

**COMMONWEALTH OF KENTUCKY  
BEFORE THE PUBLIC SERVICE COMMISSION**

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**IN THE MATTER OF:** )  
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**ADJUSTMENT OF THE RATES OF** ) **CASE NO. 2008-00427**  
**KENTUCKY-AMERICAN WATER COMPANY** )  
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**DIRECT TESTIMONY  
OF  
DR. JAMES H. VANDER WEIDE  
ON BEHALF OF  
KENTUCKY-AMERICAN WATER COMPANY**

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1 **I. WITNESS IDENTIFICATION**

2 **Q 1 What is your name and business address?**

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

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

11 A 2 I graduated from Cornell University with a Bachelor's Degree in  
12 Economics and from Northwestern University with a Ph.D. in Finance.  
13 After joining the faculty of the School of Business at Duke University, I  
14 was named Assistant Professor, Associate Professor, and then  
15 Professor.

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

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

5 I have conducted seminars and training sessions on financial  
6 analysis, financial strategy, cost of capital, cash management,  
7 depreciation policies, and short-run financial planning for a wide variety  
8 of U.S. and international companies, including ABB, Allstate, AT&T,  
9 Verizon, BellSouth, Fisons, GlaxoSmithKline, Lafarge, MidAmerican  
10 Energy, Norfolk Southern, Progress Energy, Inc, The Rank Group,  
11 Siemens, TRW, and Wolseley Plc.

12 In addition to my teaching and executive education activities, I  
13 have written research papers on such topics as portfolio management,  
14 the cost of capital, capital budgeting, the effect of regulation on the  
15 performance of public utilities, the economics of universal service  
16 requirements, and cash management. My articles have been published  
17 in *American Economic Review*, *Financial Management*, *International*  
18 *Journal of Industrial Organization*, *Journal of Finance*, *Journal of*  
19 *Financial and Quantitative Analysis*, *Journal of Bank Research*, *Journal*  
20 *of Accounting Research*, *Journal of Cash Management*, *Management*  
21 *Science*, *The Journal of Portfolio Management*, *Atlantic Economic*  
22 *Journal*, *Journal of Economics and Business*, and *Computers and*  
23 *Operations Research*. I have written a book titled *Managing Corporate*

1           *Liquidity: an Introduction to Working Capital Management*, a chapter for  
2           *The Handbook of Modern Finance*, “Financial Management in the Short  
3           Run,” and a chapter for the forthcoming book, *Handbook of Portfolio*  
4           *Construction: Contemporary Applications of Markowitz Techniques*, “Principles  
5           for Lifetime Portfolio Selection: Lessons from Portfolio Theory.”

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

7   A 3   Yes. As an expert on financial and economic theory and practice, I have  
8           participated in more than 400 regulatory and legal proceedings before  
9           the U.S. Congress, the Canadian Radio-Television and  
10          Telecommunications Commission, the Federal Communications  
11          Commission, the National Telecommunications and Information  
12          Administration, the Federal Energy Regulatory Commission, the public  
13          service commissions of 42 states, the insurance commissions of five  
14          states, the Iowa State Board of Tax Review, the National Association of  
15          Securities Dealers, and the North Carolina Property Tax Commission. In  
16          addition, I have prepared expert testimony in proceedings before the  
17          U.S. District Court for the District of Nebraska; the U.S. District Court for  
18          the District of New Hampshire; the U.S. District Court for the Eastern  
19          District of North Carolina; the U.S. District Court for the Northern District  
20          of California; Montana Second Judicial District Court, Silver Bow County;  
21          the Superior Court, North Carolina; the U.S. Bankruptcy Court for the  
22          Southern District of West Virginia; and the U. S. District Court for the  
23          Eastern District of Michigan. As an expert on financial and economic

1 theory, I have testified on the cost of capital, competition, risk, incentive  
2 regulation, forward-looking economic cost, economic pricing guidelines,  
3 depreciation, accounting, valuation, and other financial and economic  
4 issues in more than 375 cases before the U.S. Congress, the Canadian  
5 Radio-Television and Telecommunications Commission, the Federal  
6 Communications Commission, the National Telecommunications and  
7 Information Administration, the Federal Energy Regulatory Commission,  
8 the National Energy Board, the public service commissions of 40 states  
9 and the District of Columbia, the insurance commissions of five states,  
10 the Iowa State Board of Tax Review, North Carolina Property Tax  
11 Commission, and the National Association of Securities Dealers. In  
12 addition, I have testified as an expert witness in proceedings before the  
13 U.S. District Court, Northern District of California; U.S. District Court,  
14 District of Nebraska; U.S. District Court, District of New Hampshire; U.S.  
15 District Court, Eastern District of North Carolina; Superior Court, North  
16 Carolina; the U.S. Bankruptcy Court, Southern District of West Virginia;  
17 and the U.S. District Court for the Eastern District of Michigan.

18 **II. PURPOSE OF TESTIMONY**

19 **Q 4 What is the purpose of your testimony?**

20 A 4 I have been asked by Kentucky-American Water Company (KAWC) to  
21 prepare an independent appraisal of its cost of equity capital and to  
22 recommend a rate of return on equity that is fair, that allows KAWC to

1 attract capital on reasonable terms, and that allows KAWC to maintain its  
2 financial integrity.

3 **Q 5 How do you estimate KAWC's cost of equity?**

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

8 **Q. 6 What cost of equity do you find for your comparable companies in  
9 this proceeding?**

10 A. 6 On the basis of my studies, I find that the cost of equity for my  
11 comparable companies is in the range 11.1 percent to 13.4 percent (see  
12 Table 1), with an average of 11.75 percent.

13 **TABLE 1**  
14 **COST OF EQUITY MODEL RESULTS**

<b>METHOD</b>	<b>COST OF EQUITY</b>
Discounted Cash Flow	11.5%
Ex Ante Risk Premium	11.1%
Ex Post Risk Premium	11.3%
Historical CAPM	11.4%
DCF CAPM	13.4%

15  
16 **Q 7 What is your recommendation regarding KAWC's cost of equity?**

17 A 7 I conservatively recommend that KAWC be allowed a rate of return on  
18 equity equal to 11.5 percent. My recommended cost of equity is  
19 conservative because it is slightly less than the average result I obtain  
20 from my cost of equity studies and the financial risk of my proxy

1 companies is less than the financial risk implied by KAWC's ratemaking  
2 capital structure.

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

4 A 8 Yes. I have an Exhibit\_\_\_(JVW-1), consisting of nine schedules and four  
5 appendices that were prepared by me or under my direction and  
6 supervision.

7 **III. ECONOMIC AND LEGAL PRINCIPLES**

8 **Q 9 How do economists define the required rate of return, or cost of**  
9 **capital, associated with particular investment decisions such as the**  
10 **decision to invest in water treatment, storage, and distribution**  
11 **facilities?**

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

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

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

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



1 A 11 The cost of capital measures the return investors can expect on  
2 investments of comparable risk. The cost of capital also measures the  
3 investor's required rate of return on investment because rational  
4 investors will not invest in a particular investment opportunity if the  
5 expected return on that opportunity is less than the cost of capital. Thus,  
6 the cost of capital is a hurdle rate for both investors and the firm.

7 **Q 12 Do all investors have the same position in the firm?**

8 A 12 No. Debt investors have a fixed claim on a firm's assets and income that  
9 must be paid prior to any payment to the firm's equity investors. Since  
10 the firm's equity investors have a residual claim on the firm's assets and  
11 income, equity investments are riskier than debt investments. Thus, the  
12 cost of equity exceeds the cost of debt and increases with the  
13 percentage of debt in the firm's capital structure.

14 **Q 13 How do economists define the cost of equity?**

15 A 13 Economists define the cost of equity as the return investors expect to  
16 receive on alternative equity investments of comparable risk. Since the  
17 return on an equity investment of comparable risk is not a contractual  
18 return, the cost of equity is more difficult to measure than the cost of  
19 debt. There is agreement, however, as I have already noted, that:  
20 (1) the cost of equity is greater than the cost of debt; (2) the cost of  
21 equity increases with the percentage of debt in the firm's capital  
22 structure; and (3) the cost of equity, like the cost of debt, is both forward  
23 looking and market based.

1 **Q 14 How do economists measure the percentages of debt and equity in**  
2 **a firm's capital structure?**

3 A 14 Economists measure the percentages of debt and equity in a firm's  
4 capital structure by first calculating the market value of the firm's debt  
5 and the market value of its equity. Economists then calculate the  
6 percentage of debt by the ratio of the market value of debt to the  
7 combined market value of debt and equity, and the percentage of equity  
8 by the ratio of the market value of equity to the combined market values  
9 of debt and equity. For example, if a firm's debt has a market value of  
10 \$25 million and its equity has a market value of \$75 million, then its total  
11 market capitalization is \$100 million, and its capital structure contains  
12 25 percent debt and 75 percent equity.

13 **Q 15 Why do economists measure a firm's capital structure in terms of**  
14 **the market values of its debt and equity?**

15 A 15 Economists measure a firm's capital structure in terms of the market  
16 values of its debt and equity because: (1) the weighted average cost of  
17 capital is defined as the return investors expect to earn on a portfolio of  
18 the company's debt and equity securities; (2) investors measure the  
19 expected return and risk on their portfolios using market value weights,  
20 not book value weights; and (3) market values are the best measures of  
21 the amounts of debt and equity investors have invested in the company  
22 on a going forward basis.

1 **Q 16 Why do investors measure the return on their investment portfolios**  
2 **using market value weights rather than book value weights?**

3 A 16 Investors measure the return on their investment portfolios using market  
4 value weights because market values are the best measure of the  
5 amounts the investors currently have invested in each security in the  
6 portfolio. From the point of view of investors, the historical cost or book  
7 value of their investment is irrelevant to the current risk and required  
8 return on their portfolios because if they were to sell their investments,  
9 they would receive market value, not historical cost. Thus, the return can  
10 only be measured in terms of market values.

11 **Q 17 Is the economic definition of the weighted average cost of capital**  
12 **consistent with regulators' traditional definition of the average cost**  
13 **of capital?**

14 A 17 No. The economic definition of the weighted average cost of capital is  
15 based on the market costs of debt and equity, the market value  
16 percentages of debt and equity in a company's capital structure, and the  
17 future expected risk of investing in the company. In contrast, regulators  
18 have traditionally defined the weighted average cost of capital using the  
19 embedded cost of debt and the book values of debt and equity in a  
20 company's capital structure.

21 **Q 18 Does the required rate of return on an investment vary with the risk**  
22 **of that investment?**

1 A 18 Yes. Since investors are averse to risk, they require a higher rate of  
2 return on investments with greater risk.

3 **Q 19 Are these economic principles regarding the fair return for capital**  
4 **recognized in any Supreme Court cases?**

5 A 19 Yes. These economic principles, relating to the supply of and demand  
6 for capital, are recognized in two United States Supreme Court cases:  
7 (1) *Bluefield Water Works and Improvement Co. v. Public Service*  
8 *Comm'n.*; and (2) *Federal Power Comm'n v. Hope Natural Gas Co.* In  
9 the *Bluefield Water Works* case, the Court states:

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

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

1 expect to earn on other investments of the same risk (the principle  
2 relating to the supply of capital).

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

5 From the investor or company point of view it is important that  
6 there be enough revenue not only for operating expenses but  
7 also for the capital costs of the business. These include  
8 service on the debt and dividends on the stock... By that  
9 standard the return to the equity owner should be  
10 commensurate with returns on investments in other  
11 enterprises having corresponding risks. That return,  
12 moreover, should be sufficient to assure confidence in the  
13 financial integrity of the enterprise, so as to maintain its credit  
14 and to attract capital. [*Federal Power Comm'n v. Hope*  
15 *Natural Gas Co.*, 320 U.S. 591, 603 (1944)]

16 **Q 20 What practical difficulties arise when one attempts to apply the**  
17 **economic principles noted above to a regulated firm?**

18 A 20 The application of these principles to the debt and preferred stock  
19 components of a regulated firm's capital structure is straightforward.  
20 Several problems arise, however, when the principles are applied to  
21 common equity. These problems stem from the fact that the cash flows  
22 to the equity investors, over any period of time, are not fixed by contract,  
23 and thus are not known with certainty. To induce equity investors to part  
24 with their money, a firm must offer them an expected return that is  
25 commensurate with expected returns on equity investments of similar  
26 risk. The need to measure expected returns makes the application of the  
27 above principles difficult.

28 **Q 21 How do you address these difficulties in your testimony?**

1 A 21 I address these difficulties by employing the comparable company  
2 approach to estimate KAWC's cost of equity.

3 **Q 22 What is the comparable company approach?**

4 A 22 The comparable company approach estimates KAWC's cost of equity by  
5 identifying a group of companies of similar risk. The cost of equity is  
6 then estimated for the companies in the proxy group.

7 **IV. BUSINESS AND FINANCIAL RISKS IN THE WATER UTILITY**  
8 **INDUSTRY**

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

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

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

21 2. Demand Uncertainty. The business risk of the water utility  
22 business is increased by the high degree of demand uncertainty in  
23 the industry. Demand uncertainty is caused primarily by: (i) wide

1 fluctuations in average temperature and rainfall from year to year;  
2 (ii) the state of the economy; and (iii) customer growth in the  
3 service territory.

4 3. Supply Uncertainty. The risk of the water utility business is further  
5 increased by the need to assure a safe and reliable supply of water  
6 to meet customer needs on any given day of the year. The Safe  
7 Drinking Water Act Amendments of 1996 authorize the  
8 Environmental Protection Agency (EPA) to periodically test the  
9 drinking water for impurities and to issue regulations requiring water  
10 utilities to reduce drinking water contaminants to an acceptable  
11 level. The EPA has exercised its authority by requiring the water  
12 utilities to meet increasingly stringent drinking water standards over  
13 time. The rising costs and uncertainty of meeting ever more  
14 stringent drinking water standards is a major risk facing the water  
15 utilities.

16 **V. COST OF EQUITY ESTIMATION METHODS**

17 **Q 24 What methods do you use to estimate the cost of common equity**  
18 **capital for KAWC?**

19 A 24 I use three generally accepted methods for estimating KAWC's cost of  
20 common equity. These are the Discounted Cash Flow (DCF), the risk  
21 premium method, and the Capital Asset Pricing Model (CAPM). The  
22 DCF method assumes that the current market price of a firm's stock is  
23 equal to the discounted value of all expected future cash flows. The risk

1 premium method assumes that the investor's required return on an  
2 equity investment is equal to the interest rate on a long-term bond plus  
3 an additional equity risk premium to compensate the investor for the risks  
4 of investing in equities compared to bonds. The CAPM assumes that the  
5 investor's required rate of return on equity is equal to a risk-free rate of  
6 interest plus the product of a company-specific risk factor, beta, and the  
7 expected risk premium on the market portfolio.

## 8 **VI. DISCOUNTED CASH FLOW (DCF) APPROACH**

9 **Q 25 Please describe the DCF model.**

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

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







1 quarterly DCF model must be used to estimate the cost of equity for  
2 these firms. The quarterly DCF model differs from the annual DCF  
3 model in that it expresses a company's price as the present discounted  
4 value of a quarterly stream of dividend payments. A complete analysis  
5 of the implications of the quarterly payment of dividends on the DCF  
6 model is provided in Exhibit\_\_(JVW-1), Appendix 1. For the reasons  
7 cited there, I employed the quarterly DCF model throughout my  
8 calculations.

9 **Q 27 Please describe the quarterly DCF model you used.**

10 A 27 The quarterly DCF model I used is described on Exhibit\_\_(JVW-1),  
11 Schedule 1 and in Appendix 1. The quarterly DCF equation shows that  
12 the cost of equity is: the sum of the future expected dividend yield and  
13 the growth rate, where the dividend in the dividend yield is the equivalent  
14 future value of the four quarterly dividends at the end of the year, and the  
15 growth rate is the expected growth in dividends or earnings per share.

16 **Q 28 In Appendix 1, you demonstrate that the quarterly DCF model**  
17 **provides the theoretically correct valuation of stocks when**  
18 **dividends are paid quarterly. Do investors, in practice, recognize**  
19 **the actual timing and magnitude of cash flows when they value**  
20 **stocks and other securities?**

21 A 28 Yes. In valuing long-term government or corporate bonds, investors  
22 recognize that interest is paid semi-annually. Thus, the price of a long-  
23 term government or corporate bond is simply the present value of the

1 semi-annual interest and principal payments on these bonds. Likewise,  
2 in valuing mortgages, investors recognize that interest is paid monthly.  
3 Thus, the value of a mortgage loan is simply the present value of the  
4 monthly interest and principal payments on the loan. In valuing stock  
5 investments, stock investors correctly recognize that dividends are paid  
6 quarterly. Thus, a firm's stock price is the present value of the stream of  
7 quarterly dividends expected from owning the stock.

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

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

18 **Q 30 How do you estimate the growth component of the quarterly DCF**  
19 **model?**

1 A 30 I use both the average analysts' estimates of future earnings per share  
2 (EPS) growth reported by I/B/E/S Thomson Reuters and the estimate of  
3 future earnings per share growth reported by Value Line.<sup>1</sup>

4 **Q 31 What are the analysts' estimates of future EPS growth?**

5 A 31 As part of their research, financial analysts working at Wall Street firms  
6 periodically estimate EPS growth for each firm they follow. The EPS  
7 forecasts for each firm are then published. Investors who are  
8 contemplating purchasing or selling shares in individual companies  
9 review the forecasts. These estimates represent five-year forecasts of  
10 EPS growth.

11 **Q 32 What is I/B/E/S?**

12 A 32 I/B/E/S is a division of Thomson Reuters that reports analysts' EPS  
13 growth forecasts for a broad group of companies. The forecasts are  
14 expressed in terms of a mean forecast and a standard deviation of  
15 forecast for each firm. Investors use the mean forecast as an estimate of  
16 future firm performance.

17 **Q 33 Why do you use the I/B/E/S growth estimates?**

18 A 33 The I/B/E/S growth rates: (1) are widely circulated in the financial  
19 community, (2) include the projections of reputable financial analysts  
20 who develop estimates of future EPS growth, (3) are reported on a timely

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<sup>1</sup> 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 also rely on the Value Line earnings growth forecasts available for American States, Aqua America, California Water, and Southwest Water.

1 basis to investors, and (4) are widely used by institutional and other  
2 investors.

3 **Q 34 Why do you rely on analysts' projections of future EPS growth in**  
4 **estimating the investors' expected growth rate rather than looking**  
5 **at historical growth rates?**

6 A 34 I rely on analysts' projections of future EPS growth because there is  
7 considerable empirical evidence that investors use analysts' forecasts to  
8 estimate future earnings growth.

9 **Q 35 Have you performed any studies concerning the use of analysts'**  
10 **forecasts as an estimate of investors' expected growth rate, g?**

11 A 35 Yes, I prepared a study in conjunction with Willard T. Carleton, Professor  
12 of Finance at the University of Arizona, on why analysts' forecasts are  
13 the best estimate of investors' expectation of future long-term growth.  
14 This study is described in a paper entitled "Investor Growth Expectations  
15 and Stock Prices: the Analysts versus Historical Growth Extrapolation,"  
16 published in the Spring 1988 edition of *The Journal of Portfolio*  
17 *Management*.

18 **Q 36 Please summarize the results of your study.**

19 A 36 First, we performed a correlation analysis to identify the historically  
20 oriented growth rates which best described a firm's stock price. Then we  
21 did a regression study comparing the historical growth rates with the  
22 average analysts' forecasts. In every case, the regression equations  
23 containing the average of analysts' forecasts statistically outperformed

1 the regression equations containing the historical growth estimates.  
2 These results are consistent with those found by Cragg and Malkiel, the  
3 early major research in this area (John G. Cragg and Burton G. Malkiel,  
4 *Expectations and the Structure of Share Prices*, University of Chicago  
5 Press, 1982). These results are also consistent with the hypothesis that  
6 investors use analysts' forecasts, rather than historically oriented growth  
7 calculations, in making stock buy and sell decisions. They provide  
8 overwhelming evidence that the analysts' forecasts of future growth are  
9 superior to historically oriented growth measures in predicting a firm's  
10 stock price.

11 **Q 37 Has your study been updated to include more recent data?**

12 A 37 Yes. Researchers at State Street Financial Advisors updated my study  
13 using data through year-end 2003. Their results continue to confirm that  
14 analysts' growth forecasts are superior to historically-oriented growth  
15 measures in predicting a firm's stock price.

16 **Q 38 What price do you use in your DCF model?**

17 A 38 I use a simple average of the monthly high and low stock prices for each  
18 firm for the three-month period ending February 2007. These high and  
19 low stock prices were obtained from Thomson Reuters.

20 **Q 39 Why do you use the three-month average stock price in applying  
21 the DCF method?**

22 A 39 I use the three-month average stock price in applying the DCF method  
23 because stock prices fluctuate daily, while financial analysts' forecasts

1 for a given company are generally changed less frequently, often on a  
2 quarterly basis. Thus, to match the stock price with an earnings forecast,  
3 it is appropriate to average stock prices over a three-month period.

4 **Q 40 Do you include an allowance for flotation costs in your DCF**  
5 **analysis?**

6 A 40 Yes. I include a five percent allowance for flotation costs in my DCF  
7 calculations.

8 **Q 41 Please explain your inclusion of flotation costs.**

9 A 41 All firms that have sold securities in the capital markets have incurred  
10 some level of flotation costs, including underwriters' commissions, legal  
11 fees, printing expense, etc. These costs are withheld from the proceeds  
12 of the stock sale or are paid separately, and must be recovered over the  
13 life of the equity issue. Costs vary depending upon the size of the issue,  
14 the type of registration method used and other factors, but in general  
15 these costs range between three and five percent of the proceeds from  
16 the issue [see Lee, Inmoo, Scott Lochhead, Jay Ritter, and  
17 Quanshui Zhao, "The Costs of Raising Capital," *The Journal of Financial*  
18 *Research*, Vol. XIX No 1 (Spring 1996), 59-74, and Clifford W. Smith,  
19 "Alternative Methods for Raising Capital," *Journal of Financial Economics*  
20 5 (1977) 273-307]. In addition to these costs, for large equity issues (in  
21 relation to outstanding equity shares), there is likely to be a decline in  
22 price associated with the sale of shares to the public. On average, the  
23 decline due to market pressure has been estimated at two to



1 three percent [see Richard H. Pettway, “The Effects of New Equity Sales  
2 Upon Utility Share Prices,” *Public Utilities Fortnightly*, May 10, 1984,  
3 35—39]. Thus, the total flotation cost, including both issuance expense  
4 and market pressure, could range anywhere from five to eight percent of  
5 the proceeds of an equity issue. I believe a combined five percent  
6 allowance for flotation costs is a conservative estimate that should be  
7 used in applying the DCF model in this proceeding.

8 **Q 42 Does KAWC issue equity in the capital markets?**

9 A 42 No. Although KAWC does not issue equity in the capital markets, its  
10 parent must issue equity to provide KAWC the necessary financing to  
11 make investments in its water supply operations in Kentucky. If the  
12 parent is not able to recover its flotation costs through KAWC’s rates, it  
13 will have no incentive to invest in KAWC.

14 **Q 43 Is a flotation cost adjustment only appropriate if a company issues  
15 stock during the test year?**

16 A 43 No. As described in Exhibit\_\_(JVW-1), Appendix 2, a flotation cost  
17 adjustment is required whether or not a company issued new stock  
18 during the test year. Previously incurred flotation costs have not been  
19 recovered in previous rate cases; rather, they are a permanent cost  
20 associated with past issues of common stock. Just as an adjustment is  
21 made to the embedded cost of debt to reflect previously incurred debt  
22 issuance costs (regardless of whether additional bond issuances were  
23 made in the test year), so should an adjustment be made to the cost of

1 equity regardless of whether additional stock was issued during the test  
2 year.

3 **Q 44 Does an allowance for recovery of flotation costs associated with**  
4 **stock sales in prior years constitute retroactive rate-making?**

5 A 44 No. An adjustment for flotation costs on equity is not meant to recover  
6 any cost that is properly assigned to prior years. In fact, the adjustment  
7 allows KAWC to recover only the current carrying costs associated with  
8 flotation expenses incurred at the time stock sales were made. The  
9 original flotation costs themselves will never be recovered, because the  
10 stock is assumed to have an infinite life.

11 **Q 45 How do you apply the DCF approach to obtain the cost of equity**  
12 **capital for KAWC?**

13 A 45 I apply the DCF approach to the publicly-traded water companies shown  
14 on Exhibit\_\_(JVW-1), Schedule 1 and the publicly-traded natural gas  
15 distribution companies (LDCs) shown on Exhibit\_\_(JVW-1), Schedule 2.

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

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

1 average DCF result for my proxy group of water companies is also  
2 shown on Exhibit\_\_(JVW-1), Schedule 1.

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

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

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

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

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

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

1

**Table 2**

2

**NUMBER OF LONG-TERM GROWTH FORECASTS FOR WATER COMPANIES**

Company	No. of I/B/E/S Analysts	No. Value Line Analysts
American States Water	1	1
Aqua America	2	1
California Water Service Group	3	1
Connecticut Water	0	0
Middlesex Water	1	0
Pennichuck	0	0
SJW Corp.	1	0
Southwest Water Co.	2	1
York Water Co.	1	0

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

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

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

14 A 51 Yes. Given the greater uncertainty in applying the DCF model to  
 15 companies with only one or two analysts' growth forecasts, as noted  
 16 above, I also apply the DCF model to an additional proxy group

1 consisting of LDCs, and each of the companies in the LDC proxy group  
2 has at least two analysts' estimates of long-term growth.

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

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

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

19 A 53 As shown in Exhibit\_\_(JVV-1), Schedule 1, my application of the DCF  
20 model to the Value Line water companies produces an average DCF  
21 result of 11.8 percent.

1 **Q 54** You note above that you also apply your DCF method to a proxy  
2 group of LDCs. Why do you apply your DCF model to a proxy  
3 group of LDCs?

4 A 54 I apply my DCF model to a proxy group of LDCs because: (1) the  
5 companies in the water company group are generally followed by only  
6 one or two analysts; (2) the LDCs are a conservative proxy for the risk of  
7 investing in water companies; and (3) it is useful to examine the cost of  
8 equity results for a larger group of companies of similar risk that have a  
9 wider following in the investment community in order to test the  
10 reasonableness of the results obtained by applying cost of equity  
11 methodologies to the small group of publicly-traded water companies.  
12 Financial theory does not require that companies be in exactly the same  
13 industry to be comparable in risk.

14 **Q 55** How do you select your proxy group of LDCs?

15 A 55 I select all the companies in Value Line's natural gas industry groups  
16 that: (1) are in the business of natural gas distribution; (2) paid dividends  
17 during every quarter of the last two years; (3) did not decrease dividends  
18 during any quarter of the past two years; (4) have at least two analysts  
19 included in the I/B/E/S consensus growth forecast;<sup>2</sup> and (5) have not  
20 announced a merger. In addition, all of the LDCs included in my group

---

<sup>2</sup> As I note above, on the basis of my professional judgment, I normally specify that the I/B/E/S long-term earnings growth forecast must include the forecasts of at least three analysts. However, in August 2008 there are only five natural gas companies with growth forecasts from at least three analysts. In this study, therefore, I also include results for companies that had growth forecasts based on two analysts' growth forecasts.

1 have an investment grade bond rating and a Value Line Safety Rank of  
2 1, 2, or 3. The LDCs in my DCF proxy group and the average DCF  
3 result are shown on Exhibit\_\_(JVW-1), Schedule 2.

4 **Q 56 How are the LDCs similar to KAWC?**

5 A 56 Like KAWC, the LDCs are regulated public utilities that: (1) invest  
6 primarily in a capital-intensive physical network that connects the  
7 customer to the source of supply; and (2) sell their products and services  
8 at regulated rates to customers whose demand is primarily dependent on  
9 weather and the state of the economy.

10 **Q 57 Does your LDC proxy group meet the standards of the *Hope* and**  
11 ***Bluefield* cases you cite above?**

12 A 57 Yes. The *Hope* and *Bluefield* standard states that a public utility should  
13 be allowed to earn a return on its investment that is commensurate with  
14 the returns investors are able to earn on investments having similar risk.  
15 The LDCs are a group of companies that meet the standards of the *Hope*  
16 and *Bluefield* cases because they are a conservative proxy for the risk of  
17 investing in KAWC.

18 **Q 58 Do you have any empirical evidence that the LDCs in your proxy**  
19 **group are a conservative proxy for KAWC?**

20 A 58 Yes. The average Value Line Safety Rank for my proxy group of LDCs  
21 is 2, on a scale where 1 is the most safe and 5 is the least safe, whereas  
22 the water companies have an average Value Line Safety Rank of 3.

1 **Q 59 Please summarize the results of your application of the DCF**  
2 **method to the LDC proxy group.**

3 A 59 My application of the DCF method to the LDC proxy group produces an  
4 average DCF result of 11.1 percent, as shown on Exhibit\_\_(JVW-1),  
5 Schedule 2.

6 **Q 60 You have presented the results of two DCF analyses. Based on**  
7 **your DCF studies, what is your conclusion regarding KAWC's**  
8 **DCF-based cost of equity?**

9 A 60 My application of the DCF model produces an average DCF result of  
10 11.8 percent for the water companies and 11.1 percent for the LDCs.  
11 Based on these data, I conclude that the DCF cost of equity for KAWC is  
12 11.5 percent.

## 13 **VII. RISK PREMIUM APPROACH**

14 **Q 61 Please describe the risk premium approach to estimating KAWC's**  
15 **cost of equity.**

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

22 **Q 62 How do you measure the required risk premium on an equity**  
23 **investment in KAWC?**



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

4 **A. Ex Ante Risk Premium Approach**

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

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

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

12 where:

14  $RP_{\text{PROXY}}$  = the required risk premium on an equity investment in  
15 the proxy group of companies;

16  $DCF_{\text{PROXY}}$  = average DCF estimated cost of equity on a portfolio of  
17 proxy companies; and

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

20 I then perform a regression analysis to determine if there is a relationship  
21 between the calculated risk premium and interest rates. Finally, I use the  
22 results of the regression analysis to estimate the investors' required risk  
23 premium. To estimate the cost of equity, I then add the required risk  
24 premium to the forecasted interest rate on A-rated utility bonds. A detailed  
25 description of my ex ante risk premium studies is contained in Appendix 3,

1 and the underlying DCF results and interest rates are displayed in  
2 Exhibit\_\_(JVW-1), Schedule 3.

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

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

12 **Q 65 What are the results of your ex ante risk premium study?**

13 A 65 To estimate the cost of equity using the ex ante risk premium method,  
14 one may add the estimated risk premium over the yield on A-rated utility  
15 bonds to the average yield to maturity on A-rated utility bonds. At August  
16 2008, the average yield to maturity on A-rated utility bonds is  
17 6.38 percent. My analyses produce an estimated risk premium over the  
18 yield on A-rated utility bonds equal to 4.73 percent. Adding an estimated  
19 risk premium of 4.73 percent to the 6.38 percent average yield to  
20 maturity on A-rated utility bonds produces a cost of equity estimate of  
21 11.1 percent using the ex ante risk premium method. (see  
22 Exhibit\_\_(JVW-1), Schedule 3).

1           **B. Ex Post Risk Premium Approach**

2   **Q 66   Please describe your ex post risk premium approach for measuring**  
3           **the required risk premium on an equity investment in KAWC.**

4   A 66   I first perform a study of the comparable returns received by bond and  
5           stock investors over the 71 years of my study. I estimated the returns on  
6           stock and bond portfolios, using stock price and dividend yield data on  
7           the S&P 500 and bond yield data on Moody's A-rated Utility Bonds. My  
8           study consisted of making an investment of one dollar in the S&P 500  
9           and Moody's A-rated utility bonds at the beginning of 1937, and  
10          reinvesting the principal plus return each year to 2008. The return  
11          associated with each stock portfolio is the sum of the annual dividend  
12          yield and capital gain (or loss) which accrued to this portfolio during the  
13          year(s) in which it was held. The return associated with the bond  
14          portfolio, on the other hand, is the sum of the annual coupon yield and  
15          capital gain (or loss) which accrued to the bond portfolio during the  
16          year(s) in which it was held. The resulting annual returns on the stock  
17          and bond portfolios purchased in each year between 1937 and 2006 are  
18          shown on Exhibit\_\_(JWV-1), Schedule 4. The average annual return on  
19          an investment in the S&P 500 stock portfolio is 11.4 percent, while the  
20          average annual return on an investment in the Moody's A-rated utility  
21          bond portfolio was 6.4 percent. The risk premium on the S&P 500 stock  
22          portfolio is, therefore, 5.0 percent.

1 I also conduct a second study using stock data on the  
2 S&P Utilities rather than the S&P 500. The S&P Utility stock portfolio  
3 shows an average annual return of 11.0 percent per year. Thus, the  
4 return on the S&P Utility stock portfolio exceeded the return on the  
5 Moody's A-rated utility bond portfolio by 4.6 percent (see  
6 Exhibit\_\_(JVW-1), Schedule 5).

7 **Q 67 Why is it appropriate to perform your ex post risk premium analysis**  
8 **using both the S&P 500 and the S&P Utility Stock indices?**

9 A 67 I have performed my ex post risk premium analysis on both the S&P 500  
10 and the S&P Utilities as upper and lower bounds for the required risk  
11 premium on an equity investment in KAWC because I believe KAWC  
12 faces risks today that are somewhere in between the average risk of the  
13 S&P Utilities and the S&P 500 over the years 1937 to 2008. Specifically,  
14 the risk premium on the S&P Utilities, 4.6 percent, represents a lower  
15 bound for the required risk premium on an equity investment in KAWC  
16 because KAWC is currently more risky than an investment in the  
17 average utility in the S&P Utilities index over the entire period 1936 to the  
18 present. On the other hand, the risk premium on the S&P 500,  
19 5.0 percent, represents an upper bound because an investment in  
20 KAWC is less risky than an investment in the S&P 500 over the period  
21 1937 to the present. I use the average of the two risk premiums as my  
22 estimate of the required risk premium for KAWC in my ex post risk  
23 premium approach.

1 **Q 68 Why do you analyze investors' experiences over such a long time**  
2 **frame?**

3 A 68 Because day-to-day stock price movements can be somewhat random, it  
4 is inappropriate to rely on short-run movements in stock prices in order to  
5 derive a reliable risk premium. Rather than buying and selling frequently  
6 in anticipation of highly volatile price movements, most investors employ  
7 a strategy of buying and holding a diversified portfolio of stocks. This  
8 buy-and-hold strategy will allow an investor to achieve a much more  
9 predictable long-run return on stock investments and at the same time  
10 will minimize transaction costs. The situation is very similar to the  
11 problem of predicting the results of coin tosses. I cannot predict with any  
12 reasonable degree of accuracy the result of a single, or even a few, flips  
13 of a balanced coin; but I can predict with a good deal of confidence that  
14 approximately 50 heads will appear in 100 tosses of this coin. Under  
15 these circumstances, it is most appropriate to estimate future experience  
16 from long-run evidence of investment performance.

17 **Q 69 Would your study provide a different ex post risk premium if you**  
18 **started with a different time period?**

19 A 69 Yes. The ex post risk premium results do vary somewhat depending on  
20 the historical time period chosen. My policy is to go back as far in history  
21 as I can get reliable data. I believe it is most meaningful to begin after  
22 the passage and implementation of the Public Utility Holding Company  
23 Act of 1935. This Act significantly changed the structure of the public

1 utility industry. Since the Public Utility Holding Company Act of 1935  
2 was not implemented until the beginning of 1937, I feel that numbers  
3 taken from before this date are not be comparable to those taken after.  
4 (The repeal of the 1935 Act does not have a material impact on the  
5 structure of the public utility industry; thus, the Act's repeal does not have  
6 any impact on my choice of time period.)

7 **Q 70 Why is it necessary to examine the yield from debt investments in**  
8 **order to determine the investors' required rate of return on equity**  
9 **capital?**

10 A 70 As previously explained, investors expect to earn a return on their equity  
11 investment that exceeds currently available bond yields because the  
12 return on equity, being a residual return, is less certain than the yield on  
13 bonds and investors must be compensated for this uncertainty. Second,  
14 investors' current expectations concerning the amount by which the  
15 return on equity will exceed the bond yield will be influenced by historical  
16 differences in returns to bond and stock investors. For these reasons,  
17 we can estimate investors' current expected returns from an equity  
18 investment from knowledge of current bond yields and past differences  
19 between returns on stocks and bonds.

20 **Q 71 Has there been any significant trend in the ex post equity risk**  
21 **premium over the 1937 to 2006 time period of your study?**

22 A 71 No. Statisticians test for trends in data series by regressing the data  
23 observations against time. I have performed such a time series

1 regression on my two data sets of historical risk premiums. As shown  
 2 below in Tables 2 and 3, there is no statistically significant trend in my  
 3 risk premium data. Indeed, the coefficient on the time variable is  
 4 insignificantly different from zero (if there were a trend, the coefficient on  
 5 the time variable should be significantly different from zero).

**TABLE 3**  
**REGRESSION OUTPUT FOR RISK PREMIUM ON S&P 500**

Line No.		Intercept	Time	Adjusted R Square	F
1	Coefficient	2.280	-0.001	0.006	1.430
2	T Statistic	1.223	-1.196		

**TABLE 4**  
**REGRESSION OUTPUT FOR RISK PREMIUM ON S&P UTILITIES**

Line No.		Intercept	Time	Adjusted R Square	F
1	Coefficient	1.004	-0.000	-0.010	0.321
2	T Statistic	0.594	-0.586		

6 **Q 72 Do you have any other evidence that there has been no significant**  
 7 **trend in ex post risk premium results over time?**

8 **A 72** Yes. The 2008 Ibbotson® *Stocks, Bonds, Bills, and Inflation® Valuation*  
 9 *Yearbook* (“Ibbotson SBBI”) published by Morningstar, Inc., contains an  
 10 analysis of “trends” in historical risk premium data. Ibbotson SBBI uses  
 11 correlation analysis to determine if there is any pattern or “trend” in risk  
 12 premiums over time. Their analysis demonstrates that there are no  
 13 trends in risk premiums over time.

1 **Q 73 What is the significance of the evidence that historical risk**  
2 **premiums have no trend or other statistical pattern over time?**

3 A 73 The significance of this evidence is that the average historical risk  
4 premium is a good estimate of the future expected risk premium. As  
5 noted in Ibbotson SBBI:

6 The significance of this evidence is that the realized equity risk  
7 premium next year will not be dependent on the realized equity  
8 risk premium from this year. That is, there is no discernable  
9 pattern in the realized equity risk premium—it is virtually  
10 impossible to forecast next year's realized risk premium based  
11 on the premium of the previous year. For example, if this year's  
12 difference between the riskless rate and the return on the stock  
13 market is higher than last year's, that does not imply that next  
14 year's will be higher than this year's. It is as likely to be higher  
15 as it is lower. The best estimate of the expected value of a  
16 variable that has behaved randomly in the past is the average (or  
17 arithmetic mean) of its past values. [Ibbotson SBBI, p. 81.]

18 **Q 74 You note that Ibbotson SBBI also provides historical risk premium**  
19 **data. How does the Ibbotson SBBI risk premium compare to your**  
20 **risk premiums?**

21 A 74 Ibbotson SBBI obtains a 7.1 percent risk premium on the S&P 500  
22 versus 20-year Treasury bonds. Since the yield on 20-year Treasury  
23 bonds is currently approximately 190 basis points less than the yield on  
24 A-rated utility bonds, the Ibbotson SBBI data indicate an approximate  
25 5.2 percent risk premium on the S&P 500 over A-rated utility bonds. As  
26 shown on Exhibit\_\_(JVV-1), Schedules 4 and 5, my studies produce a  
27 risk premium over A - rated utility bonds in the range of 4.6 percent to  
28 5.0 percent.



1 **Q 75 What conclusions do you draw from your ex post risk premium**  
2 **analyses about the required return on an equity investment in**  
3 **KAWC?**

4 A 75 My studies provide strong evidence that investors today require an equity  
5 return of approximately 4.6 to 5.0 percentage points above the expected  
6 yield on A-rated utility bonds. The average yield on Moody's A - rated  
7 utility bonds at August 2008 is 6.38 percent. Adding a 4.6 to  
8 5.0 percentage point risk premium to a yield of 6.38 percent on A-rated  
9 utility bonds, I obtain an expected return on equity in the range  
10 11.0 percent to 11.4 percent, with a midpoint of 11.2 percent. Because  
11 the ex post methodology does not reflect flotation costs, I have added a  
12 14 basis-point allowance for flotation costs, which I determined by  
13 calculating the difference in my DCF results with and without a flotation  
14 cost allowance. Adding a 14 basis-point allowance for flotation costs, I  
15 obtain an estimate of 11.3 percent as the cost of equity using the ex post  
16 risk premium method.

17 **VIII. CAPITAL ASSET PRICING MODEL**

18 **Q 76 What is the CAPM?**

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

23 
$$\text{Cost of equity} = \text{Risk-free rate} + \text{Equity beta} \times \text{Market risk premium}$$

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

6 **Q 77 How do you use the CAPM to estimate the cost of equity for your**  
7 **comparable companies?**

8 A 77 The CAPM requires an estimate of the risk-free rate, the company-  
9 specific risk factor or beta, and the expected return on the market  
10 portfolio. For my estimate of the risk-free rate, I use the August 2008  
11 average yield to maturity on long-term Treasury bonds of 4.53 percent.  
12 For my estimate of the company-specific risk, or beta, I use the average  
13 0.96 Value Line beta for my comparable water companies and the  
14 average 0.90 Value line beta for my natural gas companies. For my  
15 estimate of the expected risk premium on the market portfolio, I use two  
16 approaches. First, I estimate the risk premium on the market portfolio  
17 from the difference between the arithmetic mean return on the S&P 500  
18 and the income return on 20-year Treasury bonds as reported by  
19 Ibbotson SBBI, 7.1 percent. Second, I estimate the risk premium on the  
20 market portfolio from the difference between the DCF cost of equity for  
21 the S&P 500, 13.9 percent, and the average yield to maturity on 20-year  
22 Treasury bonds, 4.53 percent. My second approach produces a risk  
23 premium equal to 9.37 percent.

1           **A. Historical CAPM**

2   **Q 78 Why do you recommend that the risk premium on the market**  
3           **portfolio be estimated using the arithmetic mean return on the S&P**  
4           **500?**

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

8                   The equity risk premium data presented in this book are arithmetic  
9                   average risk premia as opposed to geometric average risk premia.  
10                  The arithmetic average equity risk premium can be demonstrated to  
11                  be most appropriate when discounting future cash flows. For use as  
12                  the expected equity risk premium in either the CAPM or the building  
13                  block approach, the arithmetic mean or the simple difference of the  
14                  arithmetic means of stock market returns and riskless rates is the  
15                  relevant number. This is because both the CAPM and the building  
16                  block approach are additive models, in which the cost of capital is  
17                  the sum of its parts. The geometric average is more appropriate for  
18                  reporting past performance, since it represents the compound  
19                  average return. [2008 Ibbotson SBBI, p. 77.]

20                A discussion of the importance of using arithmetic mean returns in the  
21                context of CAPM or risk premium studies is contained in Exhibit\_\_(JVV-  
22                1), Schedule 6.

23   **Q 79 Why do you recommend that the risk premium on the market**  
24           **portfolio be measured using the income return on 20-year Treasury**  
25           **bonds rather than the total return on these bonds?**

26   A 79 As discussed above, the CAPM requires an estimate of the risk-free rate  
27           of interest. When Treasury bonds are issued, the income return on the  
28           bond is risk free, but the total return, which includes both an income and

1 capital gains or losses, is not. Thus, the income return should be used in  
2 the CAPM because it is only the income return that is risk free.

3 **Q 80 What CAPM result do you obtain when you estimate the expected**  
4 **risk premium on the market portfolio from the arithmetic mean**  
5 **difference between the return on the market and the yield on 20-**  
6 **year Treasury bonds?**

7 A 80 For my water company comparable group, I obtain a CAPM cost of  
8 equity estimate of 11.5 percent, and the CAPM cost of equity estimate  
9 for my natural gas company comparable group is 11.3 percent (see  
10 Exhibit\_\_(JVW-1), Schedule 7). My estimate of the historical CAPM cost  
11 of equity is thus 11.4 percent.

## 12 **B. DCF-Based CAPM**

13 **Q 81 What CAPM result do you obtain when you estimate the expected**  
14 **return on the market portfolio by applying the DCF model to the**  
15 **S&P 500?**

16 A 81 I obtain a CAPM cost of equity estimate of 13.5 percent for my water  
17 company group, and for my gas company group, a CAPM cost of equity  
18 estimate of 13.3 percent (see Exhibit\_\_(JVW-1), Schedule 8). My  
19 estimate of the DCF-based CAPM cost of equity is 13.4 percent.

20 **Q. 82 You have estimated CAPM results in the range 11.4 percent to**  
21 **13.4 percent. Can a reasonable application of the CAPM produce**  
22 **higher cost of equity results than you have just reported?**

1 A. 82 Yes. The CAPM tends to underestimate the cost of equity for small  
2 market capitalization companies such as the water and natural gas proxy  
3 companies.

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

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

10 **TABLE 5**  
11 **IBBOTSON ESTIMATES OF PREMIUMS FOR COMPANY SIZE<sup>3</sup>**

Size	Smallest Mkt. Cap. (\$Millions)	Premium
Large-Cap (No Adjustment)	9,274.049	-
Mid-Cap	2,413.583	0.92%
Low-Cap	725.267	1.65%
Micro-Cap	1.922	3.65%

12 **IX. FAIR RATE OF RETURN ON EQUITY**

13 **Q 84 Please summarize your findings concerning KAWC's cost of equity.**

14 A 84 Based on my application of several cost of equity methods to my  
15 comparable companies, I conclude that my comparable companies' cost  
16 of equity is in the range 11.1 percent to 13.4 percent.

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<sup>3</sup> See 2008 Ibbotson® SBBI® Valuation Yearbook published by Morningstar.

1  
2

**TABLE 6  
COST OF EQUITY MODEL RESULTS**

<b>Method</b>	<b>Cost of Equity</b>
Discounted Cash Flow	11.5%
Ex Ante Risk Premium	11.1%
Ex Post Risk Premium	11.3%
Historical CAPM	11.4%
DCF CAPM	13.4%

3

4 **Q 85 Do your cost of equity results for your proxy groups depend on the**  
5 **percentages of debt and equity in your proxy companies' average**  
6 **capital structure?**

7 A 85 Yes. The cost of equity results for my proxy group reflect the financial  
8 risk associated with my proxy companies' average capital structure,  
9 where the capital structure weights are measured in terms of market  
10 values. Since financial leverage, that is, the use of debt financing,  
11 increases the risk of investing in the proxy companies' equity, the cost of  
12 equity would be higher for a company with a capital structure containing  
13 more leverage.

14 **Q 86 What are the average percentages of debt and equity in your proxy**  
15 **companies' capital structures?**

16 A 86 My proxy group of water companies has an average capital structure  
17 containing 2 percent short-term debt, 31 percent long-term debt,  
18 0 percent preferred stock, and 67 percent common equity. My proxy  
19 group of LDCs has an average capital structure containing 5 percent  
20 short-term debt, 26 percent long-term debt, 0 percent preferred stock,

1 and 69 percent common equity. These data are shown in  
2 Exhibit\_\_\_(JVW-1), Schedule 9.

3 **Q 87 How does the average capital structure of your proxy companies**  
4 **compare to KAWC's forecasted 13-month average capital**  
5 **structure?**

6 A 87 As described in the testimony of Company Witness Miller, KAWC's  
7 forecasted 13-month average capital structure contains 10.577 percent  
8 short-term debt, 44.628 percent long-term debt, 2.038 percent preferred  
9 stock, and 42.757 percent common equity. Thus, KAWC's forecasted  
10 capital structure is significantly more highly leveraged than the average  
11 capital structure of my proxy companies.

12 **Q 88 You note earlier that the cost of equity depends on a company's**  
13 **capital structure. Is there any way to adjust the cost of equity for**  
14 **your proxy companies to reflect the higher leverage in KAWC's**  
15 **capital structure?**

16 A 88 Yes. Since my proxy groups are comparable in risk to KAWC, KAWC  
17 should have the same weighted average cost of capital as my proxy  
18 companies. It is a simple matter to determine what cost of equity KAWC  
19 should have in order to have the same weighted average cost of capital  
20 as my proxy companies. Since KAWC's ratemaking capital structure  
21 contains significantly more leverage than the average capital structure of  
22 my proxy companies, and the cost of equity increases with leverage, it is

1           evident that such an adjustment would produce a significantly higher cost  
2           of equity for KAWC.

3   **Q 89   What is your recommendation as to a fair rate of return on common**  
4           **equity for KAWC?**

5   A 89   I conservatively recommend that KAWC be allowed a fair rate of return  
6           on common equity equal to 11.5 percent.

7   **Q 90   Does this conclude your testimony?**

8   A 90   Yes, it does.



## LIST OF SCHEDULES AND APPENDICES

- Schedule 1 Summary of Discounted Cash Flow Analysis for Value Line Water Companies
- Schedule 2 Summary of Discounted Cash Flow Analysis for Value Line Natural Gas Distribution Companies
- Schedule 3 Comparison of DCF Expected Return on an Equity Investment in Natural Gas Distribution Companies to the Interest Rate on A-rated Utility Bonds
- Schedule 4 Comparative Returns on S&P 500 Stock Index and Moody's A-Rated Bonds 1937—2008
- Schedule 5 Comparative Returns on S&P Utility Stocks and Moody's A-Rated Bonds 1937—2008
- Schedule 6 Using the Arithmetic Mean to Estimate the Cost of Equity Capital Comparative Returns on S&P Utility Stocks and Moody's A-Rated Bonds
- Schedule 7 Calculation of Capital Asset Pricing Model Cost of Equity Using the Ibbotson<sup>®</sup> SBBI<sup>®</sup> 7.1 Percent Risk Premium
- Schedule 8 Calculation of Capital Asset Pricing Model Cost of Equity Using DCF Estimate of the Expected Rate of Return on the Market Portfolio
- Schedule 9 Average Capital Structure of Proxy Company Groups
  
- Appendix 1 Derivation of the Quarterly DCF Model
- Appendix 2 Adjusting for Flotation Costs in Determining a Public Utility's Allowed Rate of Return on Equity
- Appendix 3 Ex Ante Risk Premium Approach
- Appendix 4 Ex Post Risk Premium Approach

**KENTUCKY-AMERICAN WATER COMPANY**  
**EXHIBIT\_\_(JVW-1)**  
**SCHEDULE 1**  
**SUMMARY OF DISCOUNTED CASH FLOW ANALYSIS**  
**FOR PROXY WATER COMPANY COMPANIES**

LINE NO.	COMPANY	d <sub>0</sub>	P <sub>0</sub>	I/B/E/S GROWTH	VALUE LINE EPS GROWTH	AVERAGE GROWTH	MARKET VALUE	COST OF EQUITY
1	American States Water	0.250	35.960	4.00%	10.00%	7.0%	682	10.3%
3	Aqua America	0.125	16.625	8.00%	9.00%	8.5%	2,467	12.1%
4	California Water Service	0.293	35.558	7.67%	8.50%	8.1%	814	12.0%
5	Middlesex Water	0.175	17.605	8.00%		8.0%	235	12.7%
6	SJW Corp.	0.161	27.083	10.00%		10.0%	513	12.8%
7	Southwest Water Co.	0.060	10.558	4.50%	12.00%	8.3%	291	10.9%
8	York Water Co.	0.118	14.757	8.00%		8.0%	159	11.6%
9	Average							11.8%

Notes:

- d<sub>0</sub> = Most recent quarterly dividend.  
d<sub>1</sub>,d<sub>2</sub>,d<sub>3</sub>,d<sub>4</sub> = Next four quarterly dividends, calculated by multiplying the last four quarterly dividends per *Value Line* by the factor (1 + g).  
P<sub>0</sub> = Average of the monthly high and low stock prices during the three months ending August 2008 per Thomson Reuters.  
FC = Flotation costs expressed as a percent of gross proceeds.  
g = Average of I/B/E/S and Value Line forecasts of future earnings growth August 2008.  
k = Cost of equity using the quarterly version of the DCF model shown by the formula below:

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

**KENTUCKY-AMERICAN WATER COMPANY**  
**EXHIBIT\_\_(JVW-1)**  
**SCHEDULE 2**  
**SUMMARY OF DISCOUNTED CASH FLOW ANALYSIS**  
**FOR NATURAL GAS DISTRIBUTION COMPANIES**

LINE NO.	COMPANY	d <sub>0</sub>	P <sub>0</sub>	GROWTH	COST OF EQUITY
1	AGL Resources	0.420	34.140	5.25%	10.9%
2	Atmos Energy	0.325	26.760	5.00%	10.6%
3	Energen Corp.	0.120	67.378	10.75%	11.6%
4	Equitable Resources	0.220	60.942	11.67%	13.5%
5	Nicor Inc.	0.465	42.023	4.25%	9.3%
6	Northwest Nat. Gas	0.375	46.147	4.83%	8.5%
7	ONEOK Inc.	0.380	46.787	9.07%	12.9%
8	Piedmont Natural Gas	0.260	26.771	5.75%	10.1%
9	South Jersey Inds.	0.270	36.922	6.67%	9.9%
10	Questar Corp.	0.123	60.583	9.00%	10.0%
11	Southwest Gas	0.225	29.380	6.00%	9.5%
12	Market-Weighted Average				11.1%

Notes:

- d<sub>0</sub> = Most recent quarterly dividend.  
d<sub>1</sub>,d<sub>2</sub>,d<sub>3</sub>,d<sub>4</sub> = Next four quarterly dividends, calculated by multiplying the last four quarterly dividends per *Value Line* by the factor (1 + g).  
P<sub>0</sub> = Average of the monthly high and low stock prices during the three months ending August 2008 from Thomson Reuters.  
FC = Flotation costs expressed as a percent of gross proceeds.  
g = I/B/E/S forecast of future earnings growth August 2008.  
k = Cost of equity using the quarterly version of the DCF model shown by the formula below:

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

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

Line No.	Date	Dcf	Bond Yield	Risk Premium
1	Jun-98	0.1154	7.03%	0.0451
2	Jul-98	0.1186	7.03%	0.0483
3	Aug-98	0.1234	7.00%	0.0534
4	Sep-98	0.1273	6.93%	0.0580
5	Oct-98	0.1260	6.96%	0.0564
6	Nov-98	0.1211	7.03%	0.0508
7	Dec-98	0.1185	6.91%	0.0494
8	Jan-99	0.1195	6.97%	0.0498
9	Feb-99	0.1243	7.09%	0.0534
10	Mar-99	0.1257	7.26%	0.0531
11	Apr-99	0.1260	7.22%	0.0538
12	May-99	0.1221	7.47%	0.0474
13	Jun-99	0.1208	7.74%	0.0434
14	Jul-99	0.1222	7.71%	0.0451
15	Aug-99	0.1220	7.91%	0.0429
16	Sep-99	0.1226	7.93%	0.0433
17	Oct-99	0.1233	8.06%	0.0427
18	Nov-99	0.1240	7.94%	0.0446
19	Dec-99	0.1280	8.14%	0.0466
20	Jan-00	0.1301	8.35%	0.0466
21	Feb-00	0.1344	8.25%	0.0519
22	Mar-00	0.1344	8.28%	0.0516
23	Apr-00	0.1316	8.29%	0.0487
24	May-00	0.1292	8.70%	0.0422
25	Jun-00	0.1295	8.36%	0.0459
26	Jul-00	0.1317	8.25%	0.0492
27	Aug-00	0.1290	8.13%	0.0477
28	Sep-00	0.1257	8.23%	0.0434
29	Oct-00	0.1260	8.14%	0.0446
30	Nov-00	0.1251	8.11%	0.0440
31	Dec-00	0.1239	7.84%	0.0455
32	Jan-01	0.1261	7.80%	0.0481
33	Feb-01	0.1261	7.74%	0.0487
34	Mar-01	0.1275	7.68%	0.0507
35	Apr-01	0.1227	7.94%	0.0433
36	May-01	0.1302	7.99%	0.0503
37	Jun-01	0.1304	7.85%	0.0519
38	Jul-01	0.1338	7.78%	0.0560
39	Aug-01	0.1327	7.59%	0.0568

Line No.	Date	Dcf	Bond Yield	Risk Premium
40	Sep-01	0.1268	7.75%	0.0493
41	Oct-01	0.1268	7.63%	0.0505
42	Nov-01	0.1268	7.57%	0.0511
43	Dec-01	0.1254	7.83%	0.0471
44	Jan-02	0.1236	7.66%	0.0470
45	Feb-02	0.1241	7.54%	0.0487
46	Mar-02	0.1189	7.76%	0.0413
47	Apr-02	0.1159	7.57%	0.0402
48	May-02	0.1162	7.52%	0.0410
49	Jun-02	0.1170	7.41%	0.0429
50	Jul-02	0.1242	7.31%	0.0511
51	Aug-02	0.1234	7.17%	0.0517
52	Sep-02	0.1260	7.08%	0.0552
53	Oct-02	0.1250	7.23%	0.0527
54	Nov-02	0.1221	7.14%	0.0507
55	Dec-02	0.1216	7.07%	0.0509
56	Jan-03	0.1219	7.06%	0.0513
57	Feb-03	0.1232	6.93%	0.0539
58	Mar-03	0.1195	6.79%	0.0516
59	Apr-03	0.1162	6.64%	0.0498
60	May-03	0.1126	6.36%	0.0490
61	Jun-03	0.1114	6.21%	0.0493
62	Jul-03	0.1127	6.57%	0.0470
63	Aug-03	0.1139	6.78%	0.0461
64	Sep-03	0.1127	6.56%	0.0471
65	Oct-03	0.1123	6.43%	0.0480
66	Nov-03	0.1089	6.37%	0.0452
67	Dec-03	0.1071	6.27%	0.0444
68	Jan-04	0.1059	6.15%	0.0444
69	Feb-04	0.1039	6.15%	0.0424
70	Mar-04	0.1037	5.97%	0.0440
71	Apr-04	0.1041	6.35%	0.0406
72	May-04	0.1045	6.62%	0.0383
73	Jun-04	0.1036	6.46%	0.0390
74	Jul-04	0.1011	6.27%	0.0384
75	Aug-04	0.1008	6.14%	0.0394
76	Sep-04	0.0976	5.98%	0.0378
77	Oct-04	0.0974	5.94%	0.0380
78	Nov-04	0.0962	5.97%	0.0365
79	Dec-04	0.0970	5.92%	0.0378
80	Jan-05	0.0990	5.78%	0.0412
81	Feb-05	0.0979	5.61%	0.0418
82	Mar-05	0.0979	5.83%	0.0396
83	Apr-05	0.0988	5.64%	0.0424
84	May-05	0.0981	5.53%	0.0427

Line No.	Date	Dcf	Bond Yield	Risk Premium
85	Jun-05	0.0976	5.40%	0.0436
86	Jul-05	0.0966	5.51%	0.0415
87	Aug-05	0.0969	5.50%	0.0419
88	Sep-05	0.0980	5.52%	0.0428
89	Oct-05	0.0990	5.79%	0.0411
90	Nov-05	0.1049	5.88%	0.0461
91	Dec-05	0.1045	5.80%	0.0465
92	Jan-06	0.0982	5.75%	0.0407
93	Feb-06	0.1124	5.82%	0.0542
94	Mar-06	0.1127	5.98%	0.0529
95	Apr-06	0.1100	6.29%	0.0471
96	May-06	0.1056	6.42%	0.0414
97	Jun-06	0.1049	6.40%	0.0409
98	Jul-06	0.1087	6.37%	0.0450
99	Aug-06	0.1041	6.20%	0.0421
100	Sep-06	0.1053	6.00%	0.0453
101	Oct-06	0.1030	5.98%	0.0432
102	Nov-06	0.1033	5.80%	0.0453
103	Dec-06	0.1035	5.81%	0.0454
104	Jan-07	0.1013	5.96%	0.0417
105	Feb-07	0.1018	5.90%	0.0428
106	Mar-07	0.1018	5.85%	0.0433
107	Apr-07	0.1007	5.97%	0.0410
108	May-07	0.0967	5.99%	0.0368
109	Jun-07	0.0970	6.30%	0.0340
110	Jul-07	0.1006	6.25%	0.0381
111	Aug-07	0.1021	6.24%	0.0397
112	Sep-07	0.1014	6.18%	0.0396
113	Oct-07	0.1080	6.11%	0.0469
114	Nov-07	0.1083	5.97%	0.0486
115	Dec-07	0.1084	6.16%	0.0468
116	Jan-08	0.1113	6.02%	0.0511
117	Feb-08	0.1139	6.21%	0.0518
118	Mar-08	0.1147	6.20%	0.0527
119	Apr-08	0.1167	6.29%	0.0538
120	May-08	0.1069	6.27%	0.0442
121	Jun-08	0.1062	6.38%	0.0424
122	Jul-08	0.1086	6.39%	0.0447
123	Aug-08	0.1142	6.38%	0.0504
124	Average	0.1142	6.81%	0.0461

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

- D<sub>0</sub> = Latest quarterly dividend per *Value Line*.
- P<sub>0</sub> = Average of the monthly high and low stock prices for each month from Thomson Reuters.
- FC = Flotation costs expressed as a percent of gross proceeds.

- g = I/B/E/S forecast of future earnings growth for each month.  
k = Cost of equity using the quarterly version of the DCF model shown by the formula below:

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

**KENTUCKY-AMERICAN WATER COMPANY**  
**EXHIBIT\_(JVW-1)**  
**SCHEDULE 4**  
**COMPARATIVE RETURNS ON S&P 500 STOCK INDEX**  
**AND MOODY'S A-RATED BONDS 1937 – 2008**

LINE NO.	YEAR	S&P 500 STOCK PRICE	STOCK DIVIDEND YIELD	STOCK RETURN	A-RATED BOND PRICE	BOND RETURN
1	2008	1,380.33	0.0211		\$72.25	
2	2007	1,424.161	0.0181	-1.27%	\$72.91	4.59%
3	2006	1,278.72	0.0183	13.20%	\$75.25	2.20%
4	2005	1,181.41	0.0177	10.01%	\$74.91	5.80%
5	2004	1,132.52	0.0162	5.94%	\$70.87	11.34%
6	2003	895.84	0.0180	28.22%	\$62.26	20.27%
7	2002	1,140.21	0.0138	-20.05%	\$57.44	15.35%
8	2001	1,335.63	0.0116	-13.47%	\$56.40	8.93%
9	2000	1,425.59	0.0118	-5.13%	\$52.60	14.82%
10	1999	1,248.77	0.0130	15.46%	\$63.03	-10.20%
11	1998	963.35	0.0162	31.25%	\$62.43	7.38%
12	1997	766.22	0.0195	27.68%	\$56.62	17.32%
13	1996	614.42	0.0231	27.02%	\$60.91	-0.48%
14	1995	465.25	0.0287	34.93%	\$50.22	29.26%
15	1994	472.99	0.0269	1.05%	\$60.01	-9.65%
16	1993	435.23	0.0288	11.56%	\$53.13	20.48%
17	1992	416.08	0.0290	7.50%	\$49.56	15.27%
18	1991	325.49	0.0382	31.65%	\$44.84	19.44%
19	1990	339.97	0.0341	-0.85%	\$45.60	7.11%
20	1989	285.41	0.0364	22.76%	\$43.06	15.18%
21	1988	250.48	0.0366	17.61%	\$40.10	17.36%
22	1987	264.51	0.0317	-2.13%	\$48.92	-9.84%
23	1986	208.19	0.0390	30.95%	\$39.98	32.36%
24	1985	171.61	0.0451	25.83%	\$32.57	35.05%
25	1984	166.39	0.0427	7.41%	\$31.49	16.12%
26	1983	144.27	0.0479	20.12%	\$29.41	20.65%
27	1982	117.28	0.0595	28.96%	\$24.48	36.48%
28	1981	132.97	0.0480	-7.00%	\$29.37	-3.01%
29	1980	110.87	0.0541	25.34%	\$34.69	-3.81%
30	1979	99.71	0.0533	16.52%	\$43.91	-11.89%
31	1978	90.25	0.0532	15.80%	\$49.09	-2.40%
32	1977	103.80	0.0399	-9.06%	\$50.95	4.20%
33	1976	96.86	0.0380	10.96%	\$43.91	25.13%
34	1975	72.56	0.0507	38.56%	\$41.76	14.75%
35	1974	96.11	0.0364	-20.86%	\$52.54	-12.91%
36	1973	118.40	0.0269	-16.14%	\$58.51	-3.37%
37	1972	103.30	0.0296	17.58%	\$56.47	10.69%
38	1971	93.49	0.0332	13.81%	\$53.93	12.13%



LINE NO.	YEAR	S&P 500 STOCK PRICE	STOCK DIVIDEND YIELD	STOCK RETURN	A-RATED BOND PRICE	BOND RETURN
39	1970	90.31	0.0356	7.08%	\$50.46	14.81%
40	1969	102.00	0.0306	-8.40%	\$62.43	-12.76%
41	1968	95.04	0.0313	10.45%	\$66.97	-0.81%
42	1967	84.45	0.0351	16.05%	\$78.69	-9.81%
43	1966	93.32	0.0302	-6.48%	\$86.57	-4.48%
44	1965	86.12	0.0299	11.35%	\$91.40	-0.91%
45	1964	76.45	0.0305	15.70%	\$92.01	3.68%
46	1963	65.06	0.0331	20.82%	\$93.56	2.61%
47	1962	69.07	0.0297	-2.84%	\$89.60	8.89%
48	1961	59.72	0.0328	18.94%	\$89.74	4.29%
49	1960	58.03	0.0327	6.18%	\$84.36	11.13%
50	1959	55.62	0.0324	7.57%	\$91.55	-3.49%
51	1958	41.12	0.0448	39.74%	\$101.22	-5.60%
52	1957	45.43	0.0431	-5.18%	\$100.70	4.49%
53	1956	44.15	0.0424	7.14%	\$113.00	-7.35%
54	1955	35.60	0.0438	28.40%	\$116.77	0.20%
55	1954	25.46	0.0569	45.52%	\$112.79	7.07%
56	1953	26.18	0.0545	2.70%	\$114.24	2.24%
57	1952	24.19	0.0582	14.05%	\$113.41	4.26%
58	1951	21.21	0.0634	20.39%	\$123.44	-4.89%
59	1950	16.88	0.0665	32.30%	\$125.08	1.89%
60	1949	15.36	0.0620	16.10%	\$119.82	7.72%
61	1948	14.83	0.0571	9.28%	\$118.50	4.49%
62	1947	15.21	0.0449	1.99%	\$126.02	-2.79%
63	1946	18.02	0.0356	-12.03%	\$126.74	2.59%
64	1945	13.49	0.0460	38.18%	\$119.82	9.11%
65	1944	11.85	0.0495	18.79%	\$119.82	3.34%
66	1943	10.09	0.0554	22.98%	\$118.50	4.49%
67	1942	8.93	0.0788	20.87%	\$117.63	4.14%
68	1941	10.55	0.0638	-8.98%	\$116.34	4.55%
69	1940	12.30	0.0458	-9.65%	\$112.39	7.08%
70	1939	12.50	0.0349	1.89%	\$105.75	10.05%
71	1938	11.31	0.0784	18.36%	\$99.83	9.94%
72	1937	17.59	0.0434	-31.36%	\$103.18	0.63%
73	S&P 500 Return 1937--2007		11.4%			
74	A-rated Utility Bond Return		6.4%			
75	Risk Premium		5.0%			

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

**KENTUCKY-AMERICAN WATER COMPANY**  
**EXHIBIT (JVW-1)**  
**SCHEDULE 5**  
**COMPARATIVE RETURNS ON S&P UTILITY STOCK INDEX**  
**AND MOODY'S A-RATED BONDS 1937 – 2008**

LINE NO.	YEAR	S&P UTILITY STOCK PRICE	STOCK DIVIDEND YIELD	STOCK RETURN	A-RATED BOND YIELD	BOND RETURN
1	2008				\$72.25	
2	2007			16.56%	\$72.91	4.59%
3	2006			20.76%	\$75.25	2.20%
4	2005			16.05%	\$74.91	5.80%
5	2004			22.84%	\$70.87	11.34%
6	2003			23.48%	\$62.26	20.27%
7	2002			-14.73%	\$57.44	15.35%
8						
9	2002	243.79	0.0362		\$57.44	
10	2001	307.70	0.0287	-17.90%	\$56.40	8.93%
11	2000	239.17	0.0413	32.78%	\$52.60	14.82%
12	1999	253.52	0.0394	-1.72%	\$63.03	-10.20%
13	1998	228.61	0.0457	15.47%	\$62.43	7.38%
14	1997	201.14	0.0492	18.58%	\$56.62	17.32%
15	1996	202.57	0.0454	3.83%	\$60.91	-0.48%
16	1995	153.87	0.0584	37.49%	\$50.22	29.26%
17	1994	168.70	0.0496	-3.83%	\$60.01	-9.65%
18	1993	159.79	0.0537	10.95%	\$53.13	20.48%
19	1992	149.70	0.0572	12.46%	\$49.56	15.27%
20	1991	138.38	0.0607	14.25%	\$44.84	19.44%
21	1990	146.04	0.0558	0.33%	\$45.60	7.11%
22	1989	114.37	0.0699	34.68%	\$43.06	15.18%
23	1988	106.13	0.0704	14.80%	\$40.10	17.36%
24	1987	120.09	0.0588	-5.74%	\$48.92	-9.84%
25	1986	92.06	0.0742	37.87%	\$39.98	32.36%
26	1985	75.83	0.0860	30.00%	\$32.57	35.05%
27	1984	68.50	0.0925	19.95%	\$31.49	16.12%
28	1983	61.89	0.0948	20.16%	\$29.41	20.65%
29	1982	51.81	0.1074	30.20%	\$24.48	36.48%
30	1981	52.01	0.0978	9.40%	\$29.37	-3.01%
31	1980	50.26	0.0953	13.01%	\$34.69	-3.81%
32	1979	50.33	0.0893	8.79%	\$43.91	-11.89%
33	1978	52.40	0.0791	3.96%	\$49.09	-2.40%
34	1977	54.01	0.0714	4.16%	\$50.95	4.20%
35	1976	46.99	0.0776	22.70%	\$43.91	25.13%
36	1975	38.19	0.0920	32.24%	\$41.76	14.75%
37	1974	48.60	0.0713	-14.29%	\$52.54	-12.91%
38	1973	60.01	0.0556	-13.45%	\$58.51	-3.37%
39	1972	60.19	0.0542	5.12%	\$56.47	10.69%
40	1971	63.43	0.0504	-0.07%	\$53.93	12.13%
41	1970	55.72	0.0561	19.45%	\$50.46	14.81%
42	1969	68.65	0.0445	-14.38%	\$62.43	-12.76%
43	1968	68.02	0.0435	5.28%	\$66.97	-0.81%
44	1967	70.63	0.0392	0.22%	\$78.69	-9.81%
45	1966	74.50	0.0347	-1.72%	\$86.57	-4.48%

LINE NO.	YEAR	S&P UTILITY STOCK PRICE	STOCK DIVIDEND YIELD	STOCK RETURN	A-RATED BOND YIELD	BOND RETURN
46	1965	75.87	0.0315	1.34%	\$91.40	-0.91%
47	1964	67.26	0.0331	16.11%	\$92.01	3.68%
48	1963	63.35	0.0330	9.47%	\$93.56	2.61%
49	1962	62.69	0.0320	4.25%	\$89.60	8.89%
50	1961	52.73	0.0358	22.47%	\$89.74	4.29%
51	1960	44.50	0.0403	22.52%	\$84.36	11.13%
52	1959	43.96	0.0377	5.00%	\$91.55	-3.49%
53	1958	33.30	0.0487	36.88%	\$101.22	-5.60%
54	1957	32.32	0.0487	7.90%	\$100.70	4.49%
55	1956	31.55	0.0472	7.16%	\$113.00	-7.35%
56	1955	29.89	0.0461	10.16%	\$116.77	0.20%
57	1954	25.51	0.0520	22.37%	\$112.79	7.07%
58	1953	24.41	0.0511	9.62%	\$114.24	2.24%
59	1952	22.22	0.0550	15.36%	\$113.41	4.26%
60	1951	20.01	0.0606	17.10%	\$123.44	-4.89%
61	1950	20.20	0.0554	4.60%	\$125.08	1.89%
62	1949	16.54	0.0570	27.83%	\$119.82	7.72%
63	1948	16.53	0.0535	5.41%	\$118.50	4.49%
64	1947	19.21	0.0354	-10.41%	\$126.02	-2.79%
65	1946	21.34	0.0298	-7.00%	\$126.74	2.59%
66	1945	13.91	0.0448	57.89%	\$119.82	9.11%
67	1944	12.10	0.0569	20.65%	\$119.82	3.34%
68	1943	9.22	0.0621	37.45%	\$118.50	4.49%
69	1942	8.54	0.0940	17.36%	\$117.63	4.14%
70	1941	13.25	0.0717	-28.38%	\$116.34	4.55%
71	1940	16.97	0.0540	-16.52%	\$112.39	7.08%
72	1939	16.05	0.0553	11.26%	\$105.75	10.05%
73	1938	14.30	0.0730	19.54%	\$99.83	9.94%
74	1937	24.34	0.0432	-36.93%	\$103.18	0.63%
75	Return 1937--2007	Stocks	11.0%			
76		Bonds	6.4%			
77	Risk Premium		4.6%			

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

[http://www.eei.org/industry\\_issues/finance\\_and\\_accounting/finance/research\\_and\\_analysis/EEI\\_Stock\\_Index](http://www.eei.org/industry_issues/finance_and_accounting/finance/research_and_analysis/EEI_Stock_Index)

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

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

Ending Wealth	Probability
\$1.30	0.50
\$0.90	0.50

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

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

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

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

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

The arithmetic mean of this investment is:

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

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

The geometric mean of this investment is:

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

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

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

**KENTUCKY-AMERICAN WATER COMPANY**  
**EXHIBIT\_\_(JVW-1)**  
**SCHEDULE 7**  
**CALCULATION OF CAPITAL ASSET PRICING MODEL COST OF EQUITY**  
**USING THE IBBOTSON® SBBI® 7.1 PERCENT RISK PREMIUM**

Risk-free Rate	4.53%	<i>Forecast Long-term Treasury bond yield</i>
Beta	0.96	<i>Average Beta Comparable Electric Companies</i>
Risk Premium	7.10%	<i>Long-horizon SBBI risk premium</i>
Beta x Risk Premium	6.82%	
Flotation	0.14%	
CAPM cost of equity	11.5%	

Risk-free Rate	4.53%	Forecast Long-term Treasury bond yield
Beta	0.94	Average Beta Comparable Gas Companies
Risk Premium	7.10%	Long-horizon Ibbotson SBBI risk premium
Beta x Risk Premium	6.67%	
Flotation	0.14%	
CAPM cost of equity	11.3%	

Ibbotson SBBI risk premium from 2008 Ibbotson® SBBI® Stocks, Bonds, Bills, and Inflation® Valuation Yearbook; Value Line beta for comparable companies from Value Line September 2008.

**COMPARABLE COMPANY BETAS**

LINE NO.	COMPANY	BETA	MARKET CAP \$ (MIL)
1	American States Water	1.05	682
2	Aqua America	0.95	2,467
3	California Water Service Group	1.15	814
4	Middlesex Water	0.90	235
5	SJW Corp.	1.15	513
6	Southwest Water Co.	1.05	291
7	York Water Co.	0.50	159
8	Average	0.96	

LINE NO.	COMPANY NAME	BETA	MARKET CAP \$ (MIL)
1	AGL Resources	0.85	2,535
2	Atmos Energy	0.85	2,496
3	Energen Corp.	1.00	4,003
4	Equitable Resources	0.95	6,531
5	Nicor Inc.	0.95	2,072
6	Northwest Nat. Gas	0.80	1,288
7	ONEOK Inc.	0.90	4,565
8	Piedmont Natural Gas	0.85	2,117
9	South Jersey Inds.	0.85	1,060
10	Questar Corp.	1.05	8,997
11	Southwest Gas	0.90	1,321
12	Average	0.94	

Data from Value Line September 2008.

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

Risk-free rate	4.53%	<i>20-Year Treasury bond yield</i>
Beta	0.96	<i>Average Beta Comparable Water Companies</i>
DCF S&P 500	13.9%	<i>DCF Cost of Equity S&amp;P 500 (see following)</i>
Risk Premium	9.37%	
Beta x Risk Premium	9.0%	
CAPM cost of equity	13.5%	

Risk-free rate	4.53%	<i>20-Year Treasury bond yield</i>
Beta	0.94	<i>Average Beta Comparable Gas Companies</i>
DCF S&P 500	13.9%	<i>DCF Cost of Equity S&amp;P 500 (see following)</i>
Risk Premium	9.37%	
Beta x Risk Premium	8.81%	
CAPM cost of equity	13.3%	

Treasury bond yield August 2008 from Federal Reserve.

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

Company	P <sub>0</sub>	D <sub>0</sub>	Growth	Cost of Equity
3M	71.71	2.00	11.40%	14.7%
ABBOTT LABORATORIES	56.10	1.44	11.43%	14.5%
AETNA	41.25	0.04	14.88%	15.0%
AMERIPRISE FINL.	42.30	0.68	12.77%	14.7%
AMERISOURCEBERGEN	40.98	0.30	13.33%	14.2%
ANHEUSER-BUSCH COS.	64.09	1.48	10.23%	12.9%
AON	46.40	0.60	11.00%	12.5%
APPLIED BIOSYSTEMS	35.09	0.17	12.96%	13.5%
APPLIED MATS.	18.67	0.24	11.43%	12.9%
AT&T	33.20	1.60	8.56%	14.2%
AVON PRODUCTS	40.11	0.80	13.00%	15.4%
BANK OF NEW YORK MELLON	37.51	0.96	10.86%	13.9%
BAXTER INTL.	65.98	0.87	14.17%	15.8%
BB&T	26.83	1.88	6.41%	14.5%
BECTON DICKINSON	83.57	1.14	13.67%	15.3%
BEMIS	26.01	0.88	10.50%	14.5%
BOEING	68.03	1.60	12.38%	15.2%
C R BARD	91.17	0.64	14.00%	14.8%
CA	23.64	0.16	12.20%	13.0%
CARDINAL HEALTH	53.46	0.56	13.29%	14.5%
CATERPILLAR	72.87	1.68	11.60%	14.3%
CENTURYTEL	35.87	2.80	6.51%	15.5%
CHESAPEAKE ENERGY	55.77	0.30	12.50%	13.1%
CHUBB	49.11	1.32	9.25%	12.4%
CINTAS	28.25	0.46	10.57%	12.5%
CLOROX	54.44	1.84	9.75%	13.7%
COCA COLA	53.33	1.52	9.45%	12.8%
COLGATE-PALM.	72.91	1.60	10.40%	13.0%
COMCAST 'A'	20.53	0.25	12.88%	14.3%
COMERICA	29.06	2.64	5.29%	15.7%
CORNING	22.41	0.20	14.67%	15.8%
COSTCO WHOLESALE	67.73	0.64	13.44%	14.6%
CVS CAREMARK	39.07	0.28	14.75%	15.6%
DANAHER	79.89	0.12	13.80%	14.0%
DARDEN RESTAURANTS	31.85	0.80	11.66%	14.6%
DEERE	70.64	1.12	10.50%	12.4%
EATON	79.59	2.00	12.25%	15.2%
ECOLAB	44.29	0.52	14.00%	15.4%
EMERSON ELECTRIC	50.16	1.20	12.40%	15.3%
ENSCO INTL.	72.56	0.10	15.60%	15.8%
ENERGY	112.15	3.00	12.18%	15.4%



Company	P <sub>0</sub>	D <sub>0</sub>	Growth	Cost of Equity
ESTEE LAUDER COS.'A'	46.29	0.55	11.00%	12.4%
EXELON	83.25	2.00	9.75%	12.6%
EXXON MOBIL	83.61	1.60	10.67%	12.9%
FAMILY DOLLAR STORES	22.67	0.50	12.75%	15.4%
FEDERATED INVR.'B'	33.78	0.96	12.25%	15.6%
FEDEX	81.85	0.44	12.83%	13.5%
FIDELITY NAT.INFO.SVS.	21.11	0.11	14.57%	15.2%
FIRST HORIZON NATIONAL	9.03	0.80	5.50%	15.7%
FPL GROUP	64.10	1.78	9.84%	13.1%
GAP	17.29	0.34	11.40%	13.7%
GENUINE PARTS	40.94	1.56	8.20%	12.6%
GENWORTH FINANCIAL	17.27	0.40	10.20%	12.9%
H&R BLOCK	23.34	0.60	11.80%	14.9%
HARLEY-DAVIDSON	38.32	1.32	11.14%	15.2%
HARTFORD FINL.SVS.GP.	64.46	2.12	11.33%	15.2%
HEWLETT-PACKARD	44.91	0.32	13.69%	14.5%
HOME DEPOT	24.94	0.90	11.00%	15.3%
HONEYWELL INTL.	51.39	1.10	11.00%	13.5%
HUNTINGTON BCSH.	6.95	0.53	5.40%	14.1%
ILLINOIS TOOL WORKS	48.21	1.24	10.86%	13.9%
IMS HEALTH	22.52	0.12	12.67%	13.3%
INGERSOLL-RAND	38.32	0.72	13.00%	15.3%
INTEL	22.38	0.56	11.83%	14.8%
INTERNATIONAL BUS.MCHS.	124.42	2.00	11.21%	13.1%
INTL.GAME TECH.	25.18	0.58	11.70%	14.4%
INVESCO	24.56	0.56	12.66%	15.4%
ITT	64.44	0.70	13.00%	14.3%
JOHNSON CONTROLS	30.75	0.52	13.00%	15.0%
JONES APPAREL GROUP	16.12	0.56	10.67%	14.8%
JP MORGAN CHASE & CO.	37.80	1.52	8.67%	13.3%
KIMBERLY-CLARK	59.22	2.32	8.00%	12.5%
LEGG MASON	42.04	0.96	9.67%	12.3%
LINCOLN NAT.	48.02	1.66	11.12%	15.2%
LOCKHEED MARTIN	106.04	1.68	11.75%	13.6%
LOWE'S COMPANIES	21.77	0.34	13.25%	15.1%
MACY'S	19.49	0.53	9.60%	12.8%
MARRIOTT INTL.'A'	27.72	0.35	11.43%	12.9%
MCDONALDS	59.80	1.50	10.45%	13.4%
MCKESSON	56.40	0.48	12.71%	13.7%
MEDTRONIC	52.71	0.75	12.89%	14.6%
METLIFE	53.30	0.74	11.92%	13.6%
MICROSOFT	26.89	0.44	11.19%	13.1%
MOLSON COORS BREWING 'B'	54.04	0.80	11.66%	13.4%
MORGAN STANLEY	38.88	1.08	11.80%	15.1%
MOTOROLA	8.52	0.20	10.54%	13.3%
NATIONAL SEMICON.	21.73	0.24	14.50%	15.8%
NEWELL RUBBERMAID	17.56	0.84	8.00%	13.5%
NEWMONT MINING	48.19	0.40	12.83%	13.8%
NIKE 'B'	60.92	0.92	13.00%	14.8%
NORDSTROM	31.00	0.64	11.01%	13.4%
NORFOLK SOUTHERN	67.13	1.28	13.22%	15.5%

Company	P <sub>0</sub>	D <sub>0</sub>	Growth	Cost of Equity
NORTHERN TRUST	74.44	1.12	11.68%	13.5%
NORTHROP GRUMMAN	68.80	1.60	12.33%	15.1%
NOVELLUS SYSTEMS	21.42	0.15	13.33%	14.2%
OMNICOM GP.	43.90	0.60	11.50%	13.1%
PACCAR	44.21	0.72	11.75%	13.7%
PALL	40.53	0.52	13.25%	14.8%
PENNEY JC	35.30	0.80	10.60%	13.3%
PEPCO HOLDINGS	25.37	1.08	8.67%	13.6%
PEPSICO	66.68	1.70	11.04%	14.1%
PERKINELMER	28.59	0.28	14.75%	15.9%
PFIZER	18.63	1.28	5.00%	12.8%
POLO RALPH LAUREN 'A'	64.33	0.20	15.00%	15.4%
PRAXAIR	93.11	1.50	12.91%	14.8%
PRINCIPAL FINL.GP.	44.20	0.90	11.93%	14.3%
PROCTER & GAMBLE	65.30	1.60	10.50%	13.4%
PROGRESS ENERGY	42.33	2.46	6.16%	12.8%
PRUDENTIAL FINL.	67.57	1.15	13.00%	15.0%
QUEST DIAGNOSTICS	51.13	0.40	13.72%	14.7%
QWEST COMMS.INTL.	3.92	0.32	3.33%	12.5%
RADIOSHACK	15.22	0.25	12.00%	13.9%
RAYTHEON 'B'	58.35	1.12	12.50%	14.8%
ROHM & HAAS	62.02	1.64	11.12%	14.2%
RYDER SYSTEM	68.73	0.92	13.57%	15.2%
SEALED AIR	21.61	0.48	9.80%	12.4%
SHERWIN-WILLIAMS	52.33	1.40	10.60%	13.7%
SNAP-ON	55.88	1.20	10.67%	13.2%
SPECTRA ENERGY	27.23	1.00	9.00%	13.3%
STANLEY WORKS	45.83	1.28	11.75%	15.1%
STAPLES	23.67	0.33	13.63%	15.3%
STARWOOD HTLS.& RSTS.	39.65	0.90	10.67%	13.3%
STATE STREET	67.28	0.96	11.64%	13.3%
SUNTRUST BANKS	40.15	3.08	5.91%	14.7%
TARGET	48.52	0.64	13.75%	15.3%
TEXTRON	46.91	0.92	12.80%	15.1%
TIFFANY & CO	41.37	0.68	12.00%	14.0%
TIME WARNER	14.90	0.25	12.57%	14.6%
TJX COS.	33.66	0.44	13.80%	15.4%
TOTAL SYSTEM SERVICES	21.24	0.28	12.75%	14.3%
TYSON FOODS 'A'	16.10	0.16	13.52%	14.7%
UNITED PARCEL SER.	63.31	1.80	10.61%	14.0%
UNITED TECHNOLOGIES	64.56	1.28	11.60%	13.9%
US BANCORP	29.11	1.70	6.76%	13.5%
US.STEEL	160.60	1.20	12.83%	13.7%
V F	73.20	2.32	10.40%	14.1%
VERIZON COMMUNICATIONS	35.39	1.72	8.04%	13.7%
WAL MART STORES	58.09	0.95	11.60%	13.5%
WALGREEN	34.59	0.45	14.10%	15.7%
WALT DISNEY	31.57	0.35	12.40%	13.7%
WELLS FARGO & CO	27.11	1.36	7.95%	13.8%
WESTERN UNION	25.75	0.04	13.73%	13.9%
WEYERHAEUSER	53.28	2.40	9.25%	14.5%

Company	P <sub>0</sub>	D <sub>0</sub>	Growth	Cost of Equity
WW GRAINGER	87.54	1.60	12.67%	14.9%
XILINX	25.53	0.56	13.06%	15.7%
XTO EN.	58.06	0.48	11.63%	12.6%
YUM! BRANDS	36.20	0.76	11.85%	14.3%
ZIONS BANCORP.	30.60	1.72	6.50%	12.9%
Market-Weighted Average				13.9%

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

- D<sub>0</sub> = Current dividend per Thomson Reuters.
- P<sub>0</sub> = Average of the monthly high and low stock prices during the three months ending August 2008 per Thomson Reuters.
- g = I/B/E/S forecast of future earnings growth August 2008.
- k = Cost of equity using the quarterly version of the DCF model shown below:

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

**KENTUCKY-AMERICAN WATER COMPANY  
EXHIBIT\_\_(JVW-1)  
SCHEDULE 9**

**AVERAGE CAPITAL STRUCTURE OF PROXY WATER COMPANY GROUP**

Line No.	Company	Short-Term Debt	Long-Term Debt	Preferred Equity	Market Cap \$ (Mil)	Total Capital	% Short-Term Debt	% Long-Term Debt	% Preferred	% Equity
1	American States Water	38	267	0	682	987	4%	27%	0%	69%
2	Aqua America	81	1,215	0	2,467	3,762	2%	32%	0%	66%
3	California Water Service	3	289	4	814	1,109	0%	26%	0%	73%
4	Middlesex Water	12	131	4	235	383	3%	34%	1%	62%
5	SJW Corp.	11	217	0	513	741	1%	29%	0%	69%
6	Southwest Water Co.	2	145	1	291	438	0%	33%	0%	66%
7	York Water Co.	5	70	0	159	235	2%	30%	0%	68%
8	Composite	151	2,336	8	5,161	7,655	2%	31%	0%	67%
9	Average						2%	30%	0%	68%

**AVERAGE CAPITAL STRUCTURE OF PROXY LDC GROUP**

Line No.	Company	Short-Term Debt	Long-Term Debt	Preferred Equity	Market Cap \$ (Mil)	Total Capital	% Short-Term Debt	% Long-Term Debt	% Preferred	% Equity
1	AGL RESOURCES	580	1,674	0	2,535	4,789	12%	35%	0%	53%
2	ATMOS ENERGY	154	2,126	0	2,496	4,777	3%	45%	0%	52%
3	ENERGEN CORP.	144	562	0	4,003	4,710	3%	12%	0%	85%
4	EQUITABLE RESOURCES	29	754	0	6,531	7,314	0%	10%	0%	89%
5	NICOR INC.	444	423	1	2,072	2,939	15%	14%	0%	70%
6	NORTHWEST NAT. GAS	148	512	0	1,288	1,948	8%	26%	0%	66%
7	ONEOK INC.	623	4,215	0	4,565	9,403	7%	45%	0%	49%
8	PIEDMONT NATURAL GAS	196	825	0	2,117	3,137	6%	26%	0%	67%
9	SOUTH JERSEY INDS.	118	358	0	1,060	1,537	8%	23%	0%	69%
10	QUESTAR CORP.	362	1,021	0	8,997	10,380	3%	10%	0%	87%
11	SOUTHWEST GAS	47	1,366	0	1,321	2,734	2%	50%	0%	48%
12	COMPOSITE	2,846	13,836	1	36,985	53,668	5%	26%	0%	69%
12	AVERAGE						6%	27%	0%	67%

Source of data: The Value Line Investment Analyzer August 2008.

APPENDIX 1  
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:

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

where

- $P_0$  = current price per share of the firm's stock,
- $D_1, D_2, \dots, D_n$  = 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:

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

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<sup>2</sup>, 3 x 2<sup>3</sup>, 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<sub>n</sub>. Then

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

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,

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

and

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

or

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

Solving for  $S_n$ , we obtain:

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

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

$$S = \frac{a}{1 - r} \quad \mathbf{(5)}$$

#### 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

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

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

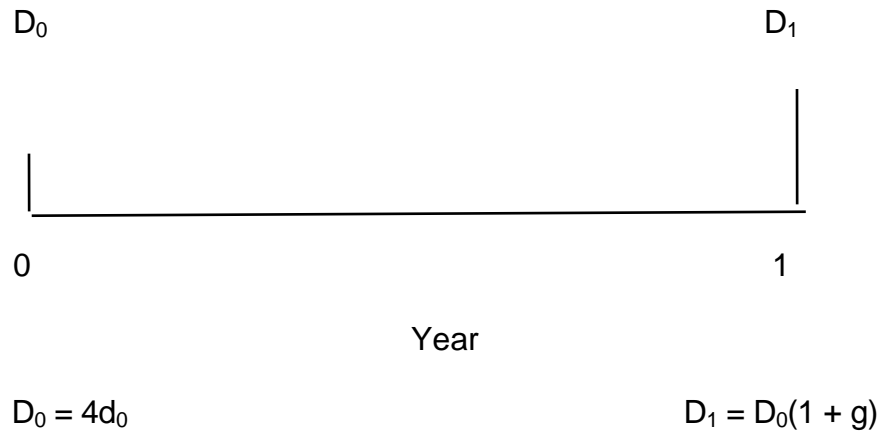
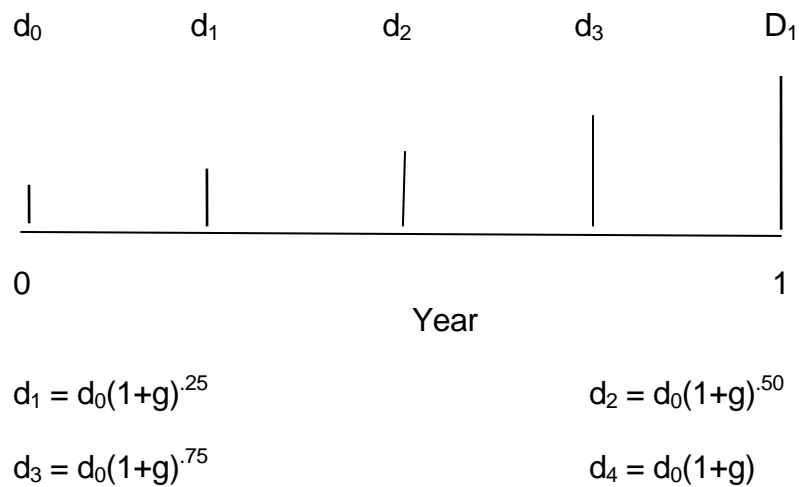


Figure 2

Quarterly DCF Model (Constant Growth Version)



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:

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

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:

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

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

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

An Alternative Quarterly DCF Model

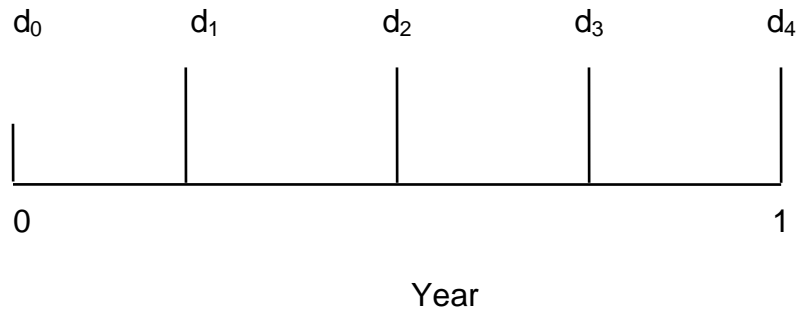
Although the constant growth Quarterly DCF Model [equation (8)] allows for the quarterly timing of dividend payments, it does require the assumption that the firm increases its dividend payments each quarter. Since this assumption is difficult for some analysts to accept, we now discuss a second Quarterly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

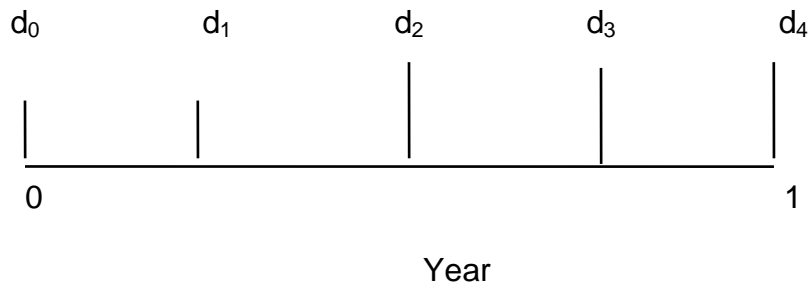
**Quarterly DCF Model (Constant Dividend Version)**

**Case 1**



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

**Case 2**

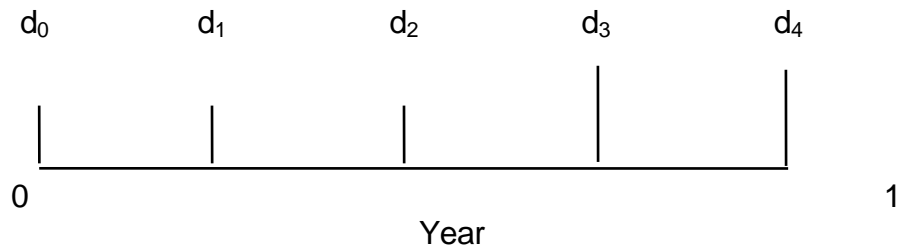


$$d_1 = d_0$$

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

**Figure 3 (continued)**

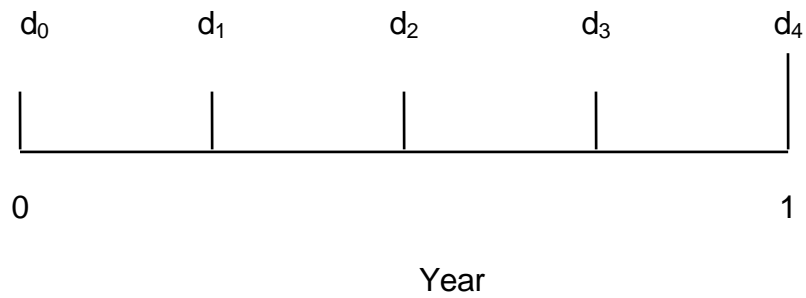
**Case 3**



$$d_1 = d_2 = d_0$$

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

**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

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

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

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

with  $D_1^*$  given by (9).

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

APPENDIX 2  
ADJUSTING FOR FLOTATION COSTS IN DETERMINING  
A PUBLIC UTILITY'S  
ALLOWED RATE OF RETURN ON EQUITY

## Introduction

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

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

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

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

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

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

## Definition of Flotation Cost

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

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

### **Magnitude of Flotation Costs**

The finance literature contains several studies of the magnitude of the flotation costs associated with new debt and equity issues. These studies differ primarily with regard to the time period studied, the sample of companies included, and the source of data. The flotation cost studies generally agree, however, that for large issues, underwriting expenses represent approximately one and one-half percent of the proceeds of debt issues and three to five percent of the proceeds of seasoned equity issues. They also agree that issuer expenses represent approximately 0.5 percent of both debt and equity issues, and that the announcement of an equity issue reduces the company's stock price by at least two to three percent of the proceeds from the stock issue. Thus, total flotation costs represent approximately two percent<sup>4</sup> of the proceeds from debt issues, and five and one-half to eight and one-half percent of the proceeds of equity issues.

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

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

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

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<sup>4</sup> The two percent flotation cost on debt only recognizes the cost of newly-issued debt. When interest rates decline, many companies exercise the call provisions on higher cost debt and reissue debt at lower rates. This process involves reacquisition costs that are not included in the academic studies. If reacquisition costs were included in the academic studies, debt flotation costs could increase significantly.



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

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

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

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

### **TIME PATTERN OF FLOTATION COST RECOVERY**

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

In the context of a regulated firm, it should be noted that there are many possible time patterns for the recovery of flotation expenses. However, if it is felt that flotation expenses are most

appropriately recovered over a period of years, then it should be recognized that investors must also be compensated for the passage of time. That is to say, the value of an investor's capital will be reduced if the expenses are merely distributed over time, without any allowance for the time value of money.

### **ACCOUNTING FOR FLOTATION COST IN A REGULATORY SETTING**

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

$$\text{Revenue Requirement} = \text{Total Expenses} + \text{Allowed Rate of Return} \times \text{Rate Base}$$

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

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

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

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

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

“used and useful” in the public service. It is unclear whether intangible assets such as flotation expenses meet this criterion.

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

### EXISTING REGULATORY METHODS

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

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

### Debt Flotation Costs

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

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

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

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

### Equity Flotation Costs

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

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

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

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

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

**Equation 3**

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

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

**Equation 4**

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

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

$$S_f = S - L.$$

This value is:

**Equation 5**

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

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

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

**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 [ $k = (D/P) + g = 6 \text{ percent} + 6 \text{ percent} = 12 \text{ percent}$ ]; and the flotation-cost-adjusted cost of equity is [ $6 \text{ percent} (1/.95) + 6 \text{ percent} = 12.316 \text{ percent}$ ].

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

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

## CONCLUSION

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

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

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

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

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

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**EXHIBIT\_\_(JWV-1)**  
**ADJUSTING FOR FLOTATION COSTS**  
**JAMES H. VANDER WEIDE**

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**Table 1**

Direct Costs as a Percentage of Gross Proceeds  
for Equity (IPOs and SEOs) and Straight and Convertible Bonds  
Offered by Domestic Operating Companies 1990—1994<sup>5</sup>

**Equities**

Proceeds (\$ in millions)	IPOs				SEOs			
	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%
<b>Total/Average</b>	<b>1,767</b>	<b>7.31%</b>	<b>3.69%</b>	<b>11.00%</b>	<b>1,593</b>	<b>5.44%</b>	<b>1.67%</b>	<b>7.11%</b>

**Bonds**

Proceeds (\$ in millions)	Convertible Bonds				Straight Bonds			
	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%
<b>Total/Average</b>	<b>211</b>	<b>2.92%</b>	<b>0.87%</b>	<b>3.79%</b>	<b>1,092</b>	<b>1.62%</b>	<b>0.62%</b>	<b>2.24%</b>

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).

<sup>5</sup> Inmoo Lee, Scott Lochhead, Jay Ritter, and Quanshui Zhao, "The Costs of Raising Capital," *Journal of Financial Research* Vol 19 No 1 (Spring 1996) pp. 59—74.

**Table 2**  
 Direct Costs of Raising Capital 1990—1994  
 Utility versus Non-Utility Companies<sup>6</sup>

<b>Equities</b>						
<b>Non-Utilities</b>	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%
<b>Total/Average</b>	1,742	7.31%	11.01%	1,457	5.57%	7.32%
<b>Utilities Only</b>						
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%
<b>Total/Average</b>	25	7.15%	10.14%	136	4.01%	4.92%

<sup>6</sup> Lee *et al*, *op. cit.*

Table 2 (continued)  
Direct Costs of Raising Capital 1990—1994  
Utility versus Non-Utility Companies<sup>7</sup>

**Bonds**

Non- Utilities Proceeds (\$ in millions)	Convertible Bonds			Straight Bonds		
	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%
<b>Total/Average</b>	203	2.90%	3.75%	957	1.70%	2.34%
<b>Utilities Only</b>						
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 <sup>8</sup>
<b>Total/Average</b>	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).

<sup>7</sup> Lee *et al*, *op. cit.*

<sup>8</sup> Not available because of missing data on other direct expenses.

**Table 3**  
**Illustration of Patterson Approach to Flotation Cost Recovery**

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

APPENDIX 3  
EX ANTE RISK PREMIUM APPROACH

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

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

where:

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

**Natural Gas Company Ex Ante Risk Premium Analysis.** To select my ex ante risk premium natural gas proxy group of companies, I used the same criteria that I use when estimating the DCF cost of equity, namely, I selected all the companies in Value Line's groups of natural gas companies that: (1) paid dividends during every quarter of the last two years; (2) did not decrease dividends during any quarter of the past two years; (3) had at least three analysts included in the I/B/E/S mean growth forecast; (4) have an investment grade bond rating and a Value Line Safety Rank of 1, 2, or 3; and (5) have not announced a merger. The LDC Ex Ante Risk Premium Schedule in my direct testimony displays the results of my ex ante risk premium study, showing the average DCF estimated cost of equity on an investment in the portfolio of natural gas companies and the yield to maturity on A-rated utility bonds in each month. The Ex Ante Risk Premium Schedule in my direct testimony displays the average DCF estimated cost of equity on an investment in the portfolio of companies and the yield to maturity on A-rated utility bonds in each month of the study.

Previous studies have shown that the ex ante risk premium tends to vary inversely with the level of interest rates, that is, the risk premium tends to increase when interest rates decline, and decrease when interest rates go up. To test whether my studies also indicate that the ex ante risk premium varies inversely with the level of interest rates, I 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,

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

where:

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

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

$e$  = a random residual; and

$a, b$  = coefficients estimated by the regression procedure.

Regression analysis assumes that the statistical residuals from the regression equation are random. My examination of the residuals 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). Therefore, I made adjustments to my data to correct for the possibility of serial correlation in the residuals.

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

premium on an investment in my proxy company group as compared to an investment in A-rated utility bonds is given by the equation:

$$RP_{\text{PROXY}} = 6.37 - .256 \times I_A.$$

Using the August 2008 6.38 percent average yield to maturity on A-rated utility bonds, the regression equation produces an ex ante risk premium cost of equity based on the electric proxy group equal to 4.73 percent ( $6.37 - .256 \times 6.38 = 4.73$ ).

To estimate the cost of equity using the ex ante risk premium method, one may add the estimated risk premium over the yield on A-rated utility bonds to the yield to maturity on A-rated utility bonds. As noted above, the average yield on A-rated utility bonds at August 2008 is 6.38 percent. My analyses produce an estimated risk premium over the yield on A-rated utility bonds equal to 4.73 percent. Adding an estimated risk premium of 4.73 percent to the 6.38 percent yield to maturity on A-rated utility bonds produces a cost of equity estimate of 11.1 percent for the comparable company proxy group using the ex ante risk premium method.



APPENDIX 4  
RISK PREMIUM APPROACH

**Source**

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

**Calculation of Stock and Bond Returns**

Sample calculation of "Stock Return" column:

$$\text{Stock Return (2007)} = \left[ \frac{\text{Stock Price (2008)} - \text{Stock Price (2007)} + \text{Dividend (2007)}}{\text{Stock Price (2007)}} \right]$$

where Dividend (2007) = Stock Price (2007) x Stock Div. Yield (2007)

Sample calculation of "Bond Return" column:

$$\text{Bond Return (2007)} = \left[ \frac{\text{Bond Price (2008)} - \text{Bond Price (2007)} + \text{Interest (2007)}}{\text{Bond Price (2007)}} \right]$$

where Interest = \$4.00.