BEFORE THE

PENNSYLVANIA PUBLIC UTILITY COMMISSION

Pennsylvania Public Utility Commission	**: Docket Nos. R-00994868**
v.	**: R-00994877;**
	: R-00994878;
Philadelphia Suburban Water Company	**: R-00994879**

DIRECT TESTIMONY

OF

DR. J. RANDALL WOOLRIDGE

FOR THE

PENNSYLVANIA OFFICE OF CONSUMER ADVOCATE

February, 2000

Philadelphia Suburban Water Company
Docket Nos. R-00994868; R-00994877; R-00994878; R-00994879

Direct Testimony of
Dr. J. Randall Woolridge

TABLE OF CONTENTS

LIST OF SCHEDULES

Schedule	Title
JRW-1	Recommended Rate of Return
JRW-2	Summary Financial Statistics
JRW-3	Monthly Dividend Yields
JRW-4	Growth Rate Indicators
JRW-5	Risk Premium Study
JRW-6	Public Utility Capital Cost Indicators
JRW-7	Industry Average Betas
JRW-8	Three-Stage Dividend Discount Model
JRW-9	Analysts' Earnings Forecasts
JRW-10	Risk Premium Assessment

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 Philadelphia Suburban Water Company ("PSWC" or

15 "Company") and to evaluate PSWC'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 9.0% for PSWC primarily by applying the discounted cash flow (DCF) approach

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

20 Utilizing my equity cost rate, capital structure ratios, and senior capital cost rates, I am

1 recommending an overall fair rate of return for the Company of 8.20%. This recommendation is

2 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 11.80% is unreasonably high primarily due to

9 (1) an inflated growth rate forecast he uses in his DCF equity cost rate, and (2) outdated and

10 seriously flawed risk premium and CAPM studies.

11

12 **II. BAROMETER GROUP SELECTION**

13

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

15 **RETURN RECOMMENDATION FOR PSWC.**

16 A. To develop a fair rate of return recommendation for PSWC, 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. The group, which I refer to as the Value Line Group I, are the eleven water companies

1 which are followed by the *Value Line Investment Survey Expanded Edition*. This group includes

2 six larger companies that covered (and include projected data) as part of the basic *Value Line*

3 service: American Water Works, The Aquarion Co., California Water Service Co., E'Town Corp.,

4 Philadelphia Suburban Corp., and United Water Resources. The group also includes another five

5 companies that are covered on a limited basis (only historic data) as part of the expanded *Value*

6 *Line* service: American States Water Co., Connecticut Water Service Co., Middlesex Water, SJW

7 Corp, and Southwest Water Co. Mr. Moul has used the same group, except he has eliminated

8 Aquarion and United Water Resources because they are currently in the process of being acquired

9 by other companies. I estimate an equity cost rate for the entire group as well as for Mr. Moul's

10 smaller group, which I refer to as Value Line Group II.

11 Summary financial statistics for Value Line Group I are provided on page 1 of Schedule

12 JRW-2. On average, the group has average net plant of $828 million and average total revenues of

13 $245 million. The group has an average common equity ratio of 47%, and a current earned return

14 on common equity of 11.8%. The average market-to-book ratio is currently 2.34.

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 PSWC?**

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

1   Schedule 1 of PSWC Exhibit No. 4-A, this capital structure consists of 48.7% common equity,

2   0.14% preferred stock, and 51.16% long-term debt. In addition, I will also use the Company's

3   proposed cost rates for preferred stock of 4.78% and long-term debt of 7.45%.

4

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

6   **A. OVERVIEW**

7

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

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

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

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

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

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

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

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

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

17 capital to attract investors.

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

19 **CONTEXT OF THE THEORY OF THE FIRM.**

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

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

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

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

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

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

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

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

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

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

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

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

12   firm's securities must be equal.

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

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

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

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

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

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

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

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

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

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

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

19   is relatively straight-forward. A firm which earns a return on equity above (below) its cost of

20   equity will typically see its common stock sell at a price above (below) its book value.

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

22   **CAPITAL FOR PUBLIC UTILITIES?**

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

24   Page 1 gives the quarterly yields on 'A' rated public utility bonds. These yields have gradually

25   declined over the past two decades from a high of 17.0 percent range in the 1st quarter of 1982 to

26   the 7.5-7.75% range as of the end of 1999.

27   The dividend yields for public utilities, as shown on page 2 of Schedule JRW-6 for the

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

1 fifteen utilities in the Dow Jones Utilities Average, have generally followed bond yields. After

2 peaking in the 12.0 percent range in 1981, these yields have declined and reached an all-time low of

3 less than 4.0% in 1998.

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

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

6 in the 11.0 - 12.0 percent range. Market-to-book ratios increased to the 1.6 range in 1993, then

7 declined to about 1.3 over the next two years, and since then have increased significantly. As of the

8 end of 1998, the market-to-book ratio for the Dow Jones Utilities hit 1.8, an all-time high.

9   The indicators in Schedule JRW-6 all suggest that capital costs for the Dow Jones Utilities

10 have decreased significantly over the years. Specifically for the equity cost rate, the significant

11 increase in the market-to-book ratio since 1995, coupled with only a small increase in the average

12 return on equity, suggests a substantial decline in the equity cost rate.

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

14 **RATE OF RETURN ON EQUITY?**

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

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

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

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

19 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 WWW

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 income-oriented investment companies and gold/silver mining

17   companies have lower 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 which, 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 which investors expect to receive from investment in the

10 firm. 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 which 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:

18
19
20 $$P = \frac{D_1}{(1+k)^1} + \frac{D_2}{(1+k)^2} + \frac{D_3}{(1+k)^3} + \ldots$$
21
22

1   where P is the current stock price, D_n is the dividend in year t, 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:

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

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:

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

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 rate-making 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 VALUE LINE WATER GROUPS I and II?**

5   A.   The dividend yields on the common stock of the Group I are given on page 1 of Schedule

6   JRW-3 for the twelve-month period ending December 1999. Over this period, the average monthly

7   dividend yield for this group has ranged from a high of 4.19 to a low of 3.06%. The 12-month

8   average for the group is 3.64%. For the group, I will employ the average of the 12-month mean

9   (3.64%) and the December 1999 (3.11%) dividend yields, which is 3.38%.

10   The dividend yields for the nine companies in Group II are given on page 2 of Schedule

11   JRW-3 for the twelve-month period ending December 1999. The average monthly dividend yield

12   for this group has ranged from a high of 4.09 to a low of 3.08%, with a 12-month average of 3.61%.

13   The average of the 12-month mean (3.61%) and the December 1999 (3.16%) dividend yields is

14   3.38%.

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

16   **DIVIDEND YIELD.**

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

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

19   associated with the development of the DCF model for popular use, the appropriate dividend yield

1 for a firm which pays dividends on a quarterly basis is found by (1) multiplying the expected

2 dividend over the coming quarter by 4, and (2) dividing this dividend by the current stock price.[3]

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

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

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

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

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

8 long-term expected growth rate.

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

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

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

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

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

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

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

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

17 **FOR YOUR DIVIDEND YIELD?**

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

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

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

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

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

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

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

8   different results, and therein lies the debate.

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

10   **DCF MODEL?**

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

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

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

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

15   growth rate forecasts as provided by Zacks, I/B/E/S, and First Call. These services solicit 5-year

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

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

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

19   average common equity.

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

1 **WELL AS INTERNAL GROWTH.**

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

20 **Q.   WHAT GROWTH DATA HAVE YOU REVIEWED FOR THE GROUPS OF**

1   **WATER COMPANIES?**

2   A.   Schedule JRW-4 provides the following growth rates for the two groups: historic five- and

3   ten- year historic growth rates in earnings, dividends, and book value per share (where available) as

4   computed by *Value Line* (using the *Value Line* methodology); and projected five-year EPS growth

5   rates from Zacks, I/B/E/S, and First Call as well as *Value Line's* projected 5-year growth rates for

6   earnings, dividends, and book value per share.

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

8   **PROSPECTIVE GROWTH OF VALUE LINE GROUP I.**

9   A.   Table 1 (page 18) provides a summary of historic and prospective growth rates for the

10 Value Line Group I. It is important to note that *Value Line* does not provide projected data for the

11 five companies only covered in the expanded edition, and that earnings forecasts are not available

12 for all firms from the three services. Historic growth in earnings, dividends, and book value for

13 Group I ranges from 1.7% to 5.0%, and the average of the historic five- and ten- year earnings,

14 dividends, and book value growth is 3.3%. Prospective internal growth is 5.0%, with *Value Line*

15 average projected retention and equity return rates of 41.8% and 11.8%, respectively. Other

16 projected growth rates range from a high of 6.4% for the average Value Line earnings growth rate

17 to a low of 2.9% for the average Value Line dividend growth rate. Zacks (with data for 8

18 companies) shows a mean 5-year projected earnings rate of 4.4%. The corresponding figure for

19 I/B/E/S (7 companies) and First Call (7 companies) are 5.1% and 4.8%, respectively. The average

20 of prospective internal growth and the forecasts for growth in earnings, dividends, and book value

1   per share is 4.9%.

2

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5

Table 1 Value Line Group I Growth Rate Indicators	
Historic Growth	
5-Year Historic EPS Growth	5.0%
5-Year Historic DPS Growth	1.7%
5-Year Historic BVPS Growth	4.4%
10-Year Historic EPS Growth	1.7%
10-Year Historic DPS Growth	3.3%
10-Year Historic BVPS Growth	3.5%
Projected Growth	
Prospective Internal Growth	5.0%
Projected EPS Growth (Value Line)	6.4%
Projected DPS Growth (Value Line)	2.9%
Projected BVPS Growth (Value Line)	5.8%
Projected EPS Growth (Zacks)	4.4%
Projected EPS Growth (I/B/E/S)	5.1%
Projected EPS Growth (First Call)	4.8%

14   Considering the average projections of Zacks, I/B/E/S, and First Call, and Value Line,

15   prospective internal growth, and the historic growth rate range, expected growth appears to be in

16   the 4.5 to 5.0 percent range. Given these results, I will use the midpoint of this range - 4.75% - as

17   expected growth for Value Line Group I.

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

19   **DCF MODEL FOR VALUE LINE GROUP I?**

20   A.   My DCF-derived equity cost rates for the Value Line Group I:

1   Value Line Group I   3.38% * 1.02375 + 4.75% = 8.21%

2 **Q.   PLEASE SUMMARIZE THE GROWTH RATES OF VALUE LINE GROUP II.**

3 A.   Table 2 (page 20) provides a summary of historic and prospective growth rates for the

4 Value Line Group II. Historic growth in earnings, dividends, and book value for Group I ranges

5 from 1.7% to 5.2%, with an average of the historic five- and ten- year growth figures of 3.8%.

6 Prospective internal growth is 5.2%, and *Value Line*'s average projected growth rates for earnings,

7 dividends, and book value are 7.0%, 3.9%, and 6.0%, respectively. Zacks (6 companies), I/B/E/S (6

8 companies) and First Call (5 companies) show mean 5-year projected earnings rates of 4.5%, 5.1%,

9 and 5.2%, respectively. The average of prospective internal growth and the forecasts for growth in

10 earnings, dividends, and book value per share is 5.25%.

11   Historic and projected growth for Group II appears a little higher. Considering the average

12 projections of Zacks, I/B/E/S, and First Call, and Value Line, prospective internal growth, and the

13 historic growth rate range, expected growth appears to be in the 4.5% - to 5.5% percent range.

14 Given these results, I will use the midpoint of this range - 5.00% - as expected growth for Value

15 Line Group II.

16

Table 2
Value Line Group II
Growth Rate Indicators

Historic Growth
5-Year Historic EPS Growth	5.2%
5-Year Historic DPS Growth	1.7%
5-Year Historic BVPS Growth	4.6%
10-Year Historic EPS Growth	2.8%
10-Year Historic DPS Growth	4.3%
10-Year Historic BVPS Growth	4.3%

Projected Growth
Prospective Internal Growth	5.2%
Projected EPS Growth (Value Line)	7.0%
Projected DPS Growth (Value Line)	3.9%
Projected BVPS Growth (Value Line)	6.0%
Projected EPS Growth (Zacks)	4.5%
Projected EPS Growth (I/B/E/S)	5.1%
Projected EPS Growth (First Call)	5.2%

Q. WHAT IS YOUR INDICATED COMMON EQUITY COST RATE FROM THE DCF MODEL FOR VALUE LINE GROUP II?

A.   My DCF-derived equity cost rates for the Value Line Group II:

Value Line Group I I   3.38% * 1.025 + 5.00% = 8.46%

C. RISK PREMIUM APPROACH

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

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

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

3                 $$k \quad = \quad R_f \quad + \quad RP$$

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

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

6   companies.

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

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

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

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

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

12   market value and the book value of the firm will be equal. Likewise, if a firm is generating

13   earnings greater (less) than required by investors, the market-to-book ratio will be greater (less)

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

15   than 1.0, indicating that the earnings of these companies are more than sufficient to meet investors'

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

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

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

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

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

1 A.   A market-to-book ratio of 1.0 indicates that investors' return requirements are being met. In

2 my approach, the risk premium, defined as the return on common equity minus the riskless interest

3 rate, is compared to contemporaneous market-to-book ratios. As such, this methodology shows the

4 additional return which utility common stock investors require above the risk-free interest rate.

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

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

7 the six water companies with forecasts provided by *Value Line*: (1) using the companies in the

8 group, I compute the premium for risk required by investors as the expected return on equity minus

9 the yield on long-term Treasury securities; (2) I regress the risk premium for each firm on the

10 market-to-book ratio for different time periods; and (3) I add the indicated average risk premium for

11 the water service companies to the current yield on long-term Treasury securities.

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

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

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

15 Risk premium studies which measure a risk premium as the difference between bond and stock

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

17 returns on equity and not historic bond and stock returns to determine investor return requirements

18 and an appropriate risk premium. Security prices and capital cost rates are based on expectations of

19 the future and not on extrapolations of returns from the past. Third, I am employing a group of

20 water service companies (and not a broader group of companies or utilities) to measure investors'

1   return requirements. Fourth, I am using the same base in my risk premium study - the yield on

2   long-term Treasury securities - as I use in estimating the cost of equity for the Company employing

3   the risk premium approach. I do not establish a risk premium utilizing bond returns as a base and

4   then estimate an equity cost rate utilizing current bond yields as a base rate. And finally, since my

5   risk premium study does not evaluate returns derived from a series of security prices over long time

6   periods, the appropriate measure of central tendency for historic returns - arithmetic mean or

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

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

9   **ANALYSIS?**

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

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

12 default risk.

13   Page 6 of Schedule JRW-5 shows the yields on long-term Treasury securities from 1996 to

14 the present. Over the last six months of 1999, these yields have been in the 6.00% to 6.60% range.

15 The current long-term bond yield (as of the first week of February) is 6.3% range. Considering the

16 range over the past six months, I will utilize the 6.3% as the risk-free rate in my risk premium

17 approach.

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

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

20 market based rates of return. My risk premium study uses expected returns (and not past returns)

1   since capital cost rates and security prices are based on expectations of the future. I perform a risk

2   premium study for the *Value Line* companies. Forecasts of returns on common equity (ROE) are

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

4   (1998/99) in my risk premium study. *Value Line* publishes individual company updates four times

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

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

7   The yield on long-term Treasury securities for the appropriate month comes from the *Federal*

8   *Reserve Bulletin* (or *Wall Street Journal*, depending on availability). For each company, I compute

9   the risk premium as the ROE minus the yield on long-term Treasury securities. I use three

10   definitions of expected ROE in estimating risk premiums: (1) 3-Year ROE - the expected ROE is

11   computed as the average of the projected ROEs for years t, t+1, and the 3-5 year projected ROE; (2)

12   2-Year ROE - the expected ROE is computed as the average of the ROEs for year t+1 and the 3-5

13   year projected ROE; and (3) Projected ROE - the expected ROE equals the 3-5 year projected ROE.

14   I regress the risk premium (using the alternative definitions of ROE) on the market-to-book ratio

15   for the firms in the water group. Finally, I add the indicated average risk premium to the current

16   yield on long-term Treasury securities to obtain an equity cost rate for the Company.

17   **Q.   PLEASE DISCUSS YOUR RISK PREMIUM RESULTS IN THIS PROCEEDING.**

18   A.   The risk premium is measured as the sum of the intercept and slope coefficients of the

19   regression. In the regressions of my risk premium study, the slope coefficient measures the

20   relationship between risk and return and hence constitutes the risk premium. As such, it is usually

1   the factor that dominates the risk premium measure. In statistical terms, this means that a positive

2   relationship exists between the risk premium and the market-to-book ratio which is indicated by a

3   positive and statistically significant slope coefficient.[4] The intercept term is usually small

4   (absolutely) and statistically insignificantly different from zero. However, in many of the

5   regressions that I have performed as part of this study, the slope coefficient is relatively small while

6   the intercept term is relative large. In addition, the regression statistics suggest that there is not a

7   statistically significant relationship between risk and return. The statistical insignificance of these

8   regressions precludes one from making inferences about the results. In fact, with an insignificant

9   slope coefficient, one could conclude (from a statistical point of view) that the risk premium was

10   equal to zero.

11 **Q. CONSIDERING THE STATISTICALLY INSIGNIFICANT REGRESSION**

12   **RESULTS IN THIS STUDY, HOW HAVE YOU MODIFIED YOUR ANALYSIS?**

13 A.   The risk premium results are provided in Schedule JRW-5. Page 1 provides a summary of

14   the eleven regressions (based on times frames and data) as well as sorting of the results based on

15   the statistical significance of the regression statistics. The data employed and detailed regression

16   statistics are provided on the pages that follow in Schedule JRW-5.

17   To determine a risk premium in this case, I have taken the eleven risk premium regressions

18   and sorted them by the statistical significance of their F-statistics. A lower probability or

---

[4] Statistical significance is usually defined at the .05 or 5% level of confidence that the regression coefficient is different from zero.

1   significance level of the F-statistic (or the higher the R-square), the better is the relationship

2   between two variables. In effect, I am estimating a risk premium by identifying those time frames

3   and forecast periods over the past year when the linear regressions suggest a statistically significant

4   relationship exists between the risk premium and market-to-book ratio.

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

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

7   frames and forecast periods based on the strength of the risk/return relationship as indicated by the

8   regression statistics. The weak risk/return strong relationship are on the left, and those with a

9   strong risk/return relationship are on the right. The average F-Statistic and associated R-square for

10   the weak relationship sample are .47 and .17. The average indicated risk premium during those

11   periods is 4.72%. However, given the regression statistic, one must conclude that this figure is not

12   significantly different from zero. For the strong relationship sample, the average F-Statistic and

13   associated R-square are .05 and .67. As previously indicated, .05 is the normal probability level

14   required to conclude statistical significance. The average risk premium during those periods is

15   3.40%. The fact that the R-square for the strong relationship sample is almost four times that of the

16   weak relationship sample indicates that this sample provides a much better model of the risk/return

17   relationship. Hence I will use this risk premium for this sample – 3.40% - as my risk premium.

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

19   **USING THE RISK PREMIUM APPROACH?**

20   A.   Using the risk premium approach, the indicated equity cost rate for the Value Line group is:

1   Value Line Companies   6.30% + 3.40% = 9.70%

2

3   **D. EQUITY COST RATE SUMMARY**

4

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

6   A.   My DCF analyses for the Value Line Water Groups indicate equity cost rates of 8.21 and

7   8.46%. My risk premium analysis suggests an equity cost rate of 9.7%. Giving primary weight to

8   the DCF results, my recommended equity cost rate for PSWC is 9.0%.

9   **Q.   GIVEN THESE RESULTS, WHAT EQUITY COST RATE RECOMMENDATION**

10 **ARE YOU MAKING FOR PSWC?**

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

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

13 **RECOMMENDATION?**

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

15 between the return on common equity and the market-to-book ratios for the Value Line Water

16 Group.

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

18 **RATIOS FOR THE GROUP INDICATE ABOUT THE REASONABLENESS OF YOUR**

19 **9.0% RECOMMENDATION?**

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

1 for the group. The average current and projected returns on equity are 11.8% for the Value Line

2 Group I and the average market-to-book ratio for the group is 2.34. These results - current and

3 projected returns on equity in the 11-12 percent range and a market-to-book ratio of over 2.0 -

4 indicate that these companies have been earning and/or are expected to continue to earn returns on

5 equity well in excess of their equity cost rates. As such, the current and expected returns on equity

6 for these companies are clearly above the equity cost rates for these companies. These observations

7 provide clear evidence that my recommended equity cost rate of 9.0% is reasonable and fully

8 consistent with the financial performance and market valuation of water utilities.

9 **Q.   FINALLY, PLEASE DISCUSS THIS RECOMMENDATION IN LIGHT OF**

10 **RECENT YIELDS ON PUBLIC UTILITY BONDS.**

11 A.   In recent months the yields on public utility bonds have been in the 7.5-8.0 percent range.

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

13 the risk and return characteristics of bonds and stocks over the past decade. This change and its

14 implications for equity risk premiums are discussed in depth in my critique of Mr. Moul's

15 testimony. In short, the relative risk of stocks and bonds has changed in recent years as stocks have

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

17 readily evidenced by the high level of real interest rates (nominal yields minus inflation) in the

18 economy. Today, with 30-year Treasuries yielding about 6.3% and inflation of about 2.5%, the real

19 rate of interest is approximately 4.0 percent. Historically, this figure has averaged 2.0 to 3.0

20 percent. The fact that stocks and bonds are nearly equal in terms of volatility and risk implies that

1   investors' required rates of returns on stocks and bonds are much closer today than in the past.

2   Accordingly, the return premium that equity investors require over bond yields is much lower than

3   it was when stock returns were much more volatile than bond returns.

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

5   **PREMIUMS?**

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

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

8   bonds. However, recent studies suggest that the historic equity risk premium is severely biased as a

9   measure of the expected risk premium. Jeremy Siegel, a Wharton finance professor and author of

10   the popular book *Stocks for the Long Term*, recently published a study entitled "The Shrinking

11   Equity Risk Premium."[5] His concluding observations include the following:

> 12   "The degree of the equity risk premium calculated from data estimated from 1926 is
> 13   unlikely to persist in the future. The real return on fixed-income assets is likely to be
> 14   significantly higher than estimated on earlier data. This is confirmed by the yields available
> 15   on Treasury index-linked securities, which currently exceed 4%. Furthermore, despite the
> 16   acceleration in earnings growth, the return on equities is likely to fall from its historical
> 17   level due to the very high level of equity prices relative to fundamentals."
18

19   The equity risk premiums of some of the leading investment firms today support this observation.

20   A recent article in *The Economist* indicated that some of these firms are estimating an equity risk

21   premium for an average risk stock in the 2.0 to 3.0 percent range above the interest rate on U.S.

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[5] Jeremy J. Siegel, "The Shrinking Equity Risk Premium, *The Journal of Portfolio Management* (Fall, 1999), pp. 10-16.

1   Treasury bonds.[6] With a current long-term Treasury rate of 6.3% and an equity risk premium of

2   2.5% (midpoint of estimated range), this implies an equity cost rate of 8.8% for an average risk

3   stock. Given the low risk of water utilities in general and PSWC in particular, my 9.0% return on

4   equity recommendation is very fair and reasonable.

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

6   **ACCEPTED NOTION IN THE INVESTMENT WORLD?**

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

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

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

10 the following passage:[7]

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

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

20   The rise in the availability of real-time information has reduced the uncertainties and
21   thereby lowered the variances that we employ to guide portfolio decisions. At least part of
22   the observed fall in equity premiums in our economy and others over the past five years
23   does not appear to be the result of ephemeral changes in perceptions. It is presumably the
24   result of a permanent technology-driven increase in information availability, which by
25   definition reduces uncertainty and therefore risk premiums. This decline is most evident

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[6] The observation implies that the premium that investors require lower return premiums today to invest in common stocks. For example, see "Choosing the Right Mixture, *The Economist* (February 27, 1999), pp. 1-2.
[7] Alan Greenspan, "Measuring Financial Risk in the Twenty-First Century," OCC Conference, October 14, 1999.

1 in equity risk premiums. It is less clear in the corporate bond market, where relative
2 supplies of corporate and Treasury bonds and other factors we cannot easily identify have
3 outweighed the effects of more readily available information about borrowers.
4
5 The marked increase over this decade in the projected slope of technology advance, of
6 course, has also augmented expectations of earnings growth, as evidenced by the dramatic
7 increase since 1995 in security analysts' projections of long-term earnings. While it may
8 be that the expectations of higher earnings embodied in equity values have had a spillover
9 effect on discount factors, the latter remain essentially independent of the earnings
10 expectations themselves.
11
12 That equity premiums have generally declined during the past decade is not in dispute.
13 What is at issue is how much of the decline reflects new, irreversible technologies, and
14 what part is a consequence of a prolonged business expansion without a significant period
15 of adjustment. The business expansion is, of course, reversible, whereas the technological
16 advancements presumably are not."
17

18

19 **V. CRITIQUE OF PSWC'S RATE OF RETURN TESTIMONY**

20

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

22 **RECOMMENDATION.**

23 A.   As summarized below, Mr. Moul's overall rate of return recommendation is 9.57%.

Source	Capital Ratio	Cost Rate	Weighted Cost Rate
L-T Debt	51.16%	7.45%	3.81%
Preferred Stock	0.14%	4.78%	0.01%
Common Equity	48.70%	11.80%	5.75%
Cost of Capital			9.57%

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

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

2   **Q.   INITIALLY PLEASE ADDRESS MR. MOUL'S EXCLUSION OF AQUARION**

3   **AND UWR IN HIS WATER COMPANY GROUP.**

4   A.   I believe that the exclusion is inappropriate, but I have still performed an analysis both

5   including and excluding them. As I discuss below, takeovers (or the threat of takeovers) are very

6   common in the market, and cause a continual reevaluation of the risk/return trade-off for securities.

7   Mr. Moul's exclusion of these two companies in his DCF analysis (because takeovers result in

8   higher stock prices and thereby lower dividend yields and DCF equity cost rates) is totally

9   inconsistent with the fact that he has not excluded companies that may be taken over in his risk

10 premium and CAPM analyses (where takeovers result in higher stock prices and, as he measures it,

11 higher equity risk premiums).

12 **Q.   COULD YOU ALSO PLEASE EVALUATE MR. MOUL'S ASSESSMENT OF THE**

13 **RELATIVE RISK OF PSWC AND THE WATER GROUP.**

14 A.   Yes. Between pages 16 and 24 of his testimony, Mr. Moul examines the risk of PSWC

15 relative to his group of water companies. He concludes that PSWC's riskiness is on par with that of

16 the group. My evaluation of his analysis suggests that PSWC's risk is below that of the group and

17 therefore an equity cost rate determined using this group should be considered as an upper limit for

18 PSWC. In particular, PSWC's S&P business profile of '2', 'AA-' S&P bond rating, the existence of

19 DSIC, 1998 interest coverage ratio, as well as lower operating and higher internal funds ratios all

20 indicate that the riskiness of PSWC is below that of the water group.

-32-

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

2 A.   Mr. Moul estimates an equity cost rate for PSWC applying several equity cost rate models

3 to the Value Line Expended Water Group (minus Aquarion and UWR). In my direct testimony I

4 refer to this group as Value Line Group II. His equity cost rate approaches include a DCF model, a

5 comparable earnings analysis, a historic risk premium, and a Capital Asset Pricing Model (CAPM).

6   His equity cost rate estimates are summarized below:

7   Summary of Approaches and Results
8

	Risk		Comparable
DCF	Premium	CAPM	Earnings
10.72%	12.50%	12.29%	14.85%

12
13 Based on these figures, he arrives at an equity cost rate estimate for PSWC in the 11.5%-11.8%

14 range. From this range the company has selected 11.8% as its proposed rate of return on common

15 equity in this proceeding.

16   The primary errors in his equity cost rate studies are (1) a DCF growth rate of 6.0% which is

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

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

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

20 and (4) a flawed comparable earnings analysis.

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

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

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

1 dividend component of his DCF, he uses 3.80% which represents the average of the 12-month

2 (3.82%) and 6-month (3.78%) average dividend yields. He adjusts this figure upwards to 3.92% to

3 reflect expected growth over the coming year. For the growth component of the DCF, he reviews

4 historic and projected growth rate data for the group for earnings per share, dividends per share,

5 book value per share, cash flow per share, and internal growth. Based on these data, he arrives at a

6 DCF growth rate of 6.0%. The sum of the adjusted dividend yield (3.92%) and growth (6.0%) is

7 9.92%. Instead of using this figure as his DCF equity cost estimate, he makes an adjustment to

8 reflect the difference between the book value capitalization employed in the rate setting process and

9 the groups' market value capitalization. This adjustment of additional 80 basis points provides a

10 DCF equity cost estimate is 10.72%.

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

12 A.   I have two primary concerns with Mr. Moul's DCF study: (1) the growth rate of 6.0%; and

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

14 **Q.   PLEASE CRITIQUE MR. MOUL'S DCF GROWTH RATE ESTIMATE OF 6.0%.**

15 A.   The 6.0% figure is out of line with historic as well as analysts' projections of growth for the

16 Value Line Extended Water Group. Page 2 of Schedule JRW-4 provides growth rate measures for

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

18 Value Line Water Group II. These figures indicate how grossly inflated Mr. Moul's 6.00% DCF

19 growth rate is for this group.

20   Several specific observations are worth noting concerning Mr. Moul's 6.00% growth rate

1   estimate:

2   (1) Mr. Moul has ignored historic growth rate figures for the group. His historic

3   growth rate range is 1.67% to 5.94% (none are as high as 6.0%), and the average

4   is only 3.9%! This observation is especially relevant for his group since, as

5   discussed below, there are a limited number of forecasts available for these

6   firms. In addition, historic growth rate figures are provided by virtually all

7   investment firms and presumably influence investors' expectations;

8   (2) Of the sixteen historic and 5-year projected figures employed by Mr. Moul, only

9   the *Value Line* projected EPS, BVPS, and CFPS figures are as large as 6.00%.

10   The other thirteen are below 6.0%. This is significant in several ways. First,

11   *Value Line* provides projections for only four of the nine water companies,

12   therefore he is obviously giving too much weight to the forecasts for EPS,

13   BVPS, and CFPS for only 4 of the 9 companies in his group. This is

14   compounded by the fact that the projected growth for the other five companies

15   in the group is lower than that of the four covered by *Value Line*. As shown on

16   page 2 of Schedule JRW-4, the average projected 5-year EPS growth rates as

17   provided by Zacks, IBES, and First Call for these other five firms (where

18   forecasts are available) are 3.8% (3 companies), 3.5% (3 companies), and 5.0%

19   (1 company), respectively. He can only justify his 6.0% figure by placing

20   abnormally high weight on the *Value Line* EPS, BVPS, and CFPS forecasts for

1   four of his nine companies and virtually ignoring the historic and projected

2   growth for the other five firms. Second, the average *Value Line* projected

3   dividend growth rate for the group is only 3.9%. This is a figure that he

4   apparently gave no weight, which is especially significant since the relevant

5   growth variable in the DCF model is dividends! Third, *Value Line* does not

6   measure growth from the present, but it uses a three-year moving average of

7   projected growth. In this case, *Value Line* is measuring projected EPS growth

8   from a base period of 1996-1998 to 2002-2004. Obviously, going back three

9   years in the base period establishes a smaller base using historic earnings and

10   thereby inflates projected earnings growth from the present (2000). And finally,

11   these forecasts represent the opinion of only one individual analyst and are not

12   the consensus of all analysts covering these stocks; and

13   **(3)** Zacks, First Call and I/B/E/S retrieve and compile EPS forecasts from Wall

14   Street Analysts. These analysts come from both sell side (Merrill Lynch, Paine

15   Webber) and the buy side (Prudential Insurance, Fidelity Investments)

16   investment firms. It is well known that the EPS forecasts of these analysts,

17   especially those on the sell side, are overly optimistic and therefore biased

18   upwards. Page 1 of Schedule JRW-9, which comes from a study I am currently

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

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

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

2   one-year ahead forecasts;

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

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

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

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

7 A.   Between pages 29 and 45 of his testimony and in Appendix E, Mr. Moul criticizes using the

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

9 one of these one specific factor. These criticisms can be summarized as follows: (1) there are

10 problems using the DCF model in this case because the share prices of water utility stocks have

11 risen due to takeover speculation; (2) the assumptions used in the derivation of the DCF model; (3)

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

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

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

15   (1) Problems with the DCF model due to rising prices attributed to takeover speculation -

16 the share prices of water stocks have risen in 1999 for a number of reasons, part of which may be

17 the possibility of being acquired. The fact that prices rise simply means that either expected returns

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

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

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

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

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

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

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

5   robust with respect to obvious real world conditions which deviate from these assumptions. No

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

7   universally in the investment community and in utility rate-making is indicative of the robustness of

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

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

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

11 reasonable assumption. Supporting this observation is a study by Goldman, Sachs which indicates

12 that the best valuation model for public utility common stocks over a 20 year period is the DCF

13 model.[8]

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

15 <u>over time</u> - P/E ratios change constantly as new information comes to the market which causes

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

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

18 economic landscape which result in changes in equity cost rates (such as changes in interest rates or

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[8] See Robert C. Jones, "Designing Factor Models for Different Types of Stock," *Financial Analysts Journal* (March/April 1990).

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

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

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

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

5   generally accepted accounting conventions.

6   In the context of the DCF model, the fact that P/E ratios change is simply an indication that

7   new information relating to the economic environment is available and this has caused investors to

8   revalue shares. The DCF is based on expectations, and thus it is also likely that the new

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

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

11   1.0. - The market value of a firm's equity exceeds the book value of equity when the firm is

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

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

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

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

16   the DCF model produced insufficient earnings. As such, Mr. Moul's hypothesis is incorrect.

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

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

19   A.   Mr. Moul makes a specific 80 basis point adjustment to his DCF equity cost rate to account

20   for the divergence of market and book values. His adjustment is based on two procedures for

1   adjusting returns based on alternative debt/equity capitalizations: one is attributed to Miller and

2   Modigliani and the other to Hamada. In response to OCA Interrogatory IV-8, Mr. Moul provides a

3   study that he claims to support the Miller/Modigliani procedure. In the study the authors' develop

4   their classic capital structure irrelevance theory. At no point do they demonstrate or prove Mr.

5   Moul's equity cost adjustment procedure. As such, it is unnecessary. The second procedure Mr.

6   Moul uses to adjust the DCF equity cost rate approach is based on Hamada's work. This procedure

7   is not associated with DCF-based equity cost adjustments, but in fact is a common approach to

8   adjusting betas based on alternative debt/equity capitalizations when using the CAPM. I will

9   address the infirmities in Mr. Moul's CAPM analyses later in my testimony, but here it is simply

10 important to point out that this procedure has nothing to do with a DCF-based equity cost rate

11 adjustment.

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

13 A.   Mr. Moul arrives at a risk premium derived equity cost rate of 12.5% for the Company.

14 This figure includes a base yield of 7.75% and an equity risk premium of 4.75%. The equity cost

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

16 which does not reflect today's investment fundamentals.

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

18 **ANALYSIS.**

19 A.   The base yield in Mr. Moul's risk premium analysis is the prospective yield on 'A' rated

20 public utility bonds. Using the yield on these securities inflates the required return on equity for

1   PSWC in three ways: (1) As Mr. Moul acknowledges on page 18 of his testimony, the company's

2   bonds are rated 'AA-' and not 'A'; (2) Long-term bonds are subject to interest rate risk, a risk which

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

4   not fixed but tend to increase over time; and (3) The base yield in Mr. Moul's risk premium study is

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

6   means that its yield-to-maturity is above its expected return and therefore using it as a base yield

7   results in an overstatement of investors' return expectations.

8   **Q.   PLEASE REVIEW MR. MOUL'S RISK PREMIUM STUDY.**

9   A.   Mr. Moul performs a historic risk premium study which appears in Schedule 12 of Exhibit

10   4-A. This study involves an assessment of the historic difference between S&P Public Utility Index

11   stock returns and 'A' rated public utility bond returns over various time periods between the years

12   1928-1998. This type of historic evaluation of stock returns is often called the "Ibbotson approach"

13   after Professor Roger Ibbotson who popularized this method of assessing historic financial market

14   returns. Mr. Moul evaluates the stock-bond return differentials using different measures of central

15   tendency (the geometric and arithmetic means and the median) over four alternative time intervals

16   (1928-1998, 1952-1998, 1974-1998, and 1979-1998). From the results of his study (which are

17   summarized on page 2 of Schedule 12), he concludes that an appropriate risk premium for the S&P

18   Public Utilities is 5.70%. To recognize the lower risk of water utilities, he arbitrarily adjusts this

19   figure downwards to 4.75% which he uses as an equity risk premium for PSWC.

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

1 **STUDY.**

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

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

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

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

6 of expectations of the future.   At the present, using historic returns to measure the equity risk

7 premium masks the dramatic change in the risk and return relationship between stocks and bonds

8 which suggests that the equity risk premium has declined.   As discussed above, the notion that the

9 equity risk premium has declined in the 1990s, resulting in higher stock prices, is a well recognized

10 and accepted fact in today's capital markets.

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

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

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

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

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

16 Specific problems with the methodology include:

17   (A) Biased historical bond returns;

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

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

20   (D) The change in risk and return.

1   These issues will be addressed in this order.

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

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

4   expectations are realized. However, the experienced returns of bondholders in the past violates this

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

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

7   are biased upwards.

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

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

10   **METHODOLOGY.**

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

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

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

14   overstates the return experienced by investors. A study by Carleton and Lakonishok entitled "Risk

15   and Return on Equity: The Use and Misuse of Historical Estimates" demonstrates the potential

16   biases introduced by using alternative return measures. The authors make the following

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

18   buy and hold (with dividends invested) strategy."[9] Since Mr. Moul's study covers more than one

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

2 and not the arithmetic mean.

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

4 **USING THE ARITHMETIC MEAN RETURN.**

5 A.   When stock returns and earnings growth rates are reported in the financial press, they are

6 normally reported using the geometric mean. This is because of the upward bias of the arithmetic

7 mean. To demonstrate this bias, consider the following example. Assume that you have a stock

8 (that pays no dividend) that is selling for $100 today, increases to $200 in one year, and then falls

9 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%

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

11 return is $((1 * .50)^{(1/2)}) - 1 = 0\%$ per year. Hence, the arithmetic mean return suggests that your

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

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

14 is the appropriate return measure. Hence, Mr. Moul's arithmetic mean and median return measures

15 are biased and should be disregarded.

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

1 **IBBOTSON METHODOLOGY. PLEASE ELABORATE.**

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

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

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

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

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

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

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

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

10 estimates of stock returns.[10]

11   It should be noted that the assumption of monthly portfolio rebalancing, implicit in the

12 Ibbotson return computation methodology, effectively presumes a monthly investment horizon for

13 investors. This monthly rebalancing horizon is nearly impossible to replicate due to the large

14 transactions costs it would generate.

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

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

17 transaction costs. These higher transactions costs were not only the higher commissions on stock

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

1 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: (1) this method makes

6 the explicit assumption that the chosen time horizon is appropriate for estimating the current market

7 risk 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 has 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-10 shows interest rates on long-term government bonds since

12 1926.   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-10 provides the annual market risk premiums for the

14 1926 to 1997 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-10 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 above) on

4 the economy and markets, better cost and risk management by businesses - and several bond related

5 factors - deregulation of the financial system, inflation fears and interest rates, and the increase in

6 the use of debt financing. Further evidence of the greater relative riskiness of bonds is shown on

7 page 4 of Schedule JRW-10, which plots real interest rates (the nominal interest rate minus

8 inflation) from 1926 to 1997. Real rates have been well above historic norms during the past 10-15

9 years. These high real interest rates reflect the fact that investors view bonds as riskier investments.

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

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

12 declined in recent years. As such, Mr. Moul's historic market risk premium analysis is simply

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

14 **Q. HAS THIS CHANGE IN THE RISK AND RETURN RELATIONSHIP BETWEEN**

15 **STOCKS AND BONDS BEEN RECOGNIZED BY THE INVESTMENT COMMUNITY?**

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

17 leading investment strategists.[11] His study showed that the market or equity risk premium had

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

---

[11] 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   support of a lower equity risk premium is the inverse relationship between real interest rates

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

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

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

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

6   **Q.   HOW IS THE SO-CALLED NEW ECONOMY OF THE 1990S RELATED TO THE**

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

8   A.   The new economy of the 1990s has produced, as of February 1st, the longest continuous

9   period of economic growth in U.S. business history (107 months). Goldman, Sachs recently

10   published a report on the new economy entitled "The Brave New Business Cycle" and discussed its

11   implications for corporate profitability and stock market valuation. According to the report, the

12   "Brave New Business Cycle," which features longer periods of business expansion, has resulted

13   from heightened competition, globalization, deregulation, and technology. Among the implications

14   of the new business cycle are higher stock valuation levels (higher P/E ratios) due to a lower equity

15   risk premium. According to the report:[12]

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
20   assets with similar duration, such as intermediate- to long-term government bonds.
21   However, although the equity risk premium is easy to define conceptually, it is difficult to

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[12] Edward F. McKelvey, "The Brave New Business Cycle: Its Implications for Corporate Profitability," U.S. Economic Research, Goldman, Sachs & Co., p. 7.

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

10   **Q.   CAN YOU PROVIDE ADDITIONAL INSIGHT INTO THE IMPLICATIONS OF A**

11   **LOWER EQUITY RISK PREMIUM?**

12   A.   More and more market observers (including Mr. Greenspan) are identifying the lower

13   equity risk premium as a primary reason for the advance of the stock market in the 1990s. They

14   indicate that analyzing historic stock and bond returns (as Mr. Moul has) overstates the current,

15   forward-looking equity risk premium. They indicate that investors no longer view the stock market

16   to be as risky as in the past, and cite as evidence that fact that stocks and bonds are almost equally

17   volatile and (therefore almost equally risky) today. Or, in other words, the equity risk premium is

18   lower today than in the past.[13]

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

20   **ANALYSIS.**

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

22   PSWC's equity cost rate. As indicated, the base yield of 7.75% (1) includes interest rate risk, a risk

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[13] 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.

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 4.75% is based on a historic risk premium study

3   of stock and bond returns over periods of up to 70 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. As indicated, this latter point reflects a dramatic change in investment

7   fundamentals that has been well recognized by the investment community and is responsible in part

8   for the bull market for stocks in the 1990s.

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

10   **MODEL.**

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

12   Company. For the CAPM, Mr. Moul computes an equity cost rate of 11.19% using a 30-year risk-

13   free rate of 6.00%, a beta of .62, and a market or equity risk premium of 8.37%. The beta he

14   employs has been adjusted upwards for the book value/market value capitalization difference, and

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

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

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

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

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

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

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

3 **PREMIUM IN HIS CAPM APPROACH.**

4 A.   Mr. Moul performs an analysis in Schedule 13 and Appendix H to arrive at his market risk

5 premium of 8.37%. It is computed as the average of the 1926-98 results from the Ibbotson study

6 (7.5%) and Value Line's 3-5 year annual return projections (9.24%). The primary problem with this

7 approach is that both the Ibbotson study and Value Line projected return overstate the market or

8 equity risk premium.

9   Initially, it should be highlighted that Mr. Moul's CAPM study should be totally ignored due

10 to the size and direction of his equity risk premium estimate. It is very much out of line with the

11 estimates employed by leading investment banks (2-3 percent, as cited above) and, whereas Mr.

12 Moul shows an increasing equity risk premium in the 1990s, the rest of the investment world,

13 including Mr. Greenspan, believe that the equity risk premium is declining.[14]

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

15 stock and bond returns over the 1926-1998 period. The errors in using the relationship between

16 long-term historic stock and bond returns was discussed above. In short, the procedure is erroneous

17 and overstates the true market or equity risk premium. Most importantly, using long-term historic

18 returns masks the dramatic change in the risk and return relationship between stocks and bonds

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[14] 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   which suggests that the market risk premium has declined.

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

3   **PROJECTED RETURNS.**

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

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

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

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

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

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

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

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

12   database on six risk measures and arrives at a group of 33 unregulated "comparable" companies.

13   The average of the historic and projected returns on common equity for the group is 14.85%.

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

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

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

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

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

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

20   return on common equity is 50% and its market-to-book ratio is nearly 20. But, I doubt if any

1 financial analyst, including Mr. Moul, would suggest that Coca Cola's equity cost rate is 50%. I

2 have used market-to-book ratios relative to earned returns on equity as a means of testing my

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

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

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

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

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

8 A.   Yes it does.

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18   **Appendix A**

19
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21   **EDUCATIONAL BACKGROUND, RESEARCH,**

1 **AND RELATED BUSINESS EXPERIENCE**
2
3
4 **J. RANDALL WOOLRIDGE**
5
6
7   J. Randall Woolridge is a Professor of Finance and the Goldman, Sachs & Co. and Frank P. Smeal Endowed
8 Faculty Fellow in Business Administration in the College of Business Administration of the Pennsylvania State
9 University in University Park, PA. He is a Vice President of the Columbia Group, a public utility consulting firm based
10 in Ridgefield, CT. He also serves on the Investment Committee of ARIS Corporation, an asset management company
11 based in State College, PA.
12
13   Professor Woolridge received a Bachelor of Arts degree in Economics from the University of North Carolina,
14 a Master of Business Administration degree from the Pennsylvania State University, and a Doctor of Philosophy degree
15 in Business Administration (major area-finance, minor area-statistics) from the University of Iowa. At Iowa he received
16 a Graduate Fellowship and was awarded membership in Beta Gamma Sigma, a national business honorary society. He
17 has taught Finance courses at the University of Iowa and Cornell College as well as the Pennsylvania State University.
18 These courses include corporation finance, commercial and investment banking, and investments at the undergraduate
19 and graduate levels.
20
21   Professor Woolridge's research has centered on the theoretical and empirical foundations of corporation
22 finance and financial markets and institutions. He has published over 25 articles in the best academic and professional
23 journals in the field, including the *Journal of Finance,* the *Journal of Financial Economics,* and the *Harvard Business*
24 *Review.* His research has been cited extensively in the business press. His work has been featured in the *New York*
25 *Times, Forbes, Fortune, The Economist, Financial World, Barron's, Wall Street Journal, Business Week, Washington*
26 *Post, Investors' Business Daily, Worth Magazine, USA Today,* and other publications. In addition, he has provided
27 commentary on CNN's *Money Line* and CNBC's *Business Today.*
28
29   Dr. Woolridge co-authored two books that have been published in 1999 – *Spin-Offs and Equity Carve-Outs:*
30 *Achieving Faster Growth and Better Performance* (Financial Executives Research Foundation) and *The Streetsmart*
31 *Guide to Valuing a Stock* (McGraw Hill).
32
33   Professor Woolridge has consulted with and prepared research reports for private businesses, investment
34 banking firms, and government agencies (including the National Association of Security Dealers, the Federal Home
35 Loan Bank Board, and the Securities and Exchange Commission). In addition, he has directed and participated in over
36 350 company-sponsored professional development programs for executives in more than 20 countries in North and
37 South America, Europe, Asia, and Africa. His clients have included major corporations and financial institutions around
38 the world.
39
40   Dr. Woolridge has prepared testimony on behalf of the Pennsylvania Office of Consumer Advocate in the
41 following cases before the Pennsylvania Public Utility Commission: Bell Telephone Company (R-811819), Peoples
42 Natural Gas Company (R-832315), Pennsylvania Power Company (R-832409), Western Pennsylvania Water Company
43 (R-832381), Pennsylvania Power Company (R-842740), Pennsylvania Gas and Water Company (R-850178),
44 Metropolitan Edison Company (R-860384), Pennsylvania Electric Company (R-860413), North Penn Gas Company (R-
45 860535), Philadelphia Electric Company (R-870629), Western Pennsylvania Water Company (R-870825), York Water
46 Company (R-870749), Pennsylvania-American Water Company (R-880916), Equitable Gas Company (R-880971), the

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