application of the DCF method to the LDC proxy group.

A. 60 My application of the DCF method to the LDC proxy group produces a market-weighted average result of 10.9 percent, as shown on Schedule 2.

VII. RISK PREMIUM APPROACH

Q. 61 Please describe the risk premium approach to estimating TAWC's cost of equity.

A. 61 The risk premium approach is based on the principle that investors expect to earn a return on an equity investment in TAWC that reflects a "premium" over and above the return they expect to earn on an investment in a portfolio of long-term bonds. This equity risk premium compensates equity investors for the additional risk they bear in making equity investments versus bond investments.

Q. 62 How do you measure the required risk premium on an equity investment in TAWC?

A. 62 I use two methods to estimate the required risk premium on an equity investment in TAWC. The first is called the ex ante risk premium method and the second is called the ex post risk premium method.

A. Ex Ante Risk Premium Approach

Q. 63 Please describe your ex ante risk premium approach for measuring the required risk premium on an equity investment in TAWC.

A. 63 My ex ante risk premium method is based on studies of the DCF expected return on a comparable group of natural gas distribution companies, which I compared to the interest rate on Moody's A-rated utility bonds. Specifically, for each month in my study period, I calculate the risk premium using the equation,

$$RP_{PROXY} = DCF_{PROXY} - I_A$$

where:

RP_{PROXY}	=	the required risk premium on an equity investment in the proxy group of companies;
DCF_{PROXY}	=	average DCF estimated cost of equity on a portfolio of proxy companies; and
I_A	=	the yield to maturity on an investment in A-rated utility bonds.

I then perform a regression analysis to determine if there is a relationship between the calculated risk premium and interest rates. Finally, I use the results of the regression analysis to estimate the investors' required risk premium. To estimate the cost of equity, I then add the required risk premium to the interest rate on A-rated utility bonds. A detailed description of my ex ante risk premium studies is contained in Appendix 4, and the underlying DCF results and interest rates are displayed in Schedule 3.

Q. 64 Why do you apply your ex ante risk premium study to LDCs rather than to water companies?

A. 64 I apply my ex ante risk premium approach to LDCs rather than to water companies because the LDCs are similar in risk to the water companies and there are sufficient data to apply the DCF method to the sample companies over a relatively long period of time. In contrast, as discussed above, the water companies are generally followed by only one or two analysts, and there are relatively few companies with consistent data extending back for a reasonably long study period.

Q. 65 What estimated risk premium do you obtain from your ex ante risk premium method?

A. 65 As described in Appendix 4, my analyses produce an estimated ex ante risk premium over the yield on A-rated utility bonds equal to 4.77 percent.

Q. 66 What cost of equity result do you obtain from your ex ante risk premium study?

A. 66 To estimate the cost of equity using the ex ante risk premium method, one may add the estimated ex ante risk premium over the yield on A-rated utility bonds to the forecasted yield to maturity on A-rated utility bonds.[2] The forecasted yield to maturity on A-rated utility bonds, 6.57 percent, is obtained by adding the 57-basis point spread between the average March 2010 yield on AAA-rated corporate bonds (5.27 percent) and A-rated utility bonds (5.84 percent) to Value Line's forecasted 6.0 percent yield on AAA-rated corporate bonds.[3] My analyses produce an estimated risk premium over the yield on A-rated utility bonds equal to 4.77 percent. Adding an estimated ex ante risk premium of 4.77 percent to the 6.57 percent yield to maturity on A-rated utility bonds produces a cost of equity estimate of 11.34 percent using the ex ante risk premium method (see Appendix 4).

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[2] One could use the yield to maturity on other debt investments to measure the interest rate component of the risk premium approach as long as one uses the yield on the same debt investment to measure the expected risk premium component of the risk premium approach. I choose to use the yield on A-rated utility bonds because it is a frequently-used benchmark for utility bond yields.

[3] Value Line Selection & Opinion, February 26, 2010, p. 3019.

B. Ex Post Risk Premium Approach

Q. 67 Please describe your ex post risk premium approach for measuring the required risk premium on an equity investment in TAWC.

A. 67 I first perform a study of the comparable returns received by bond and stock investors over the 73 years of my study. I estimate the returns on stock and bond portfolios using stock price and dividend yield data on the S&P 500 and bond yield data on Moody's A-rated utility bonds. My study consists of investing one dollar in the S&P 500 and Moody's A-rated utility bonds at the beginning of 1937 and reinvesting the principal plus return each year to 2010. The return associated with each stock portfolio is the sum of the annual dividend yield and capital gain (or loss) which accrue to this portfolio during the year(s) in which it is held. The return associated with the bond portfolio, on the other hand, is the sum of the annual coupon yield and capital gain (or loss) which accrue to the bond portfolio during the year(s) in which it is held. The resulting annual returns on the stock and bond portfolios purchased in each year between 1937 and 2010 are shown on Schedule 4. The average annual return on an investment in the S&P 500 stock portfolio is 11.06 percent, while the average annual return on an investment in the Moody's A-rated utility bond portfolio is 6.42 percent. The risk premium on the S&P 500 stock portfolio is, therefore, 4.64 percent.

I also conduct a second study using stock data on the S&P Utilities rather than the S&P 500. The S&P Utility stock portfolio shows an average annual return of 10.5 percent per year. Thus, the return on the S&P Utility stock portfolio exceeded the return on the Moody's A–rated utility bond portfolio by 4.1 percent (see Schedule 5).

Q. 68 Why is it appropriate to perform your ex post risk premium analysis using both the S&P 500 and the S&P Utility Stock indices?

A. 68 I perform my ex post risk premium analysis on both the S&P 500 and the S&P Utilities because I believe utilities today face risks that are somewhere in between the average risk of the S&P Utilities and the S&P 500 over the years 1937 to 2010. Thus, I use the average of the two historically-based risk premiums as my estimate of the required risk premium in my ex post risk premium method.

Q. 69 Why do you analyze investors' experiences over such a long time frame?

A. 69 Because day-to-day stock price movements can be somewhat random, it is inappropriate to rely on short-run movements in stock prices in order to derive a reliable risk premium. Rather than buying and selling frequently in anticipation of highly volatile price movements, most investors employ a strategy of buying and holding a diversified portfolio of stocks. This buy-and-hold strategy will allow an investor to achieve a much more predictable long-run return on stock investments and at the same time will minimize transaction costs. The situation is very similar to the problem of predicting the results of coin tosses. I cannot predict with any reasonable degree of accuracy the result of a single, or even a few, flips of a balanced coin; but I can predict with a good deal of confidence that approximately 50 heads will appear in 100 tosses of this coin. Under these circumstances, it is most appropriate to estimate future experience from long-run evidence of investment performance.

Q. 70 Would your study provide a different ex post risk premium if you started with a different time period?

A. 70 Yes, the ex post risk premium results vary somewhat depending on the historical time period chosen. My policy is to go back as far in history as I can get reliable data. I believe it is most meaningful to begin after the passage and implementation of the Public Utility Holding Company Act of 1935. This Act significantly changed the structure of the public utility industry. Since the Public Utility Holding Company Act of 1935 was not implemented until the beginning of 1937, I feel that numbers taken from before this date are not comparable to those taken after. (The repeal of the 1935 Act does not have a material impact on the structure of the public utility industry; thus, the Act's repeal does not have any impact on my choice of time period.)

Q. 71 Why is it necessary to examine the yield from debt investments in order to determine the investors' required rate of return on equity capital?

A. 71 As previously explained, investors expect to earn a return on their equity investment that exceeds currently available bond yields because the return on equity, being a residual return, is less certain than the yield on bonds and investors must be compensated for this uncertainty. Second, investors' current expectations concerning the amount by which the return on equity will exceed the bond yield will be influenced by historical differences in returns to bond and stock investors. For these reasons, we can estimate investors' current expected returns from an equity investment from knowledge of current bond yields and past differences between returns on stocks and bonds.

Q. 72 Has there been any significant trend in the ex post equity risk premium over the 1937 to 2010 time period of your study?

A. 72 No. Statisticians test for trends in data series by regressing the data observations against time. I have performed such a time series regression on my two data sets of historical risk premiums. Trends in the premium are reflected in the coefficient on the time variable; the greater the trend, the greater the deviation from zero. As shown below in Tables 2 and 3, there is no statistically significant trend in my risk premium data.

TABLE 2

REGRESSION OUTPUT FOR RISK PREMIUM ON S&P 500

Line No.		Intercept	Time	Adjusted R Square	F
1	Coefficient	2.691	(0.001)	0.015	2.07
2	T Statistic	1.465	(1.440)		

TABLE 3

REGRESSION OUTPUT FOR RISK PREMIUM ON S&P UTILITIES

Line No.		Intercept	Time	Adjusted R Square	F
1	Coefficient	1.784	(0.001)	0.002	1.12
2	T Statistic	1.085	(1.060)		

Q. 73 Is your conclusion that there is no significant trend in the equity risk premium supported in the financial literature?

A. 73 Yes. Ibbotson® SBBI® 2010 Valuation Yearbook ("Ibbotson® SBBI®") published by Morningstar, Inc., contains an analysis of "trends" in historical risk premium data. Ibbotson® SBBI® uses correlation analysis to determine if there is any pattern or "trend" in risk premiums over time. This analysis also demonstrates that there are no trends in risk premiums over time.

Q. 74 Why is it significant that historical risk premiums have no trend or other statistical pattern over time?

A. 74 The absence of any discernable trend makes averaging historical risk premiums the most reasonable method of estimating the future expected risk premium based on historical data. As noted in Ibbotson® SBBI®:

> The significance of this evidence is that the realized equity risk premium next year will not be dependent on the realized equity risk premium from this year. That is, there is no discernable pattern in the realized equity risk premium—it is virtually impossible to forecast next year's realized risk premium based on the premium of the previous year. For example, if this year's difference between the riskless rate and the return on the stock market is higher than last year's, that does not imply that next year's will be higher than this year's. It is as likely to be higher as it is lower. The best estimate of the expected

value of a variable that has behaved randomly in the past is the average (or arithmetic mean) of its past values. [Ibbotson® SBBI®, page 58.]

Q. 75 What conclusions do you draw from your ex post risk premium analyses about the required return on an equity investment in TAWC?

A. 75 My studies provide strong evidence that investors today require an equity return of approximately 4.1 to 4.6 percentage points above the expected yield on A-rated utility bonds. As described above, the forecasted yield on A-rated utility bonds at 2010 is 6.57 percent. Adding a 4.1 to 4.6 percentage point risk premium to a yield of 6.57 percent on A-rated utility bonds, I obtain an expected return on equity in the range 10.6 percent to 11.2 percent, with a midpoint of 10.9 percent. Because the ex post methodology does not reflect flotation costs, I add a 25 basis-point allowance for flotation costs, which I determine by calculating the difference in my DCF results with and without a flotation cost allowance. Adding a 25 basis-point allowance for flotation costs, I obtain an estimate of 11.2 percent as the cost of equity for TAWC using the ex post risk premium method.

VIII. CAPITAL ASSET PRICING MODEL

Q. 76 What is the CAPM?

A. 76 The CAPM is an equilibrium model of the security markets in which the expected or required return on a given security is equal to the risk-free rate of interest, plus the company equity "beta," times the market risk premium:

Cost of equity = Risk-free rate + Equity beta x Market risk premium

The risk-free rate in this equation is the expected rate of return on a risk-free government security, the equity beta is a measure of the company's risk relative to the market as a whole, and the market risk premium is the premium investors require to invest in the market basket of all securities compared to the risk-free security.

Q. 77 How do you use the CAPM to estimate the cost of equity for your proxy companies?

A. 77 The CAPM requires an estimate of the risk-free rate, the company-specific risk factor or beta, and the expected return on the market portfolio. For my estimate of the risk-free rate, I use the forecast yield to maturity on 20-year Treasury bonds[4] of 4.75 percent, using data from Value Line.[5] For my estimate of the company-specific risk, or beta, I use the average Value Line beta of 0.71 for my proxy water companies. For my estimate of the expected risk premium on the market portfolio, I use two approaches. First, I use the Ibbotson® SBBI® 6.7 percent risk

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4 I use the 20-year Treasury bond to estimate the risk-free rate because SBBI estimates the risk premium using 20-year Treasury bonds and the analyst should use the same maturity to estimate the risk-free rate as is used to estimate the risk premium on the market portfolio.

5 Value Line Investment Survey, Selection & Opinion, February 26, 2010, p. 3019. Value Line projects a yield on long-term Treasury bonds at 2011 equal to 4.9 percent. The current spread between the average March yield on 30-year Treasury bonds (4.64 percent) and 20-year Treasury bonds (4.49 percent) is 15 basis points. Subtracting 15 basis points from the 4.9 percent forecasted yield on long-term Treasury bonds produces a forecasted yield of 4.75 percent for 20-year Treasury bonds.

premium on the market portfolio, which is measured from the difference between the arithmetic mean return on the S&P 500 (11.8 percent) and the income return on 20-year Treasury bonds (5.2 percent), as reported by Ibbotson® SBBI® (11.8 – 5.2 = 6.7) (apparent discrepancy due to rounding).[6] Second, I estimate the risk premium on the market portfolio from the difference between the DCF cost of equity for the S&P 500 (12.5 percent) and the forecast yield to maturity on 20-year Treasury bonds, (4.75 percent). My second approach produces a risk premium equal to 7.75 percent (12.5 - 4.75 = 7.75).

Q. 78 Why do you recommend that the risk premium on the market portfolio be estimated using the arithmetic mean return on the S&P 500?

A. 78 As explained in Ibbotson® SBBI®, the arithmetic mean return is the best approach for calculating the return investors expect to receive in the future:

> The equity risk premium data presented in this book are arithmetic average risk premia as opposed to geometric average risk premia. The arithmetic average equity risk premium can be demonstrated to be most appropriate when discounting future cash flows. For use as the expected equity risk premium in either the CAPM or the building block approach, the arithmetic mean or the simple difference of the arithmetic means of stock market returns and riskless rates is the relevant number. This is because both the CAPM and the building block approach are additive models, in which the cost of capital is the sum of its parts. The geometric average is more appropriate for reporting past performance, since it represents the compound average return. [SBBI, p. 56.]

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[6] *See* 2010 Ibbotson® SBBI® 2010 Valuation Yearbook, p. 23, published by Morningstar®.

A discussion of the importance of using arithmetic mean returns in the context of CAPM or risk premium studies is contained in Schedule 6.

Q. 79 Why do you recommend that the risk premium on the market portfolio be estimated using the income return on 20-year Treasury bonds rather than the total return on these bonds?

A. 79 As discussed above, the CAPM requires an estimate of the risk-free rate of interest. When Treasury bonds are issued, the income return on the bond is risk free, but the total return, which includes both income and capital gains or losses, is not. Thus, the income return should be used in the CAPM because it is only the income return that is risk free.

Q. 80 What CAPM result do you obtain when you estimate the expected return on the market portfolio from the arithmetic mean difference between the return on the market and the yield on 20-year Treasury bonds?

A. 80 I obtain a CAPM estimate of 9.8 percent [see Schedule 7].

Q. 81 What CAPM result do you obtain when you estimate the risk premium on the market portfolio by applying the DCF model to the S&P 500?

A. 81 I obtain a CAPM result of 10.5 percent [see Schedule 8].

Q. 82 Can a reasonable application of the CAPM produce higher cost of equity results than you have just reported?

A. 82 Yes. The CAPM tends to underestimate the cost of equity for small market capitalization companies such as my water companies.

Q. 83 Does the finance literature support an adjustment to the CAPM equation to account for a company's size as measured by market capitalization supported in the finance literature?

A. 83 Yes, Ibbotson® SBBI® supports such an adjustment. Their estimates of the size premium required to be added to the basic CAPM cost of equity are shown below in Table 4.

TABLE 4
IBBOTSON® ESTIMATES OF PREMIUMS FOR COMPANY SIZE[7]

DECILE	SMALLEST COMPANY	LARGEST COMPANY	SIZE PREMIUM RETURN IN EXCESS OF CAPM
Mid-Cap (3-5)	1,602.429	5,936.147	1.08%
Low-Cap (6-8)	432.175	1,600.169	1.85%
Micro-Cap (9-10)	1.007	431.256	3.99%

Q. 84 Are there other reasons to believe that the CAPM may produce cost of equity estimates at this time that are unreasonably low?

A. 84 Yes. There is considerable evidence in the finance literature that the CAPM tends to underestimate the cost of equity for companies whose

[7] Ibbotson® SBBI® 2010 Valuation Yearbook.

equity beta is less than 1.0 and to overestimate the cost of equity for companies whose equity beta is greater than 1.0.[8]

Q. 85 Can you briefly summarize the evidence that the CAPM underestimates the required returns for securities or portfolios with betas less than 1.0 and overestimates required returns for securities or portfolios with betas greater than 1.0?

A. 85 Yes. The CAPM conjectures that security returns increase with increases in security betas in line with the equation

$$ER_i = R_f + \beta_i \left[ER_m - R_f\right],$$

where ER_i is the expected return on security or portfolio *i*, R_f is the risk-free rate, $ER_m - R_f$ is the expected risk premium on the market portfolio, and β_i is a measure of the risk of investing in security or portfolio *i*. If the CAPM correctly predicts the relationship between risk and return in the marketplace, then the realized returns on portfolios of securities and the corresponding portfolio betas should lie on the solid straight line with intercept R_f and slope $[R_m - R_f]$ shown below.

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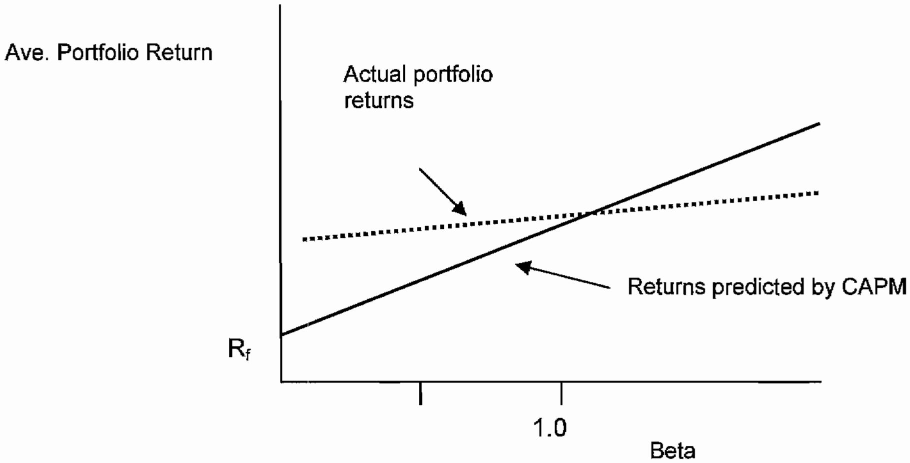
8 *See*, for example, Fischer Black, Michael C. Jensen, and Myron Scholes, "The Capital Asset Pricing Model: Some Empirical Tests," in *Studies in the Theory of Capital Markets*, M. Jensen, ed. New York: Praeger, 1972; Eugene Fama and James MacBeth, "Risk, Return, and Equilibrium: Empirical Tests," *Journal of Political Economy* 81 (1973), pp. 607-36; Robert Litzenberger and Krishna Ramaswamy, "The Effect of Personal Taxes and Dividends on Capital Asset Prices: Theory and Empirical Evidence," *Journal of Financial Economics* 7 (1979), pp. 163-95.; Rolf Banz, "The Relationship between Return and Market Value of Common Stocks," *Journal of Financial Economics* (March 1981), pp. 3-18; and Eugene Fama and Kenneth French, "The Cross-Section of Expected Returns," *Journal of Finance* (June 1992), pp. 427-465.

Figure 1
Average Returns Compared to Beta for Portfolios Formed on Prior Beta



Financial scholars have found that the relationship between realized returns and betas is inconsistent with the relationship posited by the CAPM. As described in Fama and French (1992) and Fama and French (2004), the actual relationship between portfolio betas and returns is shown by the dotted line in the figure above. Although financial scholars disagree on the reasons why the return/beta relationship looks more like the dotted line in the figure than the solid line, they generally agree that the dotted line lies above the solid line for portfolios with betas less than 1.0 and below the solid line for portfolios with betas greater than 1.0. Thus, in practice, scholars generally agree that the CAPM underestimates portfolio returns for companies with betas less than 1.0, and overestimates portfolio returns for portfolios with betas greater than 1.0.

Q. 86 What conclusions do you reach from your review of the literature on the CAPM to predict the relationship between risk and return in the marketplace?

A. 86 I conclude that the financial literature strongly supports the proposition that the CAPM underestimates the cost of equity for companies such as public utilities with betas less than 1.0. I also conclude that the results of the CAPM should be given little or no weight in this proceeding because the average beta for my proxy group of water companies is significantly less than 1.0.

IX. FAIR RATE OF RETURN ON EQUITY

Q. 87 Please summarize your findings concerning TAWC's cost of equity.

A. 87 Based on my application of the methods I describe above to my comparable companies, I conclude that my comparable companies' cost of equity is in the range 10.9 percent to 12.3 percent.

TABLE 5
COST OF EQUITY MODEL RESULTS

METHOD	MODEL RESULT
DCF--Water	12.3%
DCF--LDC	10.9%
Ex Ante Risk Premium	11.3%
Ex Post Risk Premium	11.2%
Range of Results	10.9% - 12.3%

Q. 88 What is your recommendation as to a fair rate of return on common equity for TAWC?

A. 88 I recommend that TAWC be allowed a fair rate of return on common equity in the range 10.9 percent to 12.3 percent.

Q. 89 Does this conclude your testimony?

A. 89 Yes, it does.

TENNESSEE REGULATORY AUTHORITY

STATE OF NORTH CAROLINA

COUNTY OF DURHAM

BEFORE ME, the undersigned authority, duly commissioned and qualified in and for the State and County aforesaid, personally came and appeared James H. Vander Weide, being by me first duly sworn deposed and said that:

He is appearing as a witness on behalf of Tennessee-American Water Company before the Tennessee Regulatory Authority, and if present before the Authority and duly sworn, his testimony would set forth in the annexed transcript consisting of 45 pages.

James H. Vander Weide

James H. Vander Weide

Sworn to and subscribed before me this 10 day of September 2010.

Amy C. Knudsen

Notary Public

My commission expires 2/29/2012

AMY C. KNUDSEN
NOTARY PUBLIC
Person County
N.C.
EXPIRES
FEB. 29, 2012

LIST OF SCHEDULES AND APPENDICES

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TENNESSEE AMERICAN WATER COMPANY
EXHIBIT__(JVW-1)
SCHEDULE 1
SUMMARY OF DISCOUNTED CASH FLOW ANALYSIS
FOR PROXY WATER COMPANY COMPANIES

LINE NO.	COMPANY	D_4	3-MO. AVE. PRICE	DIVIDEND	I/B/E/S GROWTH	VALUE LINE FORECAST EPS GROWTH	AVERAGE GROWTH	MARKET VALUE	COST OF EQUITY
1	Amer. States Water	0.260	33.625	1.129	4.00%	9.5%	6.8%	667	10.3%
2	Amer. Water Works	0.210	22.023	0.960	9.92%	NMF	9.9%	3,869	14.5%
3	Aqua America	0.145	17.131	0.640	8.33%	10.0%	9.2%	2,455	13.1%
4	Artesian Res. 'A'	0.187	17.948	0.804	6.00%		6.0%	120	10.7%
4	California Water	0.298	36.608	1.320	6.00%	8.5%	7.3%	808	11.0%
5	Connecticut Water	0.228	23.298	1.037		9.0%	9.0%	202	13.7%
6	Middlesex Water	0.180	17.050	0.820		9.0%	9.0%	239	14.1%
7	York Water	0.128	13.843	0.564	6.00%	7.5%	6.8%	178	11.0%
8	Market-weighted Ave.								13.3%
9	Average								12.3%

Notes:

d_0	=	Most recent quarterly dividend.
d_1,d_2,d_3,d_4	=	Next four quarterly dividends, calculated by multiplying the last four quarterly dividends per *Value Line* by the factor (1 + g).
P_0	=	Average of the monthly high and low stock prices during the three months ending March 2010 per Thomson Reuters.
FC	=	Flotation costs expressed as a percent of gross proceeds.
g	=	Average of I/B/E/S and Value Line forecasts of future earnings growth March 2010.
k	=	Cost of equity using the quarterly version of the DCF model shown by the formula below:

$$k = \frac{d_1(1+k)^{.75} + d_2(1+k)^{.50} + d_3(1+k)^{.25} + d_4}{P_0(1-FC)} + g$$

TENNESSEE AMERICAN WATER COMPANY
EXHIBIT__(JVW-1)
SCHEDULE 2
SUMMARY OF DISCOUNTED CASH FLOW ANALYSIS
FOR NATURAL GAS DISTRIBUTION COMPANIES

LINE NO.	COMPANY	D_0	P_0	DIVIDEND	GROWTH	COST OF EQUITY
1	AGL Resources	0.440	36.405	1.888	5.07%	10.5%
2	Atmos Energy	0.335	28.110	1.434	4.20%	9.6%
3	Nicor Inc.	0.465	41.380	2.007	4.30%	9.4%
4	National Fuel Gas	0.335	49.633	1.509	8.10%	11.3%
5	NiSource Inc.	0.230	15.060	0.982	3.00%	9.9%
6	Northwest Nat. Gas	0.415	44.379	1.769	5.50%	9.7%
7	ONEOK Inc.	0.440	44.172	1.877	7.23%	11.7%
8	Piedmont Natural Gas	0.270	26.075	1.206	7.00%	11.9%
9	South Jersey Inds.	0.330	39.410	1.480	11.67%	15.6%
10	Market-weighted Average					10.9%[9]
11	Average					11.1%

Notes:

d_0 = Most recent quarterly dividend.
d_1, d_2, d_3, d_4 = Next four quarterly dividends, calculated by multiplying the last four quarterly dividends per *Value Line* by the factor (1 + g).
P_0 = Average of the monthly high and low stock prices during the three months ending March 2010 from Thomson Reuters.
FC = Flotation costs expressed as a percent of gross proceeds.
g = I/B/E/S forecast of future earnings growth March 2010.
k = Cost of equity using the quarterly version of the DCF model shown by the formula below:

$$k = \frac{d_1(1+k)^{.75} + d_2(1+k)^{.50} + d_3(1+k)^{.25} + d_4}{P_0(1-FC)} + g$$

9 This result excludes outlier results for EQT (20.9 percent), Energen (6.4 percent), Questar (4.6 percent), and Southwest Gas (7.0 percent). The outlier results are excluded using criteria established by the FERC. The high outlier result is excluded because it exceeds 17.7 percent, and the low outlier results are excluded on the basis that they are less than 100 basis points above the average bond yield for the companies' bond ratings. *See*, for example, *SCE* and *New England ISO* decisions. In *SCE*, the Commission excludes a low return of 8.42 percent at a time when the average bond yield is 8.06 percent. As the Commission states, "investors generally cannot be expected to purchase stock if debt, which has less risk than stock, yields essentially the same return, this low end-return cannot be considered reliable in this case." 92 FERC at p. 61,266. In *New England ISO*, the Commission excludes a high result of 17.7 percent. *See* 117 FERC at PP 8 and 16. If these outlier results had not been excluded, the market-weighted average result would have been 10.7 percent.

TENNESSEE AMERICAN WATER COMPANY
EXHIBIT__(JVW-1)
SCHEDULE 3
COMPARISON OF DCF EXPECTED RETURN
ON AN EQUITY INVESTMENT IN NATURAL GAS DISTRIBUTION COMPANIES
TO THE INTEREST RATE ON A-RATED UTILITY BONDS

LINE NO.	DATE	DCF	BOND YIELD	RISK PREMIUM
1	Jun-98	0.1154	0.0703	0.0451
2	Jul-98	0.1186	0.0703	0.0483
3	Aug-98	0.1234	0.0700	0.0534
4	Sep-98	0.1273	0.0693	0.0580
5	Oct-98	0.1260	0.0696	0.0564
6	Nov-98	0.1211	0.0703	0.0508
7	Dec-98	0.1185	0.0691	0.0494
8	Jan-99	0.1195	0.0697	0.0498
9	Feb-99	0.1243	0.0709	0.0534
10	Mar-99	0.1257	0.0726	0.0531
11	Apr-99	0.1260	0.0722	0.0538
12	May-99	0.1221	0.0747	0.0474
13	Jun-99	0.1208	0.0774	0.0434
14	Jul-99	0.1222	0.0771	0.0451
15	Aug-99	0.1220	0.0791	0.0429
16	Sep-99	0.1226	0.0793	0.0433
17	Oct-99	0.1233	0.0806	0.0427
18	Nov-99	0.1240	0.0794	0.0446
19	Dec-99	0.1280	0.0814	0.0466
20	Jan-00	0.1301	0.0835	0.0466
21	Feb-00	0.1344	0.0825	0.0519
22	Mar-00	0.1344	0.0828	0.0516
23	Apr-00	0.1316	0.0829	0.0487
24	May-00	0.1292	0.0870	0.0422
25	Jun-00	0.1295	0.0836	0.0459
26	Jul-00	0.1317	0.0825	0.0492
27	Aug-00	0.1290	0.0813	0.0477
28	Sep-00	0.1257	0.0823	0.0434
29	Oct-00	0.1260	0.0814	0.0446
30	Nov-00	0.1251	0.0811	0.0440
31	Dec-00	0.1239	0.0784	0.0455
32	Jan-01	0.1261	0.0780	0.0481
33	Feb-01	0.1261	0.0774	0.0487
34	Mar-01	0.1275	0.0768	0.0507

LINE NO.	DATE	DCF	BOND YIELD	RISK PREMIUM
35	Apr-01	0.1227	0.0794	0.0433
36	May-01	0.1302	0.0799	0.0503
37	Jun-01	0.1304	0.0785	0.0519
38	Jul-01	0.1338	0.0778	0.0560
39	Aug-01	0.1327	0.0759	0.0568
40	Sep-01	0.1268	0.0775	0.0493
41	Oct-01	0.1268	0.0763	0.0505
42	Nov-01	0.1268	0.0757	0.0511
43	Dec-01	0.1254	0.0783	0.0471
44	Jan-02	0.1236	0.0766	0.0470
45	Feb-02	0.1241	0.0754	0.0487
46	Mar-02	0.1189	0.0776	0.0413
47	Apr-02	0.1159	0.0757	0.0402
48	May-02	0.1162	0.0752	0.0410
49	Jun-02	0.1170	0.0741	0.0429
50	Jul-02	0.1242	0.0731	0.0511
51	Aug-02	0.1234	0.0717	0.0517
52	Sep-02	0.1260	0.0708	0.0552
53	Oct-02	0.1250	0.0723	0.0527
54	Nov-02	0.1221	0.0714	0.0507
55	Dec-02	0.1216	0.0707	0.0509
56	Jan-03	0.1219	0.0706	0.0513
57	Feb-03	0.1232	0.0693	0.0539
58	Mar-03	0.1195	0.0679	0.0516
59	Apr-03	0.1162	0.0664	0.0498
60	May-03	0.1126	0.0636	0.0490
61	Jun-03	0.1114	0.0621	0.0493
62	Jul-03	0.1127	0.0657	0.0470
63	Aug-03	0.1139	0.0678	0.0461
64	Sep-03	0.1127	0.0656	0.0471
65	Oct-03	0.1123	0.0643	0.0480
66	Nov-03	0.1089	0.0637	0.0452
67	Dec-03	0.1071	0.0627	0.0444
68	Jan-04	0.1059	0.0615	0.0444
69	Feb-04	0.1039	0.0615	0.0424
70	Mar-04	0.1037	0.0597	0.0440
71	Apr-04	0.1041	0.0635	0.0406
72	May-04	0.1045	0.0662	0.0383
73	Jun-04	0.1036	0.0646	0.0390

LINE NO.	DATE	DCF	BOND YIELD	RISK PREMIUM
74	Jul-04	0.1011	0.0627	0.0384
75	Aug-04	0.1008	0.0614	0.0394
76	Sep-04	0.0976	0.0598	0.0378
77	Oct-04	0.0974	0.0594	0.0380
78	Nov-04	0.0962	0.0597	0.0365
79	Dec-04	0.0970	0.0592	0.0378
80	Jan-05	0.0990	0.0578	0.0412
81	Feb-05	0.0979	0.0561	0.0418
82	Mar-05	0.0979	0.0583	0.0396
83	Apr-05	0.0988	0.0564	0.0424
84	May-05	0.0981	0.0553	0.0427
85	Jun-05	0.0976	0.0540	0.0436
86	Jul-05	0.0966	0.0551	0.0415
87	Aug-05	0.0969	0.0550	0.0419
88	Sep-05	0.0980	0.0552	0.0428
89	Oct-05	0.0990	0.0579	0.0411
90	Nov-05	0.1049	0.0588	0.0461
91	Dec-05	0.1045	0.0580	0.0465
92	Jan-06	0.0982	0.0575	0.0407
93	Feb-06	0.1124	0.0582	0.0542
94	Mar-06	0.1127	0.0598	0.0529
95	Apr-06	0.1100	0.0629	0.0471
96	May-06	0.1056	0.0642	0.0414
97	Jun-06	0.1049	0.0640	0.0409
98	Jul-06	0.1087	0.0637	0.0450
99	Aug-06	0.1041	0.0620	0.0421
100	Sep-06	0.1053	0.0600	0.0453
101	Oct-06	0.1030	0.0598	0.0432
102	Nov-06	0.1033	0.0580	0.0453
103	Dec-06	0.1035	0.0581	0.0454
104	Jan-07	0.1013	0.0596	0.0417
105	Feb-07	0.1018	0.0590	0.0428
106	Mar-07	0.1018	0.0585	0.0433
107	Apr-07	0.1007	0.0597	0.0410
108	May-07	0.0967	0.0599	0.0368
109	Jun-07	0.0970	0.0630	0.0340
110	Jul-07	0.1006	0.0625	0.0381
111	Aug-07	0.1021	0.0624	0.0397
112	Sep-07	0.1014	0.0618	0.0396

LINE NO.	DATE	DCF	BOND YIELD	RISK PREMIUM
113	Oct-07	0.1080	0.0611	0.0469
114	Nov-07	0.1083	0.0597	0.0486
115	Dec-07	0.1084	0.0616	0.0468
116	Jan-08	0.1113	0.0602	0.0511
117	Feb-08	0.1139	0.0621	0.0518
118	Mar-08	0.1147	0.0621	0.0526
119	Apr-08	0.1167	0.0629	0.0538
120	May-08	0.1069	0.0627	0.0442
121	Jun-08	0.1062	0.0638	0.0424
122	Jul-08	0.1086	0.0640	0.0446
123	Aug-08	0.1123	0.0637	0.0486
124	Sep-08	0.1130	0.0649	0.0481
125	Oct-08	0.1213	0.0756	0.0457
126	Nov-08	0.1221	0.0760	0.0461
127	Dec-08	0.1162	0.0654	0.0508
128	Jan-09	0.1131	0.0639	0.0492
129	Feb-09	0.1155	0.0630	0.0524
130	Mar-09	0.1198	0.0642	0.0556
131	Apr-09	0.1146	0.0648	0.0498
132	May-09	0.1225	0.0649	0.0576
133	Jun-09	0.1208	0.0620	0.0588
134	Jul-09	0.1145	0.0597	0.0548
135	Aug-09	0.1109	0.0571	0.0538
136	Sep-09	0.1109	0.0553	0.0556
137	Oct-09	0.1146	0.0555	0.0592
138	Nov-09	0.1148	0.0564	0.0584
139	Dec-09	0.1123	0.0579	0.0544
140	Jan-10	0.1198	0.0577	0.0621
141	Feb-10	0.1167	0.0587	0.0580
142	Mar-10	0.1074	0.0584	0.0490

Notes: A-rated utility bond yield information from the Mergent Bond Record. DCF results are calculated using a quarterly DCF model as follows:

d_0	=	Latest quarterly dividend per *Value Line*.
P_0	=	Average of the monthly high and low stock prices for each month from Thomson Reuters.
FC	=	Flotation costs expressed as a percent of gross proceeds.
g	=	I/B/E/S forecast of future earnings growth for each month.
k	=	Cost of equity using the quarterly version of the DCF model shown by the formula below:

$$k = \left[\frac{d_0(1+g)^{\frac{1}{4}}}{P_0(1-FC)} + (1+g)^{\frac{1}{4}} \right]^4 - 1$$

TENNESSEE AMERICAN WATER COMPANY
EXHIBIT__(JVW-1)
SCHEDULE 4
COMPARATIVE RETURNS ON S&P 500 STOCK INDEX
AND MOODY'S A-RATED BONDS 1937 – 2010

LINE NO.	YEAR	S&P 500 STOCK PRICE	STOCK DIVIDEND YIELD	STOCK RETURN	A-RATED BOND PRICE	BOND RETURN
1	2010	1,123.58	0.0203		$75.02	
2	2009	865.58	0.0310	32.91%	$68.43	15.48%
3	2008	1,380.33	0.0211	-35.19%	$72.25	0.24%
4	2007	1,424.16	0.0181	-1.27%	$72.91	4.59%
5	2006	1,278.72	0.0183	13.20%	$75.25	2.20%
6	2005	1,181.41	0.0177	10.01%	$74.91	5.80%
7	2004	1,132.52	0.0162	5.94%	$70.87	11.34%
8	2003	895.84	0.0180	28.22%	$62.26	20.27%
9	2002	1,140.21	0.0138	-20.05%	$57.44	15.35%
10	2001	1,335.63	0.0116	-13.47%	$56.40	8.93%
11	2000	1,425.59	0.0118	-5.13%	$52.60	14.82%
12	1999	1,248.77	0.0130	15.46%	$63.03	-10.20%
13	1998	963.35	0.0162	31.25%	$62.43	7.38%
14	1997	766.22	0.0195	27.68%	$56.62	17.32%
15	1996	614.42	0.0231	27.02%	$60.91	-0.48%
16	1995	465.25	0.0287	34.93%	$50.22	29.26%
17	1994	472.99	0.0269	1.05%	$60.01	-9.65%
18	1993	435.23	0.0288	11.56%	$53.13	20.48%
19	1992	416.08	0.0290	7.50%	$49.56	15.27%
20	1991	325.49	0.0382	31.65%	$44.84	19.44%
21	1990	339.97	0.0341	-0.85%	$45.60	7.11%
22	1989	285.41	0.0364	22.76%	$43.06	15.18%
23	1988	250.48	0.0366	17.61%	$40.10	17.36%
24	1987	264.51	0.0317	-2.13%	$48.92	-9.84%
25	1986	208.19	0.0390	30.95%	$39.98	32.36%
26	1985	171.61	0.0451	25.83%	$32.57	35.05%
27	1984	166.39	0.0427	7.41%	$31.49	16.12%
28	1983	144.27	0.0479	20.12%	$29.41	20.65%
29	1982	117.28	0.0595	28.96%	$24.48	36.48%
30	1981	132.97	0.0480	-7.00%	$29.37	-3.01%
31	1980	110.87	0.0541	25.34%	$34.69	-3.81%
32	1979	99.71	0.0533	16.52%	$43.91	-11.89%
33	1978	90.25	0.0532	15.80%	$49.09	-2.40%
34	1977	103.80	0.0399	-9.06%	$50.95	4.20%
35	1976	96.86	0.0380	10.96%	$43.91	25.13%
36	1975	72.56	0.0507	38.56%	$41.76	14.75%
37	1974	96.11	0.0364	-20.86%	$52.54	-12.91%
38	1973	118.40	0.0269	-16.14%	$58.51	-3.37%
39	1972	103.30	0.0296	17.58%	$56.47	10.69%

LINE NO.	YEAR	S&P 500 STOCK PRICE	STOCK DIVIDEND YIELD	STOCK RETURN	A-RATED BOND PRICE	BOND RETURN
40	1971	93.49	0.0332	13.81%	$53.93	12.13%
41	1970	90.31	0.0356	7.08%	$50.46	14.81%
42	1969	102.00	0.0306	-8.40%	$62.43	-12.76%
43	1968	95.04	0.0313	10.45%	$66.97	-0.81%
44	1967	84.45	0.0351	16.05%	$78.69	-9.81%
45	1966	93.32	0.0302	-6.48%	$86.57	-4.48%
46	1965	86.12	0.0299	11.35%	$91.40	-0.91%
47	1964	76.45	0.0305	15.70%	$92.01	3.68%
48	1963	65.06	0.0331	20.82%	$93.56	2.61%
49	1962	69.07	0.0297	-2.84%	$89.60	8.89%
50	1961	59.72	0.0328	18.94%	$89.74	4.29%
51	1960	58.03	0.0327	6.18%	$84.36	11.13%
52	1959	55.62	0.0324	7.57%	$91.55	-3.49%
53	1958	41.12	0.0448	39.74%	$101.22	-5.60%
54	1957	45.43	0.0431	-5.18%	$100.70	4.49%
55	1956	44.15	0.0424	7.14%	$113.00	-7.35%
56	1955	35.60	0.0438	28.40%	$116.77	0.20%
57	1954	25.46	0.0569	45.52%	$112.79	7.07%
58	1953	26.18	0.0545	2.70%	$114.24	2.24%
59	1952	24.19	0.0582	14.05%	$113.41	4.26%
60	1951	21.21	0.0634	20.39%	$123.44	-4.89%
61	1950	16.88	0.0665	32.30%	$125.08	1.89%
62	1949	15.36	0.0620	16.10%	$119.82	7.72%
63	1948	14.83	0.0571	9.28%	$118.50	4.49%
64	1947	15.21	0.0449	1.99%	$126.02	-2.79%
65	1946	18.02	0.0356	-12.03%	$126.74	2.59%
66	1945	13.49	0.0460	38.18%	$119.82	9.11%
67	1944	11.85	0.0495	18.79%	$119.82	3.34%
68	1943	10.09	0.0554	22.98%	$118.50	4.49%
69	1942	8.93	0.0788	20.87%	$117.63	4.14%
70	1941	10.55	0.0638	-8.98%	$116.34	4.55%
71	1940	12.30	0.0458	-9.65%	$112.39	7.08%
72	1939	12.50	0.0349	1.89%	$105.75	10.05%
73	1938	11.31	0.0784	18.36%	$99.83	9.94%
74	1937	17.59	0.0434	-31.36%	$103.18	0.63%
75	Average	Stocks		11.06%		
76		Bonds		6.42%		
77		Risk Premium		4.64%		

Note: See Appendix 4 for an explanation of how stock and bond returns are derived and the source of the data presented.

TENNESSEE AMERICAN WATER COMPANY
EXHIBIT__(JVW-1)
SCHEDULE 5
COMPARATIVE RETURNS ON S&P UTILITY STOCK INDEX AND MOODY'S A-RATED BONDS 1937 – 2010

LINE NO.	YEAR	S&P UTILITY STOCK PRICE	STOCK DIVIDEND YIELD	STOCK RETURN	A-RATED BOND YIELD	BOND RETURN
1	2010				$75.02	
2	2009			10.71%	$68.43	15.48%
3	2008			-25.90%	$72.25	0.24%
4	2007			16.56%	$72.91	4.59%
5	2006			20.76%	$75.25	2.20%
6	2005			16.05%	$74.91	5.80%
7	2004			22.84%	$70.87	11.34%
8	2003			23.48%	$62.26	20.27%
9	2002			-14.73%	$57.44	15.35%
10						
11	2002	243.79	0.0362		$57.44	
12	2001	307.70	0.0287	-17.90%	$56.40	8.93%
13	2000	239.17	0.0413	32.78%	$52.60	14.82%
14	1999	253.52	0.0394	-1.72%	$63.03	-10.20%
15	1998	228.61	0.0457	15.47%	$62.43	7.38%
16	1997	201.14	0.0492	18.58%	$56.62	17.32%
17	1996	202.57	0.0454	3.83%	$60.91	-0.48%
18	1995	153.87	0.0584	37.49%	$50.22	29.26%
19	1994	168.70	0.0496	-3.83%	$60.01	-9.65%
20	1993	159.79	0.0537	10.95%	$53.13	20.48%
21	1992	149.70	0.0572	12.46%	$49.56	15.27%
22	1991	138.38	0.0607	14.25%	$44.84	19.44%
23	1990	146.04	0.0558	0.33%	$45.60	7.11%
24	1989	114.37	0.0699	34.68%	$43.06	15.18%
25	1988	106.13	0.0704	14.80%	$40.10	17.36%
26	1987	120.09	0.0588	-5.74%	$48.92	-9.84%
27	1986	92.06	0.0742	37.87%	$39.98	32.36%
28	1985	75.83	0.0860	30.00%	$32.57	35.05%
29	1984	68.50	0.0925	19.95%	$31.49	16.12%
30	1983	61.89	0.0948	20.16%	$29.41	20.65%
31	1982	51.81	0.1074	30.20%	$24.48	36.48%
32	1981	52.01	0.0978	9.40%	$29.37	-3.01%
33	1980	50.26	0.0953	13.01%	$34.69	-3.81%
34	1979	50.33	0.0893	8.79%	$43.91	-11.89%
35	1978	52.40	0.0791	3.96%	$49.09	-2.40%
36	1977	54.01	0.0714	4.16%	$50.95	4.20%
37	1976	46.99	0.0776	22.70%	$43.91	25.13%
38	1975	38.19	0.0920	32.24%	$41.76	14.75%

LINE NO.	YEAR	S&P UTILITY STOCK PRICE	STOCK DIVIDEND YIELD	STOCK RETURN	A-RATED BOND YIELD	BOND RETURN
39	1974	48.60	0.0713	-14.29%	$52.54	-12.91%
40	1973	60.01	0.0556	-13.45%	$58.51	-3.37%
41	1972	60.19	0.0542	5.12%	$56.47	10.69%
42	1971	63.43	0.0504	-0.07%	$53.93	12.13%
43	1970	55.72	0.0561	19.45%	$50.46	14.81%
44	1969	68.65	0.0445	-14.38%	$62.43	-12.76%
45	1968	68.02	0.0435	5.28%	$66.97	-0.81%
46	1967	70.63	0.0392	0.22%	$78.69	-9.81%
47	1966	74.50	0.0347	-1.72%	$86.57	-4.48%
48	1965	75.87	0.0315	1.34%	$91.40	-0.91%
49	1964	67.26	0.0331	16.11%	$92.01	3.68%
50	1963	63.35	0.0330	9.47%	$93.56	2.61%
51	1962	62.69	0.0320	4.25%	$89.60	8.89%
52	1961	52.73	0.0358	22.47%	$89.74	4.29%
53	1960	44.50	0.0403	22.52%	$84.36	11.13%
54	1959	43.96	0.0377	5.00%	$91.55	-3.49%
55	1958	33.30	0.0487	36.88%	$101.22	-5.60%
56	1957	32.32	0.0487	7.90%	$100.70	4.49%
57	1956	31.55	0.0472	7.16%	$113.00	-7.35%
58	1955	29.89	0.0461	10.16%	$116.77	0.20%
59	1954	25.51	0.0520	22.37%	$112.79	7.07%
60	1953	24.41	0.0511	9.62%	$114.24	2.24%
61	1952	22.22	0.0550	15.36%	$113.41	4.26%
62	1951	20.01	0.0606	17.10%	$123.44	-4.89%
63	1950	20.20	0.0554	4.60%	$125.08	1.89%
64	1949	16.54	0.0570	27.83%	$119.82	7.72%
65	1948	16.53	0.0535	5.41%	$118.50	4.49%
66	1947	19.21	0.0354	-10.41%	$126.02	-2.79%
67	1946	21.34	0.0298	-7.00%	$126.74	2.59%
68	1945	13.91	0.0448	57.89%	$119.82	9.11%
69	1944	12.10	0.0569	20.65%	$119.82	3.34%
70	1943	9.22	0.0621	37.45%	$118.50	4.49%
71	1942	8.54	0.0940	17.36%	$117.63	4.14%
72	1941	13.25	0.0717	-28.38%	$116.34	4.55%
73	1940	16.97	0.0540	-16.52%	$112.39	7.08%
74	1939	16.05	0.0553	11.26%	$105.75	10.05%
75	1938	14.30	0.0730	19.54%	$99.83	9.94%
76	1937	24.34	0.0432	-36.93%	$103.18	0.63%
77	Average	Stocks		10.5%		
78		Bonds		6.4%		
79		Risk Premium		4.1%		

See Appendix 5 for an explanation of how stock and bond returns are derived and the source of the data presented. Standard & Poor's discontinued its S&P Utilities Index in December 2001 and replaced its utilities stock index with separate indices for electric and natural gas utilities. In this study, the stock returns beginning in 2002 are based on the total returns for the EEI Index of U.S. shareholder-owned electric utilities, as reported by EEI on its website.
http://www.eei.org/industry_issues/finance_and_accounting/finance/research_and_analysis/EEI_Stock_Index

TENNESSEE AMERICAN WATER COMPANY
EXHIBIT__(JVW-1)
SCHEDULE 6
USING THE ARITHMETIC MEAN TO ESTIMATE
THE COST OF EQUITY CAPITAL

Consider an investment that in a given year generates a return of 30 percent with probability equal to .5 and a return of -10 percent with a probability equal to .5. For each one dollar invested, the possible outcomes of this investment at the end of year one are:

Ending Wealth	Probability
$1.30	0.50
$0.90	0.50

At the end of year two, the possible outcomes are:

Ending Wealth			Probability	Value x Probability
(1.30) (1.30)	=	$1.69	0.25	0.4225
(1.30) (.9)	=	$1.17	0.50	0.5850
(.9) (.9)	=	$0.81	0.25	0.2025
Expected Wealth	=			$1.21

The expected value of this investment at the end of year two is $1.21. In a competitive capital market, the cost of equity is equal to the expected rate of return on an investment. In the above example, the cost of equity is that rate of return which will make the initial investment of one dollar grow to the expected value of $1.21 at the end of two years. Thus, the cost of equity is the solution to the equation:

$$1(1+k)^2 = 1.21 \text{ or}$$

$$k = (1.21/1)^{.5} - 1 = 10\%.$$

The arithmetic mean of this investment is:

$$(30\%)\ (.5) + (-10\%)\ (.5) = 10\%.$$

Thus, the arithmetic mean is equal to the cost of equity capital.

The geometric mean of this investment is:

$$[(1.3)\ (.9)]^{.5} - 1 = .082 = 8.2\%.$$

Thus, the geometric mean is not equal to the cost of equity capital.

The lesson is obvious: for an investment with an uncertain outcome, the arithmetic mean is the best measure of the cost of equity capital.

TENNESSEE AMERICAN WATER COMPANY
EXHIBIT__(JVW-1)
SCHEDULE 7
CALCULATION OF CAPITAL ASSET PRICING MODEL COST OF EQUITY
USING THE IBBOTSON® SBBI® 6.7 PERCENT RISK PREMIUM

Risk-free Rate	4.75%	Long-term Treasury bond yield
Beta	0.71	Average Beta Comparable Water Companies
Risk Premium	6.70%	Long-horizon SBBI risk premium
Beta x Risk Premium	4.75%	
Flotation	0.25%	
CAPM cost of equity	9.8%	

Ibbotson® SBBI® risk premium from 2010 Ibbotson® SBBI® Stocks, Bonds, Bills, and Inflation® Valuation Yearbook; Value Line beta for comparable companies from Value Line Investment Analyzer April 2010. Forecast 20-year Treasury bond yield from Value Line Selection & Opinion, February 26, 2010, p. 3019.

TENNESSEE AMERICAN WATER COMPANY
EXHIBIT__(JVW-1)
SCHEDULE 7 (continued)
COMPARABLE COMPANY BETAS

LINE NO.	COMPANY	BETA
1	Amer. States Water	0.80
2	Amer. Water Works	NA
3	Aqua America	0.65
4	Artesian Res. 'A'	0.55
4	California Water	0.75
5	Connecticut Water	0.80
6	Middlesex Water	0.80
7	York Water	0.65
8	Average	0.71

Data from Value Line Investment Analyzer April 2010.

TENNESSEE AMERICAN WATER COMPANY
EXHIBIT__(JVW-1)
SCHEDULE 8
CALCULATION OF CAPITAL ASSET PRICING MODEL COST OF EQUITY
USING DCF ESTIMATE OF THE EXPECTED RATE OF RETURN
ON THE MARKET PORTFOLIO

LINE NO.			
1	Risk-free Rate	4.75%	Forecast 20-year Treasury Bond Yield
2	Beta	0.71	Average Beta Comparable Water Companies
3	DCF S&P 500	12.5%	DCF Cost of Equity S&P 500 (see following)
4	Risk Premium	7.75%	
5	Beta * Risk Premium	5.50%	
6	Flotation cost	0.25%	
7	Cost of Equity	10.5%	

Value Line beta for comparable companies from Value Line Investment Analyzer April 2010. Forecast 20-year Treasury bond yield from Value Line Selection & Opinion, February 26, 2010, p. 3019.

TENNESSEE AMERICAN WATER COMPANY
EXHIBIT__(JVW-1)
SCHEDULE 8 (CONTINUED)
CALCULATION OF CAPITAL ASSET PRICING MODEL COST OF EQUITY
USING DCF ESTIMATE OF THE EXPECTED RATE OF RETURN
ON THE MARKET PORTFOLIO
SUMMARY OF DISCOUNTED CASH FLOW ANALYSIS FOR S&P 500 COMPANIES

COMPANY	P_0	D_0	GROWTH	COST OF EQUITY
AMERISOURCEBERGEN	27.66	0.32	13.10%	14.4%
AUTOMATIC DATA PROC.	42.11	1.36	10.93%	14.6%
ALLERGAN	60.05	0.20	13.55%	13.9%
ASSURANT	31.51	0.60	8.50%	10.6%
APPLIED MATS.	12.96	0.28	11.50%	13.9%
AMPHENOL 'A'	42.38	0.06	12.53%	12.7%
AIRGAS	54.86	0.88	8.98%	10.7%
AVON PRODUCTS	31.55	0.88	10.43%	13.5%
AMERICAN EXPRESS	39.41	0.72	9.86%	11.9%
ALLEGHENY EN.	22.57	0.60	10.00%	13.0%
BOEING	62.89	1.68	8.33%	11.3%
BAXTER INTL.	58.23	1.16	11.81%	14.1%
BEST BUY	38.53	0.56	12.42%	14.1%
C R BARD	82.34	0.68	11.73%	12.7%
BECTON DICKINSON	77.55	1.48	11.38%	13.5%
FRANKLIN RESOURCES	104.05	0.88	10.00%	10.9%
BANK OF NEW YORK MELLON	29.16	0.36	11.00%	12.4%
CA	22.67	0.16	11.00%	11.8%
CARDINAL HEALTH	33.66	0.70	9.76%	12.1%
CHUBB	49.95	1.48	9.20%	12.5%
CBS 'B'	13.58	0.20	10.40%	12.0%
COLGATE-PALM.	81.98	2.12	9.00%	11.8%
COMCAST 'A'	16.63	0.38	11.63%	14.2%
CME GROUP	304.43	4.60	11.40%	13.1%
CSX	47.53	0.96	8.63%	10.8%
CINTAS	25.62	0.48	9.38%	11.4%
CVS CAREMARK	33.78	0.35	11.79%	13.0%
DEERE	55.84	1.12	9.75%	12.0%
QUEST DIAGNOSTICS	57.25	0.40	12.23%	13.0%
DANAHER	75.04	0.16	14.02%	14.3%
WALT DISNEY	31.49	0.35	9.57%	10.8%
DIAMOND OFFS.DRL.	92.16	0.50	11.14%	11.7%
DUKE ENERGY	16.61	0.96	4.33%	10.5%
EOG RES.	93.62	0.62	10.40%	11.1%
ENTERGY	78.81	3.32	6.96%	11.5%
EXPEDIA	22.97	0.28	11.60%	13.0%
FEDEX	84.27	0.44	11.75%	12.3%
FEDERATED INVRS.'B'	25.89	0.96	7.67%	11.7%
FLUOR	45.91	0.50	10.25%	11.5%
FPL GROUP	48.62	2.00	7.32%	11.8%
GENERAL DYNAMICS	70.92	1.68	7.80%	10.4%

COMPANY	P_0	D_0	GROWTH	COST OF EQUITY
GENERAL ELECTRIC	16.52	0.40	8.80%	11.5%
GENERAL MILLS	71.14	1.96	8.10%	11.1%
CORNING	18.71	0.20	12.80%	14.0%
GENUINE PARTS	39.92	1.64	7.33%	11.8%
GAP	20.97	0.40	10.73%	12.9%
GOODRICH	65.42	1.08	8.53%	10.3%
HALLIBURTON	30.97	0.36	10.67%	12.0%
HARTFORD FINL.SVS.GP.	25.46	0.20	11.77%	12.7%
HJ HEINZ	44.76	1.68	6.53%	10.6%
HONEYWELL INTL.	40.73	1.21	9.00%	12.3%
HEWLETT-PACKARD	50.28	0.32	13.40%	14.1%
INTERNATIONAL BUS.MCHS.	126.99	2.20	8.86%	10.8%
ITT	50.98	1.00	8.67%	10.8%
PENNEY JC	27.56	0.80	7.27%	10.4%
NORDSTROM	36.98	0.64	12.26%	14.2%
KELLOGG	53.66	1.50	10.25%	13.4%
KRAFT FOODS	28.93	1.16	7.53%	11.9%
KROGER	21.60	0.38	8.65%	10.6%
L3 COMMUNICATIONS	89.04	1.60	10.12%	12.1%
LOCKHEED MARTIN	78.21	2.52	8.92%	12.5%
LOWE'S COMPANIES	23.25	0.36	12.27%	14.0%
MARRIOTT INTL.'A'	27.94	0.16	10.08%	10.7%
MCDONALDS	64.15	2.20	10.01%	13.8%
MCKESSON	61.06	0.48	11.45%	12.3%
MOODY'S	27.95	0.42	10.57%	12.2%
MEDTRONIC	44.15	0.82	10.25%	12.3%
MASSEY EN.	44.99	0.24	11.00%	11.6%
METLIFE	37.59	0.74	9.04%	11.2%
MCGRAW-HILL	34.82	0.94	7.87%	10.8%
MEAD JOHNSON NUTRITION	47.20	0.90	9.77%	11.9%
MICROSOFT	29.05	0.52	11.25%	13.3%
NIKE 'B'	66.73	1.08	12.33%	14.2%
NORTHROP GRUMMAN	60.19	1.72	11.00%	14.2%
NORFOLK SOUTHERN	51.36	1.36	8.75%	11.7%
NATIONAL SEMICON.	14.34	0.32	9.33%	11.8%
NORTHEAST UTILITIES	26.16	1.02	7.81%	12.1%
NEWELL RUBBERMAID	14.37	0.20	9.33%	10.9%
OMNICOM GP.	37.26	0.80	10.93%	13.3%
PEOPLES UNITED FINANCIAL	15.85	0.61	9.00%	13.3%
PACCAR	37.35	0.36	11.25%	12.3%
PG&E	42.84	1.82	7.00%	11.6%
PREC.CASTPARTS	113.47	0.12	14.00%	14.1%
PRINCIPAL FINL.GP.	24.61	0.50	9.45%	11.7%
PROCTER & GAMBLE	62.30	1.76	9.33%	12.5%
PROGRESS ENERGY	39.13	2.48	3.72%	10.5%
PERKINELMER	21.87	0.28	13.05%	14.5%
PINNACLE WEST CAP.	36.78	2.10	7.00%	13.2%
PEPCO HOLDINGS	16.81	1.08	5.33%	12.3%
PRUDENTIAL FINL.	52.71	0.70	11.42%	12.9%
PRAXAIR	77.96	1.80	11.33%	13.9%

COMPANY	P_0	D_0	GROWTH	COST OF EQUITY
POLO RALPH LAUREN 'A'	82.39	0.40	10.63%	11.2%
ROPER INDS.NEW	54.04	0.38	12.00%	12.8%
RAYTHEON 'B'	54.78	1.50	8.67%	11.7%
SCANA	36.49	1.90	5.32%	10.9%
SIGMA ALDRICH	50.01	0.64	9.47%	10.9%
SARA LEE	12.98	0.44	8.47%	12.2%
SOUTHERN	32.38	1.75	4.77%	10.5%
STATE STREET	45.03	0.04	10.50%	10.6%
STRYKER	53.88	0.60	12.07%	13.3%
AT&T	25.92	1.68	5.79%	12.8%
TECO ENERGY	15.67	0.80	7.93%	13.5%
TIFFANY & CO	43.95	0.80	11.30%	13.3%
TJX COS.	39.86	0.48	12.44%	13.8%
TORCHMARK	46.98	0.60	9.38%	10.8%
T ROWE PRICE GP.	51.66	1.08	10.75%	13.1%
TOTAL SYSTEM SERVICES	15.21	0.28	8.70%	10.7%
TIME WARNER CABLE	46.54	1.60	8.27%	12.0%
UNUM GROUP	21.15	0.33	8.80%	10.5%
UNION PACIFIC	66.59	1.08	10.88%	12.7%
UNITED PARCEL SER.	60.00	1.88	8.22%	11.7%
UNITED TECHNOLOGIES	69.52	1.70	10.72%	13.5%
V F	75.66	2.40	9.60%	13.1%
VULCAN MATERIALS	46.64	1.00	10.60%	13.0%
VERIZON COMMUNICATIONS	30.19	1.90	4.86%	11.6%
WISCONSIN ENERGY	49.34	1.60	9.87%	13.5%
WELLS FARGO & CO	28.48	0.20	12.00%	12.8%
WAL MART STORES	54.05	1.21	10.80%	13.3%
WESTERN UNION	17.66	0.06	12.57%	13.0%
XCEL ENERGY	20.96	0.98	6.12%	11.2%
DENTSPLY INTL.	34.13	0.20	11.67%	12.3%
Market-weighted Average				12.5%

Notes: In applying the DCF model to the S&P 500, I included in the DCF analysis only those companies in the S&P 500 group which pay a dividend, have a positive growth rate, and have at least three analysts' long-term growth estimates. To be conservative, I also eliminated those 25% of companies with the highest and lowest DCF results.

d_0 = Current dividend per Thomson Reuters.

P_0 = Average of the monthly high and low stock prices during the three months ending March 2010 per Thomson Reuters.

g = I/B/E/S forecast of future earnings growth March 2010.

k = Cost of equity using the quarterly version of the DCF model shown below:

$$k = \left[\frac{d_0(1+g)^{\frac{1}{4}}}{P_0} + (1+g)^{\frac{1}{4}} \right]^4 - 1$$

APPENDIX 1
QUALIFICATIONS OF JAMES H. VANDER WEIDE, PH.D.

JAMES H. VANDER WEIDE, Ph.D.
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James H. Vander Weide is Research Professor of Finance and Economics at Duke University, the Fuqua School of Business. Dr. Vander Weide is also founder and President of Financial Strategy Associates, a consulting firm that provides strategic, financial, and economic consulting services to corporate clients, including cost of capital and valuation studies.

Educational Background and Prior Academic Experience

Dr. Vander Weide holds a Ph.D. in Finance from Northwestern University and a Bachelor of Arts in Economics from Cornell University. He joined the faculty at Duke University and was named Assistant Professor, Associate Professor, Professor, and then Research Professor of Finance and Economics.

Since joining the faculty at Duke, Dr. Vander Weide has taught courses in corporate finance, investment management, and management of financial institutions. He has also taught courses in statistics, economics, and operations research, and a Ph.D. seminar on the theory of public utility pricing. In addition, Dr. Vander Weide has been active in executive education at Duke and Duke Corporate Education, leading executive development seminars on topics including financial analysis, cost of capital, creating shareholder value, mergers and acquisitions, real options, capital budgeting, cash management, measuring corporate performance, valuation, short-run financial planning, depreciation policies, financial strategy, and competitive strategy. Dr. Vander Weide has designed and served as Program Director for several executive education programs, including the Advanced Management Program, Competitive Strategies in Telecommunications, and the Duke Program for Manager Development for managers from the former Soviet Union.

Publications

Dr. Vander Weide has written a book entitled *Managing Corporate Liquidity: An Introduction to Working Capital Management* published by John Wiley and Sons, Inc. He has also written a chapter titled, "Financial Management in the Short Run" for *The Handbook of Modern Finance*;" a chapter for *The Handbook of Portfolio Construction: Contemporary Applications of Markowitz Techniques,* "Principles for Lifetime Portfolio Selection: Lessons from Portfolio Theory," and written research papers on such topics as portfolio management, capital budgeting, investments, the effect of regulation on the performance of public utilities, and cash management. His articles have been published in *American Economic Review, Financial Management, International Journal of Industrial Organization, Journal of Finance, Journal of Financial and Quantitative Analysis, Journal of Bank Research, Journal of Portfolio Management, Journal* *of Accounting Research, Journal of Cash Management, Management Science, Atlantic Economic Journal, Journal of Economics and Business,* and *Computers and Operations Research.*

Professional Consulting Experience

Dr. Vander Weide has provided financial and economic consulting services to firms in the electric, gas, insurance, telecommunications, and water industries for more than 25 years. He has testified on the cost of capital, competition, risk, incentive regulation, forward-looking economic cost, economic pricing guidelines, depreciation, accounting, valuation, and other financial and economic issues in more than 400 cases before the United States Congress, the Canadian Radio-Television and Telecommunications Commission, the Federal Communications Commission, the National Energy Board (Canada), the National Telecommunications and Information Administration, the Federal Energy Regulatory Commission, the public service commissions of 43 states, the District of Columbia, and three Canadian provinces, the insurance commissions of five states, the Iowa State Board of Tax Review, the National Association of Securities Dealers, and the North Carolina Property Tax Commission. In addition, he has testified as an expert witness in proceedings before the United States District Court for the District of New Hampshire; United States District Court for the Northern District of California; United States District Court for the Northern District of Illinois, United States District Court for the District of Nebraska; United States District Court for the Eastern District of North Carolina; Superior Court of North Carolina, the United States Bankruptcy Court for the Southern District of West Virginia; and United States District Court for the Eastern District of Michigan. With respect to implementation of the Telecommunications Act of 1996, Dr. Vander Weide has testified in 30 states on issues relating to the pricing of unbundled network elements and universal service cost studies and has consulted with Bell Canada, Deutsche Telekom, and Telefónica on similar issues. He has also provided expert testimony on issues related to electric and natural gas restructuring. He has worked for Bell Canada/Nortel on a special task force to study the effects of vertical integration in the Canadian telephone industry and has worked for Bell Canada as an expert witness on the cost of capital. Dr. Vander Weide has provided consulting and expert witness testimony to the following companies:

TELECOMMUNICATIONS COMPANIES	
ALLTEL and subsidiaries	Phillips County Cooperative Tel. Co.
Ameritech (now AT&T new)	Pine Drive Cooperative Telephone Co.
AT&T (old)	Roseville Telephone Company (SureWest)
Bell Canada/Nortel	SBC Communications (now AT&T new)
BellSouth and subsidiaries	Sherburne Telephone Company
Centel and subsidiaries	Siemens
Cincinnati Bell (Broadwing)	Southern New England Telephone
Cisco Systems	Sprint/United and subsidiaries
Citizens Telephone Company	Telefónica
Concord Telephone Company	Tellabs, Inc.
Contel and subsidiaries	The Stentor Companies

TELECOMMUNICATIONS COMPANIES	
Deutsche Telekom	U S West (Qwest)
GTE and subsidiaries (now Verizon)	Union Telephone Company
Heins Telephone Company	United States Telephone Association
JDS Uniphase	Valor Telecommunications (Windstream)
Lucent Technologies	Verizon (Bell Atlantic) and subsidiaries
Minnesota Independent Equal Access Corp.	Woodbury Telephone Company
NYNEX and subsidiaries (Verizon)	
Pacific Telesis and subsidiaries	

ELECTRIC, GAS, WATER, OIL COMPANIES	
Alcoa Power Generating, Inc.	MidAmerican Energy and subsidiaries
Alliant Energy and subsidiaries	Nevada Power Company
AltaLink, L.P.	NICOR
Ameren	North Carolina Natural Gas
American Water Works	North Shore Gas
Atmos Energy and subsidiaries	Northern Natural Gas Company
BP p.l.c.	NOVA Gas Transmission Ltd.
Central Illinois Public Service	PacifiCorp
Citizens Utilities	Peoples Energy and its subsidiaries
Consolidated Natural Gas and subsidiaries	PG&E
Dominion Resources and subsidiaries	Progress Energy
Duke Energy and subsidiaries	PSE&G
Empire District Electric Company	Public Service Company of North Carolina
EPCOR Distribution & Transmission Inc.	Sempra Energy
EPCOR Energy Alberta Inc.	South Carolina Electric and Gas
FortisAlberta Inc.	Southern Company and subsidiaries
Hope Natural Gas	Tennessee-American Water Company
Interstate Power Company	The Peoples Gas, Light and Coke Co.
Iowa Southern	TransCanada
Iowa-American Water Company	Trans Québec & Maritimes Pipeline Inc.
Iowa-Illinois Gas and Electric	Union Gas
Kentucky Power Company	United Cities Gas Company
Kentucky-American Water Company	Virginia-American Water Company
Kinder Morgan Energy Partners	

INSURANCE COMPANIES
Allstate
North Carolina Rate Bureau
United Services Automobile Association (USAA)
The Travelers Indemnity Company
Gulf Insurance Company

Other Professional Experience

Dr. Vander Weide conducts in-house seminars and training sessions on topics such as creating shareholder value, financial analysis, competitive strategy, cost of capital, real options, financial strategy, managing growth, mergers and acquisitions, valuation, measuring corporate performance, capital budgeting, cash management, and financial planning. Among the firms for whom he has designed and taught tailored programs and training sessions are ABB Asea Brown Boveri, Accenture, Allstate, Ameritech, AT&T, Bell Atlantic/Verizon, BellSouth, Progress Energy/Carolina Power & Light, Contel, Fisons, GlaxoSmithKline, GTE, Lafarge, MidAmerican Energy, New Century Energies, Norfolk Southern, Pacific Bell Telephone, The Rank Group, Siemens, Southern New England Telephone, TRW, and Wolseley Plc. Dr. Vander Weide has also hosted a nationally prominent conference/workshop on estimating the cost of capital. In 1989, at the request of Mr. Fuqua, Dr. Vander Weide designed the Duke Program for Manager Development for managers from the former Soviet Union, the first in the United States designed exclusively for managers from Russia and the former Soviet republics.

In the 1970's, Dr. Vander Weide helped found University Analytics, Inc., which at that time was one of the fastest growing small firms in the country. As an officer at University Analytics, he designed cash management models, databases, and software packages that are still used by most major U.S. banks in consulting with their corporate clients. Having sold his interest in University Analytics, Dr. Vander Weide now concentrates on strategic and financial consulting, academic research, and executive education.

PUBLICATIONS
JAMES H. VANDER WEIDE

The Lock-Box Location Problem: a Practical Reformulation, *Journal of Bank Research*, Summer, 1974, pp. 92-96 (with S. Maier). Reprinted in *Management Science in Banking*, edited by K. J. Cohen and S. E. Gibson, Warren, Gorham and Lamont, 1978.

A Finite Horizon Dynamic Programming Approach to the Telephone Cable Layout Problem, *Conference Record*, 1976 International Conference on Communications (with S. Maier and C. Lam).

A Note on the Optimal Investment Policy of the Regulated Firm, *Atlantic Economic Journal*, Fall, 1976 (with D. Peterson).

A Unified Location Model for Cash Disbursements and Lock-Box Collections, *Journal of Bank Research*, Summer, 1976 (with S. Maier). Reprinted in *Management Science in Banking*, edited by K. J. Cohen and S. E. Gibson, Warren Gorham and Lamont, 1978. Also reprinted in *Readings on the Management of Working Capital*, edited by K. V. Smith, West Publishing Company, 1979.

Capital Budgeting in the Decentralized Firm,' *Management Science*, Vol. 23, No. 4, December 1976, pp. 433-443 (with S. Maier).

A Monte Carlo Investigation of Characteristics of Optimal Geometric Mean Portfolios, *Journal of Financial and Quantitative Analysis*, June, 1977, pp. 215-233 (with S. Maier and D. Peterson).

A Strategy which Maximizes the Geometric Mean Return on Portfolio Investments, *Management Science*, June, 1977, Vol. 23, No. 10, pp. 1117-1123 (with S. Maier and D. Peterson).

A Decision Analysis Approach to the Computer Lease-Purchase Decision, *Computers and Operations Research*, Vol. 4, No. 3, September, 1977, pp. 167-172 (with S. Maier).

A Practical Approach to Short-run Financial Planning, *Financial Management*, Winter, 1978 (with S. Maier). Reprinted in *Readings on the Management of Working Capital*, edited by K. V. Smith, West Publishing Company, 1979.

Effectiveness of Regulation in the Electric Utility Industry,' *Journal of Economics and Business*, May, 1979 (with F. Tapon).

On the Decentralized Capital Budgeting Problem Under Uncertainty, *Management Science*, September 1979 (with B. Obel).

Expectations Data and the Predictive Value of Interim Reporting: A Comment, *Journal of Accounting Research*, Spring 1980 (with L. D. Brown, J. S. Hughes, and M. S. Rozeff).

General Telephone's Experience with a Short-run Financial Planning Model, *Cash Management Forum*, June 1980, Vol. 6, No. 1 (with J. Austin and S. Maier).

Deregulation and Oligopolistic Price-Quality Rivalry, *American Economic Review*, March 1981 (with J. Zalkind).

Forecasting Disbursement Float, *Financial Management*, Spring 1981 (with S. Maier and D. Robinson).

Recent Developments in Management Science in Banking, *Management Science*, October 1981 (with K. Cohen and S. Maier).

Incentive Considerations in the Reporting of Leveraged Leases, *Journal of Bank Research*, April 1982 (with J. S. Hughes).

A Decision-Support System for Managing a Short-term Financial Instrument Portfolio, *Journal of Cash Management*, March 1982 (with S. Maier).

An Empirical Bayes Estimate of Market Risk, *Management Science*, July 1982 (with S. Maier and D. Peterson).

The Bond Scheduling Problem of the Multi-subsidiary Holding Company, *Management Science*, July 1982 (with K. Baker).

Deregulation and Locational Rents in Banking: a Comment, *Journal of Bank Research*, Summer 1983.

What Lockbox and Disbursement Models Really Do, *Journal of Finance*, May 1983 (with S. Maier).

Financial Management in the Short Run, *Handbook of Modern Finance*, edited by Dennis Logue, published by Warren, Gorham, & Lamont, Inc., New York, 1984.

Measuring Investors' Growth Expectations: Analysts vs. History, *The Journal of Portfolio Management*, Spring 1988 (with W. Carleton).

Entry Auctions and Strategic Behavior under Cross-Market Price Constraints, *International Journal of Industrial Organization*, 20 (2002) 611-629 (with J. Anton and N. Vettas).

Principles for Lifetime Portfolio Selection: Lessons from Portfolio Theory, *Handbook of Portfolio Construction: Contemporary Applications of Markowitz Techniques*, John B. Guerard, (Ed.), Springer, 2009.

Managing Corporate Liquidity: an Introduction to Working Capital Management, John Wiley and Sons, 1984 (with S. Maier).

APPENDIX 2
THE QUARTERLY DCF MODEL

The simple DCF Model assumes that a firm pays dividends only at the end of each year. Since firms in fact pay dividends quarterly and investors appreciate the time value of money, the annual version of the DCF Model generally underestimates the value investors are willing to place on the firm's expected future dividend stream. In this appendix, we review two alternative formulations of the DCF Model that allow for the quarterly payment of dividends.

When dividends are assumed to be paid annually, the DCF Model suggests that the current price of the firm's stock is given by the expression:

$$P_0 = \frac{D_1}{(1+k)} + \frac{D_2}{(1+k)^2} + \ldots + \frac{D_n + P_n}{(1+k)^n} \quad \textbf{(1)}$$

where

P_0	=	current price per share of the firm's stock,
$D_1, D_2, \ldots, D_n$	=	expected annual dividends per share on the firm's stock,
P_n	=	price per share of stock at the time investors expect to sell the stock, and
k	=	return investors expect to earn on alternative investments of the same risk, i.e., the investors' required rate of return.

Unfortunately, expression (1) is rather difficult to analyze, especially for the purpose of estimating k. Thus, most analysts make a number of simplifying assumptions. First, they assume that dividends are expected to grow at the constant rate g into the indefinite future. Second, they assume that the stock price at time n is simply the present value of all dividends expected in periods subsequent to n. Third, they assume that the investors' required rate of return, k, exceeds the expected dividend growth rate g. Under the above simplifying assumptions, a firm's stock price may be written as the following sum:

$$P_0 = \frac{D_0(1+g)}{(1+k)} + \frac{D_0(1+g)^2}{(1+k)^2} + \frac{D_0(1+g)^3}{(1+k)^3} + \ldots , \qquad \textbf{(2)}$$

where the three dots indicate that the sum continues indefinitely.

As we shall demonstrate shortly, this sum may be simplified to:

$$P_o = \frac{D_o(1+g)}{(k-g)}$$

First, however, we need to review the very useful concept of a geometric progression.

Geometric Progression

Consider the sequence of numbers 3, 6, 12, 24,..., where each number after the first is obtained by multiplying the preceding number by the factor 2. Obviously, this sequence of numbers may also be expressed as the sequence 3, 3 x 2, 3 x 2^2, 3 x 2^3, etc. This sequence is an example of a geometric progression.

Definition: A geometric progression is a sequence in which each term after the first is obtained by multiplying some fixed number, called the common ratio, by the preceding term.

A general notation for geometric progressions is: a, the first term, r, the common ratio, and n, the number of terms. Using this notation, any geometric progression may be represented by the sequence:

$$a, ar, ar^2, ar^3, \ldots, ar^{n-1}.$$

In studying the DCF Model, we will find it useful to have an expression for the sum of n terms of a geometric progression. Call this sum S_n. Then

$$S_n = a + ar + \ldots + ar^{n-1} . \qquad \textbf{(3)}$$

However, this expression can be simplified by multiplying both sides of equation (3) by r and then subtracting the new equation from the old. Thus,

$$rS_n = ar + ar^2 + ar^3 + \ldots + ar^n$$

and

$$S_n - rS_n = a - ar^n \quad ,$$

or

$$(1 - r)\, S_n = a\,(1 - r^n) \quad .$$

Solving for S_n, we obtain:

$$S_n = \frac{a(1 - r^n)}{(1 - r)} \qquad \textbf{(4)}$$

as a simple expression for the sum of n terms of a geometric progression. Furthermore, if $|r| < 1$, then S_n is finite, and as n approaches infinity, S_n approaches $a \div (1-r)$. Thus, for a geometric progression with an infinite number of terms and $|r| < 1$, equation (4) becomes:

$$S = \frac{a}{1 - r} \qquad \textbf{(5)}$$

<u>Application to DCF Model</u>

Comparing equation (2) with equation (3), we see that the firm's stock price (under the DCF assumption) is the sum of an infinite geometric progression with the first term

$$a = \frac{D_0(1+g)}{(1+k)}$$

and common factor

$$r = \frac{(1+g)}{(1+k)}$$

Applying equation (5) for the sum of such a geometric progression, we obtain

$$S = a \bullet \frac{1}{(1-r)} = \frac{D_0(1+g)}{(1+k)} \bullet \frac{1}{1 - \frac{1+g}{1+k}} = \frac{D_0(1+g)}{(1+k)} \bullet \frac{1+k}{k-g} = \frac{D_0(1+g)}{k-g}$$

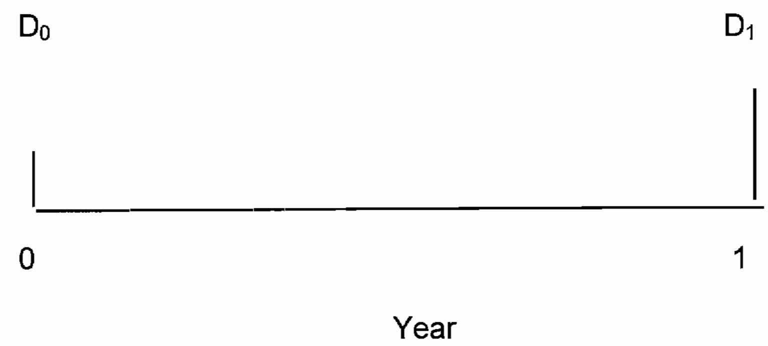
as we suggested earlier.

Quarterly DCF Model

The Annual DCF Model assumes that dividends grow at an annual rate of g% per year (see Figure 1).

Figure 1

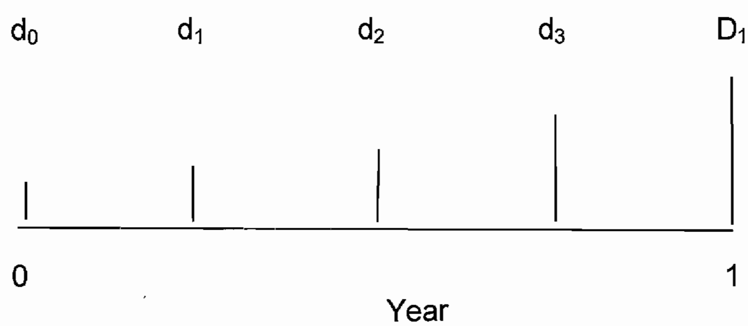
Annual DCF Model



$D_0 = 4d_0$ $\qquad$ $D_1 = D_0(1 + g)$

Figure 2

Quarterly DCF Model (Constant Growth Version)



$d_1 = d_0(1+g)^{.25}$ $\qquad$ $d_2 = d_0(1+g)^{.50}$

$d_3 = d_0(1+g)^{.75}$ $\qquad$ $d_4 = d_0(1+g)$

In the Quarterly DCF Model, it is natural to assume that quarterly dividend payments differ from the preceding quarterly dividend by the factor $(1 + g)^{.25}$, where g is expressed in terms of percent per year and the decimal .25 indicates that the growth has only occurred for one quarter of the year. (See Figure 2.) Using this assumption, along with the assumption of constant growth and $\boldsymbol{k} > \boldsymbol{g}$, we obtain a new expression for the firm's stock price, which takes account of the quarterly payment of dividends. This expression is:

$$P_0 = \frac{d_0(1+g)^{\frac{1}{4}}}{(1+k)^{\frac{1}{4}}} + \frac{d_0(1+g)^{\frac{2}{4}}}{(1+k)^{\frac{2}{4}}} + \frac{d_0(1+g)^{\frac{3}{4}}}{(1+k)^{\frac{3}{4}}} + \ldots \quad \textbf{(6)}$$

where d_0 is the last quarterly dividend payment, rather than the last annual dividend payment. (We use a lower case d to remind the reader that this is not the annual dividend.)

Although equation (6) looks formidable at first glance, it too can be greatly simplified using the formula [equation (4)] for the sum of an infinite geometric progression. As the reader can easily verify, equation (6) can be simplified to:

$$P_0 = \frac{d_0(1+g)^{\frac{1}{4}}}{(1+k)^{\frac{1}{4}} - (1+g)^{\frac{1}{4}}} \qquad \textbf{(7)}$$

Solving equation (7) for k, we obtain a DCF formula for estimating the cost of equity under the quarterly dividend assumption:

$$k = \left[\frac{d_0(1+g)^{\frac{1}{4}}}{P_0} + (1+g)^{\frac{1}{4}}\right]^4 - 1 \qquad \textbf{(8)}$$

An Alternative Quarterly DCF Model

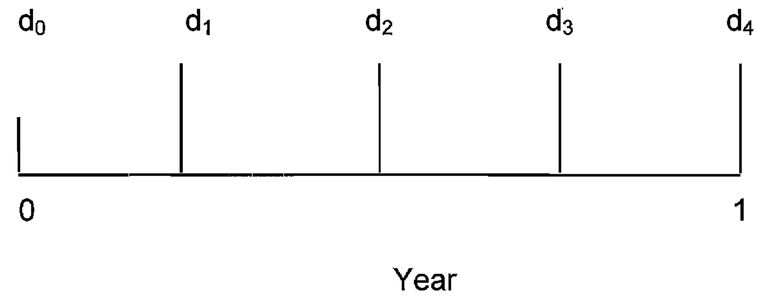
Although the constant growth Quarterly DCF Model [equation (8)] allows for the quarterly timing of dividend payments, it does require the assumption that the firm increases its dividend payments each quarter. Since this assumption is difficult for some analysts to accept, we now discuss a second Quarterly DCF Model that allows for constant quarterly dividend payments within each dividend year.

Assume then that the firm pays dividends quarterly and that each dividend payment is constant for four consecutive quarters. There are four cases to consider, with each case distinguished by varying assumptions about where we are evaluating the firm in relation to the time of its next dividend increase. (See Figure 3.)

Figure 3

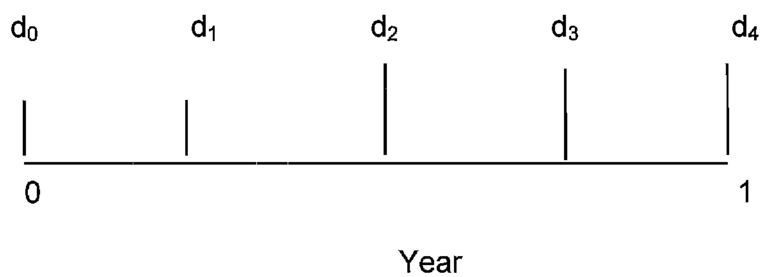
Quarterly DCF Model (Constant Dividend Version)

Case 1



$d_1 = d_2 = d_3 = d_4 = d_0(1+g)$

Case 2

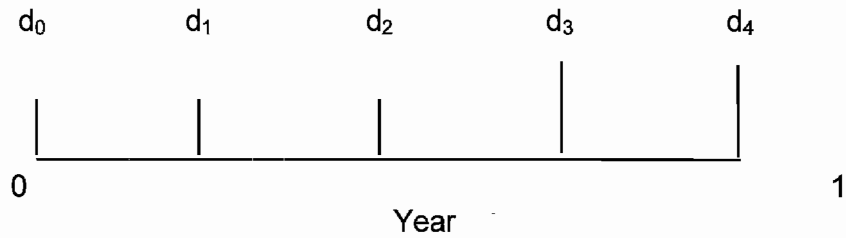


$d_1 = d_0$

$d_2 = d_3 = d_4 = d_0(1+g)$

<u>Figure 3</u> (continued)

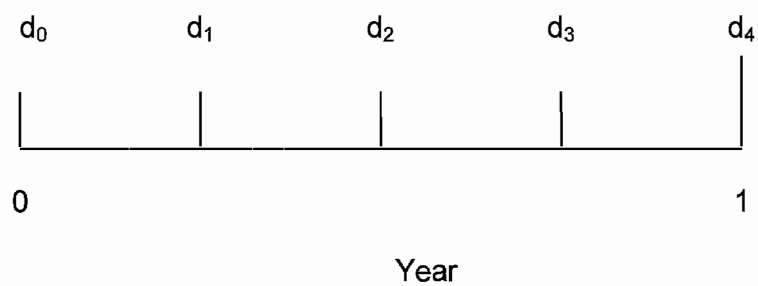
<u>Case 3</u>



$$d_1 = d_2 = d_0$$

$$d_3 = d_4 = d_0(1+g)$$

<u>Case 4</u>



$$d_1 = d_2 = d_3 = d_0$$

$$d_4 = d_0(1+g)$$

If we assume that the investor invests the quarterly dividend in an alternative investment of the same risk, then the amount accumulated by the end of the year will in all cases be given by

$$D_1^* = d_1\,(1+k)^{3/4} + d_2\,(1+k)^{1/2} + d_3\,(1+k)^{1/4} + d_4$$

where d_1, d_2, d_3 and d_4 are the four quarterly dividends. Under these new assumptions, the firm's stock price may be expressed by an Annual DCF Model of the form (2), with the exception that

$$D_1^* = d_1\,(1 + k)^{3/4} + d_2\,(1 + k)^{1/2} + d_3\,(1 + k)^{1/4} + d_4 \qquad \textbf{(9)}$$

is used in place of $D_0(1+g)$. But, we already know that the Annual DCF Model may be reduced to

$$P_0 = \frac{D_0(1+g)}{k-g}$$

Thus, under the assumptions of the second Quarterly DCF Model, the firm's cost of equity is given by

$$k = \frac{D_1^*}{P_0} + g \quad \textbf{(10)}$$

with D_1^* given by (9).

Although equation (10) looks like the Annual DCF Model, there are at least two very important practical differences. First, since D_1^* is always greater than $D_0(1+g)$, the estimates of the cost of equity are always larger (and more accurate) in the Quarterly Model (10) than in the Annual Model. Second, since D_1^* depends on k through equation (9), the unknown "k" appears on both sides of (10), and an iterative procedure is required to solve for k.

APPENDIX 3
ADJUSTING FOR FLOTATION COSTS IN DETERMINING A PUBLIC UTILITY'S ALLOWED RATE OF RETURN ON EQUITY

Introduction

Regulation of public utilities is guided by the principle that utility revenues should be sufficient to allow recovery of all prudently incurred expenses, including the cost of capital. As set forth in the 1944 *Hope Natural Gas* Case [*Federal Power Comm'n v. Hope Natural Gas Co.* 320 U. S. 591 (1944) at 603], the U. S. Supreme Court states:

> From the investor or company point of view it is important that there be enough revenue not only for operating expenses but also for the capital costs of the business. These include service on the debt and dividends on the stock....By that standard the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks.

Since the flotation costs arising from the issuance of debt and equity securities are an integral component of capital costs, this standard requires that the company's revenues be sufficient to fully recover flotation costs.

Despite the widespread agreement that flotation costs should be recovered in the regulatory process, several issues still need to be resolved. These include:

1. How is the term "flotation costs" defined? Does it include only the out-of-pocket costs associated with issuing securities (e. g., legal fees, printing costs, selling and underwriting expenses), or does it also include the reduction in a security's price that frequently accompanies flotation (i. e., market pressure)?
2. What should be the time pattern of cost recovery? Should a company be allowed to recover flotation costs immediately, or should flotation costs be recovered over the life of the issue?
3. For the purposes of regulatory accounting, should flotation costs be included as an expense? As an addition to rate base? Or as an additional element of a firm's allowed rate of return?
4. Do existing regulatory methods for flotation cost recovery allow a firm ***full*** recovery of flotation costs?

In this paper, I review the literature pertaining to the above issues and discuss my own views regarding how this literature applies to the cost of equity for a regulated firm.

Definition of Flotation Cost

The value of a firm is related to the future stream of net cash flows (revenues minus expenses measured on a cash basis) that can be derived from its assets. In the process of acquiring assets, a firm incurs certain expenses which reduce its value. Some of these expenses or costs are directly associated with revenue production in one period (e. g., wages, cost of goods sold), others are more properly associated with revenue production in many periods (e. g., the acquisition cost of plant and equipment). In either case, the word "cost" refers to any item that reduces the value of a firm.

If this concept is applied to the act of issuing new securities to finance asset purchases, many items are properly included in issuance or flotation costs. These include: (1) compensation received by investment bankers for underwriting services, (2) legal fees, (3) accounting fees, (4) engineering fees, (5) trustee's fees, (6) listing fees, (7) printing and engraving expenses, (8) SEC registration fees, (9) Federal Revenue Stamps, (10) state taxes, (11) warrants granted to underwriters as extra compensation, (12) postage expenses, (13) employees' time, (14) market pressure, and (15) the offer discount. The finance literature generally divides these flotation cost items into three categories, namely, underwriting expenses, issuer expenses, and price effects.

Magnitude of Flotation Costs

The finance literature contains several studies of the magnitude of the flotation costs associated with new debt and equity issues. These studies differ primarily with regard to the time period studied, the sample of companies included, and the source of data. The flotation cost studies generally agree, however, that for large issues, underwriting expenses represent approximately one and one-half percent of the proceeds of debt issues and three to five percent of the proceeds of seasoned equity issues. They also agree that issuer expenses represent approximately 0.5 percent of both debt and equity issues, and that the announcement of an equity issue reduces the company's stock price by at least two to three percent of the proceeds from the stock issue. Thus, total flotation costs represent approximately two percent[10] of the proceeds from debt issues, and five and one-half to eight and one-half percent of the proceeds of equity issues.

Lee *et. al.* [14] is an excellent example of the type of flotation cost studies found in the finance literature. The Lee study is a comprehensive recent study of the underwriting and issuer costs associated with debt and equity issues for both utilities and non-utilities. The results of the Lee *et. al.* study are reproduced in Tables 1 and 2. Table 1 demonstrates that the total underwriting and issuer expenses for the 1,092 debt issues in their study averaged 2.24 percent of the proceeds of the issues, while the total underwriting and issuer costs for the 1,593 seasoned equity issues in their study averaged 7.11 percent of the proceeds of the new issue. Table 1 also demonstrates that the total underwriting and issuer costs of seasoned equity offerings, as a percent of proceeds, decline with the size of the issue. For issues above $60 million, total underwriting and issuer costs amount to from three to five percent of the amount of the proceeds.

Table 2 reports the total underwriting and issuer expenses for 135 utility debt issues and 136 seasoned utility equity issues. Total underwriting and issuer expenses for utility bond offerings averaged 1.47 percent of the amount of the proceeds and for seasoned utility equity offerings averaged 4.92 percent of the amount of the proceeds. Again, there are some economies of scale associated with larger equity offerings. Total underwriting and issuer expenses for equity offerings in excess of 40 million dollars generally range from three to four percent of the proceeds.

The results of the Lee study for large equity issues are consistent with results of earlier studies by Bhagat and Frost [4], Mikkelson and Partch [17], and Smith [24]. Bhagat and Frost found that total underwriting and issuer expenses average approximately four and one-half percent of the amount of proceeds from negotiated utility offerings during the period 1973 to 1980, and approximately three and one-half percent of the amount of the proceeds from competitive utility offerings over the

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[10] The two percent flotation cost on debt only recognizes the cost of newly-issued debt. When interest rates decline, many companies exercise the call provisions on higher cost debt and reissue debt at lower rates. This process involves reacquisition costs that are not included in the academic studies. If reacquisition costs were included in the academic studies, debt flotation costs could increase significantly.

same period. Mikkelson and Partch found that total underwriting and issuer expenses average five and one-half percent of the proceeds from seasoned equity offerings over the 1972 to 1982 period. Smith found that total underwriting and issuer expenses for larger equity issues generally amount to four to five percent of the proceeds of the new issue.

The finance literature also contains numerous studies of the decline in price associated with sales of large blocks of stock to the public. These articles relate to the price impact of: (1) initial public offerings; (2) the sale of large blocks of stock from one investor to another; and (3) the issuance of seasoned equity issues to the general public. All of these studies generally support the notion that the announcement of the sale of large blocks of stock produces a decline in a company's share price. The decline in share price for initial public offerings is significantly larger than the decline in share price for seasoned equity offerings; and the decline in share price for public utilities is less than the decline in share price for non-public utilities. A comprehensive study of the magnitude of the decline in share price associated specifically with the sale of new equity by public utilities is reported in Pettway [19], who found the market pressure effect for a sample of 368 public utility equity sales to be in the range of two to three percent. This decline in price is a real cost to the utility, because the proceeds to the utility depend on the stock price on the day of issue.

In addition to the price decline associated with the announcement of a new equity issue, the finance literature recognizes that there is also a price decline associated with the actual issuance of equity securities. In particular, underwriters typically sell seasoned new equity securities to investors at a price lower than the closing market price on the day preceding the issue. The Rules of Fair Practice of the National Association of Securities Dealers require that underwriters not sell shares at a price above the offer price. Since the offer price represents a binding constraint to the underwriter, the underwriter tends to set the offer price slightly below the market price on the day of issue to compensate for the risk that the price received by the underwriter may go down, but can not increase. Smith provides evidence that the offer discount tends to be between 0.5 and 0.8 percent of the proceeds of an equity issue. I am not aware of any similar studies for debt issues.

In summary, the finance literature provides strong support for the conclusion that total underwriting and issuer expenses for public utility debt offerings represent approximately two percent of the amount of the proceeds, while total underwriting and issuer expenses for public utility equity offerings represent at least four to five percent of the amount of the proceeds. In addition, the finance literature supports the conclusion that the cost associated with the decline in stock price at the announcement date represents approximately two to three percent as a result of a large public utility equity issue.

TIME PATTERN OF FLOTATION COST RECOVERY

Although flotation costs are incurred only at the time a firm issues new securities, there is no reason why an issuing firm ought to recognize the expense only in the current period. In fact, if assets purchased with the proceeds of a security issue produce revenues over many years, a sound argument can be made in favor of recognizing flotation expenses over a reasonably lengthy period of time. Such recognition is certainly consistent with the generally accepted accounting principle that the time pattern of expenses match the time pattern of revenues, and it is also consistent with the normal treatment of debt flotation expenses in both regulated and unregulated industries.

In the context of a regulated firm, it should be noted that there are many possible time patterns for the recovery of flotation expenses. However, if it is felt that flotation expenses are most appropriately recovered over a period of years, then it should be recognized that investors must also be compensated for the passage of time. That is to say, the value of an investor's capital will be reduced if the expenses are merely distributed over time, without any allowance for the time value of money.

ACCOUNTING FOR FLOTATION COST IN A REGULATORY SETTING

In a regulatory setting, a firm's revenue requirements are determined by the equation:

Revenue Requirement = Total Expenses + Allowed Rate of Return x Rate Base

Thus, there are three ways in which an issuing firm can account for and recover its flotation expenses: (1) treat flotation expenses as a current expense and recover them immediately; (2) include flotation expenses in rate base and recover them over time; and (3) adjust the allowed rate of return upward and again recover flotation expenses over time. Before considering methods currently being used to recover flotation expenses in a regulatory setting, I shall briefly consider the advantages and disadvantages of these three basic recovery methods.

Expenses. Treating flotation costs as a current expense has several advantages. Because it allows for recovery at the time the expense occurs, it is not necessary to compute amortized balances over time and to debate which interest rate should be applied to these balances. A firm's stockholders are treated fairly, and so are the firm's customers, because they pay neither more nor less than the actual flotation expense. Since flotation costs are relatively small compared to the total revenue requirement, treatment as a current expense does not cause unusual rate hikes in the year of flotation, as would the introduction of a large generating plant in a state that does not allow Construction Work in Progress in rate base.

On the other hand, there are two major disadvantages of treating flotation costs as a current expense. First, since the asset purchased with the acquired funds will likely generate revenues for many years into the future, it seems unfair that current ratepayers should bear the full cost of issuing new securities, when future ratepayers share in the benefits. Second, this method requires an estimate of the underpricing effect on each security issue. Given the difficulties involved in measuring the extent of underpricing, it may be more accurate to estimate the average underpricing allowance for many securities than to estimate the exact figure for one security.

Rate Base. In an article in *Public Utilities Fortnightly*, Bierman and Hass [5] recommend that flotation costs be treated as an intangible asset that is included in a firm's rate base along with the assets acquired with the stock proceeds. This approach has many advantages. For ratepayers, it provides a better match between benefits and expenses: the future ratepayers who benefit from the financing costs contribute the revenues to recover these costs. For investors, if the allowed rate of return is equal to the investors' required rate of return, it is also theoretically fair since they are compensated for the opportunity cost of their investment (including both the time value of money and the investment risk).

Despite the compelling advantages of this method of cost recovery, there are several disadvantages that probably explain why it has not been used in practice. First, a firm will only recover the proper amount for flotation expenses if the rate base is multiplied by the appropriate cost of capital. To the extent that a commission under or over estimates the cost of capital, a firm will under or over recover its flotation expenses. Second, it is may be both legally and psychologically difficult for commissioners to include an intangible asset in a firm's rate base. According to established legal doctrine, assets are to be included in rate base only if they are "used and useful" in the public service. It is unclear whether intangible assets such as flotation expenses meet this criterion.

Rate of Return. The prevailing practice among state regulators is to treat flotation expenses as an additional element of a firm's cost of capital or allowed rate of return. This method is similar to the second method above (treatment in rate base) in that some part of the initial flotation cost is amortized over time. However, it has a disadvantage not shared by the rate base method. If flotation cost is included in rate base, it is fairly easy to keep track of the flotation cost on each new equity issue and see how it is recovered over time. Using the rate of return method, it is not possible to track the flotation cost for specific issues because the flotation cost for a specific issue is never recorded. Thus, it is not clear to participants whether a current allowance is meant to recover (1) flotation costs actually incurred in a test period, (2) expected future flotation costs, or (3) past flotation costs. This confusion never arises in the treatment of debt flotation costs. Because the exact costs are recorded and explicitly amortized over time, participants recognize that current allowances for debt flotation costs are meant to recover some fraction of the flotation costs on all past debt issues.

EXISTING REGULATORY METHODS

Although most state commissions prefer to let a regulated firm recover flotation expenses through an adjustment to the allowed rate of return, there is considerable controversy about the magnitude of the required adjustment. The following are some of the most frequently asked questions: (1) Should an adjustment to the allowed return be made every year, or should the adjustment be made only in those years in which new equity is raised? (2) Should an adjusted rate of return be applied to the entire rate base, or should it be applied only to that portion of the rate base financed with paid-in capital (as opposed to retained earnings)? (3) What is the appropriate formula for adjusting the rate of return?

This section reviews several methods of allowing for flotation cost recovery. Since the regulatory methods of allowing for recovery of debt flotation costs is well known and widely accepted, I will begin my discussion of flotation cost recovery procedures by describing the widely accepted procedure of allowing for debt flotation cost recovery.

Debt Flotation Costs

Regulators uniformly recognize that companies incur flotation costs when they issue debt securities. They typically allow recovery of debt flotation costs by making an adjustment to both the cost of debt and the rate base (see Brigham [6]). Assume that: (1) a regulated company issues \$100 million in bonds that mature in 10 years; (2) the interest rate on these bonds is seven percent; and (3) flotation costs represent four percent of the amount of the proceeds. Then the cost of debt for regulatory purposes will generally be calculated as follows:

$$\begin{aligned}\text{Cost of Debt} &= \frac{\text{Interest expense} + \text{Amortization of flotation costs}}{\text{Principal value - Unamortized flotation costs}} \\ &= \frac{\$7{,}000{,}000 + \$400{,}000}{\$100{,}000{,}000 - \$4{,}000{,}000} \\ &= 7.71\%\end{aligned}$$

Thus, current regulatory practice requires that the cost of debt be adjusted upward by approximately 71 basis points, in this example, to allow for the recovery of debt flotation costs. This example does not include losses on reacquisition of debt. The flotation cost allowance would increase if losses on reacquisition of debt were included.

The logic behind the traditional method of allowing for recovery of debt flotation costs is simple. Although the company has issued $100 million in bonds, it can only invest $96 million in rate base because flotation costs have reduced the amount of funds received by $4 million. If the company is not allowed to earn a 71 basis point higher rate of return on the $96 million invested in rate base, it will not generate sufficient cash flow to pay the seven percent interest on the $100 million in bonds it has issued. Thus, proper regulatory treatment is to increase the required rate of return on debt by 71 basis points.

Equity Flotation Costs

The finance literature discusses several methods of recovering equity flotation costs. Since each method stems from a specific model, (i. e., set of assumptions) of a firm and its cash flows, I will highlight the assumptions that distinguish one method from another.

Arzac and Marcus. Arzac and Marcus [2] study the proper flotation cost adjustment formula for a firm that makes continuous use of retained earnings and external equity financing and maintains a constant capital structure (debt/equity ratio). They assume at the outset that underwriting expenses and underpricing apply only to new equity obtained from external sources. They also assume that a firm has previously recovered all underwriting expenses, issuer expenses, and underpricing associated with previous issues of new equity.

To discuss and compare various equity flotation cost adjustment formulas, Arzac and Marcus make use of the following notation:

k	=	an investors' required return on equity
r	=	a utility's allowed return on equity base
S	=	value of equity in the absence of flotation costs
S_f	=	value of equity net of flotation costs
K_t	=	equity base at time t
E_t	=	total earnings in year t
D_t	=	total cash dividends at time t
b	=	$(E_t - D_t) \div E_t$ = retention rate, expressed as a fraction of earnings
h	=	new equity issues, expressed as a fraction of earnings
m	=	equity investment rate, expressed as a fraction of earnings, $m = b + h < 1$
f	=	flotation costs, expressed as a fraction of the value of an issue.

Because of flotation costs, Arzac and Marcus assume that a firm must issue a greater amount of external equity each year than it actually needs. In terms of the above notation, a firm issues $hE_t \div (1-f)$ to obtain hE_t in external equity funding. Thus, each year a firm loses:

Equation 3

$$L = \frac{hE_t}{1-f} - hE_t = \frac{f}{1-f} \times hE_t$$

due to flotation expenses. The present value, V, of all future flotation expenses is:

Equation 4

$$V = \sum_{t=1}^{\infty} \frac{fhE_t}{(1-f)(1+k)^t} = \frac{fh}{1-f} \times \frac{rK_0}{k-mr}$$

To avoid diluting the value of the initial stockholder's equity, a regulatory authority needs to find the value of r, a firm's allowed return on equity base, that equates the value of equity net of flotation costs to the initial equity base ($S_f = K_0$). Since the value of equity net of flotation costs equals the value of equity in the absence of flotation costs minus the present value of flotation costs, a regulatory authority needs to find that value of *r* that solves the following equation:

$$S_f = S - L.$$

This value is:

Equation 5

$$r = \frac{k}{1 - \frac{fh}{1-f}}$$

To illustrate the Arzac-Marcus approach to adjusting the allowed return on equity for the effect of flotation costs, suppose that the cost of equity in the absence of flotation costs is 12 percent. Furthermore, assume that a firm obtains external equity financing each year equal to 10 percent of its earnings and that flotation expenses equal 5 percent of the value of each issue. Then, according to Arzac and Marcus, the allowed return on equity should be:

$$r = \frac{.12}{1 - \frac{(.05).(.1)}{.95}} = .1206 = 12.06\%$$

Summary. With respect to the three questions raised at the beginning of this section, it is evident that Arzac and Marcus believe the flotation cost adjustment should be applied each year, since continuous external equity financing is a fundamental assumption of their model. They also believe that the adjusted rate of return should be applied to the entire equity-financed portion of the rate base because their model is based on the assumption that the flotation cost adjustment mechanism will be applied to the entire equity financed portion of the rate base. Finally, Arzac and Marcus recommend a flotation cost adjustment formula, Equation (3), that implicitly excludes recovery of financing costs associated with financing in previous periods and includes only an allowance for the fraction of equity financing obtained from external sources.

Patterson. The Arzac-Marcus flotation cost adjustment formula is significantly different from the conventional approach (found in many introductory textbooks) which recommends the adjustment equation:

Equation 6

$$r = \frac{D_t}{P_{t-1}(1-f)} + g$$

where P_{t-1} is the stock price in the previous period and g is the expected dividend growth rate. Patterson [18] compares the Arzac-Marcus adjustment formula to the conventional approach and reaches the conclusion that the Arzac-Marcus formula effectively expenses issuance costs as they are incurred, while the conventional approach effectively amortizes them over an assumed infinite life of the equity issue. Thus, the conventional formula is similar to the formula for the recovery of debt flotation costs: it is not meant to compensate investors for the flotation costs of future issues, but instead is meant to compensate investors for the flotation costs of previous issues. Patterson argues that the conventional approach is more appropriate for rate making purposes because the plant purchased with external equity funds will yield benefits over many future periods.

Illustration. To illustrate the Patterson approach to flotation cost recovery, assume that a newly organized utility sells an initial issue of stock for $100 per share, and that the utility plans to finance all new investments with retained earnings. Assume also that: (1) the initial dividend per share is six dollars; (2) the expected long-run dividend growth rate is six percent; (3) the flotation cost is five percent of the amount of the proceeds; and (4) the payout ratio is 51.28 percent. Then, the investor's required rate of return on equity is [k = (D/P) + g = 6 percent + 6 percent = 12 percent]; and the flotation-cost-adjusted cost of equity is [6 percent (1/.95) + 6 percent = 12.316 percent].

The effects of the Patterson adjustment formula on the utility's rate base, dividends, earnings, and stock price are shown in Table 3. We see that the Patterson formula allows earnings and dividends to grow at the expected six percent rate. We also see that the present value of expected future dividends, $100, is just sufficient to induce investors to part with their money. If the present value of expected future dividends were less than $100, investors would not have been willing to invest $100 in the firm. Furthermore, the present value of future dividends will only equal $100 if the firm is allowed to earn the 12.316 percent flotation-cost-adjusted cost of equity on its entire rate base.

Summary. Patterson's opinions on the three issues raised in this section are in stark contrast to those of Arzac and Marcus. He believes that: (1) a flotation cost adjustment should be applied in every year, regardless of whether a firm issues any new equity in each year; (2) a flotation cost adjustment should be applied to the entire equity-financed portion of the rate base, including that portion financed by retained earnings; and (3) the rate of return adjustment formula should allow a firm to recover an appropriate fraction of all previous flotation expenses.

CONCLUSION

Having reviewed the literature and analyzed flotation cost issues, I conclude that:

Definition of Flotation Cost: A regulated firm should be allowed to recover both the total underwriting and issuance expenses associated with issuing securities and the cost of market pressure.

Time Pattern of Flotation Cost Recovery. Shareholders are indifferent between the alternatives of immediate recovery of flotation costs and recovery over time, as long as they are fairly compensated for the opportunity cost of their money. This opportunity cost must include both the time value of money and a risk premium for equity investments of this nature.

Regulatory Recovery of Flotation Costs. The Patterson approach to recovering flotation costs is the only rate-of-return-adjustment approach that meets the *Hope* case criterion that a regulated company's revenues must be sufficient to allow the company an opportunity to recover all prudently incurred expenses, including the cost of capital. The Patterson approach is also the only rate-of-return-adjustment approach that provides an incentive for investors to invest in the regulated company.

Implementation of a Flotation Cost Adjustment. As noted earlier, prevailing regulatory practice seems to be to allow the recovery of flotation costs through an adjustment to the required rate of return. My review of the literature on this subject indicates that there are at least two recommended methods of making this adjustment: the Patterson approach and the Arzac-Marcus approach. The Patterson approach assumes that a firm's flotation expenses on new equity issues are treated in the same manner as flotation expenses on new bond issues, i. e., they are amortized over future time periods. If this assumption is true (and I believe it is), then the flotation cost adjustment should be applied to a firm's entire equity base, including retained earnings. In practical terms, the Patterson approach produces an increase in a firm's cost of equity of approximately thirty basis points. The Arzac-Marcus approach assumes that flotation costs on new equity issues are recovered entirely in the year in which the securities are sold. Under the Arzac-Marcus assumption, a firm should not be allowed any adjustments for flotation costs associated with previous flotations. Instead, a firm should be allowed only an adjustment on future security sales as they occur. Under reasonable assumptions about the rate of new equity sales, this method produces an increase in the cost of equity of approximately six basis points. Since the Arzac-Marcus approach does not allow the company to recover the entire amount of its flotation cost, I recommend that this approach be rejected and the Patterson approach be accepted.

BIBLIOGRAPHY

1. Armknecht, Raymond, Fred Grygiel and Patrick Hess, "Market Pressure: The Sales of New Common Equity and Rate of Return Regulation, "Proceedings of the Business and Economic Statistics Section of the American Statistical Association, 1974, pp. 80—91.
2. Arzac, E. R., and M. Marcus, "Flotation Cost Allowance in Rate of Return Regulation: A Note," *Journal of Finance*, December 1981, pp. 1199—1202.
3. Barclay, M. J. and R. H. Litzenberger, 1988, "Announcement Effects of New Equity Issues and the Use of Intraday Price Data," *Journal of Financial Economics* 21, 71—99.
4. Bhagat, S. and P. A. Frost, 1986, "Issuing Costs to Existing Shareholders in Competitive and Negotiated Underwritten Public Utility Equity Offerings," *Journal of Financial Economics* 15, 233—59.
5. Bierman, H., and J. E. Hass, "Equity Flotation Cost Adjustments in Utilities' Cost of Service," *Public Utilities Fortnightly*, March 1, 1983, pp.46—49 .
6. Bowyer, Jr., John W., and Jess B. Yawitz, "The Effect of New Equity Issues on Utility Stock Prices," *Pubic Utilities Fortnightly*, May 22, 1980.
7. Brigham, Eugene F., Dana Aberwald, and Louis C. Gapenski, "Common Equity Flotation Costs and Rate Making," *Public Utilities Fortnightly*, May 2, 1985, pp. 28—26.
8. Calomiris, C. W. and D. M. G Raff, 1995, "The Evolution of Market Structure, Information, and Spreads in American Investment Banking," in M. B. Bordo and R. Sylla, eds., *Anglo-American Finance: Financial Markets and Institutions in 20th Century North America and the U. K.* (Business One-Irwin Homewood, IL), 103—60.
9. Dunbar, C. G., 1995, "The Use of Warrants as Underwriter Compensation in Initial Public Offerings," *Journal of Financial Economics* 38, 59—78.
10. Evans, Robert E., "On the Existence, Measurement, and Economic Significance of Market Pressure in the Pricing of New Equity Shares," unpublished dissertation, University of Wisconsin, 1978.
11. Howe, K. M., "Flotation Cost Allowance in Rate of Return Regulation: Comment," *Journal of Finance*, March 1984, pp. 289—290.
12. Howe, K. M., "Flotation Cost Allowance for the Regulated Firm: A Comparison of Alternatives," unpublished working paper, School of Business, Iowa State University.
13. Ibbotson, R. C., "Price Performance of Common Stock New Issues," *Journal of Financial Economics*, 1975, pp. 235—272.
14. Lee, Inmoo, Scott Lochhead, Jay Ritter, and Quanshui Zhao, "The Costs of Raising Capital," *The Journal of Financial Research*, Vol XIX No 1 (Spring 1996), 59—74
15. Logue, D. E., "On the Pricing of Unseasoned Equity Offerings: 1965—1969," *Journal of Financial and Quantitative Analysis*, January 1973, pp. 91—103.
16. McDonald, J. G. and A. K. Fisher, "New Issue Stock Price Behavior," *Journal of Finance*, March 1972, pp. 97—102.
17. Mikkelson, Wayne H. and M. Megan Partch, "Valuation Effects of Security Offerings and the Issuance Process," *Journal of Financial Economics* 15 (1986), pp. 31-60.
18. Patterson, C. S., "Flotation Cost Allowance in Rate of Return Regulation: Comment," *Journal of Finance*, September 1983, pp. 1335—1338.
19. Pettway, R. H., "The Effects of New Equity Sales Upon Utility Share Prices," *Public Utilities Fortnightly*, May 10, 1984, pp. 35—39.
20. Reilly, F. K. and K. Hatfield, "Investor Experience with New Stock Issues," *Financial Analysts' Journal*, September--October 1969, pp. 73—80.
21. Richter, P. H., "The Ever Present Need for an Underpricing Allowance," *Public Utilities Fortnightly*, February 18, 1982, pp. 58—61.

22. Scholes, M., "The Market for New Securities: Substitution versus Price Pressure and the Effects of Information on Share Prices," *Journal of Business*, April 1972, pp. 179—211.

23. Securities and Exchange Commission, Report of Special Study on Securities Markets, U. S. Government Printing Office, Washington, D. C. 1963.

24. Smith, Clifford W. Jr., "Alternative Methods for Raising Capital," *Journal of Financial Economics* 5 (1977) 273-307.

Table 1

Direct Costs as a Percentage of Gross Proceeds for Equity (IPOs and SEOs) and Straight and Convertible Bonds Offered by Domestic Operating Companies 1990—1994[11]

Equities

	IPOs				SEOs			
Proceeds ($ in millions)	No. of Issues	Gross Spreads	Other Direct Expenses	Total Direct Costs	No. of Issues	Gross Spreads	Other Direct Expenses	Total Direct Costs
2-9.99	337	9.05%	7.91%	16.96%	167	7.72%	5.56%	13.28%
10-19.99	389	7.24%	4.39%	11.63%	310	6.23%	2.49%	8.72%
20-39.99	533	7.01%	2.69%	9.70%	425	5.60%	1.33%	6.93%
40-59.99	215	6.96%	1.76%	8.72%	261	5.05%	0.82%	5.87%
60-79.99	79	6.74%	1.46%	8.20%	143	4.57%	0.61%	5.18%
80-99.99	51	6.47%	1.44%	7.91%	71	4.25%	0.48%	4.73%
100-199.99	106	6.03%	1.03%	7.06%	152	3.85%	0.37%	4.22%
200-499.99	47	5.67%	0.86%	6.53%	55	3.26%	0.21%	3.47%
500 and up	10	5.21%	0.51%	5.72%	9	3.03%	0.12%	3.15%
Total/Average	**1,767**	**7.31%**	**3.69%**	**11.00%**	**1,593**	**5.44%**	**1.67%**	**7.11%**

Bonds

	Convertible Bonds				Straight Bonds			
Proceeds ($ in millions)	No. of Issues	Gross Spreads	Other Direct Expenses	Total Direct Costs	No. of Issues	Gross Spreads	Other Direct Expenses	Total Direct Costs
2-9.99	4	6.07%	2.68%	8.75%	32	2.07%	2.32%	4.39%
10-19.99	14	5.48%	3.18%	8.66%	78	1.36%	1.40%	2.76%
20-39.99	18	4.16%	1.95%	6.11%	89	1.54%	0.88%	2.42%
40-59.99	28	3.26%	1.04%	4.30%	90	0.72%	0.60%	1.32%
60-79.99	47	2.64%	0.59%	3.23%	92	1.76%	0.58%	2.34%
80-99.99	13	2.43%	0.61%	3.04%	112	1.55%	0.61%	2.16%
100-199.99	57	2.34%	0.42%	2.76%	409	1.77%	0.54%	2.31%
200-499.99	27	1.99%	0.19%	2.18%	170	1.79%	0.40%	2.19%
500 and up	3	2.00%	0.09%	2.09%	20	1.39%	0.25%	1.64%
Total/Average	**211**	**2.92%**	**0.87%**	**3.79%**	**1,092**	**1.62%**	**0.62%**	**2.24%**

Notes:

Closed-end funds and unit offerings are excluded from the sample. Rights offerings for SEOs are also excluded. Bond offerings do not include securities backed by mortgages and issues by Federal agencies. Only firm commitment offerings and non-shelf-registered offerings are included.
Gross Spreads as a percentage of total proceeds, including management fee, underwriting fee, and selling concession.
Other Direct Expenses as a percentage of total proceeds, including management fee, underwriting fee, and selling concession.
Total Direct Costs as a percentage of total proceeds (total direct costs are the sum of gross spreads and other direct expenses).

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[11] Inmoo Lee, Scott Lochhead, Jay Ritter, and Quanshui Zhao, "The Costs of Raising Capital," *Journal of Financial Research* Vol 19 No 1 (Spring 1996) pp. 59—74.

Table 2

Direct Costs of Raising Capital 1990—1994
Utility versus Non-Utility Companies[12]

Equities

Non-Utilities	IPOs			SEOs		
Proceeds ($ in millions)	No. of Issues	Gross Spreads	Total Direct Costs	No. Of Issues	Gross Spreads	Total Direct Costs
2-9.99	332	9.04%	16.97%	154	7.91%	13.76%
10-19.99	388	7.24%	11.64%	278	6.42%	9.01%
20-39.99	528	7.01%	9.70%	399	5.70%	7.07%
40-59.99	214	6.96%	8.71%	240	5.17%	6.02%
60-79.99	78	6.74%	8.21%	131	4.68%	5.31%
80-99.99	47	6.46%	7.88%	60	4.35%	4.84%
100-199.99	101	6.01%	7.01%	137	3.97%	4.36%
200-499.99	44	5.65%	6.49%	50	3.27%	3.48%
500 and up	10	5.21%	5.72%	8	3.12%	3.25%
Total/Average	1,742	7.31%	11.01%	1,457	5.57%	7.32%
Utilities Only						
2-9.99	5	9.40%	16.54%	13	5.41%	7.68%
10-19.99	1	7.00%	8.77%	32	4.59%	6.21%
20-39.99	5	7.00%	9.86%	26	4.17%	4.96%
40-59.99	1	6.98%	11.55%	21	3.69%	4.12%
60-79.99	1	6.50%	7.55%	12	3.39%	3.72%
80-99.99	4	6.57%	8.24%	11	3.68%	4.11%
100-199.99	5	6.45%	7.96%	15	2.83%	2.98%
200-499.99	3	5.88%	7.00%	5	3.19%	3.48%
500 and up	0			1	2.25%	2.31%
Total/Average	25	7.15%	10.14%	136	4.01%	4.92%

[12] Lee *et al, op. cit.*

Table 2 (continued)
Direct Costs of Raising Capital 1990—1994
Utility versus Non-Utility Companies[13]

Bonds

Non- Utilities	Convertible Bonds			Straight Bonds		
Proceeds ($ in millions)	No. of Issues	Gross Spreads	Total Direct Costs	No. of Issues	Gross Spreads	Total Direct Costs
2-9.99	4	6.07%	8.75%	29	2.07%	4.53%
10-19.99	12	5.54%	8.65%	47	1.70%	3.28%
20-39.99	16	4.20%	6.23%	63	1.59%	2.52%
40-59.99	28	3.26%	4.30%	76	0.73%	1.37%
60-79.99	47	2.64%	3.23%	84	1.84%	2.44%
80-99.99	12	2.54%	3.19%	104	1.61%	2.25%
100-199.99	55	2.34%	2.77%	381	1.83%	2.38%
200-499.99	26	1.97%	2.16%	154	1.87%	2.27%
500 and up	3	2.00%	2.09%	19	1.28%	1.53%
Total/Average	203	2.90%	3.75%	957	1.70%	2.34%
Utilities Only						
2-9.99	0			3	2.00%	3.28%
10-19.99	2	5.13%	8.72%	31	0.86%	1.35%
20-39.99	2	3.88%	5.18%	26	1.40%	2.06%
40-59.99	0			14	0.63%	1.10%
60-79.99	0			8	0.87%	1.13%
80-99.99	1	1.13%	1.34%	8	0.71%	0.98%
100-199.99	2	2.50%	2.74%	28	1.06%	1.42%
200-499.99	1	2.50%	2.65%	16	1.00%	1.40%
500 and up	0			1	3.50%	na[14]
Total/Average	8	3.33%	4.66%	135	1.04%	1.47%

Notes:
Total proceeds raised in the United States, excluding proceeds from the exercise of over allotment options.
Gross spreads as a percentage of total proceeds (including management fee, underwriting fee, and selling concession).
Other direct expenses as a percentage of total proceeds (including registration fee and printing, legal, and auditing costs).

[13] Lee *et al, op. cit.*

[14] Not available because of missing data on other direct expenses.

Table 3
Illustration of Patterson Approach to Flotation Cost Recovery

Time Period	Rate Base	Earnings @ 12.32%	Earnings @ 12.00%	Dividends	Amortization Initial FC
0	95.00				
1	100.70	11.70	11.40	6.00	0.3000
2	106.74	12.40	12.08	6.36	0.3180
3	113.15	13.15	12.81	6.74	0.3371
4	119.94	13.93	13.58	7.15	0.3573
5	127.13	14.77	14.39	7.57	0.3787
6	134.76	15.66	15.26	8.03	0.4015
7	142.84	16.60	16.17	8.51	0.4256
8	151.42	17.59	17.14	9.02	0.4511
9	160.50	18.65	18.17	9.56	0.4782
10	170.13	19.77	19.26	10.14	0.5068
11	180.34	20.95	20.42	10.75	0.5373
12	191.16	22.21	21.64	11.39	0.5695
13	202.63	23.54	22.94	12.07	0.6037
14	214.79	24.96	24.32	12.80	0.6399
15	227.67	26.45	25.77	13.57	0.6783
16	241.33	28.04	27.32	14.38	0.7190
17	255.81	29.72	28.96	15.24	0.7621
18	271.16	31.51	30.70	16.16	0.8078
19	287.43	33.40	32.54	17.13	0.8563
20	304.68	35.40	34.49	18.15	0.9077
21	322.96	37.52	36.56	19.24	0.9621
22	342.34	39.77	38.76	20.40	1.0199
23	362.88	42.16	41.08	21.62	1.0811
24	384.65	44.69	43.55	22.92	1.1459
25	407.73	47.37	46.16	24.29	1.2147
26	432.19	50.21	48.93	25.75	1.2876
27	458.12	53.23	51.86	27.30	1.3648
28	485.61	56.42	54.97	28.93	1.4467
29	514.75	59.81	58.27	30.67	1.5335
30	545.63	63.40	61.77	32.51	1.6255
Present Value@12%		195.00	190.00	100.00	5.00

APPENDIX 4
EX ANTE RISK PREMIUM APPROACH

My ex ante risk premium method is based on studies of the DCF expected return on proxy companies compared to the interest rate on Moody's A-rated utility bonds. Specifically, for each month in my study period, I calculate the risk premium using the equation,

$$RP_{PROXY} = DCF_{PROXY} - I_A$$

where:

RP_{PROXY}	=	the required risk premium on an equity investment in the proxy group of companies,
DCF_{PROXY}	=	average DCF estimated cost of equity on a portfolio of proxy companies; and
I_A	=	the yield to maturity on an investment in A-rated utility bonds.

For my ex ante risk premium analysis, I begin with my comparable group of natural gas companies shown in Schedule 2. Previous studies have shown that the ex ante risk premium tends to vary inversely with the level of interest rates, that is, the risk premium tends to increase when interest rates decline, and decrease when interest rates go up. To test whether my studies also indicate that the ex ante risk premium varies inversely with the level of interest rates, I perform a regression analysis of the relationship between the ex ante risk premium and the yield to maturity on A-rated utility bonds, using the equation,

$$RP_{PROXY} = a + (b \times I_A) + e$$

where:

RP_{PROXY} = risk premium on proxy company group;

I_A = yield to maturity on A-rated utility bonds;

e = a random residual; and

a, b = coefficients estimated by the regression procedure.

Regression analysis assumes that the statistical residuals from the regression equation are random. My examination of the residuals reveals that there is a significant probability that the residuals are serially correlated (non-zero serial correlation indicates that the residual in one time period tends to be correlated with the residual in the previous time period). Therefore, I make adjustments to my data to correct for the possibility of serial correlation in the residuals.

The common procedure for dealing with serial correlation in the residuals is to estimate the regression coefficients in two steps. First, a multiple regression analysis is used to estimate the serial correlation coefficient, *r*. Second, the estimated serial correlation coefficient is used to transform the original variables into new variables whose serial correlation is approximately zero. The regression coefficients are then re-estimated using the transformed variables as inputs in the regression equation. Based on my knowledge of the statistical relationship between the yield to maturity on A-rated utility bonds and the required risk premium, my estimate of the ex ante risk premium on an investment in my proxy natural gas company group as compared to an investment in A-rated utility bonds is given by the equation:

$$RP_{PROXY} = \underset{(8.87)}{0.706} - \underset{(-2.99)}{-.3494} \times I_A.$$ [15]

[15] The t-statistics are shown in parentheses.

Using a 6.57 percent forecasted yield to maturity on A-rated utility bonds at March 2010,[16] the regression equation produces an ex ante risk premium based on the natural gas proxy group equal to 4.77 percent (0.0706 – .3494 x 6.57 = 4.77).

To estimate the cost of equity using the ex ante risk premium method, one may add the estimated risk premium over the yield on A-rated utility bonds to the forecasted yield to maturity on A-rated utility bonds. As described above, my analyses produce an estimated risk premium over the yield on A-rated utility bonds equal to 4.77 percent. Adding an estimated risk premium of 4.77 percent to the 6.57 percent forecasted yield to maturity on A-rated utility bonds produces a cost of equity estimate of 11.34 percent using the ex ante risk premium method.

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[16] As described in the testimony, is obtained by adding the 57-basis point spread between the average March 2010 yield on AAA-rated corporate bonds (5.27 percent) and A-rated utility bonds (5.84 percent) to Value Line's forecasted 6.0 percent yield on AAA-rated corporate bonds. *See* Value Line Selection & Opinion, February 26, 2010, p. 3019.

APPENDIX 5
EX POST RISK PREMIUM APPROACH

Source

Stock price and yield information is obtained from Standard & Poor's Security Price publication. Standard & Poor's derives the stock dividend yield by dividing the aggregate cash dividends (based on the latest known annual rate) by the aggregate market value of the stocks in the group. The bond price information is obtained by calculating the present value of a bond due in 30 years with a $4.00 coupon and a yield to maturity of a particular year's indicated Moody's A-rated Utility bond yield. The values shown on Schedules 4 and 5 are the January values of the respective indices.

Calculation of Stock and Bond Returns

Sample calculation of "Stock Return" column:

$$\text{Stock Return (2009)} = \left[\frac{\text{Stock Price (2010) - Stock Price (2009)} + \text{Dividend (2009)}}{\text{Stock Price (2009)}}\right]$$

where Dividend (2009) = Stock Price (2009) x Stock Div. Yield (2009)

Sample calculation of "Bond Return" column:

$$\text{Bond Return (2009)} = \left[\frac{\text{Bond Price (2010) - Bond Price (2009)} + \text{Interest (2009)}}{\text{Bond Price (2009)}}\right]$$

where Interest = $4.00.