COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

IN THE MATTER OF:	)	
	)	
NOTICE OF ADJUSTMENT OF THE RATES OF	)	CASE NO. 2004-00103
KENTUCKY AMERICAN WATER COMPANY	)	
EFFECTIVE ON AND AFTER MAY 30, 2004	)	

DIRECT TESTIMONY OF
DR. JAMES H. VANDER WEIDE

April 30, 2004

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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 the Fuqua School of Business of Duke University. 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 in 1966 with a Bachelor's Degree in Economics. I then attended Northwestern University where I earned a Ph.D. in Finance. In January 1972, I joined the faculty of the School of Business at Duke University and was named Assistant Professor, Associate Professor, and then Professor.

Since joining the faculty I have taught courses in corporate finance, investment management, and management of financial institutions. I have taught a graduate seminar on the theory of public utility pricing and lectured in executive development seminars on the cost of capital, financial analysis, capital budgeting, mergers and acquisitions, real options, cash management, short-run financial planning, and competitive strategy. I have also served as Program Director of several executive education programs at the Fuqua School of

Business, including the Duke Advanced Management Program, the Duke Executive Program in Telecommunications, the Duke Competitive Strategies in Telecommunications Program, and the Duke Program for Manager Development for managers from the former Soviet Union.

I have conducted seminars and training sessions on financial analysis, financial strategy, cost of capital, real options analysis, cash management, depreciation policies, and short-run financial planning for a wide variety of U.S. and international companies, including ABB, Accenture, Allstate, Ameritech, AT&T, Bell Atlantic, BellSouth, Carolina Power & Light, Contel, Fisons, Glaxo Wellcome, GTE, Lafarge, MidAmerican Energy, New Century Energies, Norfolk Southern, Pacific Bell Telephone, Progress Energy, Inc, The Rank Group, Siemens, Southern New England Telephone, TRW, and Wolseley Plc.

In addition to my teaching and executive education activities, I have written research papers on such topics as portfolio management, the cost of capital, capital budgeting, the effect of regulation on the performance of public utilities, the economics of universal service requirements, and cash management. My 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 Accounting Research, Journal of Cash Management, Management Science, The Journal of Portfolio Management, Atlantic Economic

Journal, Journal of Economics and Business, and Computers and Operations Research. I have written a book titled Managing Corporate Liquidity: an Introduction to Working Capital Management, and a chapter for The Handbook of Modern Finance, "Financial Management in the Short Run."

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

A 3 Yes. As an expert on financial and economic theory, I have 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 some 350 cases 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 public service commissions of 40 states, the insurance commissions of five states, the Iowa State Board of Tax Review, and the National Association of Securities Dealers. In addition, I have testified as an expert witness in proceedings before the U.S. District Court, District of Nebraska; U.S. District Court, Eastern District of North Carolina; Superior Court, North Carolina; the U.S. Bankruptcy Court, Southern District of West Virginia, and the United States 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 Kentucky-American Water Company (KAWC) 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 KAWC to attract capital on reasonable terms, and that allows KAWC to maintain its financial integrity.

Q 5 Did you estimate KAWC's cost of equity directly from its stock price?

A 5 No. Since KAWC's stock is not publicly traded, I could not estimate KAWC's cost of equity directly from its stock price. Instead, I estimated KAWC's cost of equity from stock market data for two groups of proxy companies.

Q 6 What average cost of equity do you find for your proxy companies?

A 6 On the basis of my studies, I find that the average cost of equity for my proxy companies is equal to 11.2 percent. This conclusion is based on my application of three standard cost of equity estimation techniques: (1) the discounted cash flow (DCF) model; (2) the ex ante risk premium method; and (3) the ex post risk premium method.

Q 7 What is your recommendation regarding KAWC's cost of equity?

A 7 I recommend that KAWC be allowed a rate of return on equity equal to 11.2 percent. My recommended cost of equity is conservative because KAWC has significantly higher financial leverage, and, hence, greater financial risk, than my proxy companies.

Q 8 Do you have an exhibit to accompany your testimony?

A 8 Yes. I have an Exhibit___(JVW-1), consisting of six schedules and three appendices that were prepared by me or under my direction and supervision.

III. ECONOMIC AND LEGAL PRINCIPLES

Q 9 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 9 Economists define the cost of capital as the return investors expect to receive on alternative investments of comparable risk.

Q 10 How does the cost of capital affect a firm's investment decisions?

A 10 The goal of a firm is to maximize the value of the firm. This goal can be accomplished by accepting all investments in plant and equipment with an expected rate of return greater than or equal to the cost of capital. Thus, a firm should continue to invest in plant and equipment only so long as the return on its investment is greater than or equal to its cost of capital.

Q 11 How does the cost of capital affect investors' willingness to invest in a company?

A 11 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 investment 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 12 Do all investors have the same position in the firm?

A 12 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. Since the firm's equity investors have a residual claim on the firm's assets and income, equity investments are riskier than debt investments. Thus, the cost of equity exceeds the cost of debt and increases with the percentage of debt in the firm's capital structure.

Q 13 How do economists define the cost of equity?

A 13 Economists define the cost of equity as 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. There is agreement, however, as I have already noted, that: (1) the cost of equity is greater than the cost of debt; (2) the cost of equity increases with the percentage of debt in the firm's capital structure; and (3) the cost of equity, like the cost of debt, is both forward looking and market based.

Q 14 Does the required rate of return on an investment vary with the risk of that investment?

A 14 Yes. Since investors are averse to risk, they require a higher rate of return on investments with greater risk.

Q 15 Are these economic principles regarding the fair return for capital recognized in any Supreme Court cases?

A 15 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)]

Q 16 What practical difficulties arise when one attempts to apply the economic principles noted above to a regulated firm?

A 16 The application of these principles to the debt and preferred stock components of a regulated firm's capital structure is straightforward. Several problems arise, however, when the principles are applied to common equity. These problems stem from the fact that the cash flows to the equity investors, over any period of time, are not fixed by contract, and thus are not known with certainty. To induce equity investors to part with their money, a firm must offer them an expected return that is commensurate with expected returns on equity investments of similar risk. The need to measure expected returns makes the application of the above principles difficult.

Q 17 How do you address these difficulties in your testimony?

A 17 I address these difficulties by employing the comparable company approach to estimate KAWC's cost of equity.

Q 18 What is the comparable company approach?

A 18 The comparable company approach estimates KAWC's cost of equity by identifying a group of companies of similar risk. The cost of equity is then estimated for the companies in the proxy group.

IV. BUSINESS AND FINANCIAL RISKS IN THE WATER UTILITY INDUSTRY

Q 19 What are the major factors that affect business risk in the water utility industry?

A 19 Business risk in the water utility industry is affected by the following economic factors:

1. <u>High Operating Leverage</u>. 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. <u>Demand Uncertainty</u>. 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.

Water utilities such as KAWC also face the risk of having to make major capital expenditures to replace aging facilities and expand facilities to meet the water needs of a growing population. In Kentucky, the uncertain investment costs associated with building the facilities to assure reliable supplies of water is especially acute. KAWC has already spent considerable sums to explore the possibility of building a water pipeline to Louisville. Whatever alternative is selected to solve the water shortage problem in the Lexington area is likely to require a major investment by KAWC. This investment will strain the Company's financial resources.

Moreover, since September 11, 2001, water companies have faced increasing expenditures to secure water plants and reservoirs from the possibility of terrorist attempts to contaminate the water supply. The uncertainty of future security requirements and the cost of meeting these requirements is an additional risk for water companies such as KAWC.

V. COST OF EQUITY ESTIMATION METHODS

Q 20 What methods did you use to estimate the cost of common equity capital for KAWC?

A 20 I used three generally accepted methods for estimating KAWC's cost of common equity. These are the Discounted Cash Flow (DCF), the ex ante risk premium, and the ex post risk premium methods. 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 ex ante risk premium method assumes that an investor's current expectations regarding the equity risk premium can be estimated from recent data on the DCF expected rate of return on equity compared to the interest rate on long-term bonds. The ex post risk premium method assumes that an investor's current expectations regarding the equity-debt return differential is equal to the historical record of earned returns on comparable stock and bond investments. The cost of equity under both risk premium methods is then equal to the interest rate on the appropriate bond investments plus the risk premium.

VI. DISCOUNTED CASH FLOW (DCF) APPROACH

Q 21 Please describe the DCF model.

A 21 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;
$D_1, D_2 ... D_n$	=	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 22 Are you recommending that the annual DCF model be used to estimate KAWC's cost of equity?

A 22 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 1. For the reasons cited there, I employed the quarterly DCF model throughout my calculations.

Q 23 Please describe the quarterly DCF model you used.

A 23 The quarterly DCF model I used is described on Exhibit__(JVW-1), Schedule A and in Appendix 1. 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 24 In Appendix 1, 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 24 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 25 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 25 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 26 How did you estimate the growth component of the quarterly DCF model?

A 26 I used both the average analysts' estimates of future earnings per share (EPS) growth reported by I/B/E/S and the estimate of future earnings per share growth reported by Value Line.[1]

Q 27 What are the analysts' estimates of future EPS growth?

A 27 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 28 What is I/B/E/S?

A 28 I/B/E/S is a firm 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 29 Why did you use the I/B/E/S growth estimates?

A 29 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 30 Why did you rely on analysts' projections of future EPS growth in estimating the investors' expected growth rate rather than looking at historical growth rates?

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[1] 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 are so small 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 have also relied on available Value Line earnings growth forecasts for three water companies, including American States, Aqua America, and California Water. Value Line does not have any long-term earnings growth forecasts for other water companies.

A 30 I relied on analysts' projections of future EPS growth because there is considerable empirical evidence that investors use analysts' forecasts to estimate future earnings growth.

Q 31 Have you performed any studies concerning the use of analysts' forecasts as an estimate of investors' expected growth rate, g?

A 31 Yes, I prepared a study in conjunction with Willard T. Carleton, Karl Eller Professor 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 Historical Growth Extrapolation," published in the Spring 1988 edition of *The Journal of Portfolio Management*.

Q 32 Please summarize the results of your study.

A 32 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 33 What price did you use in your DCF model?

A 33 I used a simple average of the monthly high and low stock prices for each firm for the three-month period ending January 2004. These high and low stock prices were obtained from the Standard & Poor's *Stock Guide*, a source generally available to and used by investors.

Q 34 Why did you use the three-month average stock price in applying the DCF method?

A 34 I used 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 35 Did you include an allowance for flotation costs in your DCF analysis?

A 35 Yes. I have included a five percent allowance for flotation costs in my DCF calculations.

Q 36 Please explain your inclusion of flotation costs.

A 36 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 37 Does KAWC issue equity in the capital markets?

A 37 No. Although KAWC does not issue equity in the capital markets, its parent, RWE, must issue equity to provide KAWC the necessary financing to make investments in its water supply operations in Kentucky. If the parent is not able to recover its flotation costs through KAWC's rates, it will have no incentive to invest in KAWC.

Q 38 Is a flotation cost adjustment only appropriate if a company issues stock during the test year?

A 38 No. As described in Exhibit__(JVW-1), Appendix 2, 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 39 Does an allowance for recovery of flotation costs associated with stock sales in prior years constitute retroactive rate-making?

A 39 No. An adjustment for flotation costs on equity is not meant to recover any cost that is properly assigned to prior years. In fact, the adjustment allows KAWC to recover only the current carrying costs associated with flotation expenses incurred at the time stock sales were made. The original flotation costs themselves will never be recovered, because the stock is assumed to have an infinite life.

Q 40 How did you apply the DCF approach to obtain the cost of equity capital for KAWC?

A 40 I applied the DCF approach to the publicly-traded water companies shown on Exhibit__(JVW-1), Schedule A and the publicly-traded natural gas distribution companies (LDCs) shown on Exhibit__(JVW-1), Schedule B.

Q 41 How did you select your group of publicly-traded water companies?

A 41 I selected all the water companies included in the Value Line Investment Survey that: (1) paid dividends during every quarter of the last five years; (2) did not decrease dividends during any quarter of the past five 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 2 or 3, where 3 is the average Safety Rank of the Value Line universe of companies and 2 is above average in safety. The average DCF result for my proxy group of water companies is also shown on Exhibit__(JVW-1), Schedule A.

Q 42 Why did you eliminate companies that have either decreased or eliminated their dividend in the past five years?

A 42 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 43 Why did you eliminate companies that do not have any analyst's long-term growth forecasts?

A 43 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 forecast 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 44 Are the Value Line water companies widely followed by analysts in the investment community?

A 44 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

Company	No. of I/B/E/S Analysts	No. of Value Line Analysts
American States Water	1	1
Aqua America	6	1
California Water	2	1
Middlesex Water	1	0
Southwest Water	1	0
York Water Company	1	0
Connecticut Water Services	0	0
SJW Corp.	0	0

Q 45 Do you normally include companies in your proxy groups that have only one or two analysts' long-term growth forecasts?

A 45 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 46 Recognizing the greater uncertainty associated with DCF results based on just one or two analysts' forecasts, did you supplement your DCF results for the water companies with a DCF analysis of an additional proxy group?

A 46 Yes. Given the greater uncertainty in applying the DCF model to companies with only one or two analysts' growth forecasts, as noted above, I have also applied the DCF model to an additional proxy group consisting of LDCs, and each of the companies in the LDC proxy group has at least three analysts' estimates of long-term growth.

Q 47 You noted 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 47 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 48 What companies were eliminated from your water company proxy group by your selection criteria?

A 48 Connecticut Water Services and SJW Corp. were eliminated from my proxy group because they have no analysts' forecasts of long-term growth. No water companies were eliminated because of other selection criteria.

Q 49 Please summarize the result of your application of the DCF model to your water company proxy group.

A 49 As shown in Exhibit__(JVW-1), Schedule A, my application of the DCF model to the Value Line water companies produces an average DCF result of 10.7 percent.

Q 50 You noted above that you also applied your DCF method to a proxy group of LDCs. Why did you apply your DCF model to a proxy group of LDCs?

A 50 I applied 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 similar in risk to the 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 51 How did you select your proxy group of LDCs?

A 51 I selected all the companies in Value Line's natural gas industry groups that: (1) are primarily in the business of natural gas distribution; (2) paid dividends during every quarter of the last five years; (3) did not decrease dividends during any quarter of the past five years; (4) had at least three analysts included in the I/B/E/S consensus growth forecast; and (5) have not announced a merger. In addition, all of the LDCs included in my group have 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 Exhibit__(JVW-1), Schedule B.

Q 52 Which LDCs were eliminated according to your criteria?

A 52 I eliminated Cascade, Laclede, NUI, Piedmont, and South Jersey because they have fewer than three analyst's growth forecasts; Southern Union was not included because it pays no dividends; and SEMCO was eliminated because it has reduced its dividend payment.

Q 53 How are the LDCs similar to KAWC?

A 53 Like KAWC, 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 services at regulated rates to customers whose demand is primarily dependent on weather and the state of the economy.

Q 54 Does your LDC proxy group meet the standards of the *Hope* and *Bluefield* cases you cite above?

A 54 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 similar in risk to KAWC.

Q 55 Do you have any empirical evidence that the LDCs in your proxy group are a reasonable proxy for KAWC?

A 55 Yes. The average Value Line Safety Rank for my proxy group of LDCs is 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 approximately 3.

Q 56 Please summarize the results of your application of the DCF method to the LDC proxy group.

A 56 My application of the DCF method to the LDC proxy group produces an average DCF result of 10.7 percent, as shown on Exhibit__(JVW-1), Schedule B.

Q 57 You have presented the results of two DCF analyses. Based on your DCF studies, what is your conclusion regarding KAWC's DCF-based cost of equity?

A 57 My application of the DCF model produces an average DCF result of 10.7 percent for the water companies and 10.7 percent for the LDCs. Based on these data, I conclude that the DCF cost of equity for KAWC is 10.7 percent.

VII. RISK PREMIUM APPROACH

Q 58 Please describe the risk premium approach to estimating KAWC's cost of equity.

A 58 The risk premium approach is based on the principle that investors expect to earn a return on an equity investment in KAWC 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 59 How did you measure the required risk premium on an equity investment in KAWC?

A 59 I used two methods to estimate the required risk premium on an equity investment in KAWC. 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 60 Please describe your ex ante risk premium approach for measuring the required risk premium on an equity investment in KAWC.

A 60 My ex ante risk premium method is based on a study of the DCF expected return on a proxy group of natural gas distribution companies compared to the interest rate on Moody's A-rated utility bonds. Specifically, for each month in my 68-month study period, I calculated 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 LDCs;

DCF_{PROXY} = average DCF estimated cost of equity on a portfolio of proxy LDCs; and

I_A = the yield to maturity on an investment in A-rated utility bonds.

I utilized a 68-month period because this was as far back as I could readily obtain data.

Q 61 Why did you apply your ex ante risk premium study to LDCs rather than to water companies?

A 61 I applied 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 is 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 62 What were the results of your ex ante risk premium study?

A 62 The results of my ex ante risk premium study are described in Exhibit__(JVW-1), Schedule C. Over the study period, the average DCF estimated cost of equity on an investment in the portfolio of LDCs was equal to 12.19 percent, while the average yield to maturity on A-rated utility bonds was 7.44 percent. Thus, the average estimated risk premium on an investment in KAWC was 4.75 percent over the yield on A-rated utility bonds.

Q 63 Does the ex ante risk premium vary with the level of interest rates?

A 63 Yes. 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.

Q 64 Have you performed a statistical analysis to determine whether this inverse relationship holds for your ex ante risk premium data?

A 64 Yes. I performed 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 portfolio of LDCs;
I_A	=	yield to maturity on A-rated utility bonds;
e	=	a random residual; and
a, b	=	coefficients estimated by the regression procedure.

Q 65 Regression analysis assumes that the statistical residuals from the regression equation are random. Did you examine whether this assumption is valid for your data?

A 65 Yes. My examination of the residuals revealed 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).

Q 66 Did you make any adjustments in your data to correct for the possibility of serial correlation in the residuals?

A 66 Yes. 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. This procedure produced ***a*** and ***b*** coefficient estimates equal to 7.87 and –0.419, indicating that the risk premium increases by 42 basis points for every 100 basis point decrease in the interest rate on A-rated utility bonds.

Q 67 Using your knowledge of the statistical relationship between the yield to maturity on A-rated utility bonds and the required risk premium, what is your estimate of the ex ante risk premium on an investment in KAWC?

A 67 As noted above, my estimate of the ex ante risk premium on an investment in KAWC as compared to an investment in A-rated utility bonds is given by the equation:

$$RP_{PROXY} = 7.87 - 0.419 \times I_A.$$

Using the 6.16 percent average yield to maturity on A-rated utility bonds in January 2004, the regression equation produces an ex ante risk premium equal to 5.29 percent (7.87 – 0.419 x 6.16 = 5.29).

Q 68 What range of risk premiums did you obtain in your ex ante risk premium study?

A 68 As shown on Vander Weide Exhibit__(JVW-1), Schedule C, my study shows a range of risk premiums on a portfolio of LDC stock investments versus a portfolio of A-rated utility bonds of approximately 375 to 583 basis points.

Q 69 What cost of equity do you obtain from your ex ante risk premium approach?

A 69 To estimate the cost of equity using the ex ante risk premium approach, one may add the estimated risk premium over the yield on A-rated utility bonds to the yield to maturity on A-rated utility bonds. In January 2004, the average yield to maturity on A-rated utility bonds was 6.16 percent. As noted above, my analyses produce an estimated risk premium over the yield on A-rated utility bonds equal to 5.29 percent. Adding an estimated risk premium of 5.29 percent to the 6.16 percent yield to maturity on A-rated utility bonds produces a cost of equity estimate of 11.45 percent using the ex ante risk premium approach.

B. Ex Post Risk Premium Approach

Q 70 Please describe your ex post risk premium approach for measuring the required risk premium on an equity investment in KAWC.

A 70 I first performed a study of the comparable returns received by bond and stock investors over the last 66 years. I estimated 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 consisted of making an investment of 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 2003. The return associated with each stock portfolio is the sum of the annual dividend yield and capital gain (or loss) which accrued to this portfolio during the year(s) in which it was 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 accrued to the bond portfolio during the year(s) in which it was held. The resulting annual returns on the stock and bond portfolios purchased in each year between 1937 and 2003 are shown on Exhibit__(JVW-1), Schedule D. The average annual return on an investment in the S&P 500 stock portfolio was 11.42 percent, while the average annual return on an investment in the Moody's A-rated utility bond portfolio was 6.19 percent. The risk premium on the S&P 500 stock portfolio is, therefore, 5.22 percent (apparent discrepancy due to rounding).

I also conducted a second study using stock data on the S&P Utilities rather than the S&P 500. As shown on Exhibit__(JVW-1), Schedule E, the S&P Utility stock portfolio showed an average annual return of 10.81 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 4.61 percent (apparent discrepancy due to rounding).

Q 71 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 71 I have performed my ex post risk premium analysis on both the S&P 500 and the S&P Utilities as upper and lower bounds for the required risk premium on an equity investment in KAWC because I believe KAWC faces risks today that are somewhere in between the average risk of the S&P Utilities and the S&P 500 over the years 1937 to 2003. Specifically, the risk premium on the S&P Utilities, 4.61 percent, represents a lower bound for the required risk premium on an equity investment in KAWC because KAWC is currently more risky than an investment in the average utility in the S&P Utilities index over the entire period 1936 to the present. On the other hand, the risk premium on the S&P 500, 5.22 percent, represents an upper bound because an investment in KAWC is less risky than an investment in the S&P 500 over the period 1937 to the present. I use the average of the two risk premiums as my estimate of the required risk premium for KAWC in my ex post risk premium approach.

Q 72 Why did you analyze investors' experiences over such a long time frame?

A 72 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 73 Would your study provide a different ex post risk premium if you started with a different time period?

A 73 Yes. The ex post risk premium results do vary somewhat depending on the historical time period chosen. My policy was to go back as far in history as I could get reliable data. I thought it would be 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 felt that numbers taken from before this date would not be comparable to those taken after.

Q 74 Why was it necessary to examine the yield from debt investments in order to determine the investors' required rate of return on equity capital?

A 74 As previously explained, investors expect to earn a return on their equity investment that exceeds currently available bond yields. This is 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, the investors' current expectations concerning the amount by which the return on equity will exceed the bond yield will be strongly 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 75 Has there been any significant trend in the ex post equity risk premium over the 1937 to 2003 time period of your study?

A 75 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. As shown below in Tables 2 and 3, there is no statistically significant trend in my risk premium data. Indeed, the coefficient on the time variable is insignificantly different from zero (if there were a trend, the coefficient on the time variable should be significantly different from zero).

TABLE 2
REGRESSION OUTPUT FOR RISK PREMIUM ON S&P 500

Line No.		Intercept	Time	Adjusted R Square	F
1	Coefficient	0.106	-0.001	0.004	1.236
2	T Statistic	2.015	-1.112		

TABLE 3

REGRESSION OUTPUT FOR RISK PREMIUM ON S&P UTILITIES

Line No.		Intercept	Time	Adjusted R Square	F
1	Coefficient	0.075	-0.001	-0.008	0.483
2	T Statistic	1.652	-0.695		

Q 76 Do you have any other evidence that there has been no significant trend in ex post risk premium results over time?

A 76 Yes. The Ibbotson Associates' *2003 Yearbook* contains an analysis of "trends" in historical risk premium data. Ibbotson Associates uses correlation analysis to determine if there is any pattern or "trend" in risk premiums over time. They also conclude that there are no trends in risk premiums over time.

Q 77 What is the significance of the evidence that historical risk premiums have no trend or other statistical pattern over time?

A 77 The significance of this evidence is that the average historical risk premium is a good estimate of the future expected risk premium. As Ibbotson notes:

> 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 Associates' Valuation Edition 2003 Yearbook, page 75.]

Q 78 You noted that Ibbotson Associates also provides historical risk premium data. How do the Ibbotson Associates' risk premiums compare to your risk premiums?

A 78 Ibbotson Associates obtains a 7.0 percent risk premium on the S&P 500 versus long-term government bonds. Since the yield on long-term government bonds is currently approximately 125 basis points less than the yield on A-rated utility bonds, the Ibbotson Associates' data would indicate an approximate 5.75 percent risk premium on the S&P 500 over A-rated utility bonds. As shown on Exhibit__(JVW-1), Schedules D and E, my studies produce a risk premium over A-rated utility bonds in the range of 4.61 percent to 5.22 percent.

Q 79 What conclusions do you draw from your ex post risk premium analyses about the required return on an equity investment in KAWC?

A 79 My own studies, combined with my analysis of other studies, provide strong evidence that investors today require an equity return of approximately 4.61 to 5.22 percentage points above the expected yield on A-rated utility bonds. The average interest rate on Moody's A-rated utility bonds for the three-month period November through January 2004 has ranged from 6.16 percent to 6.36 percent. On the basis of this information and my knowledge of current market conditions, I conclude that investors would expect a long-term yield of approximately 6.26 percent on A-rated utility bonds. Adding a 4.61 to 5.22 percentage point risk premium to an expected yield of 6.26 percent on A-rated utility bonds, I obtain an expected return on equity in the range 10.9 to 11.5 percent, with a midpoint of 11.2 percent. Adding a 25 basis-point allowance for flotation costs,[2] I obtain an estimate of 11.4 percent as the cost of equity for KAWC using the ex post risk premium method.

VIII. FAIR RATE OF RETURN ON EQUITY

Q 80 Please summarize your findings concerning KAWC's cost of equity.

A 80 My DCF analysis suggests that KAWC's cost of equity is 10.7 percent. My ex ante risk premium approach produces a cost of equity estimate for KAWC of 11.4 percent. From my ex post risk premium approach, I find that the cost of equity is 11.4 percent. Based on my three recommended methodologies, I conclude that the average cost of equity for the companies in my proxy groups is 11.2 percent.

Q 81 Does your 11.2 percent cost of equity conclusion for your proxy groups depend on the percentages of debt and equity in your proxy companies' average capital structure?

A 81 Yes. The 11.2 percent cost of equity for my proxy group reflects the financial risk associated with my proxy companies' average capital

[2] I determined the flotation cost allowance by calculating the difference in my DCF results with and without a flotation cost allowance.

structure, where the capital structure weights are measured in terms of market values. Since financial leverage, that is, the use of debt financing, increases the risk of investing in the proxy companies' equity, the cost of equity would be higher for a company with a capital structure containing more leverage.

Q 82 What are the average percentages of debt and equity in your proxy companies' capital structures?

A 82 My proxy group of water companies has an average capital structure containing 5.37 percent short-term debt, 25.68 percent long-term debt, 0.09 percent preferred stock, and 68.87 percent common equity. My proxy group of LDCs has an average capital structure containing 8.41 percent short-term debt, 33.94 percent long-term debt, 0.54 percent preferred stock, and 57.10 percent common equity. These data are shown in Exhibit___(JVW-1), Schedule F.

Q 83 How does the average capital structure of your proxy companies compare to KAWC's pro forma capital structure at December 31, 2003?

A 83 As described in the testimony of Company Witness Miller, KAWC's pro forma capital structure at December 31, 2003, contains 4.23 percent short-term debt, 51.11 percent long-term debt, 3.76 percent preferred stock, and 40.90 percent common equity. Thus, KAWC's pro forma capital structure is significantly more highly leveraged than the average capital structure of my proxy companies.

Q 84 You mentioned earlier that the cost of equity depends on a company's capital structure. Is there any way to adjust the 11.2 percent cost of equity for your proxy companies to reflect the higher leverage in KAWC's capital structure?

A 84 Yes. Since my proxy groups are comparable in risk to KAWC, KAWC should have the same weighted average cost of capital as my proxy companies. It is a simple matter to determine what cost of equity KAWC should have in order to have the same weighted average cost of capital as my proxy companies. Since KAWC's capital structure contains significantly more leverage than the average capital structure of my proxy companies, and the cost of equity increases with leverage, it is evident that such an adjustment would produce a significantly higher cost of equity for KAWC.

Q 85 What is your recommendation as to a fair rate of return on common equity for KAWC?

A 85 I conservatively recommend that KAWC be allowed a fair rate of return on common equity equal to 11.2 percent.

Q 86 Does this conclude your testimony?

A 86 Yes, it does.

LIST OF SCHEDULES AND APPENDICES

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

Company	Dividend	Price	Growth	Cost of Equity
Amer. States Water	0.221	25.092	4.5%	8.5%
Aqua America	0.120	21.345	9.5%	12.1%
California Water	0.283	27.342	6.5%	11.3%
Middlesex Water	0.165	20.067	7.0%	10.8%
Southwest Water	0.047	12.220	9.0%	10.7%
York Water Company	0.145	18.517	7.0%	10.5%
Average[3]			7.3%	10.7%

Notes:

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 January 2004 per S&P Stock Guide.

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 January 2004.

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

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

3 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, one company in the water company group, Aqua America, is four times as large as the next largest company and 20 times larger than the smallest company. Thus, referring to a market-weighted average result would effectively cause a market-weighted average result to depend primarily on the result for a single company, Aqua America, which, in this case, has the highest DCF result. I therefore conservatively report a simple average of the DCF results for all the water companies. The market-weighted average DCF result for the water companies is 11.4%.

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

Company	Dividend	Price	Growth	Cost of Equity
AGL Resources	0.280	28.842	4.71%	9.1%
Atmos Energy	0.305	24.723	5.67%	11.3%
Energen Corp.	0.185	40.275	7.00%	9.1%
Equitable Resources	0.300	42.262	9.75%	12.5%
KeySpan Corp.	0.445	35.670	5.86%	11.7%
New Jersey Resources	0.325	38.338	6.00%	9.8%
NICOR Inc.	0.465	33.453	3.83%	10.1%
Northwest Nat. Gas	0.325	30.413	4.17%	8.9%
Peoples Energy	0.530	41.175	5.00%	10.9%
Southwest Gas	0.205	22.805	5.33%	9.5%
UGI Corp.	0.285	32.552	6.33%	10.4%
WGL Holdings Inc.	0.320	27.565	3.86%	9.1%
Market-Weighted Average				10.7%

Notes:

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 January 2004 per S&P Stock Guide.
FC	=	Flotation costs expressed as a percent of gross proceeds.
g	=	I/B/E/S forecast of future earnings growth January 2004.
k	=	Cost of equity using the quarterly version of the DCF model shown by the formula below:

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

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

Date	DCF	A-Rated Bond Yield	Risk Premium
June-98	0.1105	0.0703	0.0402
July-98	0.1130	0.0703	0.0427
August-98	0.1202	0.0700	0.0502
September-98	0.1255	0.0693	0.0562
October-98	0.1256	0.0696	0.0560
November-98	0.1197	0.0703	0.0494
December-98	0.1159	0.0691	0.0468
January-99	0.1176	0.0697	0.0479
February-99	0.1219	0.0709	0.0510
March-99	0.1247	0.0726	0.0521
April-99	0.1253	0.0722	0.0531
May-99	0.1223	0.0747	0.0476
June-99	0.1214	0.0774	0.0440
July-99	0.1226	0.0771	0.0455
August-99	0.1223	0.0791	0.0432
September-99	0.1229	0.0793	0.0436
October-99	0.1243	0.0806	0.0437
November-99	0.1259	0.0794	0.0465
December-99	0.1302	0.0814	0.0488
January-00	0.1325	0.0835	0.0490
February-00	0.1371	0.0825	0.0546
March-00	0.1356	0.0828	0.0528
April-00	0.1331	0.0829	0.0502
May-00	0.1301	0.0870	0.0431
June-00	0.1300	0.0836	0.0464
July-00	0.1325	0.0825	0.0500
August-00	0.1298	0.0813	0.0485
September-00	0.1268	0.0823	0.0445
October-00	0.1272	0.0814	0.0458
November-00	0.1246	0.0811	0.0435
December-00	0.1227	0.0784	0.0443
January-01	0.1251	0.0780	0.0471
February-01	0.1260	0.0774	0.0486
March-01	0.1273	0.0768	0.0505
April-01	0.1244	0.0794	0.0450
May-01	0.1311	0.0799	0.0512
June-01	0.1316	0.0785	0.0531
July-01	0.1341	0.0778	0.0563
August-01	0.1342	0.0759	0.0583

KAWC ENERGY COMPANY
EXHIBIT__(JVW-1)
SCHEDULE C (continued)
COMPARISON OF DCF EXPECTED RETURN
ON AN EQUITY INVESTMENT IN NATURAL GAS DISTRIBUTION COMPANIES
TO THE INTEREST RATE ON A-RATED UTILITY BONDS.

Date	DCF	A-Rated Bond Yield	Risk Premium
September-01	0.1247	0.0775	0.0472
October-01	0.1258	0.0763	0.0495
November-01	0.1265	0.0757	0.0508
December-01	0.1247	0.0783	0.0464
January-02	0.1224	0.0766	0.0458
February-02	0.1230	0.0754	0.0476
March-02	0.1167	0.0776	0.0391
April-02	0.1132	0.0757	0.0375
May-02	0.1130	0.0752	0.0378
June-02	0.1138	0.0741	0.0397
July-02	0.1219	0.0731	0.0488
August-02	0.1207	0.0717	0.0490
September-02	0.1245	0.0708	0.0537
October-02	0.1228	0.0723	0.0505
November-02	0.1194	0.0714	0.0480
December-02	0.1190	0.0707	0.0483
January-03	0.1194	0.0706	0.0488
February-03	0.1211	0.0693	0.0518
March-03	0.1184	0.0679	0.0505
April-03	0.1157	0.0664	0.0493
May-03	0.1110	0.0636	0.0474
June-03	0.1101	0.0621	0.0480
July-03	0.1103	0.0667	0.0436
August-03	0.1112	0.0679	0.0433
September-03	0.1097	0.0656	0.0441
October-03	0.1094	0.0643	0.0451
November-03	0.1061	0.0636	0.0425
December-03	0.1040	0.0627	0.0413
January-04	0.1034	0.0616	0.0418
Average	0.1219	0.0744	0.0475

KAWC ENERGY COMPANY
EXHIBIT__(JVW-1)
SCHEDULE C (continued)
COMPARISON OF DCF EXPECTED RETURN
ON AN EQUITY INVESTMENT IN NATURAL GAS DISTRIBUTION COMPANIES
TO THE INTEREST RATE ON A-RATED UTILITY BONDS.

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 per S&P Stock Guide and Dow Jones.
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:

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

KAWC ENERGY COMPANY
EXHIBIT__(JVW-1)
SCHEDULE D
COMPARATIVE RETURNS ON S&P 500 STOCK INDEX
AND MOODY'S A-RATED BONDS 1937 – 2003

Year	Stock Price	Stock Dividend Yield	Stock Return	Bond Price	Bond Return
2003	895.84			62.26	
2002	1,140.21	0.0138	-20.05%	57.44	15.35%
2001	1,335.63	0.0116	-13.47%	56.40	8.93%
2000	1,425.59	0.0118	-5.13%	52.60	14.82%
1999	1,248.77	0.0130	15.46%	63.03	-10.20%
1998	963.35	0.0162	31.25%	62.43	7.38%
1997	766.22	0.0195	27.68%	56.62	17.32%
1996	614.42	0.0231	27.02%	60.91	-0.48%
1995	465.25	0.0287	34.93%	50.22	29.26%
1994	472.99	0.0269	1.05%	60.01	-9.65%
1993	435.23	0.0288	11.56%	53.13	20.48%
1992	416.08	0.0290	7.50%	49.56	15.27%
1991	325.49	0.0382	31.65%	44.84	19.44%
1990	339.97	0.0341	-0.85%	45.60	7.11%
1989	285.41	0.0364	22.76%	43.06	15.18%
1988	250.48	0.0366	17.61%	40.10	17.36%
1987	264.51	0.0317	-2.13%	48.92	-9.84%
1986	208.19	0.0390	30.95%	39.98	32.36%
1985	171.61	0.0451	25.83%	32.57	35.05%
1984	166.39	0.0427	7.41%	31.49	16.12%
1983	144.27	0.0479	20.12%	29.41	20.65%
1982	117.28	0.0595	28.96%	24.48	36.48%
1981	132.97	0.0480	-7.00%	29.37	-3.01%
1980	110.87	0.0541	25.34%	34.69	-3.81%
1979	99.71	0.0533	16.52%	43.91	-11.89%
1978	90.25	0.0532	15.80%	49.09	-2.40%
1977	103.80	0.0399	-9.06%	50.95	4.20%
1976	96.86	0.0380	10.96%	43.91	25.13%
1975	72.56	0.0507	38.56%	41.76	14.75%
1974	96.11	0.0364	-20.86%	52.54	-12.91%
1973	118.40	0.0269	-16.14%	58.51	-3.37%
1972	103.30	0.0296	17.58%	56.47	10.69%
1971	93.49	0.0332	13.81%	53.93	12.13%
1970	90.31	0.0356	7.08%	50.46	14.81%
1969	102.00	0.0306	-8.40%	62.43	-12.76%
1968	95.04	0.0313	10.45%	66.97	-0.81%
1967	84.45	0.0351	16.05%	78.69	-9.81%
1966	93.32	0.0302	-6.48%	86.57	-4.48%
1965	86.12	0.0299	11.35%	91.40	-0.91%
1964	76.45	0.0305	15.70%	92.01	3.68%
1963	65.06	0.0331	20.82%	93.56	2.61%
1962	69.07	0.0297	-2.84%	89.60	8.89%
1961	59.72	0.0328	18.94%	89.74	4.29%
1960	58.03	0.0327	6.18%	84.36	11.13%

KAWC ENERGY COMPANY
EXHIBIT__(JVW-1)
SCHEDULE D (CONTINUED)
COMPARATIVE RETURNS ON S&P 500 STOCK INDEX
AND MOODY'S A-RATED BONDS 1937—2003

Year	Stock Price	Stock Dividend Yield	Stock Return	Bond Price	Bond Return
1959	55.62	0.0324	7.57%	91.55	-3.49%
1958	41.12	0.0448	39.74%	101.22	-5.60%
1957	45.43	0.0431	-5.18%	100.70	4.49%
1956	44.15	0.0424	7.14%	113.00	-7.35%
1955	35.60	0.0438	28.40%	116.77	0.20%
1954	25.46	0.0569	45.52%	112.79	7.07%
1953	26.18	0.0545	2.70%	114.24	2.24%
1952	24.19	0.0582	14.05%	113.41	4.26%
1951	21.21	0.0634	20.39%	123.44	-4.89%
1950	16.88	0.0665	32.30%	125.08	1.89%
1949	15.36	0.0620	16.10%	119.82	7.72%
1948	14.83	0.0571	9.28%	118.50	4.49%
1947	15.21	0.0449	1.99%	126.02	-2.79%
1946	18.02	0.0356	-12.03%	126.74	2.59%
1945	13.49	0.0460	38.18%	119.82	9.11%
1944	11.85	0.0495	18.79%	119.82	3.34%
1943	10.09	0.0554	22.98%	118.50	4.49%
1942	8.93	0.0788	20.87%	117.63	4.14%
1941	10.55	0.0638	-8.98%	116.34	4.55%
1940	12.30	0.0458	-9.65%	112.39	7.08%
1939	12.50	0.0349	1.89%	105.75	10.05%
1938	11.31	0.0784	18.36%	99.83	9.94%
1937	17.59	0.0434	-31.36%	103.18	0.63%
Return			11.42%		6.19%
Risk Premium			5.22%		

Note: See Appendix 3 for an explanation of how stock and bond returns are derived and the source of the data presented.

KAWC ENERGY COMPANY
EXHIBIT__(JVW-1)
SCHEDULE E
COMPARATIVE RETURNS ON S&P UTILITIES STOCK INDEX AND MOODY'S A-RATED BONDS 1937—2003

Year	Stock Price	Stock Dividend Yield	Stock Return	Bond Price	Bond Return
2003	160.57			62.26	
2002	142.14	0.0475	17.79%	57.44	15.35%
2002	243.79	0.0362		57.44	
2001	307.70	0.0287	-17.90%	56.40	8.92%
2000	239.17	0.0413	32.78%	52.60	14.82%
1999	253.52	0.0394	-1.72%	63.03	-10.20%
1998	228.61	0.0457	15.47%	62.43	7.38%
1997	201.14	0.0492	18.58%	56.62	17.32%
1996	202.57	0.0454	3.83%	60.91	-0.48%
1995	153.87	0.0584	37.49%	50.22	29.26%
1994	168.70	0.0496	-3.83%	60.01	-9.65%
1993	159.79	0.0537	10.95%	53.13	20.48%
1992	149.70	0.0572	12.46%	49.56	15.27%
1991	138.38	0.0607	14.25%	44.84	19.44%
1990	146.04	0.0558	0.33%	45.60	7.11%
1989	114.37	0.0699	34.68%	43.06	15.18%
1988	106.13	0.0704	14.80%	40.10	17.36%
1987	120.09	0.0588	-5.74%	48.92	-9.84%
1986	92.06	0.0742	37.87%	39.98	32.36%
1985	75.83	0.086	30.00%	32.57	35.05%
1984	68.50	0.0925	19.95%	31.49	16.12%
1983	61.89	0.0948	20.16%	29.41	20.65%
1982	51.81	0.1074	30.20%	24.48	36.48%
1981	52.01	0.0978	9.40%	29.37	-3.01%
1980	50.26	0.0953	13.01%	34.69	-3.81%
1979	50.33	0.0893	8.79%	43.91	-11.89%
1978	52.40	0.0791	3.96%	49.09	-2.40%
1977	54.01	0.0714	4.16%	50.95	4.20%
1976	46.99	0.0776	22.70%	43.91	25.13%
1975	38.19	0.092	32.24%	41.76	14.75%
1974	48.60	0.0713	-14.29%	52.54	-12.91%
1973	60.01	0.0556	-13.45%	58.51	-3.37%
1972	60.19	0.0542	5.12%	56.47	10.69%
1971	63.43	0.0504	-0.07%	53.93	12.13%
1970	55.72	0.0561	19.45%	50.46	14.81%
1969	68.65	0.0445	-14.38%	62.43	-12.76%
1968	68.02	0.0435	5.28%	66.97	-0.81%
1967	70.63	0.0392	0.22%	78.69	-9.81%
1966	74.50	0.0347	-1.72%	86.57	-4.48%
1965	75.87	0.0315	1.34%	91.40	-0.91%
1964	67.26	0.0331	16.11%	92.01	3.68%
1963	63.35	0.033	9.47%	93.56	2.61%
1962	62.69	0.032	4.25%	89.60	8.89%
1961	52.73	0.0358	22.47%	89.74	4.29%
1960	44.50	0.0403	22.52%	84.36	11.13%
1959	43.96	0.0377	5.00%	91.55	-3.49%

KAWC ENERGY COMPANY
EXHIBIT__(JVW-1)
SCHEDULE E (CONTINUED)
COMPARATIVE RETURNS ON S&P UTILITIES STOCK INDEX AND MOODY'S A-RATED BONDS 1937—2003

Year	Stock Price	Stock Dividend Yield	Stock Return	Bond Price	Bond Return
1958	33.30	0.0487	36.88%	101.22	-5.60%
1957	32.32	0.0487	7.90%	100.70	4.49%
1956	31.55	0.0472	7.16%	113.00	-7.35%
1955	29.89	0.0461	10.16%	116.77	0.20%
1954	25.51	0.052	22.37%	112.79	7.07%
1953	24.41	0.0511	9.62%	114.24	2.24%
1952	22.22	0.055	15.36%	113.41	4.26%
1951	20.01	0.0606	17.10%	123.44	-4.89%
1950	20.20	0.0554	4.60%	125.08	1.89%
1949	16.54	0.057	27.83%	119.82	7.72%
1948	16.53	0.0535	5.41%	118.50	4.49%
1947	19.21	0.0354	-10.41%	126.02	-2.79%
1946	21.34	0.0298	-7.00%	126.74	2.59%
1945	13.91	0.0448	57.89%	119.82	9.11%
1944	12.10	0.0569	20.65%	119.82	3.34%
1943	9.22	0.0621	37.45%	118.50	4.49%
1942	8.54	0.094	17.36%	117.63	4.14%
1941	13.25	0.0717	-28.38%	116.34	4.55%
1940	16.97	0.054	-16.52%	112.39	7.08%
1939	16.05	0.0553	11.26%	105.75	10.05%
1938	14.30	0.073	19.54%	99.83	9.94%
1937	24.34	0.0432	-36.93%	103.18	0.63%
Return			10.81%		6.19%
Risk Premium			4.61%		

Note: See Appendix 3 for an explanation of how stock and bond returns are derived and the source of the data presented. In 2002, S&P discontinued its S&P Utilities stock index, and S&P no longer reports dividend yields for electric utilities. Thus, for this study, the utility stock returns beginning in 2002 are computed based on the companies contained in the S&P electric company index, as listed in the *S&P Security Price Record*. The dividend yields for these stocks are the January dividend yields reported by Value Line.

KAWC ENERGY COMPANY
EXHIBIT__(JVW-1)
SCHEDULE F

AVERAGE CAPITAL STRUCTURE OF PROXY WATER COMPANY GROUP

Line No.	Company	Short-Term Debt	Long-Term Debt	Preferred Equity	Equity	% Short-Term Debt	% Long-Term Debt	% Preferred Equity	% Equity
1	American States Water	48.3	231.1	0.0	383.9	7.28%	34.84%	0.00%	57.88%
2	Aqua America	149.4	582.9	0.2	2,009.6	5.45%	21.26%	0.01%	73.29%
3	California Water	24.8	250.4	3.5	461.4	3.35%	33.83%	0.47%	62.34%
4	Middlesex Water	13.5	97.5	4.1	211.2	4.14%	29.88%	1.26%	64.72%
5	Southwest Water	2.6	75.4	0.5	179.0	1.01%	29.29%	0.19%	69.51%
6	York Water Co.	4.5	32.6	0.0	118.6	2.89%	20.94%	0.00%	76.17%
7	Total/Average	243.1	1,269.9	8.3	3,363.6	4.98%	26.00%	0.17%	68.86%

AVERAGE CAPITAL STRUCTURE OF PROXY LDC GROUP

Line No.	Company	Short-Term Debt	Long-Term Debt	Preferred Equity	Equity	% Short-Term Debt	% Long-Term Debt	% Preferred Equity	% Equity
1	AGL Resources	419	994	0	1,836	12.89%	30.60%	0.00%	56.51%
2	Atmos Energy	128	864	0	1,274	5.65%	38.13%	0.00%	56.22%
3	KeySpan Corp.	927	5,224	84	5,825	7.69%	43.32%	0.69%	48.30%
4	Energen Corp.	136	513	0	1,513	6.29%	23.73%	0.00%	69.98%
5	Equitable Resources	146	572	0	2,714	4.26%	16.67%	0.00%	79.07%
6	New Jersey Resources	87	371	0	1,025	5.85%	24.99%	0.02%	69.14%
7	NICOR Inc.	415	396	4	1,460	18.24%	17.41%	0.19%	64.16%
8	Northwest Nat. Gas	90	446	8	778	6.79%	33.72%	0.63%	58.86%
9	Peoples Energy	378	554	0	1,571	15.10%	22.14%	0.00%	62.77%
10	Southwest Gas	62	1,092	60	783	3.09%	54.70%	3.01%	39.20%
11	UGI Corp.	205	1,127	20	1,362	7.54%	41.54%	0.74%	50.18%
12	WGL Holdings Inc.	179	637	28	1,375	8.06%	28.69%	1.27%	61.98%
13	Total/Average	3,171	12,790	205	21,514	8.41%	33.94%	0.54%	57.10%

Source of data: The Value Line Investment Survey January 2004.

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:

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

where the three dots indicate that the sum continues indefinitely.

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

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

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:

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

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

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

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

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

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 ÷ (1-r). Thus, for a geometric progression with an infinite number of terms and $|r| < 1$, equation (4) becomes:

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

Application to DCF Model

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

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

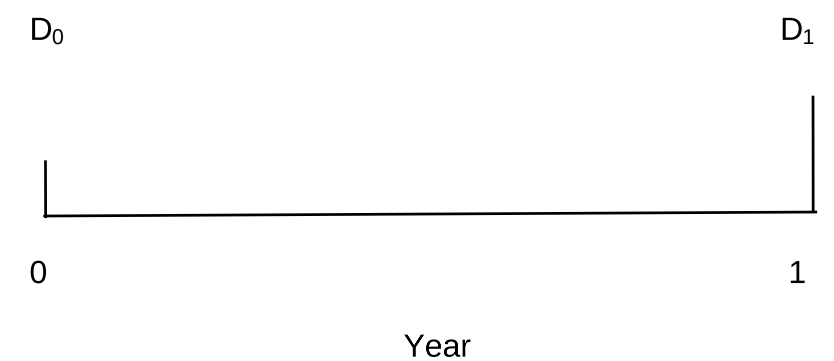
as we suggested earlier.

Quarterly DCF Model

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

Figure 1

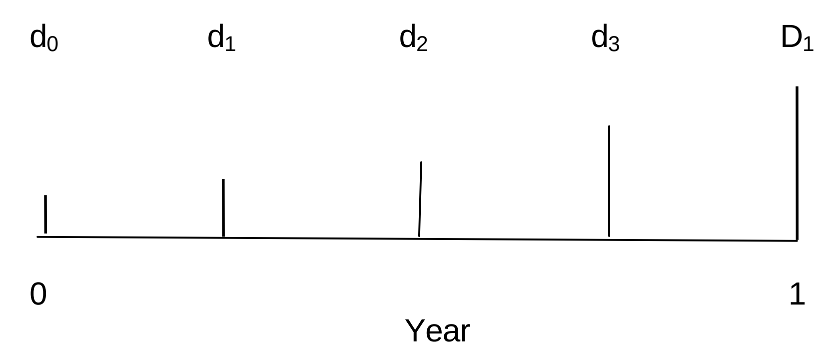
Annual DCF Model



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

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 ***k*** > ***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:

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

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

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

An Alternative Quarterly DCF Model

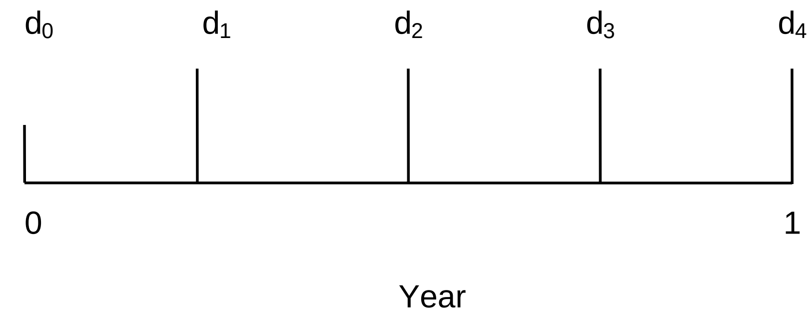
Although the constant growth Quarterly DCF Model [equation (8)] allows for the quarterly timing of dividend payments, it does require the assumption that the firm increases its dividend payments each quarter. Since this assumption is difficult for some analysts to accept, we now discuss a second Quarterly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

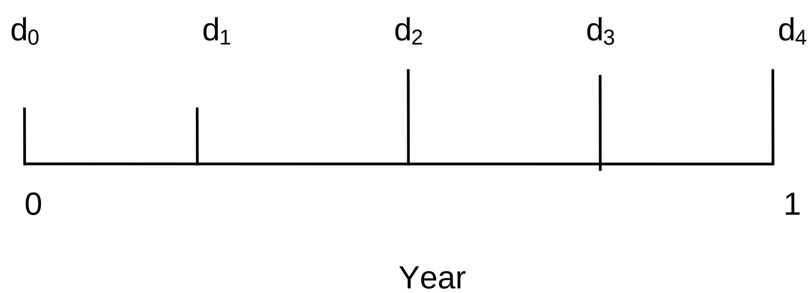
Quarterly DCF Model (Constant Dividend Version)

Case 1



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

Case 2

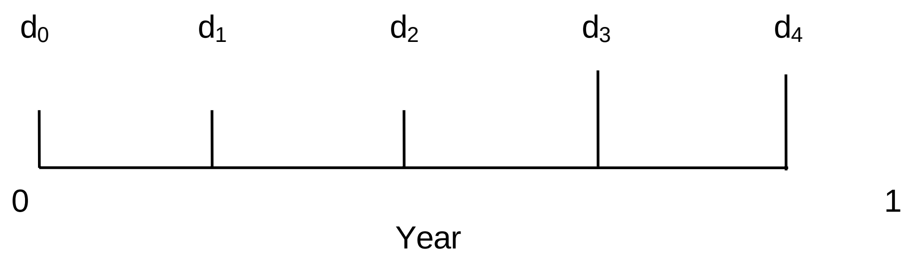


$$d_1 = d_0$$

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

Figure 3 (continued)

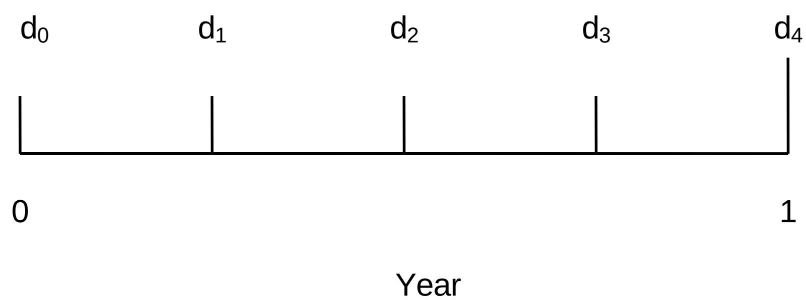
Case 3



$d_1 = d_2 = d_0$

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

Case 4



$d_1 = d_2 = d_3 = d_0$

$d_4 = d_0(1+g)$

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.

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

I. 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.

II. 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.

III. 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[4] 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

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[4] 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.

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 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.

IV. 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.

V. 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.

VI. 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:

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

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 $hE_t \div (1\text{-}f)$ 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.

VII. 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.

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Table 4

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[5]

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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[5] 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 5

Direct Costs of Raising Capital 1990—1994
Utility versus Non-Utility Companies[6]

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%

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

Table 2 (continued)
Direct Costs of Raising Capital 1990—1994
Utility versus Non-Utility Companies[7]

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[8]
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).

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

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

Table 6
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

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 D and E are the January values of the respective indices.

Calculation of Stock and Bond Returns

Sample calculation of "Stock Return" column:

$$\text{Stock Return (2002)} = \left[\frac{\text{Stock Price (2003) - Stock Price (2002) + Dividend (2002)}}{\text{Stock Price (2002)}} \right]$$

where Dividend (2002) = Stock Price (2002) x Stock Div. Yield (2002)

Sample calculation of "Bond Return" column:

$$\text{Bond Return (2002)} = \left[\frac{\text{Bond Price (2003) - Bond Price (2002) + Interest (2002)}}{\text{Bond Price (2002)}} \right]$$

where Interest = $4.00.