

**BEFORE THE PUBLIC SERVICE COMMISSION  
OF THE STATE OF DELAWARE**

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
  
18  
  
19  
  
20  
  
21  
  
22  
  
23  
24  
25  
26  
27  
28

IN THE MATTER OF THE APPLICATION  
OF ARTESIAN WATER COMPANY, INC  
FOR A REVISION OF RATES

}  
}  
}

Docket No. 00-649

**DIRECT TESTIMONY OF  
DR. J. RANDALL WOOLRIDGE  
ON BEHALF OF  
THE DIVISION OF THE PUBLIC ADVOCATE**

**April, 2001**

1 **Q. PLEASE STATE YOUR FULL NAME, ADDRESS, AND OCCUPATION.**

2  
3 A. My name is J. Randall Woolridge and my business address is 120 Haymaker Circle, State  
4 College, PA 16801. I am a Professor of Finance and the Goldman, Sachs & Co. and Frank P.  
5 Smeal Endowed University Fellow in Business Administration at the University Park Campus of  
6 the Pennsylvania State University. In addition, I am a Vice President of the Columbia Group Inc., a  
7 public utility consulting firm based in Ridgefield, CT. A summary of my educational background,  
8 research, and related business experience is provided in Appendix A.

9

10

**I. SUBJECT OF TESTIMONY AND**

11

**SUMMARY OF RECOMMENDATIONS**

12

13 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?**

14 A. I have been asked by the Division of the Public Advocate ("DPA") to provide an opinion as  
15 to the overall fair rate of return for Artesian Water Company ("AWC" or "Company") and to  
16 evaluate AWC's rate of return testimony in this proceeding.

17 **Q. PLEASE REVIEW YOUR COST OF CAPITAL RETURN FINDINGS.**

18 A. I have independently arrived at a cost of capital for the Company. I have established an  
19 equity cost rate of 10.0% for AWC primarily by applying the discounted cash flow (DCF) and risk  
20 premium approaches to a group of publicly-held water service companies. Utilizing my equity cost  
21 rate, capital structure ratios, and senior capital cost rates, I am recommending an overall fair rate of

1 return for the Company of 8.80%. This recommendation is summarized in Schedule 1.

2 **Q. PLEASE SUMMARIZE YOUR ASSESSMENT OF THE COMPANY'S RATE OF**  
3 **RETURN POSITION.**

4 A. The Company's rate of return testimony is offered by Mr. Henry Mulle. Mr. Mulle provides  
5 a recommendation for the Company's capital structure, senior capital cost rates, equity cost rate, and  
6 overall rate of return. The Company's proposed rate of return is inflated due to an overstated equity  
7 cost rate. Mr. Mulle's estimated equity cost rate of 13.25% is unreasonably high primarily due to  
8 primarily to (1) an inflated dividend yield and growth rate forecast in his DCF equity cost rate, and  
9 (2) outdated and seriously flawed risk premium and CAPM approaches, (3) a defective comparable  
10 earnings study, and (3) inappropriate adjustments for business and conservation risk, market value  
11 – book value conversion.

12 **II. BAROMETER GROUP SELECTION**

13  
14 **Q. PLEASE DESCRIBE YOUR APPROACH TO DEVELOPING A FAIR RATE OF**  
15 **RETURN RECOMMENDATION FOR AWC.**

16 A. To develop a fair rate of return recommendation for AWC, I evaluate the return  
17 requirements of investors on the common stock of a group of publicly-held water service  
18 companies.

19 **Q. PLEASE DESCRIBE YOUR GROUP OF WATER SERVICE COMPANIES.**

20 A. I am employing the same group of publicly-held water companies identified by Mr. Mulle.

1 This group includes American States Water Company, American Water Works, California Water  
2 Service Co., Connecticut Water Services, Middlesex Water, and Philadelphia Suburban Corp.

3 Summary financial statistics for the group are provided on page 1 of Schedule 2. On  
4 average, the group has average net plant of \$1,214 million and average total revenues of \$1,035  
5 million. These figures are inflated by the size of American Water Works. The median net plant and  
6 revenues for the group are \$493 million and \$257 million, respectively. The group has an average  
7 common equity ratio of 44.5%, and a current earned return on common equity of 10.3%. The  
8 average market-to-book ratio is currently 2.17 or 217%.

9

### 10 **III. CAPITAL STRUCTURE RATIOS AND DEBT COST RATES**

11

12 **Q. WHAT CAPITAL STRUCTURE RATIOS AND SENIOR CAPITAL COST RATES**  
13 **ARE YOU USING TO ESTIMATE AN OVERALL RATE OF RETURN FOR AWC?**

14 A. At this point, I am utilizing the Company's proposed capital structure. As shown in  
15 Schedule 1 of AWC Exhibit No. 1, this capital structure consists of 58.52% long-term debt, 0.80%  
16 preferred stock, and 40.68% common equity. In addition, I will also use the Company's proposed  
17 cost rates for preferred stock (11.20% for current portion and 9.21% for other) and long-term debt  
18 (7.95%).

19

20

1 **IV. THE COST OF COMMON EQUITY CAPITAL**

2 **A. OVERVIEW**

3  
4 **Q. WHY MUST AN OVERALL COST OF CAPITAL OR FAIR RATE OF RETURN**  
5 **BE ESTABLISHED FOR A PUBLIC UTILITY?**

6 A. In a competitive industry the return on a firm's common equity capital is determined  
7 through the competitive market for its goods and services. Due to the capital requirements needed  
8 to provide utility services, however, and to the economic benefit to society from avoiding  
9 duplication of these services, public utilities are monopolies. It is not appropriate to permit utilities  
10 to set their own prices because of the lack of competition and the essential nature of the services.  
11 Thus, regulation seeks to establish prices which are fair to consumers and at the same time are  
12 sufficient to meet the operating and capital costs of the utility, i.e., provide an adequate return on  
13 capital to attract investors.

14 **Q. PLEASE PROVIDE AN OVERVIEW OF THE COST OF CAPITAL IN THE**  
15 **CONTEXT OF THE THEORY OF THE FIRM.**

16 A. The total cost of operating a business includes the cost of capital. The cost of common  
17 equity capital is the expected return on a firm's common stock that the marginal investor would  
18 deem sufficient to compensate for risk and the time value of money. In equilibrium, the expected  
19 and required rates of return on a company's common stock are equal.

20 Normative economic models of the firm, developed under very restrictive assumptions,

1 provide insight into the relationship between firm performance or profitability, capital costs, and the  
2 value of the firm. Under the economist's ideal model of perfect competition, where entry and exit is  
3 costless, products are undifferentiated, and there are increasing marginal costs of production, firms  
4 produce up to the point where price equals marginal cost. Over time, a long-run equilibrium is  
5 established where price equals average cost, including the firm's capital costs. In equilibrium, total  
6 revenues equal total costs, and because capital costs represent investors' required return on the  
7 firm's capital, actual returns equal required returns and the market value and the book value of the  
8 firm's securities must be equal.

9 In the real world, firms can achieve competitive advantage due to product market  
10 imperfections - most notably through product differentiation (adding real or perceived value to  
11 products) and achieving economies of scale (decreasing marginal costs of production). Competitive  
12 advantage allows firms to price products above average cost and thereby earn accounting profits  
13 greater than those required to cover capital costs. When these profits are in excess of that required  
14 by investors, or in other words when a firm earns a return on equity in excess of its cost of equity,  
15 investors respond by valuing the firm's equity in excess of its book value.

16 James M. McTaggart, founder of the international management consulting firm Marakon  
17 Associates, has described this essential relationship between the return on equity, the cost of equity,  
18 and the market-to-book ratio in the following manner:<sup>1</sup>

---

<sup>1</sup> James M. McTaggart, "The Ultimate Poison Pill: Closing the Value Gap," *Commentary* (Spring 1988), p. 2.

1 Fundamentally, the value of a company is determined by the cash flow it generates over time  
2 for its owners, and the minimum acceptable rate of return required by capital investors. This "cost of  
3 equity capital" is used to discount the expected equity cash flow, converting it to a present value. The  
4 cash flow is, in turn, produced by the interaction of a company's return on equity and the annual rate  
5 of equity growth. High return on equity (ROE) companies in low-growth markets, such as Kellogg,  
6 are prodigious generators of cash flow, while low ROE companies in high-growth markets, such as  
7 Texas Instruments, barely generate enough cash flow to finance growth.

8  
9 A company's ROE over time, relative to its cost of equity, also determines whether it is  
10 worth more or less than its book value. If its ROE is consistently greater than the cost of equity capital  
11 (the investor's minimum acceptable return), the business is economically profitable and its market  
12 value will exceed book value. If, however, the business earns an ROE consistently less than its cost of  
13 equity, it is economically unprofitable and its market value will be less than book value.

14  
15  
16 As such, the relationship between a firm's return on equity, cost of equity, and market-to-book ratio  
17 is relatively straight-forward. A firm which earns a return on equity above (below) its cost of  
18 equity will typically see its common stock sell at a price above (below) its book value.

19 **Q. WHAT ECONOMIC FACTORS HAVE AFFECTED THE COST OF EQUITY**  
20 **CAPITAL FOR PUBLIC UTILITIES?**

21 A. Schedule 6 provides indicators of public utility equity cost rates for recent years. Page 1  
22 shows the dividend yields for the fifteen utilities in the Dow Jones Utilities Average over the past  
23 decade. These yields peaked in 1994 at 6.4% and bottomed out in 1998 at 4.3%. Since that time  
24 they have slowly increased to 5.1% in the year 2000.

25 Average earned returns on common equity and market-to-book ratios are given on page 2 of  
26 Schedule 6. Over the past decade, earned returns on common equity have consistently been in the  
27 10.0 - 12.0 percent range. Their low point was 10.1% in 1997 and they have gradually increased to  
28 11.9% as of the year 2000. Over the past decade market-to-book ratios for this group bottomed out

1 at 138% in 1995 and they have steadily increased to the 190% range as of the year 2000.

2 The indicators in Schedule 6, coupled with the overall decreased in interest rates, suggest  
3 that capital costs for the Dow Jones Utilities have decreased over the past decade. Specifically for  
4 the equity cost rate, the significant increase in the market-to-book ratio since 1995, coupled with  
5 only a much small increase in the average return on equity, suggests a substantial decline in the  
6 overall equity cost rate.

7 **Q. WHAT FACTORS DETERMINE INVESTORS' EXPECTED OR REQUIRED**  
8 **RATE OF RETURN ON EQUITY?**

9 A. The expected or required rate of return on common stock is a function of market-wide as  
10 well as company-specific factors. The most important market factor is the time value of money as  
11 indicated by the level of interest rates in the economy. Common stock investor requirements  
12 generally increase and decrease with like changes in interest rates. The perceived risk of a firm is  
13 the predominant factor that influences investor return requirements on a company-specific basis.  
14 Firm risk is often separated into business and financial risk. Business risk encompasses all factors  
15 that affect a firm's operating revenues and expenses. Financial risk results from incurring fixed  
16 obligations in the form of debt in financing its assets.

17 **Q. COMPARE THE BUSINESS AND FINANCIAL RISK OF PUBLIC UTILITIES**  
18 **AND OTHER INDUSTRIES.**

19 A. Due to the essential nature of their service as well as their regulated status, public utilities  
20 are exposed to a lesser degree of business risk than other, non-regulated businesses. The relatively



1 low level of business risk allows public utilities to meet much of their capital requirements through  
2 borrowing in the financial markets, thereby incurring greater than average financial risk.  
3 Nonetheless, the overall investment risk of public utilities is below most other industries. Schedule  
4 7 provides an assessment of investment risk for 97 different industries as measured by beta, which  
5 according to modern capital market theory is the only relevant measure of investment risk that need  
6 be of concern for investors. These betas come from the *Value Line Investment Survey* and are  
7 compiled by Aswath Damodaran of New York University. They may be found on the WWW at  
8 <http://www.stern.nyu.edu/~adamodar/>. The investment risk of water utilities is ranked the 3<sup>rd</sup>  
9 lowest of the 97 industries. Only alcoholic beverages and electric utilities (central) have lower  
10 measures of investment risk than water utilities.

11 **Q. HOW CAN THE EXPECTED OR REQUIRED RATE OF RETURN ON COMMON**  
12 **EQUITY CAPITAL BE DETERMINED?**

13 A. The costs of debt and preferred stock are normally based on historic or book values and can  
14 be determined with a great degree of accuracy. The cost of common equity capital, however,  
15 cannot be determined precisely and must instead be estimated from market data and informed  
16 judgment. The return to the equity owner should be commensurate with returns on investments in  
17 other enterprises having comparable risks.

18 According to valuation principles, the present value of an asset equals the discounted value  
19 of its expected future cash flows. Investors discount these expected cash flows at their required rate  
20 of return which, as noted above, reflects the time value of money and the perceived riskiness of the

1 expected future cash flows. As such, the cost of common equity is the rate at which investors  
2 discount expected cash flows associated with common stock ownership.

3 Models have been developed to ascertain the cost of common equity capital for a firm.  
4 Each model, however, has been developed using restrictive economic assumptions. Consequently,  
5 judgment is required in selecting appropriate financial valuation models to estimate a firm's cost of  
6 common equity capital, in determining the data inputs for these models, and in interpreting the  
7 models' results. All of these decisions must take into consideration the firm involved as well as  
8 conditions in the economy and the financial markets.

9 **Q. HOW DO YOU PLAN TO ESTIMATE THE COST OF EQUITY CAPITAL FOR**  
10 **THE COMPANY?**

11 A. I rely primarily on the discounted cash flow (DCF) model to estimate the cost of equity  
12 capital. I believe that the DCF model provides the best measure of equity cost rates for public  
13 utilities. I have also performed a risk premium (RP) study, but I give these results less weight  
14 because I believe that risk premium studies provide a less reliable indication of equity cost rates for  
15 public utilities.

16

17 **B. DISCOUNTED CASH FLOW ANALYSIS**

18

19 **Q. BRIEFLY DESCRIBE THE THEORY BEHIND THE TRADITIONAL DCF**  
20 **MODEL.**

1 A. According to the discounted cash flow (DCF) model, the current stock price is equal to the  
2 discounted value of all future dividends which investors expect to receive from investment in the  
3 firm. As such, stockholders' returns ultimately result from current as well as future dividends. As  
4 owners of a corporation, common stockholders are entitled to a pro-rata share of the firm's earnings.  
5 The DCF model presumes that earnings which are not paid out in the form of dividends are  
6 reinvested in the firm so as to provide for future growth in earnings and dividends. The rate at  
7 which investors discount future dividends, which reflects the timing and riskiness of the expected  
8 cash flows, is interpreted as the market's expected or required return on the common stock.  
9 Therefore this discount rate represents the cost of common equity. Algebraically, the DCF model  
10 can be expressed as:

11  
12  
13 
$$P = \frac{D_1}{(1+k)^1} + \frac{D_2}{(1+k)^2} + \frac{D_3}{(1+k)^3} + \dots$$
  
14  
15

16 where P is the current stock price,  $D_n$  is the dividend in year t, and k is the cost of common equity.

17 **Q. HOW DO YOU ESTIMATE STOCKHOLDERS' EXPECTED OR REQUIRED**  
18 **RATE OF RETURN USING THE DCF MODEL?**

19 A. Under certain assumptions, including a constant and infinite expected growth rate, and  
20 constant dividend/earnings and price/earnings ratios, the DCF model can be simplified to the  
21 following:

22

1  
2  
3  
4  
5

$$P = \frac{D_1}{k - g}$$

6 where  $D_1$  represents the expected dividend over the coming year and  $g$  is the expected growth rate  
7 of dividends. This is known as the constant-growth version of the DCF model. To use the  
8 constant-growth DCF model to estimate a firm's cost of equity, you solve for  $k$  in the above  
9 expression and obtain the following:

10  
11  
12  
13  
14

$$k = \frac{D_1}{P} + g$$

15 In the constant-growth version of the DCF model, the current dividend payment and stock price are  
16 directly observable. Therefore, the primary problem and controversy in applying the DCF model to  
17 estimate equity cost rates entails estimating investors' expected dividend growth rate.

18 **Q. WHAT FACTORS SHOULD ONE CONSIDER WHEN APPLYING THE DCF**  
19 **METHODOLOGY?**

20 A. One should be sensitive to several factors when using the DCF model to estimate a firm's  
21 cost of equity capital. In general, one must recognize the assumptions under which the DCF model  
22 was developed in estimating its components (the dividend yield and expected growth rate). The  
23 dividend yield can be measured precisely at any point in time, but tends to vary somewhat over  
24 time. Estimation of expected growth is considerably more difficult. One must consider recent firm

1 performance, in conjunction with current economic developments and other information available  
2 to investors, to accurately estimate investors' expectations.

3 **Q. IS THE CONSTANT GROWTH DCF MODEL CONSISTENT WITH**  
4 **VALUATION TECHNIQUES EMPLOYED BY INVESTMENT FIRMS?**

5 A. Yes. Virtually all investment firms use some form of the DCF model as a valuation  
6 technique. Schedule 8 provides a description of a three-stage DCF or dividend discount model  
7 (DDM), which is commonly referred to as the Merrill Lynch DDM.<sup>2</sup> This model presumes that a  
8 company's dividend payout progresses initially through a growth stage, then proceeds through a  
9 transition stage, and finally assumes a steady state stage. The dividend payment stage of a firm  
10 depends on the profitability of its internal investments which, in turn, is largely a function of the life  
11 cycle of the product or service. Given the regulated status of public utilities, and especially the fact  
12 that their returns on investment are effectively set through the rate-making process, the industry  
13 would be in the steady-state stage of a three-stage DDM. The DCF valuation procedure for  
14 companies in this stage is the constant-growth DCF.

15 **Q. WHAT DIVIDEND YIELD DO YOU EMPLOY IN YOUR DCF ANALYSIS FOR**  
16 **THE WATER GROUP?**

17 A. The dividend yields on the common stock for the group are provided in Schedule 3 for the  
18 twelve-month period ending April, 2001. Over this period, the average monthly dividend yield for

---

<sup>2</sup> A description of this model is found in William F. Sharp, Gordon J. Alexander, and Jeffrey V. Bailey, *Investments* (Prentice-Hall, 1995), pp. 590-1.

1 this group has ranged from a high of 4.2 to a low of 3.7%. The 12-month average for the group is  
2 3.9%. For the group, I will employ the average of the 12-month mean (3.9%) and the April, 2001  
3 (3.7%) dividend yields, which is 3.8%.

4 **Q. PLEASE DISCUSS THE APPROPRIATE ADJUSTMENT TO THE SPOT**  
5 **DIVIDEND YIELD.**

6 A. According to the traditional DCF model, the dividend yield term relates to the dividend  
7 yield over the coming period. As indicated by Professor Myron Gordon, who is commonly  
8 associated with the development of the DCF model for popular use, the appropriate dividend yield  
9 for a firm that pays dividends on a quarterly basis is found by (1) multiplying the expected dividend  
10 over the coming quarter by 4, and (2) dividing this dividend by the current stock price.<sup>3</sup>

11 In applying the DCF model, it is common to adjust the current dividend for growth over the  
12 coming year as opposed to the coming quarter. This can be complicated because firms tend to  
13 announce changes in dividends at different times during the year. As such, the dividend yield  
14 computed based on presumed growth over the coming quarter as opposed to the coming year can be  
15 quite different. Consequently, it is common to adjust the dividend yield by some fraction of the  
16 long-term expected growth rate.

17 The appropriate adjustment to the dividend yield is further complicated in the regulatory  
18 process when the overall cost of capital is applied to a projected or end-of-future-test-year rate base.

---

<sup>3</sup> See Direct Testimony of Myron J. Gordon and Lawrence I. Gould before the FCC at FCC Docket No. 79-05, in the

1 The net effect of this application is an overstatement of the equity cost rate estimate derived from  
2 the DCF model. In the context of the constant-growth DCF model, both the adjusted dividend  
3 yield and the growth component are overstated. Put simply, the overstatement results from  
4 applying an equity cost rate computed using current market data to a future or test-year-end rate  
5 base which includes growth associated with the retention of earnings during the year.

6 **Q. GIVEN THIS DISCUSSION, WHAT ADJUSTMENT FACTOR WILL YOU USE**  
7 **FOR YOUR DIVIDEND YIELD?**

8 A. I will adjust the dividend yield for the two groups by 1/2 the expected growth so as to  
9 reflect growth over the coming year.

10 **Q. PLEASE DISCUSS THE GROWTH RATE COMPONENT OF THE DCF MODEL.**

11 A. There is much debate as to the proper methodology to employ in estimating the growth  
12 component of the DCF model. By definition, this component is investors' expectation of the long-  
13 term dividend growth rate. Presumably, investors use some combination of historic and/or  
14 projected growth rates for earnings and dividends per share and for internal or book value growth to  
15 assess long-term potential. Alternative approaches to measure these expectations tend to generate  
16 different results, and therein lies the debate.

17 **Q. HOW ARE YOU DETERMINING A GROWTH RATE COMPONENT FOR YOUR**  
18 **DCF MODEL?**

19 A. I have analyzed many measures of growth for the companies in the water company groups.

---

Matter of ATT Petition for Modification of Prescribed Rate of Return, April 1980, p. 62.

1 Initially I evaluated historic earnings, dividends, and book value per share growth rates as provided  
2 in the *Value Line Investment Survey*. I have also used *Value Line's* 5-year projected growth rate  
3 estimates for earnings, dividends, and book value per share. In addition, I have utilized earnings  
4 growth rate forecasts as provided by Zacks, Multex Global, and First Call. These services solicit 5-  
5 year earning growth rate projections for securities analysts and compile and publish the averages of  
6 these forecasts on a monthly basis. They are readily available on the Internet. Finally, I have also  
7 assessed prospective growth as measured by prospective earnings retention rates and returns on  
8 average common equity.

9 **Q. PLEASE DISCUSS HISTORIC GROWTH IN EARNINGS AND DIVIDENDS AS**  
10 **WELL AS INTERNAL GROWTH.**

11 A. Historic growth rates for earnings, dividends, and book value per share are readily available  
12 to virtually all investors and presumably an important ingredient in forming expectations  
13 concerning future growth. However, one must use historic growth numbers as measures of  
14 investors' expectations with caution. In some cases, past growth may not reflect future growth  
15 potential. Also, employing a single growth rate number (for example, for five or ten years), is  
16 unlikely to accurately measure investors' expectations due to the sensitivity of a single growth rate  
17 figure to fluctuations in individual firm performance as well as overall economic fluctuations (i.e.,  
18 business cycles). However, one must appraise the context in which the growth rate is being  
19 employed. According to the conventional DCF model, the expected return on a security is equal to  
20 the sum of the dividend yield and the expected long-term (actually **infinite**) growth in dividends.



1 Therefore, to best estimate the cost of common equity capital using the conventional DCF model,  
2 one must look to long-term growth rate expectations.

3 Internally-generated growth is a function of the percentage of earnings retained within the  
4 firm (the earnings retention rate) and the rate of return earned on those earnings (the return on  
5 equity). The internal growth rate is computed as the retention rate times the return on equity.  
6 Internal growth is significant in determining long-run earnings and, therefore, dividends. Investors  
7 recognize the importance of internally-generated growth and pay premiums for stocks of companies  
8 that retain earnings and earn high returns on internal investments.

9 **Q. WHAT GROWTH DATA HAVE YOU REVIEWED FOR THE GROUPS OF**  
10 **WATER COMPANIES?**

11 A. Schedule 4 provides the following growth rates for the two groups: historic five- and ten-  
12 year historic growth rates in earnings, dividends, and book value per share (where available) as  
13 computed by *Value Line* (using the *Value Line* methodology); and projected five-year EPS growth  
14 rates from Zacks, Multex Global, and First Call as well as *Value Line's* projected 5-year growth  
15 rates for earnings, dividends, and book value per share.

16 **Q. PLEASE SUMMARIZE YOUR ANALYSIS OF THE VALUE LINE'S HISTORIC**  
17 **AND PROSPECTIVE GROWTH FOR THE COMPARISON GROUP OF WATER**  
18 **COMPANIES.**

19 A. Page 1 of Schedule 4 provides a summary of historic and prospective growth rates for the as  
20 provided in the *Value Line Investment Survey*. Historic growth in earnings, dividends, and book

1 value for the group from 3.4% to 5.0%, and the average of the historic five- and ten- year earnings,  
2 dividends, and book value growth is 4.3%. Prospective internal growth is 4.3%, with *Value Line*  
3 average projected retention and equity return rates of 35.8% and 11.8%, respectively. *Value Line*  
4 average projected growth rates for earnings, dividends, and book value per share for the group are  
5 7.4%, 3.1%, and 5.4%, respectively.

6 **Q. PLEASE ASSESS GROWTH FOR THE COMPARISON GROUP AS MEASURED**  
7 **BY ANALYSTS' FORECASTS OF EXPECTED 5-YEAR GROWTH IN EARNINGS PER**  
8 **SHARE (EPS).**

9 A. Several services collect, summarize, and publish the 5-year EPS growth rate forecasts of  
10 Wall Street analysts. These services include Zacks, First Call, and Multex Global (formerly  
11 I/B/E/S). These forecasts are provided for the comparison group companies on page 2 of Schedule  
12 4. Since (1) there is considerable overlap in analyst coverage between the three services, and (2)  
13 not all of the companies have forecasts from the different services, I have averaged the expected 5-  
14 year EPS growth rates from the three services (along with the 5-year EPS forecasts from *Value*  
15 *Line*) for each company to arrive at an expected EPS growth rate by company. The right-hand  
16 column shows these averages, and the resulting mean for the entire group, which is 5.4%.

**Table 1**  
**Comparison Group of Water Companies**  
**Growth Rate Indicators**

<u>Historic Growth</u>	
5-Year Historic EPS Growth	4.5%
5-Year Historic DPS Growth	3.7%
5-Year Historic BVPS Growth	5.0%
10-Year Historic EPS Growth	3.4%
10-Year Historic DPS Growth	4.5%
10-Year Historic BVPS Growth	4.8%
<u>Projected Growth</u>	
Prospective Internal Growth	4.3%
Projected EPS Growth ( <u>Value Line - 4 firms</u> )	7.4%
Projected DPS Growth ( <u>Value Line - 4 firms</u> )	3.1%
Projected BVPS Growth ( <u>Value Line - 4 firms</u> )	5.4%
Projected EPS Growth	
American States Water Co.	5.3%
American Water Works	6.6%
California Water	6.0%
Connecticut Water	3.0%
Middlesex Water	3.0%
Philadelphia Suburban	8.6%
Average Projected EPS Growth	5.4%

14 Historic indicators suggest an average growth rate for the comparison group between 4.0 and 5.0  
 15 percent. Projected growth for the group is higher and has a broader range. The midpoint of this  
 16 range is in the 5.0 to 6.0 percent area. Considering these ranges, and giving higher weight to the  
 17 projected growth figures, I will use 5.5 percent as the expected growth rate in my DCF model for  
 18 the comparison group.

19 **Q. WHAT IS YOUR INDICATED COMMON EQUITY COST RATE FROM THE**  
 20 **DCF MODEL FOR THE COMPARISON GROUP?**

1 A. My DCF estimated cost of equity capital for AWC using the comparison group is the sum  
2 of the adjusted dividend yield and expected growth:

3 Comparison group:  $3.80\% * (1.0275) + 5.50\% = 9.40\%$

4

5 **C. RISK PREMIUM APPROACH**

6

7 **Q. HOW WILL YOU ESTIMATE THE COMPANY'S EQUITY COST RATE USING**  
8 **THE RISK PREMIUM APPROACH?**

9 A. According to the risk premium approach, the cost of equity is the sum of the interest rate on  
10 a risk-free bond ( $R_f$ ) and a risk premium (RP), as in the following:

11 
$$k = R_f + RP$$

12 I use the yield on long-term Treasury securities as the risk-free interest rate, and estimate the risk  
13 premium by assessing investors' return requirements and market-to-book ratios for water service  
14 companies.

15 **Q. PLEASE PROVIDE AN OVERVIEW OF YOUR RISK PREMIUM APPROACH.**

16 A. My risk premium approach is based on two fundamental economic concepts: the economic  
17 theory of the firm as discussed earlier in my testimony, and the fundamental financial proposition  
18 of a positive relationship between risk and return. According to economic theory, when a firm's  
19 accounting profits (which include capital costs) are sufficient to meet investors' requirements, the  
20 market value and the book value of the firm will be equal. Likewise, if a firm is generating

1 earnings greater (less) than required by investors, the market-to-book ratio will be greater (less)  
2 than 1.0. In recent years, the market-to-book ratios for water service companies have been greater  
3 than 1.0, indicating that the earnings of these companies are more than sufficient to meet investors'  
4 requirements. The positive relationship between risk and return requires that, in a world of risk  
5 aversion, investors require a higher expected return for a higher level of perceived risk in an  
6 investment. By definition, the premium for assuming risk is based on the difference between the  
7 expected return on the risky investment and the expected return on a riskless investment.

8 **Q. HOW DO YOU PERFORM YOUR RISK PREMIUM STUDY?**

9 A. A market-to-book ratio of 1.0 indicates that investors' return requirements are being met. In  
10 my approach, the risk premium, defined as the return on common equity minus the riskless interest  
11 rate, is compared to contemporaneous market-to-book ratios. As such, this methodology shows the  
12 additional return which utility common stock investors require above the risk-free interest rate.

13 To establish a cost of equity for the Company, I examine required rates of return as  
14 indicated by both accounting and market based rates of return. I perform the study in three steps for  
15 the six water companies with forecasts provided by *Value Line*: (1) using the companies in the  
16 group, I compute the premium for risk required by investors as the expected return on equity minus  
17 the yield on long-term Treasury securities; (2) I regress the risk premium for each firm on the  
18 market-to-book ratio for different time periods; and (3) I add the indicated average risk premium for  
19 the water service companies to the current yield on long-term Treasury securities.

20 **Q. PLEASE DISCUSS THE FEATURES OF YOUR RISK PREMIUM STUDY.**

1 A. First, by directly comparing the expected returns on equity (minus the risk-free interest rate)  
2 to market-to-book ratios, I am directly measuring the accounting earnings required by investors.  
3 Risk premium studies which measure a risk premium as the difference between bond and stock  
4 returns do not directly address the adequacy of accounting earnings. Second, I am using forecasted  
5 returns on equity and not just historic bond and stock returns to determine investor return  
6 requirements and an appropriate risk premium. Security prices and capital cost rates are based on  
7 expectations of the future and not on extrapolations of returns from the past. Third, I am employing  
8 a group of water service companies (and not a broader group of companies or utilities) to measure  
9 investors' return requirements. Fourth, I am using the same base in my risk premium study - the  
10 yield on long-term Treasury securities - as I use in estimating the cost of equity for the Company  
11 employing the risk premium approach. I do not establish a risk premium utilizing bond returns as a  
12 base and then estimate an equity cost rate utilizing current bond yields as a base rate. And finally,  
13 since my risk premium study does not evaluate returns derived from a series of security prices over  
14 long time periods, the appropriate measure of central tendency for historic returns - arithmetic mean  
15 or median, or geometric mean returns - is not an issue.

16 **Q. WHAT RISK-FREE RATE OF INTEREST ARE YOU USING IN YOUR**  
17 **ANALYSIS?**

18 A. The riskless or risk-free rate of interest is presumed to be equal to the yields on obligations  
19 of the U.S. Treasury. These obligations are termed riskless because they are presumed to have no  
20 default risk.

1 Page 2 of Schedule 5 shows the yields on long-term Treasury securities. As the Federal  
2 Reserve has lowered rates in response to a slowing economy, these rates have declined over the past  
3 year from the 6.0-6.5% range to below 5.50%. I will utilize 5.50% as the risk-free rate in my risk  
4 premium approach.

5 **Q. PLEASE PROVIDE THE DETAILS OF YOUR RISK PREMIUM STUDY.**

6 A. As described above, I examine required rates of return as indicated by both accounting and  
7 market based rates of return. My risk premium study uses past and expected returns since capital  
8 cost rates and security prices are based on expectations of the future. I perform a risk premium  
9 study for the *Value Line* companies. Forecasts of returns on common equity (ROE) are available  
10 from the *Value Line Investment Survey* for these companies. I use a one-year base period  
11 (2000/2001) in my risk premium study. *Value Line* publishes individual company updates four  
12 times per year. For each *Value Line* update, I obtain the year t-1, t, t+1 and the 3-5 year projected  
13 ROE. Market-to-book ratios as of the month of the update are obtained from *C. A. Turner Utility*  
14 *Reports*. The yield on long-term Treasury securities for the appropriate month comes from the  
15 *Federal Reserve Bulletin* (or *Wall Street Journal*, depending on availability). For each company, I  
16 compute the risk premium as the ROE minus the yield on long-term Treasury securities. I average  
17 the ROEs for the different time periods to determine the expected ROE. I then regress the risk  
18 premium (using the average ROE and the interest rate ) on the market-to-book ratio for the firms in  
19 the water group. Finally, I add the indicated average risk premium to the current yield on long-term  
20 Treasury securities to obtain an equity cost rate for the Company.

1 **Q. PLEASE DISCUSS THE RESULTS OF YOUR RISK PREMIUM ANALYSIS.**

2 A. The table on page 1 of Schedule 5 shows the regression results for the four different time  
3 periods. The results suggest that risk premium has ranged from about 3.0% to 4.4% over the past  
4 year. The average is 3.52%.

5 **Q. WHAT EQUITY COST RATE DO YOU ESTIMATE FOR THE COMPANY**  
6 **USING THE RISK PREMIUM APPROACH?**

7 A. Given the most recent risk premium (4.40%), and the average over the year (3.50%), I will  
8 use 4.0% as my risk premium. Hence, using the risk premium approach, the indicated equity cost  
9 rate for the group is:

10 Comparable Companies  $5.50\% + 4.0\% = 9.5\%$

11

#### 12 **D. EQUITY COST RATE SUMMARY**

13

14 **Q. PLEASE SUMMARIZE YOUR EQUITY COST RATE STUDY.**

15 A. My DCF analysis for the comparable group indicates an equity cost rate of 9.4%. My risk  
16 premium analysis suggests an equity cost rate of 9.5%. Therefore, I will use an equity cost rate of  
17 is 9.5% for the comparable group.

18 **Q. GIVEN THESE RESULTS, WHAT EQUITY COST RATE RECOMMENDATION**  
19 **ARE YOU MAKING FOR AWC?**

20 A. Given these results, I am recommending an equity cost rate of 10.0% for AWC. This



1 provides a 50 basis point adjustment for the higher financial risk of AWC as indicated by its lower  
2 common equity ratio. This adjustment is in line with the adjustment for financial risk made by Mr.  
3 Mulle.

4 **Q. HOW DO YOU TEST THE REASONABLENESS OF YOUR 10.0%**  
5 **RECOMMENDATION?**

6 A. To test the reasonableness of my 10.0% recommendation, I have examined the relationship  
7 between the return on common equity and the market-to-book ratios for the comparable group of  
8 water companies.

9 **Q. WHAT DO THE RETURNS ON COMMON EQUITY AND MARKET-TO-BOOK**  
10 **RATIOS FOR THE GROUP INDICATE ABOUT THE REASONABLENESS OF YOUR**  
11 **10.0% RECOMMENDATION?**

12 A. Schedules 2 and 4 provide financial performance and market valuation statistics for the  
13 group. The average current and projected returns on equity are 10.3% and 11.9% for the group.  
14 The average market-to-book ratio for the group is 2.17. These results - current and projected  
15 returns on equity in the 10-11 percent range and a market-to-book ratio of over 2.0 – clearly  
16 indicate that these companies have been earning and/or are expected to continue to earn returns on  
17 equity well in excess of their equity cost rates. As such, the current and expected returns on equity  
18 for these companies are clearly above the equity cost rates for these companies. These observations  
19 provide convincing evidence that my recommended equity cost rate of 10.0% is reasonable and  
20 fully consistent with the financial performance and market valuation of water utilities.

1 **Q. FINALLY, PLEASE DISCUSS THIS RECOMMENDATION IN LIGHT OF**  
2 **RECENT YIELDS ON PUBLIC UTILITY BONDS.**

3 A. In recent months the yields on public utility bonds have been in the 7.50 percent range. My  
4 equity return recommendation of 10.0% must be viewed in the context of the significant shift in the  
5 risk and return characteristics of bonds and stocks over the past two decades. This change and its  
6 implications for equity risk premiums are discussed in depth in my critique of Mr. Mulle's  
7 testimony. In short, the relative risk of stocks and bonds has changed in recent years as stocks have  
8 become less volatile and risky while bonds have become more volatile and risky. This change is  
9 readily evidenced by the high level of real interest rates (nominal yields minus inflation) in the  
10 economy. Today, with 30-year Treasuries yielding about 5.5% and inflation of about 2.5%, the real  
11 rate of interest is approximately 3.0 percent. Historically, this figure has averaged 2.0 percent. The  
12 fact that stocks and bonds are nearly equal in terms of volatility and risk implies that investors'  
13 required rates of returns on stocks and bonds are much closer today than in the past. Accordingly,  
14 the return premium that equity investors require over bond yields is much lower than it was when  
15 stock returns were much more volatile than bond returns.

16 **Q. WHAT IS THE MAGNITUDE OF THE DECLINE OF THE EQUITY RISK**  
17 **PREMIUMS?**

18 A. Most historic assessments of the equity risk premium (such as the analysis performed by  
19 Mr. Mulle) suggest an equity risk premium of 5-7 percent above the rate on long-term Treasury  
20 bonds. However, recent studies suggest that the historic equity risk premium is severely biased as a

1 measure of the expected risk premium. Jeremy Siegel, a Wharton finance professor and author of  
2 the popular book *Stocks for the Long Term*, recently published a study entitled “The Shrinking  
3 Equity Risk Premium.”<sup>4</sup> His concluding observations include the following:

4 “The degree of the equity risk premium calculated from data estimated from 1926 is  
5 unlikely to persist in the future. The real return on fixed-income assets is likely to be  
6 significantly higher than estimated on earlier data. This is confirmed by the yields available  
7 on Treasury index-linked securities, which currently exceed 4%. Furthermore, despite the  
8 acceleration in earnings growth, the return on equities is likely to fall from its historical  
9 level due to the very high level of equity prices relative to fundamentals.”  
10

11 The equity risk premiums of some of the leading investment firms today support this observation.  
12 An article in *The Economist* indicated that some of these firms are estimating an equity risk  
13 premium for an average risk stock in the 2.0 to 3.0 percent range above the interest rate on U.S.  
14 Treasury bonds.<sup>5</sup> With a current long-term Treasury rate of 5.5% and an equity risk premium of  
15 2.5% (midpoint of estimated range), this implies an equity cost rate of 8.0% for an average risk  
16 stock. Given the low risk of water utilities in general and AWC in particular, my 10.0% return on  
17 equity recommendation is very fair and reasonable.

18 **Q. IS THIS DECLINE IN THE EQUITY RISK PREMIUM A GENERALLY**  
19 **ACCEPTED NOTION IN THE INVESTMENT WORLD?**

20 A. Yes. In fact, Alan Greenspan, the Chairman of the Federal Reserve Board, indicated in an  
21 October 14, 1999 speech on financial risk that the fact that equity risk premiums have declined

---

<sup>4</sup> Jeremy J. Siegel, "The Shrinking Equity Risk Premium, *The Journal of Portfolio Management* (Fall, 1999).

<sup>5</sup> The observation implies that the premium that investors require lower return premiums today to invest in common

1 during the past decade is “not in dispute.” He summarized some of the elements of the decline in  
2 the following passage:<sup>6</sup>

3 “There can be little doubt that the dramatic improvements in information technology in  
4 recent years have altered our approach to risk. Some analysts perceive that information  
5 technology has permanently lowered equity premiums and, hence, permanently raised the  
6 prices of the collateral that underlies all financial assets.

7  
8 The reason, of course, is that information is critical to the evaluation of risk. The less that  
9 is known about the current state of a market or a venture, the less the ability to project  
10 future outcomes and, hence, the more those potential outcomes will be discounted.

11  
12 The rise in the availability of real-time information has reduced the uncertainties and  
13 thereby lowered the variances that we employ to guide portfolio decisions. At least part of  
14 the observed fall in equity premiums in our economy and others over the past five years  
15 does not appear to be the result of ephemeral changes in perceptions. It is presumably the  
16 result of a permanent technology-driven increase in information availability, which by  
17 definition reduces uncertainty and therefore risk premiums. This decline is most evident  
18 in equity risk premiums. It is less clear in the corporate bond market, where relative  
19 supplies of corporate and Treasury bonds and other factors we cannot easily identify have  
20 outweighed the effects of more readily available information about borrowers.

21  
22 The marked increase over this decade in the projected slope of technology advance, of  
23 course, has also augmented expectations of earnings growth, as evidenced by the dramatic  
24 increase since 1995 in security analysts' projections of long-term earnings. While it may  
25 be that the expectations of higher earnings embodied in equity values have had a spillover  
26 effect on discount factors, the latter remain essentially independent of the earnings  
27 expectations themselves.

28  
29 That equity premiums have generally declined during the past decade is not in dispute.  
30 What is at issue is how much of the decline reflects new, irreversible technologies, and  
31 what part is a consequence of a prolonged business expansion without a significant period  
32 of adjustment. The business expansion is, of course, reversible, whereas the technological  
33 advancements presumably are not.”

34 **V. CRITIQUE OF AWC'S RATE OF RETURN TESTIMONY**

---

stocks. For example, see "Choosing the Right Mixture, *The Economist* (February 27, 1999), pp. 1-2.

1

2 **Q. PLEASE SUMMARIZE MR. MULLE'S OVERALL RATE OF RETURN**  
3 **RECOMMENDATION.**

4 A. As summarized below, Mr. Mulle's overall rate of return recommendation is 10.12%.

<u>Source</u>	<u>Capital Ratio</u>	<u>Cost Rate</u>	<u>Weighted Cost Rate</u>
L-T Debt	58.52%	7.95%	4.652%
Preferred Stock – Current	0.12%	11.2%	0.013%
Preferred Stock	0.68%	9.21%	0.062%
<u>Common Equity</u>	<u>40.68%</u>	<u>13.25%</u>	<u>5.391%</u>
Cost of Capital			10.12%

12

13 Whereas I have adopted Mr. Mulle's capital structure and senior capital cost rates, I believe that his  
14 equity cost rate estimate and overall rate of return recommendation are excessive.

15 **Q. PLEASE OUTLINE YOUR CRITIQUE OF MR. MULLE'S TESTIMONY.**

16 A. Primarily I will address the following issues are they pertain to Mr. Mulle's testimony: (1)  
17 Mr. Mulle's equity cost rate approaches and estimates, along with the adjustments he makes for  
18 flotation costs, size, and market value – book value conversion; (2) his studies pertaining to the  
19 business risk of AWC and conservation risk, along with their related adjustments; and (3) the issue  
20 of the equity risk premium and how is measured.

21 **Q. PLEASE REVIEW MR. MULLE'S EQUITY COST RATE APPROACHES.**

22 A. Mr. Mulle estimates an equity cost rate for AWC by applying several equity cost rate

---

<sup>6</sup> Alan Greenspan, "Measuring Financial Risk in the Twenty-First Century," OCC Conference, October 14, 1999.

1 models to the comparable group of water companies. His equity cost rate approaches include a  
2 DCF model, a comparable earnings analysis, a historic risk premium, and a Capital Asset Pricing  
3 Model (CAPM). His equity cost rate estimates are summarized below:

4 Summary of Approaches and Results

	<u>DCF</u>	<u>Risk Premium</u>	<u>CAPM</u>	<u>Comparable Earnings</u>
	11.65%	12.39%	12.62%	13.00%

5  
6  
7  
8  
9  
10 He also makes a market-to-book adjustment to his DCF and CAPM figures. Based on these figures,  
11 he arrives at an equity cost rate estimate for the group of 12.0%. To this figure he makes the  
12 following adjustments to arrive at his 13.25% recommendation for AWC:

13	Comparable Group Equity Cost Rate	12.0%
14	Adjustments:	
15	Financial Risk:	0.68%
16	Business Risk	0.07%
17	<u>Conservation Risk</u>	<u>0.50%</u>
18	AWC Recommendation	13.25%
19		

20 **Q. INITIALLY PLEASE EVALUATE MR. MULLE'S ASSESSMENT OF THE**  
21 **RELATIVE BUSINESS RISK OF AWC AND THE WATER GROUP.**

22 A. Between pages 28 and 29 and in Schedule 9 of his testimony, Mr. Mulle examines the  
23 business risk of AWC relative to his group of water companies. He concludes that AWC's business  
24 risk is greater than that of the comparable group based on two factors (1) a study of the variability  
25 of pre-tax return on capital, and (2) the relative customer mix of AWC and the comparable group.

26 This conclusion is incorrect on the both counts. With regard to the variability of pre-tax

1 return on capital, his conclusion is based solely on the results for fifteen years only. But, in fact, his  
2 business risk measure indicates that AWC is less risky than the comparable group for the most  
3 recent five and ten year periods. As such, the two most recent time periods, which obviously are the  
4 most relevant, provide results that are in direct contrast to his conclusion as to the relative business  
5 risk of AWC.

6 Mr. Mulle also indicates that AWC is riskier due to its relative customer mix. In this  
7 regard, he notes that AWC is more dependent on commercial sales than the comparison group. His  
8 only support for this conclusion are the 1998 percentages of revenue mix, sales volume mix, and  
9 customer mix for AWC and the comparison group. His conclusion based solely on these  
10 percentages is in error. First, it must be noted that he provides no study to support his conclusion  
11 that a higher commercial customer mix increases risk. Second, AWC's residential percentages for  
12 revenues, volumes, and customers are about the same as the comparable group. As such, they are  
13 very comparable on this measure. And third, the higher commercial mix for AWC is matched by a  
14 higher mix for industrial and other for the comparable group. Thus, only if Mr. Mulle can clearly  
15 demonstrate that the commercial side of the water business is riskier than the industrial and other  
16 can he conclude that the relative customer mix of AWC is riskier than that of the comparable group

17 **Q. PLEASE ASSESS MR. MULLE'S STUDY OF THE CONSERVATION RISK**  
18 **TARIFF.**

19 A. On pages 19-22 of his testimony and on pages 3 and 6 of Schedule 9, Mr. Mulle performs a  
20 study that, in his opinion, demonstrates AWC's inclining tariff structure has resulted in

1 conservation which exposes AWC to conservation risk. He argues that this risk is not recognized in  
2 his business risk analysis. He claims that his study suggests that AWC needs an additional 50 basis  
3 points in its equity cost rate to account for the conservation risk. My observations are that Mr.  
4 Mulle's study does not, in any way, support the notion that the inclining tariff rate has exposed  
5 AWC to additional risk and therefore there is no need a his proposed 50 basis point conservation  
6 risk factor.

7 Initially, it must be highlighted that Mr. Mulle's own study of the variability of the  
8 variability of pre-tax return on capital contradicts his notion that the company needs an equity cost  
9 adjustment for conservation. As shown on page 2 of Schedule 9, over the past 10 years the  
10 variability of AWC's pre-tax return on capital is more than 25% less than that of the comparison  
11 group. Hence, this demonstrates that over the period with inclining tariffs, the overall business risk  
12 of AWC was significantly less than that of the group.

13 Second, Mr. Mulle's study evaluates the growth in sales, revenues, and common equity for  
14 AWC and the comparable group over the 1989-1999 period. He then extrapolates these figures  
15 forward to arrive at an equity shortfall that is the justification for his 50 basis point equity cost rate  
16 adjustment.

17 There are two seriously flaws that totally invalidate Mr. Mulle study and therefore its  
18 conclusions and the resulting equity cost rate adjustment. First, the most serious error in the study  
19 and analysis is the conclusion that any slowdown in sales, revenues, or equity growth for AWC in  
20 the post-1992 period was directly associated with the imposition of inclining tariffs. There are



1 many factors that affect the demand for water over time – most notably weather, as well as  
2 population and economic growth. To arrive at the conclusion that the imposition of inclining tariffs  
3 affected sales, revenues, and equity growth, Mr. Mulle would have to model the demand for water  
4 for AWC and the comparison group based on these factors as well as tariffs. Without such a study,  
5 it is impossible to conclude whether it was the weather patterns or one of these other factors or the  
6 tariffs themselves that resulted in differential growth rates in sales, revenues, or equity. As such,  
7 Mr. Mulle’s study is critically flawed and his conclusions are not valid.

8 Second, even the results are taken seriously (which is a mistake), I do not believe that they  
9 show a significant differential in the most important factor – revenue growth. Consider these  
10 figures for the 8- and 10- year revenue growth rates for AWC and the comparable group:

11 Revenue Growth

	10-Year	8-Year
12 AWS	7.15%	6.46%
13 Comparable Group	7.17%	6.55%

14  
15

16 It is clear that the revenue growth for both AWC and the comparable group was nearly identical  
17 over both periods and hence the imposition of inclining tariffs did not significantly affect  
18 conservation in the post-1992 period.

19 **Q. GIVEN THESE OBSERVATIONS, WHAT IS YOUR CONCLUSION**  
20 **REGARDING THE 50 BASIS POINT ADJUSTMENT FOR THE CONSERVATION RISK**  
21 **FACTOR?**

1 A. The adjustment is based on a critically flawed study and therefore the 50 basis point  
2 adjustment is invalid.

3 **Q. PLEASE REVIEW MR. MULLE'S EQUITY COST RATE ESTIMATION**  
4 **APPROACHES.**

5 A. Mr. Mulle uses a DCF analysis, two types of risk premium analyses (risk premium and  
6 CAPM), as well as an accounting-based approach in the form of comparable earnings. In each  
7 case, the approaches are applied to firms deemed comparable to AWC. The DCF approach uses  
8 dividends and earnings data to estimate the expected or required rate of return on the stock of the  
9 comparable firms. The risk premium method employs the difference in historic stock and bond  
10 returns to estimate expected or required rates of return for similar firms. And the comparable  
11 earnings approach simply measures the return on equity for firms deemed comparable in risk to  
12 AWC.

13 **Q. PLEASE PROVIDE SOME INSIGHT INTO RECENT RESEARCH FOCUSING**  
14 **ON THESE ALTERNATIVE APPROACHES TO ESTIMATING A FIRM'S COST OF**  
15 **EQUITY CAPITAL**

16 A. The controversy of using these alternative approaches for estimating the cost of equity  
17 capital has spawned a series of studies by academics in recent years. The primary controversy  
18 revolves around two related issues: (1) the size of equity risk premium which is the return equity  
19 investors require above the yield on bonds; and (2) the fact that estimates of the equity risk  
20 premium using fundamental firm data (earnings and dividends) are much lower than estimates

1 using historic stock and bond market data. Eugene Fama and Ken French, two of the most  
2 preeminent scholars in finance, recently published a paper entitled "The Equity Premium."<sup>7</sup> They  
3 use dividend and earnings growth models to estimate expected stock returns and equity risk  
4 premiums and compare these results to actual stock returns. For the period 1950-1999, they  
5 estimate that the expected equity risk premium from DCF models using dividend and earnings  
6 growth to be 3.40% and 4.83%. These figures are much lower than the equity risk premium  
7 produced from the average stock return which is 8.28%. They conclude that the estimates using  
8 DCF models and fundamental data are superior to those using historic stock returns for three  
9 reasons: (1) the estimates are more precise (a lower standard error); (2) The Sharpe ratio, which is  
10 measured as the [(expected stock return – risk-free rate)/standard deviation], is constant over time  
11 for the DCF models but more than doubles for the average stock return; and (3) valuation theory  
12 specifies relations between the market-to-book ratio, return on investment, and cost of equity  
13 capital that favor estimates from fundamentals. They conclude that the high average stock return  
14 over the past 50 years were the result of low expected returns and that the average equity risk  
15 premium has been in the 3-4 percent range.

16 A soon-to-be published study by James Claus and Jacob Thomas of Columbia University  
17 provide direct support for the findings of Fama and French.<sup>8</sup> These authors compute equity risk

---

<sup>7</sup> Eugene F. Fama and Kenneth R. French, "The Equity Premium," Working Paper, Sloan School of Management, MIT, 2001.

<sup>8</sup> James Claus and Jacob Thomas, "Equity Risk Premia as Low as Three Percent? Empirical Evidence from Analysts' Earnings Forecasts for Domestic and International Stock Market," Forthcoming, *Journal of Finance*.

1 premiums over the 1985-1998 period by (1) computing the discount rate that equates market values  
2 with the present value of expected future cash flows, and (2) then subtracting the risk-free interest  
3 rate. The expected cash flows are developed using analysts' earnings forecasts. They conclude that  
4 over this period the equity risk premium is in the range of 3.0%. They note that over this period  
5 average stock returns overstate the equity risk premium because as the equity risk premium has  
6 declined, stock prices have risen (present values increase when required rates of return decline).  
7 The higher stock prices have produced returns that have exceeded expectations and therefore  
8 historic equity risk premium estimates are biased upwards.

9 **Q. DOES THE INVESTMENT COMMUNITY ALSO RECOGNIZE THAT THE**  
10 **EQUITY RISK PREMIUM HAS DECLINED?**

11 A. Yes. One of the first studies in this area was by Stephen Einhorn, one of Wall Street's  
12 leading investment strategists.<sup>9</sup> His study showed that the market or equity risk premium had  
13 declined to the 2.0 to 3.0 percent range by the early 1990s. Among the evidence he provided in  
14 support of a lower equity risk premium is the inverse relationship between real interest rates  
15 (observed interest rates minus inflation) and stock prices. He noted that the decline in the market  
16 risk premium has led to a significant change in the relationship between interest rates and stock  
17 prices. One implication of this development was that stock prices had increased higher than would  
18 be suggested by the historic relationship between valuation levels and interest rates.

---

<sup>9</sup> See Steven G. Einhorn, "The Perplexing Issue of Valuation: Will the Real Value Please Stand Up?" *Financial Analysts Journal* (July-August 1990 (pp. 11-16).

1 Other investment firms like J.P. Morgan have also acknowledged that fact that the equity  
2 risk premium has declined to the 2-3 percent range.<sup>10</sup> In addition, John Bogle, the founder of  
3 mutual mutual fund leader Vanguard and one of the financial leaders of the 20<sup>th</sup> century, also argues  
4 that the equity risk premium has fallen to 3.0 percent in his 1999 book *Common Sense on Mutual*  
5 *Funds*.

6 **Q. WHAT ECONOMIC DEVELOPMENTS HAVE BEEN ASSOCIATED WITH THE**  
7 **DECLINE IN THE EQUITY RISK PREMIUM?**

8 A. The expanded business cycle of the 1990 produced the longest continuous period of  
9 economic growth in U.S. business history. Goldman, Sachs published a report on the new economy  
10 entitled "The Brave New Business Cycle" and discussed its implications for corporate profitability  
11 and stock market valuation. According to the report, the "Brave New Business Cycle," which  
12 features longer periods of business expansion, has resulted from heightened competition,  
13 globalization, deregulation, and technology. Among the implications of the new business cycle are  
14 higher stock valuation levels (higher P/E ratios) due to a lower equity risk premium. According to  
15 the report:<sup>11</sup>

16 **Signs of a reduced equity risk premium.** In theory, by stabilizing the growth of the  
17 earnings stream, the Brave New Business Cycle should reduce the premium that investors  
18 require for equity investments. This premium is nothing more than the difference in  
19 expected total return between investing in equities and investing in "safe" fixed-income

---

<sup>10</sup> For example, see "Welcome to Bull Country," *The Economist* (July 18, 1998), pp. 21-3, and "Choosing the Right Mixture," *The Economist* (February 27, 1999), pp. 71-2.

<sup>11</sup> Edward F. McKelvey, "The Brave New Business Cycle: Its Implications for Corporate Profitability," U.S. Economic Research, Goldman, Sachs & Co., p. 7.

1 assets with similar duration, such as intermediate- to long-term government bonds.  
2 However, although the equity risk premium is easy to define conceptually, it is difficult to  
3 measure because ex post returns are not the same as ex ante expectations, even for periods  
4 of several years. Even so, support for the notion that the equity risk premium has declined  
5 can be found in two related facts. First, the P/E multiple for the S&P 500 has been trending  
6 up for more than a decade, whereas it should normally rise in recessions and early  
7 expansions and then fall progressively during expansions, as the excess slack in the  
8 economy is exhausted. Second, this increase has far outstripped the modest decline in real  
9 yields on 10-year government bonds that has occurred since the early 1980s. These  
10 disparate trends strongly suggest that the equity risk premium is probably moving down."  
11

12 **Q. WHAT ARE THE IMPLICATIONS OF THIS DISCUSSION ON THE EQUITY**  
13 **RISK PREMIUM IN THIS PROCEEDING?**

14 A. This discussion (and the previous quotes from Greenspan and Siegel) highlights the fact that  
15 leading academics, regulators, and investment firms recognize that the equity risk premium has  
16 declined to the 3.0% range and that the lower equity risk premium has been a primary reason for the  
17 high stock market returns over the past two decades. It also highlights the fact that indicate that  
18 analyzing historic stock and bond returns overstates the current, forward-looking equity risk  
19 premium.

20 There are three direct implications of this discussion as they pertain to Mr. Mulle's  
21 testimony and this proceeding. First, the best measures of equity cost rates come from using  
22 fundamental firm data in a DCF model. Second, Mr. Mulle has employed the DCF model, but he  
23 has used the historic stock price growth (not earnings or dividends) as his primary growth rate  
24 measure. This injects the same bias (as discussed above) in his DCF model as using historic stock  
25 returns in an equity risk premium analysis. And third, using historic stock and bond returns to

1 estimate an equity risk premium, as Mr. Mulle has in his risk premium and CAPM studies,  
2 overstates the equity risk premium and produces inflated equity cost rates.

3 **Q. PLEASE DISCUSS MR. MULLE'S DCF-DERIVED EQUITY COST RATE.**

4 A. Mr. Mulle uses two forms of the DCF model (1) a DCF where he estimates the dividend  
5 yield and expected growth rate and (2) a book value DCF where he replaces dividend yield with  
6 book value yield and estimates expected book value growth. My critique will focus on (1), since  
7 (2) is an unconventional approach developed by Mr. Mulle which does not measure the cost of  
8 equity capital. Nonetheless, most of my comments on (1) also pertain to (2).

9 On page 2 of Schedule 7 Mr. Mulle develops the dividend yield for his market yield basis  
10 DCF using the expected dividend one year hence, which he adjusts (1) for the compounding of  
11 dividend payments over the year, (2) for prospective issuance costs and market pressure. This  
12 results in a dividend yield of 4.38%.

13 **Q. PLEASE CRITIQUE THE DIVIDEND YIELD OF MR. MULLE'S MARKET**  
14 **YIELD BASIS DCF MODEL.**

15 A. The errors in Mr. Mulle's dividend yield calculation are:

16 (1) He adjusts the dividend for a full year of growth. The results in an overstatement of the  
17 dividend and the dividend yield because (a) companies increase dividends at different points  
18 during the year, and (b) this dividend yield and resulting equity cost rate are applied to end-  
19 of-year book value and therefore they already include growth:

20 (2) He adjusts the dividends for the compounding of quarterly dividends. This is an erroneous

1 adjustment, as was demonstrated many years ago in an academic study:<sup>12</sup> and

2 (3) He adjusts the dividend yield for issuance costs and market pressure. Since there is no  
3 evidence that these utilities will be issuing equity over the coming year, there is no need to  
4 adjust the cost of equity to reflect costs they will not incur. Furthermore, even if they were  
5 issuing equity, the issuance costs/market pressure study Mr. Mulle presents is so out of date  
6 that the adjustment figure he uses is not reflective of current market conditions.

7 **Q. PLEASE DISCUSS THE GROWTH COMPONENT OF MR. MULLE'S MARKET**  
8 **YIELD BASIS DCF MODEL.**

9 A. On pages 7 and 8 of Schedule 7 and Appendix C, Mr. Mulle develops the growth  
10 component for his market-yield basis DCF model. For his comparable group companies, he arrives  
11 at an average growth rate of 6.27% by the following weighting scheme: 40% for historic stock price  
12 growth, and 20% each for historic dividends, earnings, and book value per share. He then  
13 multiplies this figure (6.1%) by a share growth factor (to account for external growth) to arrive at  
14 6.27%. Mr. Mulle determined the individual growth rates for each indicator and for each company  
15 by finding a 'best-fit' linear regression line using historic data. He varied the number of years of  
16 data to establish a 'best-fit' regression line in each case.

17 **Q. PLEASE CRITIQUE THIS DCF GROWTH COMPONENT.**

18 A. There are several number of flaws in Mr. Mulle's analysis which leads to an overstatement

---

<sup>12</sup> Charles Linke and J. Kenton Zumwalt, "The Irrelevance of Compounding Frequency in Determining a Utility's Cost of Equity," *Financial Management* (Autumn, 1987), pp. 65-9.



1 of expected growth for the comparable group of water companies. These include:

- 2 (1) Mr. Mulle has used historic stock price growth as his primary indicator of  
3 expected growth. The problems with this procedure are: (a) as previously noted,  
4 it is well recognized that using historic stock prices and returns to measure  
5 equity cost rates biases these estimates upwards due to the declining equity risk  
6 premium; (b) this procedure puts the cart before the horse. The primary  
7 fundamental drivers of stock prices and returns are growth in earnings and  
8 dividends. These factors drive stock prices – stock prices do not produce  
9 earnings and dividends; (c) historic stock price growth, as estimated by Mr.  
10 Mulle, is 10.0%. This is nearly three times the average growth rate of dividends,  
11 earnings, and book value per share. Stock prices have grown faster than these  
12 factors in the past due to lower interest rates and a lower equity risk premium. It  
13 is impossible for stock prices to grow forever at a rate of three times the  
14 fundamental factors that drive stock prices.
- 15 (2) Mr. Mulle has ignored the growth rate forecasts of analysts. Even though they  
16 are subject to a well-known positive bias, they still indicate projected growth for  
17 the group somewhat below Mr. Mulle's 6.27%.<sup>13</sup>

---

<sup>13</sup> Zacks, First Call and Multex retrieve and compile EPS forecasts from Wall Street Analysts. These analysts come from both sell side (Merrill Lynch, Paine Webber) and buy side (Prudential Insurance, Fidelity Investments) investment firms. It is well known that the EPS forecasts of these analysts, especially those on the sell side, are overly optimistic and therefore biased upwards.

1 (3) The variable of interest in the DCF model is dividend per share growth. The  
2 average projected dividend growth rate for the group is only 3.0%. Yet, Mr.  
3 Mulle gives only 20% weight to dividend growth.

4 (4) Mr. Mulle adjusts his estimated growth rate by share growth to account for  
5 external growth. This procedure is redundant since his earnings projections  
6 from historic data include both internal and external growth. Hence, his  
7 procedure results in a double counting of external growth.

8 **Q. USING THE DIVIDEND YIELD AND GROWTH RATE, HOW DOES MR.**  
9 **MULLE THEN ARRIVE AT A DCF-DERIVED EQUITY COST RATE OF 12.20%?**

10 A. Mr. Mulle averages his market yield basis and book yield basis DCF results and then makes  
11 two adjustments. First, he adjusts the results for the so-called size effect. Then he makes an  
12 additional adjustment for the conversion of market values to book values. Both of these  
13 adjustments are unnecessary. The size effect is based on historic stock return studies by Ibbotson  
14 Associates and is intended to account for the relatively small capitalization of the water companies.  
15 The adjustment is used in error by Mr. Mulle because the stock prices for the water companies that  
16 he uses in the dividend yield already reflect the fact that these firms are small cap stocks. Hence,  
17 his adjustment results is redundant and results in a double counting of the small firm size effect.  
18 The market value – book value adjustment is also an error, and it is discussed below.

19 **Q. PLEASE ADDRESS MR. MULLE'S CRITICISMS OF THE DCF MODEL IN**  
20 **GENERAL AND, SPECIFICALLY, THE ADJUSTMENT TO HIS DCF EQUITY COST**

1 **RATE TO ACCOUNT FOR THE CAPITALIZATION CHANGES ASSOCIATED WITH**  
2 **THE DIVERGENCE OF MARKET AND BOOK VALUES.**

3 A. Between pages 47 and 53 of his testimony, Mr. Mulle criticizes using the DCF model to  
4 estimate equity cost rates in today's market conditions and makes an adjustment for one of these one  
5 specific factor. These criticisms can be summarized as follows: (1) there are problems using the  
6 DCF model in this case because the share prices of water utility stocks have risen due to takeover  
7 speculation; (2) the assumptions used in the derivation of the DCF model; (3) in conjunction with  
8 the DCF assumptions, which include the assumption of a constant P/E ratio, the fact that P/E ratios  
9 are not constant but change over time, and (4) the DCF model produces insufficient earnings when  
10 market-to-book ratios are above 1.0. I will address these issues in order.

11 (1) Problems with the DCF model due to rising prices attributed to takeover speculation -  
12 the share prices of water stocks have risen in recent years for a number of reasons, part of which  
13 may be the possibility of being acquired. The fact that prices rise simply means that either expected  
14 returns have changed or that there has been a reassessment of risk. This may also mean that equity  
15 cost rates have changed as well. Nonetheless, these conditions by themselves do not mean that the  
16 DCF model does not provide an accurate indicator of equity cost rates.

17 (2) The assumptions used in the derivation of the DCF model - First, it must be noted that  
18 all economic models are derived using fairly restrictive assumptions. In the DCF model,  
19 assumptions such as constant P/E and dividend payout ratios make the model internally consistent.  
20 Criticisms of the assumptions of the model are valid if it can be demonstrated that the model is not

1 robust with respect to obvious real world conditions which deviate from these assumptions. No  
2 such evidence has been provided in this proceeding. The fact that the DCF model is used almost  
3 universally in the investment community and in utility rate-making is indicative of the robustness of  
4 the methodology. The model does not require that investors have an infinite investment horizon.  
5 Simply put, the DCF model only presumes that stocks are priced on the basis of current and  
6 prospective dividends. Especially in the case of public utility stocks, I believe that this is a  
7 reasonable assumption

8 (3) The assumption of a constant P/E ratio, given that P/E ratios are not constant but change  
9 over time - P/E ratios change constantly as new information comes to the market which causes  
10 investors to revalue a company's shares (the numerator of the P/E ratio) relative to current earnings  
11 (the denominator of the P/E ratio). This new information may be associated with changes in the  
12 economic landscape which result in changes in equity cost rates (such as changes in interest rates or  
13 investors' risk/return tradeoff). In the context of the DCF model, the fact that P/E ratios change  
14 only provides an indication of changes in a firm's share price relative to past earnings. Share prices  
15 look forward and are determined by a firm's prospective cash returns discounted to the present by  
16 investors' required return. Earnings look backwards and are a function of firm performance and  
17 generally accepted accounting conventions.

18 In the context of the DCF model, the fact that P/E ratios change is simply an indication that  
19 new information relating to the economic environment is available and this has caused investors to  
20 revalue shares. The DCF is based on expectations, and thus it is also likely that the new

1 information actually results in a change in equity cost rates.

2 (4) The DCF model produces insufficient earnings when market-to-book ratios are above  
3 1.0. - The market value of a firm's equity exceeds the book value of equity when the firm is  
4 expected to earn more on the book value of investment than investors require. In other words, the  
5 expected return on equity capital is greater than the cost of equity capital (the return that investors  
6 require). Given the almost universal application of the DCF model in regulatory and investment  
7 circles, it is rather obvious that public utilities would not be selling in excess of 2.00 times book if  
8 the DCF model produced insufficient earnings. As such, Mr. Mulle's hypothesis is incorrect.

9 **Q. PLEASE SUMMARIZE YOUR EVALUATION OF MR. MULLE'S USE OF THE**  
10 **DCF MODEL TO ESTIMATE AWC'S EQUITY COST RATE.**

11 A. The primary errors in Mr. Mulle's DCF equity cost rate study are (1) an excessive dividend  
12 yield due to inappropriate adjustments for quarterly dividend compounding and issuance  
13 costs/market pressure; (2) a DCF growth rate which is inflated due primarily to an inappropriate use  
14 of, and clear over weighting of, historic stock price growth; and (3) improper adjustments to his  
15 DCF equity cost rate to reflect the firm size and the difference between book and market values.

16 **Q. PLEASE CRITIQUE MR. MULLE'S RISK PREMIUM STUDIES.**

17 A. Mr. Mulle has performed two risk premium studies. In the first, he starts with the real  
18 interest rate (1.67%) and, using Ibbotson Associates data, adds inflation, maturity, credit, and then  
19 equity and firm size risk premia to arrive at an equity cost rate of 12.20%. In the second study, he  
20 starts with the base yield on A rated public utility bonds (8.41%), and adds an equity risk premium

1 (3.86%) as well as adjustments for issuance costs (0.30%) and small size premium (0.54%) to  
2 arrive at an equity cost rate of 13.11%.

3 Initially, with respect to the first study, it should be highlighted that the expected inflation  
4 figure (3.65%) is much higher than the 2.7% forecasted by economists. In addition, with respect to  
5 the second study, it should be noted that the base yield on A rate public utility bonds has declined  
6 about 100 basis points since he filed his testimony. But the problems with the base yield in the  
7 second study go beyond this. The base yield, the prospective yield on 'A' rated public utility bonds,  
8 inflates the required return on equity for AWC in two ways: (1) long-term bonds are subject to  
9 interest rate risk, a risk which does not affect common stockholders since dividend payments  
10 (unlike bond interest payments) are not fixed but tend to increase over time; and (2) this base yield  
11 is subject to credit risk since it is not default risk-free like an obligation of the U.S. Treasury. This  
12 means that its yield-to-maturity is above its expected return and therefore using it as a base yield  
13 results in an overstatement of investors' return expectations.

14 . The major flaw in both studies that results in an overstatement of the equity cost rate is the  
15 equity risk premium. As shown on page 4 of Schedule 5, the equity risk premium for both studies  
16 comes from Ibbotson's Associates SBBI Yearbook. The equity risk premium is 6.99% for the first  
17 study and 3.86% for the second study. According to the note, it is the SBBI equity risk premium.  
18 The SBBI equity risk premium is computed as the difference in the average stock and bond returns  
19 over the 1926 – 1999 time period. Mr. Mulle then multiplies this premium by the average beta for  
20 the water companies. But, as discussed above, academics and investment firms have discovered

1 that using Ibbotson's historic average returns and methodology grossly overstates the true equity  
2 risk premium. Hence, Mr. Mulle's risk premium studies provide excessive equity cost rate  
3 estimates because he has employed inflated equity risk premium estimates.

4 **Q. PLEASE ELABORATE ON THE ERRORS IN USING HISTORIC STOCK AND**  
5 **BOND RETURNS TO ESTIMATE AN EQUITY RISK PREMIUM.**

6 A. There are several flaws in using historic returns over long time periods to estimate expected  
7 equity risk premiums. Most significant is the implicit assumption that (1) risk premiums do not  
8 change over time, and (2) there has been no change in the relative risk of stocks and bonds.

9 Specific problems with the methodology include:

10 (A) Biased historical bond returns;

11 (B) The arithmetic versus the geometric mean return;

12 (C) Unattainable and biased stock historical returns; and

13 (D) The change in risk and return.

14 These issues will be addressed in this order.

15 **Q. HOW ARE HISTORIC BOND RETURNS BIASED?**

16 A. An essential assumption of these studies is that over long periods of time investors'  
17 expectations are realized. However, the experienced returns of bondholders in the past violates this  
18 critical assumption. Historic bond returns are biased downward as a measure of expectancy because  
19 of capital losses suffered by bondholders in the past. As such, risk premiums derived from this data  
20 are biased upwards.

1 **Q. PLEASE DISCUSS THE ISSUE RELATING TO THE USE OF THE**  
2 **ARITHMETIC VERSUS THE GEOMETRIC MEAN RETURNS IN THE IBBOTSON**  
3 **METHODOLOGY.**

4 A. The measure of investment return has a significant effect on the interpretation of the risk  
5 premium results. When analyzing a single security price series over time (i.e., a time series), the  
6 best measure of investment performance is the geometric mean return. Using the arithmetic mean  
7 overstates the return experienced by investors. A study by Carleton and Lakonishok entitled "Risk  
8 and Return on Equity: The Use and Misuse of Historical Estimates" demonstrates the potential  
9 biases introduced by using alternative return measures. The authors make the following  
10 observation: "The geometric mean measures the changes in wealth over more than one period on a  
11 buy and hold (with dividends invested) strategy."<sup>14</sup> Since Mr. Mulle's study covers more than one  
12 period (and he assumes that dividends are reinvested), he should be employing the geometric mean  
13 and not the arithmetic mean.

14 **Q. PLEASE PROVIDE AN EXAMPLE DEMONSTRATING THE PROBLEM WITH**  
15 **USING THE ARITHMETIC MEAN RETURN.**

16 A. When stock returns and earnings growth rates are reported in the financial press, they are  
17 normally reported using the geometric mean. This is because of the upward bias of the arithmetic

---

<sup>14</sup> Willard T. Carleton and Josef Lakonishok, "Risk and Return on Equity: The Use and Misuse of Historical Estimates," *Financial Analysts Journal* (January-February, 1985), pp. 38-47.



1 mean. To demonstrate this bias, consider the following example. Assume that you have a stock  
2 (that pays no dividend) that is selling for \$100 today, increases to \$200 in one year, and then falls  
3 back to \$100 in two years. The table below shows the prices and returns.

Time Period	Stock Price	Annual Return
0	\$100	
1	\$200	100%
2	\$100	-50%

4 The arithmetic mean return is simply  $(100\% + (-50\%))/2 = 25\%$  per year. The geometric mean  
5 return is  $((1 + .50)^{(1/2)) - 1 = 0\%$  per year. Hence, the arithmetic mean return suggests that your  
6 stock has appreciated at an annual rate of 25%, while the geometric mean return indicates an annual  
7 return of 0%. Since after two years, your stock is still only worth \$100, the geometric mean return  
8 is the appropriate return measure. Hence, Mr. Mulle's arithmetic mean and median return measures  
9 are biased and should be disregarded.

10 **Q. YOU NOTE THAT HISTORIC STOCK RETURNS ARE BIASED USING THE**  
11 **IBBOTSON METHODOLOGY. PLEASE DISCUSS THIS FURTHER.**

12 A. Returns developed using Ibbotson's methodology are computed on stock indexes and  
13 therefore (1) cannot be reflective of expectations because these returns are unattainable to  
14 investors, and (2) produce biased results. This methodology assumes (a) monthly portfolio  
15 rebalancing and (b) reinvestment of interest and dividends. Monthly portfolio rebalancing  
16 presumes that investors rebalance their portfolios at the end of each month so as to have an equal  
17 dollar amount invested in each security at the beginning of each month. The assumption would

1 obviously generate extremely high transactions costs and, as such, these returns are unattainable  
2 to investors. Transaction costs themselves provide another bias in historic versus expected  
3 returns. The observed stock returns of the past were not realized returns of investors due to the  
4 much higher transaction costs. These higher transactions costs were not only the higher  
5 commissions on stock trades, but also the lack of low cost mutual funds like index funds.

6 **Q. FINALLY, PLEASE DISCUSS THE NOTION THAT MR. MULLE'S RISK**  
7 **PREMIUM STUDIES DO NOT REFLECT THE CHANGE IN RISK AND RETURN IN**  
8 **TODAY'S FINANCIAL MARKETS.**

9 A. The equity risk premium methodology employed by Mr. Mulle is also unrealistic in that: (1)  
10 this method makes the explicit assumption that the chosen time horizon is appropriate for  
11 estimating the current market risk premium, and (2) risk premiums do not change over time. These  
12 assumptions are not valid in today's environment. Economic developments over time have changed  
13 the economy and business cycle and has resulted in a dramatic change in the risk/return relationship  
14 between stocks and bonds. The nature of the change is that bonds have increased in risk relative to  
15 stocks.

16 Page 1 of Schedule 9 shows interest rates on long-term government bonds since 1926.  
17 Obviously, the interest rate levels of the past twenty years are significantly above those of the  
18 previous 50 years. Page 2 of Schedule 9 provides the annual market risk premiums for the 1926 to  
19 2000 period where the annual premium is defined as the return on common stock minus the return  
20 on long-term Treasury Bonds. There is considerable variability in this series and a clear decline in

1 recent decades. The high was 54% in 1933 and the low was -38% in 1931. Clear evidence of a  
2 change in the relative riskiness of bonds and stocks is provided on page 3 of Schedule 9 which plots  
3 the standard deviation of annual stock and bond returns since 1926. The plot shows that, whereas  
4 stock returns were much more volatile than bond returns from the 1920s to the 1970s, bond returns  
5 became more variable than stock returns during the 1980s. In recent years stocks and bonds have  
6 been almost equally volatile. The decrease in the volatility of stocks relative to bonds has been  
7 attributed to several stock related factors - the impact of technology on productivity and the new  
8 economy, the role of information (see Greenspan's comments above) on the economy and markets,  
9 better cost and risk management by businesses - and several bond related factors - deregulation of  
10 the financial system, inflation fears and interest rates, and the increase in the use of debt financing.  
11 Further evidence of the greater relative riskiness of bonds is shown on page 4 of Schedule 9, which  
12 plots real interest rates (the nominal interest rate minus inflation) from 1926 to 2000. Real rates  
13 have been well above historic norms during the past 10-15 years. These high real interest rates  
14 reflect the fact that investors view bonds as riskier investments.

15         The net effect of the change in risk and return has been a significant decrease in the return  
16 premium that stock investors require over bond yields. In short, the market risk premium has  
17 declined in recent years. As such, Mr. Mulle's historic market risk premium analysis is simply  
18 outdated and not reflective of current investor expectations and investment fundamentals.

19 **Q. PLEASE SUMMARIZE YOUR ASSESSMENT OF MR. MULLE'S RISK**  
20 **PREMIUM ANALYSIS.**

1 A. Mr. Mulle's risk premium study is erroneous and should be disregarded in estimating  
2 AWC's equity cost rate. As indicated, the base yield in the second study (1) includes interest rate  
3 risk, a risk not generally faced by equity investors, and (2) is above investors' expected return on  
4 public utility bonds. The equity risk premiums for both studies are based on a historic risk  
5 premium study of stock and bond returns over periods of up to 75 years that (1) employs biased  
6 bond returns; (2) uses the arithmetic mean return, (3) utilizes biased and unattainable stock returns,  
7 and (4) most importantly, masks the change in the relative risk of stocks and bonds and the  
8 resulting decline in the equity risk premium. As indicated, using the historic relationship between  
9 stock and bond returns to measure an equity risk premium is erroneous and, especially in this case,  
10 overstates the true market equity risk premium. The equity risk premium is based on expectations  
11 of the future and when past market conditions vary significantly from the present, historic data does  
12 not provide a realistic or accurate barometer of expectations of the future. At the present, using  
13 historic returns to measure the equity risk premium masks the dramatic change in the risk and  
14 return relationship between stocks and bonds which suggests that the equity risk premium has  
15 declined. As discussed above, the notion that the equity risk premium has declined, resulting in  
16 higher stock prices, is a well recognized and accepted in the academic, regulatory, and investment  
17 worlds and is responsible in part for the bull market for stocks.

18 **Q. PLEASE ASSESS MR. MULLE'S USE OF THE CAPITAL ASSET PRICING**  
19 **MODEL.**

20 A. Mr. Mulle applies a CAPM to the water group to estimate an equity cost rate for the

1 Company. For the CAPM, Mr. Mulle computes an equity cost rate of 11.34% using a 30-year risk-  
2 free rate of 5.96%, a beta of .53, and a market or equity risk premium of 10.25%. He then makes  
3 adjustments for cost of issuance/market pressure, size, and market value-book value and arrives at  
4 an equity cost rate for AWC of 12.72%. The equity risk premium is an average of the historic risk  
5 premium (the difference between the arithmetic mean returns on the S&P 500 and long-term  
6 Treasuries) and expected returns (the difference between Value Line's expected market return and  
7 the 30-year Treasury rate).

8 The primary problem with Mr. Mulle's CAPM analysis is, once again, the magnitude of the  
9 equity risk premium. In addition, as previously discussed, the adjustments for issuance/market  
10 pressure, size, and market value-book value are unnecessary. This issues has been addressed above  
11 and are not repeated here.

12 **Q. PLEASE DISCUSS THE ERRORS IN MR. MULLE'S EQUITY OR MARKET**  
13 **RISK PREMIUM IN HIS CAPM APPROACH.**

14 A. Mr. Mulle performs an analysis on page 2 of Schedule 5 to arrive at his market risk  
15 premium of 10.25%. It is computed as the average of the 1926-99 results from the Ibbotson study  
16 (7.8%) and *Value Line's* 3-5 year annual return projections (12.7%). The primary problem with this  
17 approach is that both the Ibbotson study and *Value Line* projected return overstate the market or  
18 equity risk premium.

19 Initially, it should be highlighted that Mr. Mulle's CAPM study should be totally ignored  
20 due to the size and direction of his equity risk premium estimate. It is completely out of line with

1 the estimates of academics and and of leading investment firms (3.0%, as cited above). In addition,  
2 with the higher stock returns of the 1990s providing increasing equity risk premiums using Mr.  
3 Mulle's approach, the rest of the investment world, including Mr. Greenspan, believe that the  
4 equity risk premium is declining.

5 The Ibbotson historic risk premium simply represents the difference in the arithmetic mean  
6 stock and bond returns over the 1926-1999 period. The errors in using the relationship between  
7 long-term historic stock and bond returns was discussed above. In short, the procedure is erroneous  
8 and overstates the true market or equity risk premium. Most importantly, using long-term historic  
9 returns masks the dramatic change in the risk and return relationship between stocks and bonds  
10 which suggests that the market risk premium has declined.

11 **Q. PLEASE ADDRESS THE PROBLEMS WITH USING VALUE LINE'S**  
12 **PROJECTED RETURNS.**

13 A. The primary error in using *Value Line's* 3-5 year annual return projections is that these  
14 projections are consistently high relative to actual experienced returns and, as such, provide  
15 upwardly biased market risk premiums. Mr. Mulle's analysis clearly demonstrates this. The  
16 projected annual market return, using Mr. Mulle's approach and *Value Line* data, is 18.66%! This  
17 is so far above historic norms (about 11% over the long-term) that it totally unreasonable. Of  
18 course, employing this figure results in an overstated equity risk premium and CAPM-derived  
19 equity cost rate.

20 **Q. FINALLY PLEASE DISCUSS MR. MULLE'S COMPARABLE EARNINGS**

1 **ANALYSIS.**

2 A. Mr. Mulle also estimates an equity cost rate for the Company employing the comparable  
3 earnings approach. His methodology involves averaging historic and prospective returns on  
4 common equity for a proxy group of non-utility companies "comparable" in risk to his comparable  
5 group as determined from screening *Value Line's* database. Mr. Mulle screens the database on ten  
6 risk measures and arrives at a group of 3 unregulated "comparable" companies. The average of the  
7 historic and projected returns on common equity for the group is 15.10%. On this basis, he uses a  
8 comparable earnings equity cost rate of 13.00%

9 This approach is fundamentally flawed for several reasons. He has not performed any  
10 analysis to examine whether his return on equity figures are likely measures of long-term earnings  
11 expectations. More importantly, however, since Mr. Mulle has not evaluated the market-to-book  
12 ratios for these companies, he cannot indicate whether the past and projected returns on common  
13 equity are above or below investors' requirements. These returns on common equity are excessive  
14 if the market-to-book ratios for these companies are above 1.0. For example, Kellogg's return on  
15 common equity is 75% and its market-to-book ratio is over 10.0. But, no financial analyst,  
16 including Mr. Mulle, would suggest that Kellogg's equity cost rate is 75%. Simply put, the  
17 comparable earnings approach is an invalid way to measure a firm's cost of equity capital because it  
18 does not provide a market test as to whether that return on equity is above or below investors'  
19 requirements.

1 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

2 **A. Yes it does.**



1 **Appendix A**

2  
3  
4 **EDUCATIONAL BACKGROUND, RESEARCH,**  
5 **AND RELATED BUSINESS EXPERIENCE**  
6

7  
8 **J. RANDALL WOOLRIDGE**  
9

10  
11 J. Randall Woolridge is a Professor of Finance and the Goldman, Sachs & Co. and Frank P. Smeal Endowed  
12 Faculty Fellow in Business Administration in the College of Business Administration of the Pennsylvania State  
13 University in University Park, PA. He is a Vice President of the Columbia Group, a public utility consulting firm based  
14 in Ridgefield, CT. He also serves on the Investment Committee of ARIS Corporation, an asset management company  
15 based in State College, PA.  
16

17 Professor Woolridge received a Bachelor of Arts degree in Economics from the University of North Carolina,  
18 a Master of Business Administration degree from the Pennsylvania State University, and a Doctor of Philosophy degree  
19 in Business Administration (major area-finance, minor area-statistics) from the University of Iowa. At Iowa he received  
20 a Graduate Fellowship and was awarded membership in Beta Gamma Sigma, a national business honorary society. He  
21 has taught Finance courses at the University of Iowa and Cornell College as well as the Pennsylvania State University.  
22 These courses include corporation finance, commercial and investment banking, and investments at the undergraduate  
23 and graduate levels.  
24

25 Professor Woolridge's research has centered on the theoretical and empirical foundations of corporation  
26 finance and financial markets and institutions. He has published over 25 articles in the best academic and professional  
27 journals in the field, including the *Journal of Finance*, the *Journal of Financial Economics*, and the *Harvard Business*  
28 *Review*. His research has been cited extensively in the business press. His work has been featured in the *New York*  
29 *Times*, *Forbes*, *Fortune*, *The Economist*, *Financial World*, *Barron's*, *Wall Street Journal*, *Business Week*, *Washington*  
30 *Post*, *Investors' Business Daily*, *Worth Magazine*, *USA Today*, and other publications. In addition, he has provided  
31 commentary on CNN's *Money Line* and CNBC's *Business Today*.  
32

33 Dr. Woolridge co-authored two recently-published books – *Spin-Offs and Equity Carve-Outs: Achieving*  
34 *Faster Growth and Better Performance* (Financial Executives Research Foundation) and *The Streetsmart Guide to*  
35 *Valuing a Stock* (McGraw Hill).  
36

37 Professor Woolridge has consulted with and prepared research reports for private businesses, investment  
38 banking firms, and government agencies (including the National Association of Security Dealers, the Federal Home  
39 Loan Bank Board, and the Securities and Exchange Commission). In addition, he has directed and participated in over  
40 350 company-sponsored professional development programs for executives in more than 20 countries in North and  
41 South America, Europe, Asia, and Africa. His clients have included major corporations and financial institutions around  
42 the world.  
43

44 Dr. Woolridge has prepared testimony on behalf of the Pennsylvania Office of Consumer Advocate in the

1 following cases before the Pennsylvania Public Utility Commission: Bell Telephone Company (R-811819), Peoples  
2 Natural Gas Company (R-832315), Pennsylvania Power Company (R-832409), Western Pennsylvania Water Company  
3 (R-832381), Pennsylvania Power Company (R-842740), Pennsylvania Gas and Water Company (R-850178),  
4 Metropolitan Edison Company (R-860384), Pennsylvania Electric Company (R-860413), North Penn Gas Company (R-  
5 860535), Philadelphia Electric Company (R-870629), Western Pennsylvania Water Company (R-870825), York Water  
6 Company (R-870749), Pennsylvania-American Water Company (R-880916), Equitable Gas Company (R-880971), the  
7 Bloomsburg Water Co. (R-891494), Columbia Gas of Pennsylvania, Inc. (R-891468), Pennsylvania-American Water  
8 Company (R-90562), Breezewood Telephone Company (R-901666), York Water Company (R-901813), Columbia Gas  
9 of Pennsylvania, Inc. (R-901873), National Fuel Gas Distribution Company (R-911912), Pennsylvania-American Water  
10 Company (R-911909), Borough of Media Water Fund (R-912150), UGI Utilities, Inc. - Electric Utility Division (R-  
11 922195), Dauphin Consolidated Water Supply Company - General Waterworks of Pennsylvania, Inc. (R-932604),  
12 National Fuel Gas Distribution Company (R-932548), Commonwealth Telephone Company (I-920020), Conestoga  
13 Telephone and Telegraph Company (I-920015), Peoples Natural Gas Company (R-932866), Blue Mountain  
14 Consolidated Water Company (R-932873), National Fuel Gas Company (R-942991), UGI - Gas Division (R-953297),  
15 UGI - Electric Division (R-953534), Pennsylvania-American Water Company (R-973944), Pennsylvania-American  
16 Water Company (R-994638). He has prepared testimony on behalf of the Pennsylvania Office of Consumer Advocate  
17 in the following case before the Federal Energy Regulatory Commission (National Fuel Gas Supply Corporation (RP-  
18 92-73-000). He has prepared testimony for the New Jersey Department of the Public Advocate, Division of Rate  
19 Counsel: New Jersey-American Water Company (R-91081399J), New Jersey-American Water Company (R-  
20 92090908J), and Environmental Disposal Corp (R-94070319). He has prepared testimony for the Hawaii Office of the  
21 Consumer Advocate: East Honolulu Community Services, Inc. (Docket No. 7718). He has prepared testimony for the  
22 County of Nassau in New York State: Long Island Lighting Company (PSC Case No. 942354). He has prepared  
23 testimony for the Office of Consumer Counsel in Connecticut: United Illuminating (Docket No. 96-03-29). He has  
24 prepared testimony for the Office of the People's Counsel in the District of Columbia: Potomac Electric Power Company  
25 (Formal Case No. 939).