BEFORE THE

PENNSYLVANIA PUBLIC UTILITY COMMISSION

Pennsylvania Public Utility Commission   :

              v.   :   **Docket No. 00016339**

Pennsylvania American Water Company   :

DIRECT TESTIMONY

OF

DR. J. RANDALL WOOLRIDGE

FOR THE

PENNSYLVANIA OFFICE OF CONSUMER ADVOCATE

August, 2001

Philadelphia American Water Company
Docket No. R-00016339

Direct Testimony of
Dr. J. Randall Woolridge

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

2 A.   My name is J. Randall Woolridge and my business address is 120 Haymaker Circle, State

3 College, PA 16801. I am a Professor of Finance and the Goldman, Sachs & Co. and Frank P.

4 Smeal Endowed University Fellow in Business Administration at the University Park Campus of

5 the Pennsylvania State University. In addition, I am affiliated with the Columbia Group Inc., a

6 public utility consulting firm based in Ridgefield, CT. A summary of my educational background,

7 research, and related business experience is provided in Appendix A.

8

9   **I. SUBJECT OF TESTIMONY AND**

10   **SUMMARY OF RECOMMENDATIONS**

11

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

13 A.   I have been asked by the Office of Consumer Advocate ("OCA") to provide an opinion as

14 to the overall fair rate of return for Pennsylvania American Water Company ("PAWC" or

15 "Company") and to evaluate PAWC's rate of return testimony in this proceeding.

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

17 A.   I have independently arrived at a cost of capital for the Company. I have established an

18 equity cost rate of 9.00% for PAWC primarily by applying the discounted cash flow (DCF)

19 approach to a group of publicly-held water service companies. I have also performed a risk

20 premium study. Utilizing my equity cost rate, capital structure ratios, and senior capital cost rates, I

1 am recommending an overall fair rate of return for the Company of 8.16%. This recommendation

2 is summarized in Schedule JRW-1.

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

4 **RETURN POSITION.**

5 A. The Company's rate of return testimony is offered by Mr. Paul R. Moul. Mr. Moul provides

6 a recommendation for the Company's capital structure, senior capital cost rates, equity cost rate, and

7 overall rate of return. The Company's proposed rate of return is inflated due to an overstated equity

8 cost rate. Mr. Moul's estimated equity cost rate of 12.00% is unreasonably high primarily due to 1)

9 an inflated growth rate forecast he uses in his DCF equity cost rate, (2) outdated and seriously

10 flawed risk premium and Capital Asset Pricing Model (CAPM) studies, and (3) inappropriate

11 adjustments to his equity cost rate estimates.

12

13 **II. COMPARISON GROUP SELECTION**

14

15 **Q.** **PLEASE DESCRIBE YOUR APPROACH TO DEVELOPING A FAIR RATE OF**

16 **RETURN RECOMMENDATION FOR PAWC.**

17 A. To develop a fair rate of return recommendation for PAWC, I evaluate the return

18 requirements of investors on the common stock of a group of publicly-held water service

19 companies.

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

1 A.   The group, which I refer to as the comparison or water group, were selected on the

2 following basis: (1) listed as water utility companies and covered by the *Value Line Investment*

3 *Survey Expanded Edition* and *C.A. Turner Utility Reports*, and (2) water revenues of at least 90% of

4 total revenues. These screens produced a group of seven companies - American States Water

5 Company, American Water Works, California Water Service Co., Connecticut Water Service Co.,

6 Middlesex Water, SJW Corp, and Philadelphia Suburban Corp. SJW Corp was subsequently

7 removed from the group because of its ongoing merger involvement with American Water Works.

8   Summary financial statistics for the group are provided on page 1 of Schedule JRW-2. On

9 average, the group has median net plant of $503.7 million and median total revenues of $215.3

10 million. The group has an average common equity ratio of 44%, and a current earned return on

11 common equity of 10.6%. PAWC has net plant of $1,276.8 million, total revenues of $291.0

12 million, a common equity ratio of 43.4%, and a return on equity of 10.7%. Overall, these

13 performance and risk financial figures suggest that PAWC and the group are quite similar and

14 therefore the equity cost rate results for the group should provide a good measure for PAWC.

15

16   **III. CAPITAL STRUCTURE RATIOS AND DEBT COST RATES**

17

18 **Q.   WHAT CAPITAL STRUCTURE RATIOS AND SENIOR CAPITAL COST RATES**

19 **ARE YOU USING TO ESTIMATE AN OVERALL RATE OF RETURN FOR PAWC?**

20 A.   At this point, I am utilizing the Company's proposed capital structure. As shown in

1   Schedule 1 of PAWC Exhibit No. 9-A, this capital structure consists of 42.62% common equity,

2   1.23% preferred stock, and 56.15% long-term debt. In addition, I will also use the Company's

3   proposed cost rates for preferred stock of 8.05% and long-term debt of 7.52%.

IV. THE COST OF COMMON EQUITY CAPITAL

A. OVERVIEW

7   **Q.   WHY MUST AN OVERALL COST OF CAPITAL OR FAIR RATE OF RETURN**

8   **BE ESTABLISHED FOR A PUBLIC UTILITY?**

9   A.   In a competitive industry the return on a firm's common equity capital is determined

10   through the competitive market for its goods and services. Due to the capital requirements needed

11   to provide utility services, however, and to the economic benefit to society from avoiding

12   duplication of these services, public utilities are monopolies. It is not appropriate to permit utilities

13   to set their own prices because of the lack of competition and the essential nature of the services.

14   Thus, regulation seeks to establish prices which are fair to consumers and at the same time are

15   sufficient to meet the operating and capital costs of the utility, i.e., provide an adequate return on

16   capital to attract investors.

17   **Q.   PLEASE PROVIDE AN OVERVIEW OF THE COST OF CAPITAL IN THE**

18   **CONTEXT OF THE THEORY OF THE FIRM.**

19   A.   The total cost of operating a business includes the cost of capital. The cost of common

20   equity capital is the expected return on a firm's common stock that the marginal investor would

1   deem sufficient to compensate for risk and the time value of money. In equilibrium, the expected

2   and required rates of return on a company's common stock are equal.

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

4   provide insight into the relationship between firm performance or profitability, capital costs, and the

5   value of the firm. Under the economist's ideal model of perfect competition, where entry and exit is

6   costless, products are undifferentiated, and there are increasing marginal costs of production, firms

7   produce up to the point where price equals marginal cost. Over time, a long-run equilibrium is

8   established where price equals average cost, including the firm's capital costs. In equilibrium, total

9   revenues equal total costs, and because capital costs represent investors' required return on the

10 firm's capital, actual returns equal required returns and the market value and the book value of the

11 firm's securities must be equal.

12   In the real world, firms can achieve competitive advantage due to product market

13 imperfections - most notably through product differentiation (adding real or perceived value to

14 products) and achieving economies of scale (decreasing marginal costs of production). Competitive

15 advantage allows firms to price products above average cost and thereby earn accounting profits

16 greater than those required to cover capital costs. When these profits are in excess of that required

17 by investors, or when a firm earns a return on equity in excess of its cost of equity, investors

18 respond by valuing the firm's equity in excess of its book value.

19   James M. McTaggart, founder of the international management consulting firm Marakon

20 Associates, has described this essential relationship between the return on equity, the cost of equity,

1 and the market-to-book ratio in the following manner:[1]

2   Fundamentally, the value of a company is determined by the cash flow it
3 generates over time for its owners, and the minimum acceptable rate of return
4 required by capital investors. This "cost of equity capital" is used to discount the
5 expected equity cash flow, converting it to a present value. The cash flow is, in turn,
6 produced by the interaction of a company's return on equity and the annual rate of
7 equity growth. High return on equity (ROE) companies in low-growth markets, such
8 as Kellogg, are prodigious generators of cash flow, while low ROE companies in
9 high-growth markets, such as Texas Instruments, barely generate enough cash flow
10 to finance growth.
11
12   A company's ROE over time, relative to its cost of equity, also determines
13 whether it is worth more or less than its book value. If its ROE is consistently
14 greater than the cost of equity capital (the investor's minimum acceptable return), the
15 business is economically profitable and its market value will exceed book value. If,
16 however, the business earns an ROE consistently less than its cost of equity, it is
17 economically unprofitable and its market value will be less than book value.
18

19 As such, the relationship between a firm's return on equity, cost of equity, and market-to-book ratio

20 is relatively straightforward. A firm which earns a return on equity above its cost of equity will see

21 its common stock sell at a price above its book value. Conversely, a firm which earns a return on

22 equity below its cost of equity will see its common stock sell at a price below its book value.

23 **Q.**   **WHAT ECONOMIC FACTORS HAVE AFFECTED THE COST OF EQUITY**

24 **CAPITAL FOR PUBLIC UTILITIES?**

25 A.   Schedule JRW-6 provides indicators of public utility equity cost rates for recent years.

26 Page 1 shows the dividend yields for the fifteen utilities in the Dow Jones Utilities Average over

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

1 the past decade. These yields peaked in 1994 at 6.4% and bottomed out in 1998 at 4.3%. Since

2 that time they have slowly increased to 5.1% in the year 2000.

3   Average earned returns on common equity and market-to-book ratios are given on page 2 of

4 Schedule JRW-6. Over the past decade, earned returns on common equity have consistently been

5 in the 10.0 - 12.0 percent range. The low point was 10.1% in 1997 and they have gradually

6 increased to 11.9% as of the year 2000. Over the past decade market-to-book ratios for this group

7 bottomed out at 138% in 1995 and they have steadily increased to the 190% range as of the year

8 2000.

9   The indicators in Schedule JRW-6, coupled with the overall decreased in interest rates,

10 suggest that capital costs for the Dow Jones Utilities have decreased over the past decade.

11 Specifically for the equity cost rate, the significant increase in the market-to-book ratio since 1995,

12 coupled with only a much small increase in the average return on equity, suggests a substantial

13 decline in the overall equity cost rate.

14 **Q. WHAT FACTORS DETERMINE INVESTORS' EXPECTED OR REQUIRED**

15 **RATE OF RETURN ON EQUITY?**

16 A.   The expected or required rate of return on common stock is a function of market-wide, as

17 well as company-specific, factors. The most important market factor is the time value of money as

18 indicated by the level of interest rates in the economy. Common stock investor requirements

19 generally increase and decrease with like changes in interest rates. The perceived risk of a firm is

20 the predominant factor that influences investor return requirements on a company-specific basis.

1　Firm risk is often separated into business and financial risk. Business risk encompasses all factors

2　that affect a firm's operating revenues and expenses. Financial risk results from incurring fixed

3　obligations in the form of debt in financing its assets.

4　**Q.　COMPARE THE BUSINESS AND FINANCIAL RISK OF PUBLIC UTILITIES**

5　**AND OTHER INDUSTRIES.**

6　A.　Due to the essential nature of their service as well as their regulated status, public utilities

7　are exposed to a lesser degree of business risk than other, non-regulated businesses. The relatively

8　low level of business risk allows public utilities to meet much of their capital requirements through

9　borrowing in the financial markets, thereby incurring greater than average financial risk.

10　Nonetheless, the overall investment risk of public utilities is below most other industries. Schedule

11　JRW-7 provides an assessment of investment risk for 97 different industries as measured by beta,

12　which according to modern capital market theory is the only relevant measure of investment risk

13　that need be of concern for investors. These betas come from the *Value Line Investment Survey* and

14　are compiled by Aswath Damodoran of New York University. They may be found on the Internet

15　at http://www.stern.nyu.edu/~adamodar/. The investment risk of water utilities is ranked the 3rd

16　lowest of the 97 industries. Only alcoholic beverages and electric utilities (central) have lower

17　measures of investment risk than water utilities.

18　**Q.　HOW CAN THE EXPECTED OR REQUIRED RATE OF RETURN ON COMMON**

19　**EQUITY CAPITAL BE DETERMINED?**

20　A.　The costs of debt and preferred stock are normally based on historic or book values and can

1   be determined with a great degree of accuracy. The cost of common equity capital, however,

2   cannot be determined precisely and must instead be estimated from market data and informed

3   judgment. The return to the equity owner should be commensurate with returns on investments in

4   other enterprises having comparable risks.

5   According to valuation principles, the present value of an asset equals the discounted value

6   of its expected future cash flows. Investors discount these expected cash flows at their required rate

7   of return that, as noted above, reflects the time value of money and the perceived riskiness of the

8   expected future cash flows. As such, the cost of common equity is the rate at which investors

9   discount expected cash flows associated with common stock ownership.

10   Models have been developed to ascertain the cost of common equity capital for a firm.

11 Each model, however, has been developed using restrictive economic assumptions. Consequently,

12 judgment is required in selecting appropriate financial valuation models to estimate a firm's cost of

13 common equity capital, in determining the data inputs for these models, and in interpreting the

14 models' results. All of these decisions must take into consideration the firm involved as well as

15 conditions in the economy and the financial markets.

16 **Q.   HOW DO YOU PLAN TO ESTIMATE THE COST OF EQUITY CAPITAL FOR**

17 **THE COMPANY?**

18 A.   I rely primarily on the discounted cash flow (DCF) model to estimate the cost of equity

19 capital. I believe that the DCF model provides the best measure of equity cost rates for public

20 utilities. I have also performed a risk premium (RP) study, but I give these results less weight

1 because I believe that risk premium studies provide a less reliable indication of equity cost rates for

2 public utilities.

3

4 **B. DISCOUNTED CASH FLOW ANALYSIS**

5

6 **Q.   BRIEFLY DESCRIBE THE THEORY BEHIND THE TRADITIONAL DCF**

7 **MODEL.**

8 A.   According to the discounted cash flow (DCF) model, the current stock price is equal to the

9 discounted value of all future dividends that investors expect to receive from investment in the firm.

10 As such, stockholders' returns ultimately result from current as well as future dividends. As

11 owners of a corporation, common stockholders are entitled to a pro-rata share of the firm's earnings.

12 The DCF model presumes that earnings that are not paid out in the form of dividends are

13 reinvested in the firm so as to provide for future growth in earnings and dividends. The rate at

14 which investors discount future dividends, which reflects the timing and riskiness of the expected

15 cash flows, is interpreted as the market's expected or required return on the common stock.

16 Therefore this discount rate represents the cost of common equity. Algebraically, the DCF model

17 can be expressed as:

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$$P = \frac{D_1}{(1+k)^1} + \frac{D_2}{(1+k)^2} + \ldots \frac{D_n}{(1+k)^n}$$

1   where P is the current stock price, D_n is the dividend in year n, and k is the cost of common equity.

2   **Q.   HOW DO YOU ESTIMATE STOCKHOLDERS' EXPECTED OR REQUIRED**

3   **RATE OF RETURN USING THE DCF MODEL?**

4   A.   Under certain assumptions, including a constant and infinite expected growth rate, and

5   constant dividend/earnings and price/earnings ratios, the DCF model can be simplified to the

6   following:

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

12   where D_1 represents the expected dividend over the coming year and g is the expected growth rate

13   of dividends. This is known as the constant-growth version of the DCF model. To use the

14   constant-growth DCF model to estimate a firm's cost of equity, you solve for k in the above

15   expression and obtain the following:

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

21   In the constant-growth version of the DCF model, the current dividend payment and stock price are

22   directly observable. Therefore, the primary problem and controversy in applying the DCF model to

23   estimate equity cost rates entails estimating investors' expected dividend growth rate.

24   **Q.   WHAT FACTORS SHOULD ONE CONSIDER WHEN APPLYING THE DCF**

1 **METHODOLOGY?**

2 A.   One should be sensitive to several factors when using the DCF model to estimate a firm's

3 cost of equity capital. In general, one must recognize the assumptions under which the DCF model

4 was developed in estimating its components (the dividend yield and expected growth rate). The

5 dividend yield can be measured precisely at any point in time, but tends to vary somewhat over

6 time. Estimation of expected growth is considerably more difficult. One must consider recent firm

7 performance, in conjunction with current economic developments and other information available

8 to investors, to accurately estimate investors' expectations.

9 **Q.   IS   THE   CONSTANT   GROWTH   DCF   MODEL   CONSISTENT   WITH**

10 **VALUATION TECHNIQUES EMPLOYED BY INVESTMENT FIRMS?**

11 A.   Yes.   Virtually all investment firms use some form of the DCF model as a valuation

12 technique.   Schedule JRW-8 provides a description of a three-stage DCF or dividend discount

13 model (DDM), which is commonly referred to as the Merrill Lynch DDM.[2] This model presumes

14 that a company's dividend payout progresses initially through a growth stage, then proceeds

15 through a transition stage, and finally assumes a steady state stage. The dividend payment stage of

16 a firm depends on the profitability of its internal investments, which, in turn, is largely a function of

17 the life cycle of the product or service. Given the regulated status of public utilities, and especially

18 the fact that their returns on investment are effectively set through the ratemaking process, the

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[2] 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 industry would be in the steady-state stage of a three-stage DDM. The DCF valuation procedure

2 for companies in this stage is the constant-growth DCF.

3 **Q.   WHAT DIVIDEND YIELD DO YOU EMPLOY IN YOUR DCF ANALYSIS FOR**

4 **THE WATER GROUP?**

5 A.   The dividend yields on the common stock for the group is provided in Schedule JRW-3 for

6 the twelve-month period ending July, 2001. Over this period, the average monthly dividend yield

7 for this group has ranged from a high of 4.0 to a low of 3.5%. The 12-month average for the group

8 is 3.8 %. For the group, I will employ the average of the 12-month mean (3.8%) and the July, 2001

9 (3.6%) dividend yields, which is 3.7%.

10 **Q.   PLEASE DISCUSS THE APPROPRIATE ADJUSTMENT TO THE SPOT**

11 **DIVIDEND YIELD.**

12 A.   According to the traditional DCF model, the dividend yield term relates to the dividend

13 yield over the coming period. As indicated by Professor Myron Gordon, who is commonly

14 associated with the development of the DCF model for popular use, (1) multiplying the expected

15 dividend over the coming quarter by 4, and (2) dividing this dividend by the current stock price to

16 determine the appropriate dividend yield for a firm, which pays dividends on a quarterly basis.[3]

17   In applying the DCF model, it is common to adjust the current dividend for growth over the

18 coming year as opposed to the coming quarter. This can be complicated because firms tend to

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[3] See Direct Testimony of Myron J. Gordon and Lawrence I. Gould before the FCC at FCC Docket No. 79-05, in the Matter of ATT Petition for Modification of Prescribed Rate of Return, April 1980, p. 62.

1   announce changes in dividends at different times during the year. As such, the dividend yield

2   computed based on presumed growth over the coming quarter as opposed to the coming year can be

3   quite different. Consequently, it is common to adjust the dividend yield by some fraction of the

4   long-term expected growth rate.

5   The appropriate adjustment to the dividend yield is further complicated in the regulatory

6   process when the overall cost of capital is applied to a projected or end-of-future-test-year rate base.

7   The net effect of this application is an overstatement of the equity cost rate estimate derived from

8   the DCF model. In the context of the constant-growth DCF model, both the adjusted dividend

9   yield and the growth component are overstated. Put simply, the overstatement results from

10   applying an equity cost rate computed using current market data to a future or test-year-end rate

11   base which includes growth associated with the retention of earnings during the year.

12   **Q.   GIVEN THIS DISCUSSION, WHAT ADJUSTMENT FACTOR WILL YOU USE**

13   **FOR YOUR DIVIDEND YIELD?**

14   A.   I will adjust the dividend yield for the two groups by 1/2 the expected growth so as to

15   reflect growth over the coming year.

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

17   A.   There is much debate as to the proper methodology to employ in estimating the growth

18   component of the DCF model. By definition, this component is investors' expectation of the long-

19   term dividend growth rate. Presumably, investors use some combination of historic and/or

20   projected growth rates for earnings and dividends per share and for internal or book value growth to

1 assess long-term potential. Alternative approaches to measure these expectations tend to generate

2 different results, and therein lies the debate.

3 **Q.   HOW ARE YOU DETERMINING A GROWTH RATE COMPONENT FOR YOUR**

4 **DCF MODEL?**

5 A.   I have analyzed many measures of growth for the companies in the water company group.

6 Initially, I evaluated historic earnings, dividends, and book value per share growth rates as provided

7 in the *Value Line Investment Survey*. I have also used *Value Line's* 5-year projected growth rate

8 estimates for earnings, dividends, and book value per share. In addition, I have utilized earnings

9 growth rate forecasts as provided by Zacks, Multex Global, and First Call. These services solicit 5-

10 year earning growth rate projections for securities analysts and compile and publish the averages of

11 these forecasts on a monthly basis. They are readily available on the Internet. Finally, I have also

12 assessed prospective growth as measured by prospective earnings retention rates and returns on

13 average common equity.

14 **Q.   PLEASE DISCUSS HISTORIC GROWTH IN EARNINGS AND DIVIDENDS AS**

15 **WELL AS INTERNAL GROWTH.**

16 A.   Historic growth rates for earnings, dividends, and book value per share are readily available

17 to virtually all investors and presumably an important ingredient in forming expectations

18 concerning future growth. However, one must use historic growth numbers as measures of

19 investors' expectations with caution. In some cases, past growth may not reflect future growth

20 potential. Also, employing a single growth rate number (for example, for five or ten years), is

1   unlikely to accurately measure investors' expectations due to the sensitivity of a single growth rate

2   figure to fluctuations in individual firm performance as well as overall economic fluctuations (i.e.,

3   business cycles). However, one must appraise the context in which the growth rate is being

4   employed. According to the conventional DCF model, the expected return on a security is equal to

5   the sum of the dividend yield and the expected long-term (actually **infinite**) growth in dividends.

6   Therefore, to best estimate the cost of common equity capital using the conventional DCF model,

7   one must look to long-term growth rate expectations.

8   Internally generated growth is a function of the percentage of earnings retained within the

9   firm (the earnings retention rate) and the rate of return earned on those earnings (the return on

10 equity). The internal growth rate is computed as the retention rate times the return on equity.

11 Internal growth is significant in determining long-run earnings and, therefore, dividends. Investors

12 recognize the importance of internally generated growth and pay premiums for stocks of companies

13 that retain earnings and earn high returns on internal investments.

14 **Q.   WHAT GROWTH DATA HAVE YOU REVIEWED FOR THE GROUP OF**

15 **WATER COMPANIES?**

16 A.   Schedule JRW-4 provides the following growth rates for the companies in the group:

17 historic five- and ten- year historic growth rates in earnings, dividends, and book value per share

18 (where available) as computed by *Value Line* (using the *Value Line* methodology); and projected

19 five-year EPS growth rates from Zacks, Multex Global, and First Call as well as *Value Line's*

20 projected 5-year growth rates for earnings, dividends, and book value per share.

1 **Q. PLEASE SUMMARIZE YOUR ANALYSIS OF THE *VALUE LINE'S* HISTORIC**

2 **AND PROSPECTIVE GROWTH FOR THE GROUP OF WATER COMPANIES.**

3 A. Page 1 of Schedule JRW-4 provides a summary of historic and prospective growth rates for

4 the companies in the group as provided in the *Value Line Investment Survey*. Historic growth in

5 earnings, dividends, and book value for the group range from 3.4% to 4.9%, and the average of the

6 historic five- and ten- year earnings, dividends, and book value growth is 4.4%. Prospective

7 internal growth is 5.3%, with *Value Line* average projected retention and equity return rates of

8 43.2% and 11.5%, respectively. *Value Line* average projected growth rates for earnings, dividends,

9 and book value per share for the group are 6.9%, 3.3%, and 5.0%, respectively. However, these

10 projections are for only four of the six companies , as there are no projections for Connecticut

11 Water Service and Middlesex Water.

12 **Q. PLEASE ASSESS GROWTH FOR THE GROUP AS MEASURED BY ANALYSTS'**

13 **FORECASTS OF EXPECTED 5-YEAR GROWTH IN EARNINGS PER SHARE (EPS).**

14 A. Zacks, First Call, and Multex Global (formerly I/B/E/S) collect, summarize, and publish

15 Wall Street analysts' projected 5-year EPS growth rate forecasts for companies. These forecasts are

16 provided for the comparison group companies on page 2 of Schedule JRW-4. Since (1) there is

17 considerable overlap in analyst coverage between the three services, and (2) not all of the

18 companies have forecasts from the different services, I have averaged the expected 5-year EPS

19 growth rates from the three services (along with the 5-year EPS forecasts from *Value Line*) for each

20 company to arrive at an expected EPS growth rate by company. The right-hand column shows these

1 averages, and the resulting mean for the group, which is 5.2%.

2 **Q.   PLEASE   SUMMARIZE   YOUR   ANALYSIS   OF   THE   HISTORIC   AND**

3 **PROSPECTIVE GROWTH OF THE WATER COMPANY GROUP.**

4 A.   Table 1 provides a summary of historic and prospective growth rates for the group. Historic

5 indicators suggest an average growth rate for the comparison group between 4.0 and 5.0 percent.

6 Projected growth for the group is a little higher and has a broader range. Given these results and the

7 discussion above, expected growth appears to be in the 5.00 – 5.50 percent range. I will use the

8 midpoint of this range - 5.25% - as the expected growth component of my DCF model.

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Table 1	
Comparison Group of Water Companies	
Growth Rate Indicators	
Historic Growth	
5-Year Historic EPS Growth	3.8%
5-Year Historic DPS Growth	3.4%
5-Year Historic BVPS Growth	4.8%
10-Year Historic EPS Growth	4.3%
10-Year Historic DPS Growth	4.9%
10-Year Historic BVPS Growth	5.2%
Projected Growth	
Prospective Internal Growth	5.3%
Average Projected DPS Growth (4 Cos)	3.3%
Average Projected BVPS Growth (4 Cos)	5.0%
Average Projected EPS Growth (4 Cos)	7.4%
Average Projected EPS Growth	
American States Water Co.	5.0%
American Water Works	6.9%
California Water	5.9%
Connecticut Water	3.0%
Middlesex Water	3.0%
Philadelphia Suburban	7.4%
Average Projected EPS Growth	5.2%

1   **Q.   WHAT IS YOUR INDICATED COMMON EQUITY COST RATE FROM THE**

2   **DCF MODEL FOR COMPARISON GROUP?**

3   A.   My DCF-derived equity cost rate for the group is:

4   DCF Equity Cost Rate   =   D/P   +   G

5   Water Group   3.7% * 1.0263 + 5.25% = 9.0%

6

7   **C. RISK PREMIUM APPROACH**

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9   **Q.   HOW WILL YOU ESTIMATE THE COMPANY'S EQUITY COST RATE USING**

10   **THE RISK PREMIUM APPROACH?**

11   A.   According to the risk premium approach, the cost of equity is the sum of the interest rate on

12   a risk-free bond (R_f) and a risk premium (RP), as in the following:

13   k   = R_f +   RP

14   I use the yield on long-term Treasury securities as the risk-free interest rate, and estimate the risk

15   premium by assessing investors' return requirements and market-to-book ratios for water service

16   companies.

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

18   A.   My risk premium approach is based on two fundamental economic concepts: the economic

19   theory of the firm, as discussed earlier in my testimony, and the fundamental financial proposition

20   of a positive relationship between risk and return. According to economic theory, when a firm's

1 accounting profits (which include capital costs) are sufficient to meet investors' requirements, the

2 market value and the book value of the firm will be equal. Accordingly, if a firm is earning profits

3 greater than required by investors, the market-to-book ratio will be greater than 1.0, and if a firm is

4 earning profits less than required by investors, the market-to-book ratio will be less than 1.0 In

5 recent years, the market-to-book ratios for water service companies have been greater than 1.0,

6 indicating that the earnings of these companies are more than sufficient to meet investors'

7 requirements. The positive relationship between risk and return requires that, in a world of risk

8 aversion, investors require a higher expected return for a higher level of perceived risk in an

9 investment. By definition, the premium for assuming risk is based on the difference between the

10 expected return on the risky investment and the expected return on a riskless investment.

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

12 A.   As discussed above, a market-to-book ratio of 1.0 indicates that investors' return

13 requirements are being met. In my approach, the risk premium, defined as the return on common

14 equity minus the riskless interest rate, is compared to contemporaneous market-to-book ratios. As

15 such, this methodology shows the additional return that utility common stock investors require

16 above the risk-free interest rate.

17   To establish a cost of equity for the Company, I examine required rates of return as

18 indicated by both accounting- and market- based rates of return. I perform the study in three steps

19 for the companies in the water group: (1) using the companies in the group, I compute the premium

20 for risk required by investors as the expected return on equity minus the yield on long-term

1   Treasury securities; (2) I regress the risk premium for each firm on the market-to-book ratio for

2   different time periods; and (3) I add the indicated average risk premium for the water service

3   companies to the current yield on long-term Treasury securities.

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

5   A.   First, by directly comparing the expected returns on equity (minus the risk-free interest rate)

6   to market-to-book ratios, I am directly measuring the accounting earnings required by investors.

7   Risk premium studies that measure a risk premium as the difference between bond and stock

8   returns do not directly address the adequacy of accounting earnings. Second, I am using historic

9   and forecasted returns on equity and not simply historic bond and stock returns to determine

10 investor return requirements and an appropriate risk premium. Security prices and capital cost rates

11 are based on expectations of the future and not on extrapolations of returns from the past. Third, I

12 am employing a group of water service companies (and not a broader group of companies or

13 utilities) to measure investors' return requirements. Fourth, I am using the same base in my risk

14 premium study - the yield on long-term Treasury securities - as I use in estimating the cost of equity

15 for the Company employing the risk premium approach. I do not establish a risk premium utilizing

16 bond returns as a base and then estimate an equity cost rate utilizing current bond yields as a base

17 rate. And finally, since my risk premium study does not evaluate returns derived from a series of

18 security prices over long time periods, the appropriate measure of central tendency for historic

19 returns - arithmetic mean or median, or geometric mean returns - is not an issue.

20 **Q.   WHAT RISK-FREE RATE OF INTEREST ARE YOU USING IN YOUR**

1   **ANALYSIS?**

2   A.   The riskless or risk-free rate of interest is presumed to be equal to the yields on obligations

3   of the U.S. Treasury. These obligations are termed riskless because they are presumed to have no

4   default risk.

5   Page 2 of Schedule JRW-5 shows the yields on long-term Treasury securities over the past

6   18 months. Over the first half of 2001, these yields have been in the 5.50% to 5.75% range. The

7   long-term bond yield as of August 1 was 5.54%. Considering the range over the past six months, I

8   will utilize the 5.6% as the risk-free rate in my risk premium approach.

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

10   A.   As described above, I examine required rates of return as indicated by both accounting- and

11   market- based rates of return. My risk premium study uses past and expected returns since capital

12   cost rates and security prices are based on expectations of the future. I perform a risk premium

13   study for the companies in the water group. Forecasts of returns on common equity (ROE) are

14   available from the *Value Line Investment Survey* for these companies. I use a one-year base period

15   (2000/2001) in my risk premium study. *Value Line* publishes individual company updates four

16   times per year. For each *Value Line* update, I obtain the year t-1, t, t+1 and the 3-5 year projected

17   ROE. Market-to-book ratios as of the month of the update are obtained from *C. A. Turner Utility*

18   *Reports*. The yield on long-term Treasury securities for the appropriate month comes from the

19   Federal Reserve Website (www.federalreserve.gov). For each company, I compute the risk

20   premium as the ROE minus the yield on long-term Treasury securities. I average the ROEs for the

-22-

1   different time periods to determine the expected ROE. I then regress the risk premium (using the

2   average ROE and the risk-free rate) on the market-to-book ratio for the firms in the water group.

3   Finally, I add the indicated average risk premium to the current yield on long-term Treasury

4   securities to obtain an equity cost rate for the Company.

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

6   A.   The table on page 1 of Schedule JRW-5 shows the regression results for the four different

7   time periods. The results suggest that risk premium has ranged from about 3.0% to 4.4% over the

8   past year. The average is 3.47%, which I will use as my equity risk premium.

9   **Q.   WHAT EQUITY COST RATE DO YOU ESTIMATE FOR THE COMPANY**

10   **USING THE RISK PREMIUM APPROACH?**

11   A.   Given my risk-free rate and risk premium, the indicated equity cost rate for the group using

12   the risk premium approach is:

13   Risk Premium Equity Cost Rate   =   Riskfree Rate   +   Risk Premium

14   Water Group   5.60%   +   3.47%   = 9.1%

15

16   **D. EQUITY COST RATE SUMMARY**

17

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

19   A.   My DCF analysis for the comparable group indicates an equity cost rate of 9.0%. My risk

20   premium analysis suggests an equity cost rate of 9.1%.

1   Q.   GIVEN THESE RESULTS, WHAT EQUITY COST RATE RECOMMENDATION

2   ARE YOU MAKING FOR PAWC?

3   A.   Given these results, I am recommending an equity cost rate of 9.0% for PAWC.

4   Q.   HOW   DO   YOU   TEST   THE   REASONABLENESS   OF   YOUR   9.0%

5   RECOMMENDATION?

6   A.   To test the reasonableness of my 9.0% recommendation, I have examined the relationship

7   between the return on common equity and the market-to-book ratios for the water group.

8   Q.   WHAT DO THE RETURNS ON COMMON EQUITY AND MARKET-TO-BOOK

9   RATIOS FOR THE GROUP INDICATE ABOUT THE REASONABLENESS OF YOUR

10 9.0% RECOMMENDATION?

11 A.   Schedules JRW-2 and JRW-4 provide financial performance and market valuation statistics

12 for the group. The average current return on equity and market-to-book ratio for the group are

13 10.6% and 2.19, respectively. These results indicate that these companies are earning returns on

14 equity well in excess of their equity cost rates. As such, this provides clear evidence that my

15 recommended equity cost rate of 9.0% is reasonable and fully consistent with the financial

16 performance and market valuation of the water group.

17 Q.   FINALLY,   PLEASE   DISCUSS   THIS   RECOMMENDATION   IN   LIGHT   OF

18 RECENT YIELDS ON PUBLIC UTILITY BONDS.

19 A.   In recent months the yields on public utility bonds have been in the 7.50 percent range. My

20 equity return recommendation of 9.0% must be viewed in the context of the significant shift in the

1   risk and return characteristics of bonds and stocks over the past two decades. This change and its

2   implications for equity risk premiums are discussed further in my critique of Mr. Moul's testimony.

3   In short, the relative risk of stocks and bonds has changed in recent years as stocks have become

4   less volatile and risky while bonds have become more volatile and risky. This change is readily

5   evidenced by the high level of real interest rates (nominal yields minus inflation) in the economy.

6   Today, with 30-year Treasuries yielding about 5.5% and inflation of about 2.5%, the real rate of

7   interest is approximately 3.0 percent. Historically, this figure has averaged 2.0 percent. The fact

8   that stocks and bonds are nearly equal in terms of volatility and risk implies that investors' required

9   rates of returns on stocks and bonds are much closer today than in the past. Accordingly, the return

10   premium that equity investors require over bond yields is much lower than it was when stock

11   returns were much more volatile than bond returns.

12   **Q.   WHAT IS THE MAGNITUDE OF THE DECLINE OF THE EQUITY RISK**

13   **PREMIUMS?**

14   A.   Most historic assessments of the equity risk premium (such as the analysis performed by

15   Mr. Moul) suggest an equity risk premium of 5-7 percent above the rate on long-term Treasury

16   bonds. However, recent studies by leading academic scholars and investment firms suggest that

17   this equity risk premium is now in the 2-4 percent range.

18   **Q.   PLEASE BRIEFLY SUMMARIZE THE NEW ACADEMIC STUDIES ON THE**

19   **DECLINE IN THE EQUITY RISK PREMIUM.**

20   A.   Several 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."[4] 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 declining equity risk premium, as well as the controversy of alternative approaches for

12   estimating the cost of equity capital, has been the subject of several very recent studies. The

13   primary debate revolves around two related issues: (1) the size of equity risk premium which is the

14   return equity investors require above the yield on bonds; and (2) the fact that estimates of the equity

15   risk premium using fundamental firm data (earnings and dividends) are much lower than estimates

16   using historic stock and bond return data. Eugene Fama and Ken French, two of the most

17   preeminent scholars in finance, recently published a paper entitled "The Equity Premium."[5] They

18   use dividend and earnings growth models to estimate expected stock returns and equity risk

19   premiums and compare these results to actual stock returns. For the period 1950-1999, they

20   estimate that the expected equity risk premium from DCF models using dividend and earnings

21   growth to be 3.40% and 4.83%. These figures are much lower than the equity risk premium

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[4] Jeremy J. Siegel, "The Shrinking Equity Risk Premium, *The Journal of Portfolio Management* (Fall, 1999).
[5] Eugene F. Fama and Kenneth R. French, "The Equity Premium," Working Paper, Sloan School of Management,

1   produced from the average stock and bond return return that is 8.28%. They conclude that the

2   estimates using DCF models and fundamental data are superior to those using historic stock returns

3   for three reasons: (1) the estimates are more precise (a lower standard error); (2) The Sharpe ratio,

4   which is measured as the [(expected stock return – risk-free rate)/standard deviation], is constant

5   over time for the DCF models but more than doubles for the average stock-bond return model; and

6   (3) valuation theory specifies relations between the market-to-book ratio, return on investment, and

7   cost of equity capital that favor estimates from fundamentals.   They conclude that the high average

8   stock returns over the past 50 years were the result of low expected returns and that the average

9   equity risk premium has been in the 3-4 percent range.

10   A soon-to-be published study by James Claus and Jacob Thomas of Columbia University

11   provides direct support for the findings of Fama and French.[6]   These authors compute equity risk

12   premiums over the 1985-1998 period by (1) computing the discount rate that equates market values

13   with the present value of expected future cash flows, and (2) then subtracting the risk-free interest

14   rate. The expected cash flows are developed using analysts' earnings forecasts. They conclude that

15   over this period the equity risk premium is in the range of 3.0%. They note that over this period

16   average stock returns overstate the equity risk premium because as the equity risk premium has

17   declined, stock prices have risen (present values increase when required rates of return decline).

18   The higher stock prices have produced returns that have exceeded expectations and therefore

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MIT, 2001.
[6]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   historic equity risk premium estimates are biased upwards.

2   **Q.   DOES THE INVESTMENT COMMUNITY ALSO RECOGNIZE THAT THE**

3   **EQUITY RISK PREMIUM HAS DECLINED?**

4   A.   Yes. One of the first studies in this area was by Stephen Einhorn, one of Wall Street's

5   leading investment strategists.[7] His study showed that the market or equity risk premium had

6   declined to the 2.0 to 3.0 percent range by the early 1990s. Among the evidence he provided in

7   support of a lower equity risk premium is the inverse relationship between real interest rates

8   (observed interest rates minus inflation) and stock prices. He noted that the decline in the market

9   risk premium has led to a significant change in the relationship between interest rates and stock

10 prices. One implication of this development was that stock prices had increased higher than would

11 be suggested by the historic relationship between valuation levels and interest rates.

12   The equity risk premiums of some of the other leading investment firms today support the

13 result of the academic studies. An article in *The Economist* indicated that some other firms like J.P.

14 Morgan are estimating an equity risk premium for an average risk stock in the 2.0 to 3.0 percent

15 range above the interest rate on U.S. Treasury bonds.[8]

16 **Q.   WHAT ECONOMIC DEVELOPMENTS HAVE BEEN ASSOCIATED WITH THE**

17 **DECLINE IN THE EQUITY RISK PREMIUM?**

18 A.   The expanded business cycle of the 1990's produced the longest continuous period of

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[7] 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   economic growth in U.S. business history. Goldman, Sachs published a report on the new economy

2   entitled "The Brave New Business Cycle" and discussed its implications for corporate profitability

3   and stock market valuation. According to the report, this "Brave New Business Cycle," which

4   features longer periods of business expansion, has resulted from heightened competition,

5   globalization, deregulation, and technology. Among the implications of the new business cycle are

6   higher stock valuation levels (higher P/E ratios) due to a lower equity risk premium. According to

7   the report:[9]

8   **Signs of a reduced equity risk premium.** In theory, by stabilizing the growth of the
9   earnings stream, the Brave New Business Cycle should reduce the premium that investors
10   require for equity investments. This premium is nothing more than the difference in
11   expected total return between investing in equities and investing in "safe" fixed-income
12   assets with similar duration, such as intermediate- to long-term government bonds.
13   However, although the equity risk premium is easy to define conceptually, it is difficult to
14   measure because ex post returns are not the same as ex ante expectations, even for periods
15   of several years. Even so, support for the notion that the equity risk premium has declined
16   can be found in two related facts. First, the P/E multiple for the S&P 500 has been trending
17   up for more than a decade, whereas it should normally rise in recessions and early
18   expansions and then fall progressively during expansions, as the excess slack in the
19   economy is exhausted. Second, this increase has far outstripped the modest decline in real
20   yields on 10-year government bonds that has occurred since the early 1980s. These
21   disparate trends strongly suggest that the equity risk premium is probably moving down.

22

23   **Q.   IS THIS DECLINE IN THE EQUITY RISK PREMIUM A GENERALLY**

24   **ACCEPTED NOTION BY GOVERNMENT POLICY MAKERS?**

25   A.   Yes. In fact, Alan Greenspan, the Chairman of the Federal Reserve Board, indicated in an

---

[8] 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.
[9] Edward F. McKelvey, "The Brave New Business Cycle: Its Implications for Corporate Profitability," U.S. Economic

1   October 14, 1999 speech on financial risk that the fact that equity risk premiums have declined

2   during the past decade is "not in dispute." He summarized some of the elements of the decline in

3   the following passage:[10]

4   "There can be little doubt that the dramatic improvements in information technology in
5   recent years have altered our approach to risk. Some analysts perceive that information
6   technology has permanently lowered equity premiums and, hence, permanently raised the
7   prices of the collateral that underlies all financial assets.
8
9   The reason, of course, is that information is critical to the evaluation of risk. The less that
10 is known about the current state of a market or a venture, the less the ability to project
11 future outcomes and, hence, the more those potential outcomes will be discounted.
12
13 The rise in the availability of real-time information has reduced the uncertainties and
14 thereby lowered the variances that we employ to guide portfolio decisions. At least part of
15 the observed fall in equity premiums in our economy and others over the past five years
16 does not appear to be the result of ephemeral changes in perceptions. It is presumably the
17 result of a permanent technology-driven increase in information availability, which by
18 definition reduces uncertainty and therefore risk premiums. This decline is most evident
19 in equity risk premiums. It is less clear in the corporate bond market, where relative
20 supplies of corporate and Treasury bonds and other factors we cannot easily identify have
21 outweighed the effects of more readily available information about borrowers.
22
23 The marked increase over this decade in the projected slope of technology advance, of
24 course, has also augmented expectations of earnings growth, as evidenced by the dramatic
25 increase since 1995 in security analysts' projections of long-term earnings. While it may
26 be that the expectations of higher earnings embodied in equity values have had a spillover
27 effect on discount factors, the latter remain essentially independent of the earnings
28 expectations themselves.
29
30 That equity premiums have generally declined during the past decade is not in dispute.
31 What is at issue is how much of the decline reflects new, irreversible technologies, and
32 what part is a consequence of a prolonged business expansion without a significant period
33 of adjustment. The business expansion is, of course, reversible, whereas the technological

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Research, Goldman, Sachs & Co., p. 7.
[10]   Alan Greenspan, "Measuring Financial Risk in the Twenty-First Century," OCC Conference, October 14, 1999.

1 advancements presumably are not."

2

3

4   **V. CRITIQUE OF PAWC'S RATE OF RETURN TESTIMONY**

5

6 **Q.   PLEASE   SUMMARIZE   MR.   MOUL'S   OVERALL   RATE   OF   RETURN**

7 **RECOMMENDATION.**

8 A.   As summarized below, Mr. Moul's overall rate of return recommendation is 9.43%.

Source	Capital Ratio	Cost Rate	Weighted Cost Rate
L-T Debt	56.15%	7.52%	4.22%
Preferred Stock	1.23%	8.05%	0.10%
Common Equity	42.62%	12.00%	5.11%
Cost of Capital			9.43%

16 Whereas I have adopted Mr. Moul's capital structure and senior capital cost rates, I believe that his

17 equity cost rate estimate and overall rate of return recommendation are excessive.

18 **Q.   PLEASE REVIEW MR. MOUL'S EQUITY COST RATE APPROACHES.**

19 A.   Mr. Moul estimates an equity cost rate for PAWC by applying several equity cost rate

20 models to his *Value Line* Water Group. This group includes American States Water Company,

21 American Water Works, California Water Service Group, and Philadelphia Suburban Water

22 Company. His equity cost rate approaches include a DCF model, a comparable earnings analysis, a

23 historic risk premium, and the CAPM. His equity cost rate estimates are summarized below:

24   Summary of Approaches and Results

		Risk		Comparable
	DCF	Premium	CAPM	Earnings
	10.93%	12.50%	12.67%	12.90%

6 Based on these figures, he arrives at an equity cost rate estimate for PAWC 0F 12.0%.

7   The primary errors in his equity cost rate studies are (1) a DCF growth rate of 6.50% which

8 is well above average historic and projected growth rate measures, (2) an arbitrary adjustment to his

9 DCF estimate to reflect the difference between book and market values in the firm's capitalizations;

10 (3) outdated and biased equity risk premium estimates for his risk premium and CAPM analyses,

11 and (4) a flawed comparable earnings analysis. These errors are discussed in detail below.

12 **Q.   PLEASE SUMMARIZE MR. MOUL'S DCF ESTIMATES.**

13 A.   Mr. Moul performs a traditional DCF analysis and then adjusts this result upwards to reflect

14 the difference between the market and book value capitalizations of his water group. For the

15 dividend component of his DCF, he uses 3.83% that represents the 6-month average dividend yield

16 adjusted upwards to reflect expected growth over the coming year. For the growth component of

17 the DCF, he reviews historic and projected growth rate data for the group for earnings per share,

18 dividends per share, book value per share, cash flow per share, and internal growth. Based on these

19 data, he arrives at a DCF growth rate of 6.50%. The sum of the adjusted dividend yield (3.83%)

20 and growth (6.50%) is 10.33%. Instead of using this figure as his DCF equity cost estimate, he

21 makes an adjustment to reflect the difference between the book value capitalization employed in the

22 rate setting process and the groups' market value capitalization. This adjustment of additional 60

1   basis points provides a DCF equity cost estimate of 10.93%.

2   **Q.   PLEASE EXPRESS YOUR CONCERNS WITH MR. MOUL'S DCF ESTIMATE.**

3   A.   I have two primary concerns with Mr. Moul's DCF study: (1) the growth rate of 6.50%; and

4   (2) the book value/market value adjustment.

5   **Q.   PLEASE CRITIQUE MR. MOUL'S DCF GROWTH RATE ESTIMATE OF 6.50%.**

6   A.   The 6.50% figure is out of line with historic as well as analysts' projections of growth for

7   the companies in the group. The table below shows *Value Line's* growth rate measures for the

8   group. It shows six measures of historic growth and six measures of projected growth for

9   companies in the group. For the averages, the only measure that nears Mr. Moul's 6.50% figure is

10   *Value Line's* projected earnings per share growth rate. All others are in the 4-5 percent range and

11   are not even close to 6.50%.

	Historic Growth					
Company	**Past 10 Years**			**Past 5 Years**		
	Earnings	**Dividends**	**Book Value**	**Earnings**	**Dividends**	**Book Value**
American States Water Co.	3.5%	2.0%	5.0%	3.0%	1.0%	3.5%
American Water Works	6.0%	9.0%	7.5%	5.5%	9.0%	7.5%
California Water Services	1.5%	2.5%	3.0%	3.0%	2.0%	3.0%
Philadelphia Suburban	6.0%	6.0%	4.0%	9.5%	4.5%	7.0%
Mean	**4.3%**	**4.9%**	**5.2%**	**5.3%**	**4.1%**	**5.3%**
Company	**Projected Growth** **Est'd. '97-'99 to '03-'05**			**Internal Growth**		
	Earnings	**Dividends**	**Book Value**	**Return on Equity**	**Retention Rate**	**Internal Growth**
American States Water Co.	6.0%	1.5%	4.5%	10.5%	44.0%	4.6%
American Water Works	9.0%	4.5%	6.0%	11.5%	57.0%	6.6%
California Water Services	6.0%	1.5%	2.0%	15.0%	43.0%	6.5%
Philadelphia Suburban	6.5%	5.5%	7.5%	12.5%	46.0%	5.8%
Mean	**6.9%**	**3.3%**	**5.0%**	**12.4%**	**47.5%**	**5.8%**

Data Sources: Value Line Investment Survey, May, 2001.

1   Several other specific observations are worth noting concerning Mr. Moul's 6.50% growth

2 rate estimate:

3   (1) Mr. Moul has virtually ignored historic growth rate figures for the group. The

4   average of his historic growth rate figures (Page 1 of PAWC Exhibit No. 9,

5   Schedule 9) range is 5.25%. This observation is especially relevant for his

6   group since historic growth rate figures are provided by virtually all investment

7   firms and presumably influence investors' expectations.

8   (2) Of the eighteen historic and 5-year projected figures employed by Mr. Moul in

9   PAWC Exhibit No. 9, Schedules 9 and 10, only four are as large as 6.50%. The

10   other fourteen are *below 6.50%.*

11   **(3)** The average *Value Line* projected dividend growth rate for the group is only

12   3.13%. This is a figure that he apparently gave no weight, which is especially

13   significant *since the relevant growth variable in the DCF model is dividends.*

14   **(4)** Zacks, First Call and Multex (I/B/E/S) retrieve and compile EPS forecasts from

15   Wall Street Analysts. These analysts come from both the sell side (Merrill

16   Lynch, Paine Webber) and the buy side (Prudential Insurance, Fidelity

17   Investments) investment firms. It is well known that the EPS forecasts of these

18   analysts, especially those on the sell side, are overly optimistic and therefore

19   biased upwards. The chart below, which comes from a study I am currently

20   doing, shows the magnitude of the bias. The top line is the analysts' forecasts of

1   earnings (one-year ahead) and the bottom line is the actual earnings. Whereas

2   the upward bias has declined in recent years, it still is in the 10% range for the

3   one-year ahead forecasts.

One-Year Ahead EPS Estimates vs. Actual EPS (Average)
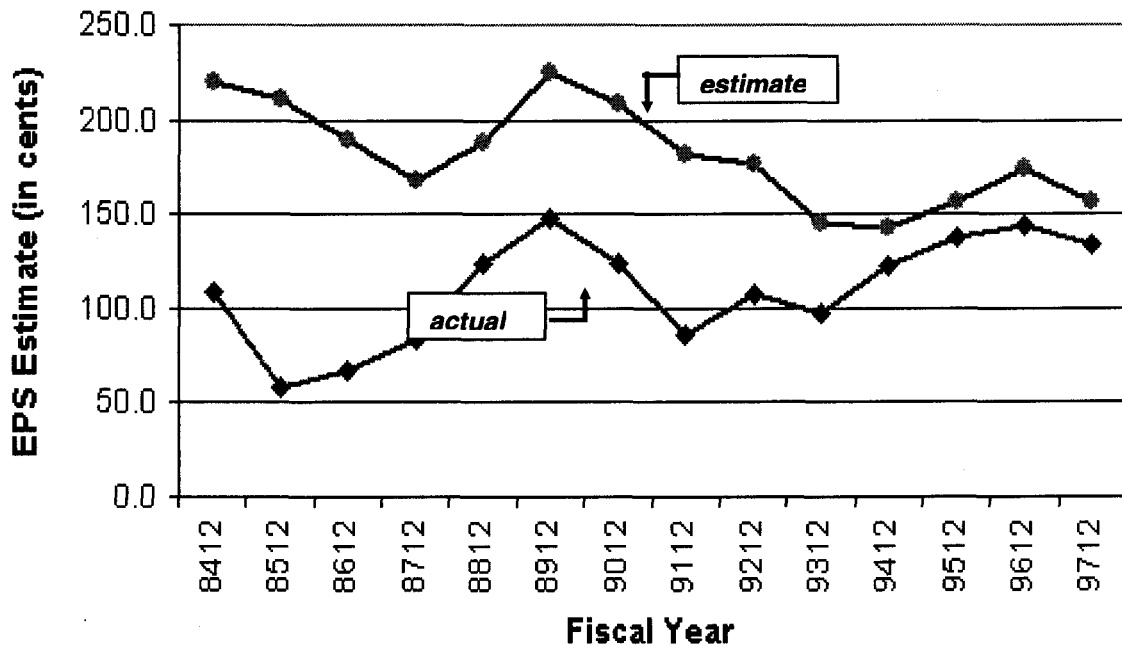
4

5   **Q.   PLEASE ADDRESS MR. MOUL'S CRITICISMS OF THE DCF MODEL IN**

6   **GENERAL AND, SPECIFICALLY, THE ADJUSTMENT TO HIS DCF EQUITY COST**

7   **RATE TO ACCOUNT FOR THE CAPITALIZATION CHANGES ASSOCIATED WITH**

8   **THE DIVERGENCE OF MARKET AND BOOK VALUES.**

9   A.   On pages 25 to 40 of his testimony and in Appendix E, Mr. Moul criticizes the use of the

1   DCF model to estimate equity cost rates in today's market conditions and makes an adjustment for

2   one of these factors. His criticisms can be summarized as follows: (1) there are problems in using

3   the DCF model in this case because the share prices of water utility stocks have risen due to

4   takeover speculation; (2) the assumptions used in the theoretical derivation of the DCF model; (3)

5   in conjunction with the DCF assumptions, which include the assumption of a constant P/E ratio, the

6   fact that P/E ratios are not constant but change over time, and (4) the DCF model produces

7   insufficient earnings when market-to-book ratios are above 1.0. I will address these issues in order.

8   (1) <u>Problems with the DCF model due to rising prices attributed to takeover speculation</u> -

9   the share prices of water stocks have risen in recent years for a number of reasons, part of which

10   may be the possibility of being acquired. The fact that prices rise simply means that either expected

11   returns have changed or that there has been a reassessment of risk. This may also mean that equity

12   cost rates have changed as well. Nonetheless, these conditions by themselves do not mean that the

13   DCF model does not provide an accurate indicator of equity cost rates.

14   (2) <u>The assumptions used in the derivation of the DCF model</u> - First, it must be noted that

15   all economic models are derived using fairly restrictive assumptions. In the DCF model,

16   assumptions such as constant P/E and dividend payout ratios make the model internally consistent.

17   Criticisms of the assumptions of the model are valid if it can be demonstrated that the model is not

18   robust with respect to obvious real world conditions that deviate from these assumptions. No such

19   evidence has been provided in this proceeding. The fact that the DCF model is used almost

20   universally in the investment community and in utility ratemaking is indicative of the robustness of

1   the methodology. The model does not require that investors have an infinite investment horizon.

2   Simply put, the DCF model only presumes that stocks are priced on the basis of current and

3   prospective dividends. Especially in the case of public utility stocks, I believe that this is a

4   reasonable assumption.

5   (3) The assumption of a constant P/E ratio, given that P/E ratios are not constant but change

6   over time - P/E ratios change constantly as new information comes to the market that causes

7   investors to revalue a company's shares (the numerator of the P/E ratio) relative to current earnings

8   (the denominator of the P/E ratio). This new information may be associated with changes in the

9   economic landscape that result in changes in equity cost rates (such as changes in interest rates or

10   investors' risk/return tradeoff). In the context of the DCF model, the fact that P/E ratios change

11   only provides an indication of changes in a firm's share price relative to past earnings. Share prices

12   look forward and are determined by a firm's prospective cash returns discounted to the present by

13   investors' required return. Earnings look backwards and are a function of firm performance and

14   generally accepted accounting conventions.

15   Thus, in the context of the DCF model, the fact that P/E ratios change is simply an

16   indication that new information relating to the economic environment is available and this has

17   caused investors to revalue shares. The DCF is based on expectations, and thus it is also likely that

18   the new information actually results in a change in equity cost rates.

19   (4) The DCF model produces insufficient earnings when market-to-book ratios are above

20   1.0. - The market value of a firm's equity exceeds the book value of equity when the firm is

1   expected to earn more on the book value of investment than investors require. In other words, the

2   expected return on equity capital is greater than the cost of equity capital (the return that investors

3   require). Given the almost universal application of the DCF model in regulatory and investment

4   circles, it is rather obvious that public utilities would not be selling in excess of 2.00 times book

5   value if the DCF model produced insufficient earnings. As such, Mr. Moul's hypothesis is

6   incorrect.

7   **Q.   PLEASE PROVIDE A FURTHER EVALUATION OF MR. MOUL'S**

8   **ADJUSTMENT FOR MARKET AND BOOK VALUE DIVERGENCE.**

9   A.   Mr. Moul makes a specific 60 basis point adjustment to his DCF equity cost rate to account

10   for the divergence of market and book values. His adjustment is based on a procedure for adjusting

11   returns based on alternative debt/equity capitalizations. In response to OCA Interrogatory II-8, Mr.

12   Moul provided copies of two studies published by Miller and Modigliani that he claims support the

13   adjustment procedure. In the study the authors' develop their classic capital structure irrelevance

14   theory. At no point do they demonstrate or support Mr. Moul's equity cost adjustment procedure.

15   **Q.   PLEASE REVIEW MR. MOUL'S RISK PREMIUM ANALYSIS.**

16   A.   Mr. Moul arrives at a risk premium derived equity cost rate of 12.50% for the Company.

17   This figure includes a base yield of 7.50% and an equity risk premium of 5.00%. The equity cost

18   estimate is excessive due to an overstated base yield and a biased and inflated equity risk premium

19   that does not reflect today's investment fundamentals.

20   **Q.   PLEASE DISCUSS THE BASE YIELD OF MR. MOUL'S RISK PREMIUM**

1 ANALYSIS.

2 A.   The base yield in Mr. Moul's risk premium analysis is the prospective yield on long-term,

3 'A' rated public utility bonds. Using the yield on these securities inflates the required return on

4 equity for PAWC in two ways: (1) long-term bonds are subject to interest rate risk, a risk which

5 does not affect common stockholders since dividend payments (unlike bond interest payments) are

6 not fixed but tend to increase over time and (2) the base yield in Mr. Moul's risk premium study is

7 subject to credit risk since it is not default risk-free like an obligation of the U.S. Treasury. As a

8 result, its yield-to-maturity includes a premium for default risk and therefore is above its expected

9 return. Hence using such a bond's yield-to-maturity as a base yield results in an overstatement of

10 investors' return expectations.

11 Q.   PLEASE REVIEW MR. MOUL'S RISK PREMIUM STUDY.

12 A.   Mr. Moul performs a historic risk premium study that appears in PAWC Exhibit No. 9,

13 Schedule. This study involves an assessment of the historic difference between S&P Public Utility

14 Index stock returns and 'A' rated public utility bond returns over various time periods between the

15 years 1928-2000. This type of historic evaluation of stock returns is often called the "Ibbotson

16 approach" after Professor Roger Ibbotson who popularized this method of assessing historic

17 financial market returns. Mr. Moul evaluates the stock-bond return differentials using different

18 measures of central tendency (the geometric and arithmetic means and the median) over four

19 alternative time intervals (1928-2000, 1952-2000, 1974-2000, and 1979-2000). From the results of

20 his study (which are summarized on page 2 of PAWC Exhibit No. 9, Schedule 12), he concludes

1 that an appropriate risk premium for the S&P Public Utilities is 6.65%. To recognize the lower risk

2 of water utilities, he arbitrarily adjusts this figure downwards to 5.00% which he uses as an equity

3 risk premium for PAWC.

4 **Q.   PLEASE SUMMARIZE YOUR ASSESSMENT OF MR. MOUL'S RISK PREMIUM**

5 **STUDY.**

6 A.   Using the historic relationship between stock and bond returns to measure an equity risk

7 premium is erroneous and, especially in this case, overstates the true market equity risk premium.

8 The equity risk premium is based on expectations of the future and when past market conditions

9 vary significantly from the present, historic data does not provide a realistic or accurate barometer

10 of expectations of the future. Currently, using historic returns to measure the equity risk premium

11 masks the dramatic change in the risk and return relationship between stocks and bonds which

12 suggests that the equity risk premium has declined in recent years. As discussed above, the notion

13 that the equity risk premium has declined in the 1990s, resulting in higher stock prices and returns,

14 is a well-recognized and accepted fact in today's capital markets.

15 **Q.   PLEASE DISCUSS THE ERRORS IN USING HISTORIC STOCK AND BOND**

16 **RETURNS TO ESTIMATE AN EQUITY RISK PREMIUM.**

17 A.   There are several flaws in using historic returns over long time periods to estimate expected

18 equity risk premiums. Most significant is the implicit assumption that (1) risk premiums do not

19 change over time, and (2) there has been no change in the relative risk of stocks and bonds.

20 Specific problems with the methodology include:

1   (A) Biased historical bond returns;

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

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

4   (D) The change in risk and return.

5   These issues will be addressed in this order.

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

7   A.   An essential assumption of these studies is that over long periods of time investors'

8   expectations are realized. However, the experienced returns of bondholders in the past violate this

9   critical assumption. Historic bond returns are biased downward as a measure of expectancy because

10   of capital losses suffered by bondholders in the past. As such, risk premiums derived from this data

11   are biased upwards.

12   **Q.   PLEASE DISCUSS THE ISSUE RELATING TO THE USE OF THE**

13   **ARITHMETIC VERSUS THE GEOMETRIC MEAN RETURNS IN THE IBBOTSON**

14   **METHODOLOGY.**

15   A.   The measure of investment return has a significant effect on the interpretation of the risk

16   premium results. When analyzing a single security price series over time (i.e., a time series), the

17   best measure of investment performance is the geometric mean return. Using the arithmetic mean

18   overstates the return experienced by investors. In a study entitled "Risk and Return on Equity: The

19   Use and Misuse of Historical Estimates," Carleton and Lakonishok make the following

20   observation: "The geometric mean measures the changes in wealth over more than one period on a

1 buy and hold (with dividends invested) strategy."[11] Since Mr. Moul's study covers more than one

2 period (and he assumes that dividends are reinvested), he should be employing the geometric mean

3 and not the arithmetic mean.

4 **Q.   PLEASE PROVIDE AN EXAMPLE DEMONSTRATING THE PROBLEM WITH**

5 **USING THE ARITHMETIC MEAN RETURN.**

6 A.   To demonstrate the upward bias of the arithmetic mean, consider the following example.

7 Assume that you have a stock (that pays no dividend) that is selling for $100 today, increases to

8 $200 in one year, and then falls back to $100 in two years. The table below shows the prices and

9 returns.

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

10

11 The arithmetic mean return is simply (100% + (-50%))/2 = 25% per year. The geometric mean

12 return is ((1 * .50)^(1/2)) – 1 = 0% per year. Hence, the arithmetic mean return suggests that your

13 stock has appreciated at an annual rate of 25%, while the geometric mean return indicates an annual

14 return of 0%. Since after two years, your stock is still only worth $100, the geometric mean return

15 is the appropriate return measure. For this reason, when stock returns and earnings growth rates are

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[11] 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 reported in the financial press, they are normally reported using the geometric mean. This is

2 because of the upward bias of the arithmetic mean. Hence, Mr. Moul's arithmetic mean return

3 measures are biased and should be disregarded.

4 **Q.   YOU NOTE THAT HISTORIC STOCK RETURNS ARE BIASED USING THE**

5 **IBBOTSON METHODOLOGY. PLEASE ELABORATE.**

6 A.   Returns developed using Ibbotson's methodology are computed on stock indexes and

7 therefore (1) cannot be reflective of expectations because these returns are unattainable to investors,

8 and (2) produce biased results. This methodology assumes (a) monthly portfolio rebalancing and

9 (b) reinvestment of interest and dividends. Monthly portfolio rebalancing presumes that investors

10 rebalance their portfolios at the end of each month so as to have an equal dollar amount invested in

11 each security at the beginning of each month. The assumption would obviously generate extremely

12 high transactions costs and, as such, these returns are unattainable to investors. In addition, an

13 academic study demonstrates that the monthly portfolio rebalancing assumption produces biased

14 estimates of stock returns.[12]

15   Transaction costs themselves provide another bias in historic versus expected returns. The

16 observed stock returns of the past were not the realized returns of investors due to the much higher

17 transactions costs of previous decades. These higher transactions costs were not only the higher

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[12] See Richard Roll, "On Computing Mean Returns and the Small Firm Premium," *Journal of Financial Economics* (1983), pp. 371-86.

1   commissions on stock trades, but also the lack of low cost mutual funds like index funds.

2   Q.   FINALLY, PLEASE DISCUSS THE NOTION THAT MR. MOUL'S RISK

3   PREMIUM STUDIES DO NOT REFLECT THE CHANGE IN RISK AND RETURN IN

4   TODAY'S FINANCIAL MARKETS.

5   A.   The methodology employed by Mr. Moul is also unrealistic in that it makes the explicit

6   assumption that (1) the chosen time horizon is appropriate for estimating the current market risk

7   premium, and (2) risk premiums do not change over time. These assumptions are not valid in

8   today's environment. Economic developments over the past decade have changed the economy and

9   business cycle and have resulted in a dramatic change in the risk/return relationship between stocks

10   and bonds. The nature of the change is that bonds have increased in risk relative to stocks.

11   Page 1 of Schedule JRW-9 shows interest rates on long-term government bonds since 1926.

12   Obviously, the interest rate levels of the past twenty years are significantly above those of the

13   previous 50 years. Page 2 of Schedule JRW-9 provides the annual market risk premiums for the

14   1926 to 2000 period where the annual premium is defined as the return on common stock minus the

15   return on long-term Treasury Bonds. There is considerable variability in this series and a clear

16   decline in recent decades. The high was 54% in 1933 and the low was -38% in 1931. Clear

17   evidence of a change in the relative riskiness of bonds and stocks is provided on page 3 of Schedule

18   JRW-9 which plots the standard deviation of annual stock and bond returns since 1926. The plot

19   shows that, whereas stock returns were much more volatile than bond returns from the 1920s to the

20   1970s, bond returns became more variable than stock returns during the 1980s. In recent years

1   stocks and bonds have been almost equally volatile. The decrease in the volatility of stocks relative

2   to bonds has been attributed to several stock related factors - the impact of technology on

3   productivity and the new economy, the role of information (see Greenspan's comments on pages

4   30-31 of my testimony) on the economy and markets, better cost and risk management by

5   businesses - and several bond related factors - deregulation of the financial system, inflation fears

6   and interest rates, and the increase in the use of debt financing. Further evidence of the greater

7   relative riskiness of bonds is shown on page 4 of Schedule JRW-9, which plots real interest rates

8   (the nominal interest rate minus inflation) from 1926 to 2000. Real rates have been well above

9   historic norms during the past 10-15 years. These high real interest rates reflect the fact that

10   investors view bonds as riskier investments.

11   The net effect of the change in risk and return has been a significant decrease in the return

12   premium that stock investors require over bond yields. In short, the market risk premium has

13   declined in recent years. As I highlighted earlier in my testimony, this decline has been discovered

14   in studies by leading academic scholars and investment firms, and has been acknowledged by

15   government regulators. As such, Mr. Moul's historic market risk premium analysis is simply

16   outdated and not reflective of current investor expectations and investment fundamentals.

17   **Q.   PLEASE SUMMARIZE YOUR RECOMMENDATIONS CONCERNING MR.**

18   **MOUL'S RISK PREMIUM ANALYSIS.**

19   A.   Mr. Moul's risk premium study is erroneous and should be disregarded in estimating

20   PAWC's equity cost rate. As indicated, the base yield of 7.50% (1) includes interest rate risk, a risk

1   not generally faced by equity investors, and (2) is above investors' expected return on medium-term

2   public utility bonds. The equity risk premium of 5.00% is based on a historic risk premium study

3   of stock and bond returns over periods of up to 75 years that (1) employs biased bond returns; (2)

4   uses the arithmetic mean return, (3) utilizes biased and unattainable stock returns, and (4) most

5   importantly, masks the change in the relative risk of stocks and bonds and the resulting decline in

6   the equity risk premium.

7   **Q.   PLEASE ASSESS MR. MOUL'S USE OF THE CAPITAL ASSET PRICING**

8   **MODEL.**

9   A.   Mr. Moul applies the CAPM to the water group to estimate an equity cost rate for the

10 Company. For the CAPM, Mr. Moul computes an equity cost rate of 12.09% using a 30-year risk-

11 free rate of 5.25%, an adjusted beta of .75, and a market or equity risk premium of 9.12%. The beta

12 he employs has been adjusted upwards for the book value/market value capitalization difference,

13 and the market or equity risk premium is an average of the historic risk premium (the difference

14 between the arithmetic mean returns on the S&P 500 and long-term Treasuries), and expected

15 returns (the difference between *Value Line's* expected market return and the 30-year Treasury rate).

16   The primary problem with Mr. Moul's CAPM analysis is the size of the market or equity

17 risk premium. He has also erred in adjusting the beta due to the book value/market value issue.

18 This issue has been addressed above and will not be discussed here.

19 **Q.   PLEASE DISCUSS THE ERRORS IN MR. MOUL'S EQUITY OR MARKET RISK**

20 **PREMIUM IN HIS CAPM APPROACH.**

1 A.   Mr. Moul performs an analysis in PAWC Exhibit No. 9, Schedule 13 and Appendix H, to

2 arrive at his market risk premium of 8.37%. It is computed as the average of the 1926-2000 results

3 from the Ibbotson study (7.3%) and *Value Line's* 3-5 year annual return projections (10.94%). The

4 primary problem with this approach is that both the Ibbotson study and *Value Line* projected return

5 overstate the market or equity risk premium.

6   Initially, Mr. Moul's CAPM study should be totally ignored due to the size and direction of

7 his equity risk premium estimate. It is totally out of line with the equity risk premium estimates

8 discovered in recent academic studies and those employed by leading investment banks (2-4

9 percent, as cited above). Furthermore, whereas Mr. Moul shows an increasing equity risk premium

10 in the 1990s, the rest of the investment world, including Mr. Greenspan, believe that the equity risk

11 premium is declining.[13]

12   The Ibbotson historic risk premium simply represents the difference in the arithmetic mean

13 stock and bond returns over the 1926-2000 period. The errors in using the relationship between

14 long-term historic stock and bond returns were discussed above. In short, the procedure is

15 erroneous and overstates the true market or equity risk premium. Most importantly, using long-

16 term historic returns masks the dramatic change in the risk and return relationship between stocks

17 and bonds that suggests that the market risk premium has declined.

18 **Q.   PLEASE   ADDRESS   THE   PROBLEMS   WITH   USING   *VALUE   LINE'S***

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[13] Using the same methodology in the 1997 Pennsylvania American Water Company base rate case (R-00973944), Mr. Moul estimated an equity risk premium of 6.74%.

1 **PROJECTED RETURNS.**

2 A.   The primary error in using *Value Line's* 3-5 year annual return projections is that these

3 projections are consistently high relative to actual experienced returns and, as such, provide

4 upwardly biased market risk premiums. This results in an overstated market risk premium.

5 **Q.   USING A MORE REALISTIC EQUITY RISK PREMIUM, WHAT EQUITY COST**

6 **RATE WOULD MR. MOUL GET USING THE CAPM?**

7 A.   Using the current 30-Treasury rate (5.6%), the beta for Mr. Moul's *Value Line* Group

8 (0.61), and the average equity risk premium from the Fama-French study ([3.40+4.83]/2 = 4.12%),

9 an equity cost rate of 8.11% is indicated.

10	CAPM Equity Cost Rate	=	Risk-Free Rate	+	Beta	*	Equity Risk Premium
11	*Value Line* Group	=	5.60%	+	0.61	*	4.11%
12		=			8.11%		

13 **Q.   PLEASE DISCUSS MR. MOUL'S COMPARABLE EARNINGS ANALYSIS.**

14 A.   Mr. Moul also estimates an equity cost rate for the Company employing the comparable

15 earnings approach. His methodology involves averaging historic and prospective returns on

16 common equity for a proxy group of non-utility companies "comparable" in risk to his barometer

17 group as determined from screening *Value Line's* Value Screen database. Mr. Moul screens the

18 database on six risk measures and arrives at a group of nine unregulated "comparable" companies.

19 The average of the historic and projected median returns on common equity for the group is

20 12.90%.

1   This approach is fundamentally flawed for several reasons. He has not performed any

2 analysis to examine whether his return on equity figures are likely measures of long-term earnings

3 expectations. More importantly, however, since Mr. Moul has not evaluated the market-to-book

4 ratios for these companies, he cannot indicate whether the past and projected returns on common

5 equity are above or below investors' requirements. These returns on common equity are excessive

6 if the market-to-book ratios for these companies are above 1.0. For example, Coca Cola's projected

7 return on common equity is in excess of 30% and its market-to-book ratio is nearly 20. But, I doubt

8 if any financial analyst, including Mr. Moul, would suggest that Coca Cola's equity cost rate is

9 30%. I have used market-to-book ratios relative to earned returns on equity as a means of testing my

10 overall rate of return recommendation. As discussed above, this procedure involves a

11 straightforward relationship between a firm's return on equity, cost of equity, and market-to-book

12 ratio. A firm which earns a return on equity above (below) its cost of equity will see its common

13 stock sell at a price above (below) its book value.

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

15 A.   Yes it does.

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1   **Appendix A**

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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, the Goldman, Sachs & Co. and Frank P. Smeal Endowed
12   Faculty Fellow in Business Administration, and Director of the Smeal College Trading Room in the College of Business
13   Administration of the Pennsylvania State University in University Park, PA. He is also a Vice President of the
14   Columbia Group, a public utility consulting firm based in Ridgefield, CT, and serves on the Investment Committee of
15   ARIS Corporation, an asset management company 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 books that have been published in 1999 – *Spin-Offs and Equity Carve-Outs:*
34   *Achieving Faster Growth and Better Performance* (Financial Executives Research Foundation) and *The Streetsmart*
35   *Guide to 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) and Philadelphia Suburban Water Company (R-004868). He has prepared testimony on
17   behalf of the Pennsylvania Office of Consumer Advocate in the following case before the Federal Energy Regulatory
18   Commission (National Fuel Gas Supply Corporation (RP-92-73-000). He has prepared testimony for the New Jersey
19   Department of the Public Advocate, Division of Rate Counsel: New Jersey-American Water Company (R-91081399J),
20   New Jersey-American Water Company (R-92090908J), and Environmental Disposal Corp (R-94070319). He has
21   prepared testimony for the Hawaii Office of the Consumer Advocate: East Honolulu Community Services, Inc. (Docket
22   No. 7718). He has prepared testimony for the County of Nassau in New York State: Long Island Lighting Company
23   (PSC Case No. 942354). He has prepared testimony for the Office of Consumer Counsel in Connecticut: United
24   Illuminating (Docket No. 96-03-29). He has prepared testimony for the Office of the People's Counsel in the District of
25   Columbia: Potomac Electric Power Company (Formal Case No. 939).
26