

OCA Statement No. 1

Docket No. R-00994638

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

Pennsylvania Public Utility Commission :

v. : **Docket No. R-00994638**

Pennsylvania American Water Company :

**DIRECT TESTIMONY
OF
DR. J. RANDALL WOOLRIDGE
FOR THE
PENNSYLVANIA OFFICE OF CONSUMER ADVOCATE**

July 1999

Pennsylvania American Water Company
Docket No. R-00994638

Direct Testimony of
Dr. J. Randall Woolridge

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LIST OF SCHEDULES

<u>Schedule</u>	<u>Title</u>
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	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 Pennsylvania American Water Company ("PAWC" or
15 "Company") and to evaluate PAWC's rate of return testimony in this proceeding.

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

17 A. I have independently arrived at a cost of capital for the Company. I have established an
18 equity cost rate of 9.0% for PAWC 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 which supports my equity cost rate recommendation. Utilizing my equity cost rate, capital
21 structure ratios, and senior capital cost rates, I am recommending an overall fair rate of return for
22 the Company of 8.25%. This recommendation is summarized in Schedule JRW-1.

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

1 **RETURN POSITION.**

2 A. The Company's rate of return testimony is offered by Mr. James E. Harrison, Vice President
3 and Treasurer of PAWC. Mr. Harrison provides a recommendation for the Company's capital
4 structure, senior capital cost rates, equity cost rate, and overall rate of return. The Company's
5 proposed rate of return is inflated due to an overstated equity cost rate. Mr. Harrison's estimated
6 equity cost rate of 11.75% is unreasonably high primarily due to (1) an inflated growth rate forecast
7 he uses in his DCF equity cost rate, (2) an outdated and flawed risk premium study, and (3) an
8 unjustified 45 basis point adjustment he makes to his equity cost rate.

9

10 **II. BAROMETER GROUP SELECTION**

11

12 **Q. PLEASE DESCRIBE YOUR APPROACH TO DEVELOPING A FAIR RATE OF**
13 **RETURN RECOMMENDATION FOR PAWC.**

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

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

18 A. The group, which I refer to as the Value Line Water Group, are the six water companies
19 which are followed by the *Value Line Investment Survey*. This group includes American Water
20 Works, The Aquarion Company, California Water Service Company, E'Town Corporation,

1 Philadelphia Suburban Corp., and United Water Resources. Summary financial statistics for these
2 companies are provided on page 1 of Schedule JRW-2. On average, the group has average net
3 plant of \$1,163 million and average total revenues of \$337 million. The average pre-tax interest
4 coverage ratio for the group is 3.0X. The group has an average common equity ratio of 42.5%, and
5 a current earned return on common equity of 12.0%. The average market-to-book ratio is currently
6 1.96.

7
8 **III. CAPITAL STRUCTURE RATIOS AND DEBT COST RATES**

9
10 **Q. WHAT CAPITAL STRUCTURE RATIOS AND SENIOR CAPITAL COST RATES**
11 **ARE YOU USING TO ESTIMATE AN OVERALL RATE OF RETURN FOR PAWC?**

12 **A.** At this point, I am utilizing the Company's proposed capital structure. As shown in
13 Schedule 1 of PAWC Exhibit No. 4-A, this capital structure consists of 42.31% common equity,
14 1.37% preferred stock, and 56.32% long-term debt. In addition, I will also use the Company's
15 proposed cost rates for preferred stock of 8.04% and long-term debt of 7.69%.

16
17
18 **IV. THE COST OF COMMON EQUITY CAPITAL**

19 **A. OVERVIEW**

20

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

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

11 **Q. PLEASE PROVIDE AN OVERVIEW OF THE COST OF CAPITAL IN THE**
12 **CONTEXT OF THE THEORY OF THE FIRM.**

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

17 Normative economic models of the firm, developed under very restrictive assumptions,
18 provide insight into the relationship between firm performance or profitability, capital costs, and the
19 value of the firm. Under the economist's ideal model of perfect competition, where entry and exit is
20 costless, products are undifferentiated, and there are increasing marginal costs of production, firms

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1 produce up to the point where price equals marginal cost. Over time, a long-run equilibrium is
2 established where price equals average cost, including the firm's capital costs. In equilibrium, total
3 revenues equal total costs, and because capital costs represent investors' required return on the
4 firm's capital, actual returns equal required returns and the market value and the book value of the
5 firm's securities must be equal.

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

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

17 Fundamentally, the value of a company is determined by the cash flow it generates over time
18 for its owners, and the minimum acceptable rate of return required by capital investors. This "cost of
19 equity capital" is used to discount the expected equity cash flow, converting it to a present value. The
20 cash flow is, in turn, produced by the interaction of a company's return on equity and the annual rate
21 of equity growth. High return on equity (ROE) companies in low-growth markets, such as Kellogg,

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

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1 are prodigious generators of cash flow, while low ROE companies in high-growth markets, such as
2 Texas Instruments, barely generate enough cash flow to finance growth.
3

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

10
11 As such, the relationship between a firm's return on equity, cost of equity, and market-to-book ratio
12 is relatively straight-forward. A firm which earns a return on equity above (below) its cost of
13 equity will typically see its common stock sell at a price above (below) its book value.

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

16 A. Schedule JRW-6 provides indicators of public utility equity cost rates for recent years.
17 Page 1 gives the quarterly yields on 'A' rated public utility bonds. These yields have gradually
18 declined over the past two decades from a high of 17.0 percent range in the 1st quarter of 1982 to
19 the 7.5% range as of the middle of 1999.

20 The dividend yields for public utilities, as shown on page 2 of Schedule JRW-6 for the
21 fifteen utilities in the Dow Jones Utilities Average, have generally followed bond yields. After
22 peaking in the 12.0 percent range in 1981, these yields have declined and reached an all-time low of
23 less than 4.0% in 1998.

24 Average earned returns on common equity and market-to-book ratios are given on page 3 of
25 Schedule JRW-6. Over the past decade, earned returns on common equity have consistently been

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1 in the 11.0 - 12.0 percent range. Market-to-book ratios increased to the 1.6 range in 1993, then
2 declined to about 1.3 over the next two years, and since then have increased significantly. As of
3 1998, the market-to-book ratio for the Dow Jones Utilities hit 1.8, an all-time high.

4 The indicators in Schedule JRW-6 all suggest that capital costs for the Dow Jones Utilities
5 have decreased significantly over the years. Specifically for the equity cost rate, the significant
6 increase in the market-to-book ratio since 1995, coupled with only a small increase in the average
7 return on equity, suggests a substantial decline in the equity cost rate.

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

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

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

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

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

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

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

19 According to valuation principles, the present value of an asset equals the discounted value
20 of its expected future cash flows. Investors discount these expected cash flows at their required rate

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1 of return which, as noted above, reflects the time value of money and the perceived riskiness of the
2 expected future cash flows. As such, the cost of common equity is the rate at which investors
3 discount expected cash flows associated with common stock ownership.

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

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

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

17

18

B. DISCOUNTED CASH FLOW ANALYSIS

19

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

1 **MODEL.**

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

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$$P = \frac{D_1}{(1+k)^1} + \frac{D_2}{(1+k)^2} + \frac{D_3}{(1+k)^3} + \dots$$

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

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

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

1 following:

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

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

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

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

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

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

1 time. Estimation of expected growth is considerably more difficult. One must consider recent firm
2 performance, in conjunction with current economic developments and other information available
3 to investors, to accurately estimate investors' expectations.

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

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

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

18 A. The dividend yields on the common stock of the group are given on page 1 of Schedule

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.

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1 JRW-3 for the twelve-month period ending July 1999. Over this period, the average monthly
2 dividend yield for the group has ranged from a high of 4.3% to a low of 3.6%. The 12-month
3 average for the group is 4.0%. For the group, I will employ the average of the 12-month mean
4 (4.0%) and the July 1999 (3.6%) dividend yields, which is 3.8%.

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

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

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

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

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.

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

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

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

9 A. I will adjust the dividend yield for the Value Line Water Group by 1/2 the expected growth
10 so as to reflect growth over the coming year.

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

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

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

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

1 Initially I evaluated historic earnings, dividends, and book value per share growth rates. In addition,
2 I have utilized growth rate forecasts provided by Zacks - which compiles the earnings forecasts for
3 companies made by securities analysts -- and the *Value Line Investment Survey* - which is a very
4 well known investment information source in the U.S. Finally, I have also assessed prospective
5 growth as measured by prospective earnings retention rates and returns on average common equity.

6 **Q. PLEASE DISCUSS HISTORIC GROWTH IN EARNINGS AND DIVIDENDS AS**
7 **WELL AS INTERNAL GROWTH.**

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

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

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

6 **Q. WHAT GROWTH DATA HAVE YOU REVIEWED FOR THE GROUP OF**
7 **WATER COMPANIES?**

8 A. Schedule JRW-4 provides the following growth rates for the Value Line Water Group:
9 historic five- and ten- year historic growth rates in earnings, dividends, and book value per share as
10 computed by *Value Line* (using the *Value Line* methodology); and projected five-year EPS growth
11 rates from *Zacks* and *Value Line's* projected 5-year growth rates for earnings, dividends, and book
12 value per share.

13 **Q. PLEASE SUMMARIZE YOUR ANALYSIS OF THE HISTORIC AND**
14 **PROSPECTIVE GROWTH OF THE VALUE LINE WATER GROUP.**

15 A. Table 1 (see page 18) provides a summary of historic and prospective growth rates for the
16 Value Line Water Group. For the group, the average historic five- and ten- year earnings,
17 dividends, and book value growth is 3.4%. Prospective internal growth is 4.8%, with Value Line
18 average projected retention and equity return rates of 41% and 11.6%, respectively. Other
19 projected growth rates range from a high of 7.3% for Value Line earnings growth rate to a low of
20 3.7% for Value Line dividend growth rate. *Zacks* projected earnings rates show a mean 5-year

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1 projection of 4.6%. According to Yahoo, which covers 13 water service companies, the average
2 projected earnings growth rate for the industry over the next five years is 4.2%. The average of
3 prospective internal growth and the forecasts for growth in earnings, dividends, and book value per
4 share is 4.4%. Considering the average projections of Zacks, the Yahoo industry average, and
5 Value Line, prospective internal growth, and the historic growth rate range, expected growth
6 appears to be in the 4.5 to 5.0 percent range. Given these results, I will use the midpoint of this
7 range - 4.75% - as expected growth for the Value Line Water Group.

8 **Q. WHAT IS YOUR INDICATED COMMON EQUITY COST RATE FROM THE**
9 **DCF MODEL FOR THE VALUE LINE WATER GROUP?**

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

11 Value Line Water Group $3.80\% * 1.02375 + 4.75\% = 8.6\%$

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Table 1	
Value Line Water Group	
Growth Rate Indicators	
<u>Historic Growth</u>	
5-Year Historic EPS Growth	4.7%
5-Year Historic DPS Growth	2.9%
5-Year Historic BVPS Growth	4.3%
10-Year Historic EPS Growth	1.5%
10-Year Historic DPS Growth	3.4%
10-Year Historic BVPS Growth	3.6%
<u>Projected Growth</u>	
Prospective Internal Growth	4.8%
Projected EPS Growth (Value Line)	7.3%
Projected DPS Growth (Value Line)	3.7%
Projected BVPS Growth (Value Line)	6.0%
Projected EPS Growth (Zacks)	4.6%
Projected Industry EPS Growth (Yahoo)	4.2%

C. RISK PREMIUM APPROACH

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

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

$$k = R_f + RP$$

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

1 companies.

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

3 A. My risk premium approach is based on two fundamental economic concepts: the economic
4 theory of the firm as discussed earlier in my testimony, and the fundamental financial proposition
5 of a positive relationship between risk and return. According to economic theory, when a firm's
6 accounting profits (which include capital costs) are sufficient to meet investors' requirements, the
7 market value and the book value of the firm will be equal. Likewise, if a firm is generating
8 earnings greater (less) than required by investors, the market-to-book ratio will be greater (less)
9 than 1.0. In recent years, the market-to-book ratios for water service companies have been greater
10 than 1.0, indicating that the earnings of these companies are more than sufficient to meet investors'
11 requirements. The positive relationship between risk and return requires that, in a world of risk
12 aversion, investors require a higher expected return for a higher level of perceived risk in an
13 investment. By definition, the premium for assuming risk is based on the difference between the
14 expected return on the risky investment and the expected return on a riskless investment.

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

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

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

1 indicated by both accounting and market based rates of return. I perform the study in three steps for
2 the Value Line Water Group: (1) using the six water service companies in the group, I compute the
3 premium for risk required by investors as the expected return on equity minus the yield on long-
4 term Treasury securities; (2) I regress the risk premium for each firm on the market-to-book ratio
5 for different time periods; and (3) I add the indicated average risk premium for the water service
6 companies to the current yield on long-term Treasury securities.

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

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

1 periods, the appropriate measure of central tendency for historic returns - arithmetic mean or
2 median, or geometric mean returns - is not an issue.

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

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

8 Page 6 of Schedule JRW-5 shows the yields on long-term Treasury securities from 1996 to
9 the present. Over the first six months of 1999, these yields have been in the 5.39% to 6.31% range.
10 The current long-term bond yield (as of July 15) is 5.9%. Considering the midpoint of the range in
11 1999 and the current figure, I will utilize the 5.9% as the risk-free rate in my risk premium
12 approach.

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

14 A. As described above, I examine required rates of return as indicated by both accounting and
15 market based rates of return. My risk premium study uses expected returns (and not past returns)
16 since capital cost rates and security prices are based on expectations of the future. I perform a risk
17 premium study for Value Line Water Group. Forecasts of returns on common equity (ROE) are
18 available from the Value Line Investment Survey for these companies. I use a one-year base period
19 (1998/99) in my risk premium study. Value Line publishes individual company updates four times
20 per year. For each Value Line update, I obtain the year t, t+1 and the 3-5 year projected ROE.

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

2 The yield on long-term Treasury securities for the appropriate month comes from the *Federal*
3 *Reserve Bulletin* (or *Wall Street Journal*, depending on availability). For each company, I compute
4 the risk premium as the ROE minus the yield on long-term Treasury securities. I use three
5 definitions of expected ROE in estimating risk premiums: (1) 3-Year ROE - the expected ROE is
6 computed as the average of the projected ROEs for years t, t+1, and the 3-5 year projected ROE; (2)
7 2-Year ROE - the expected ROE is computed as the average of the ROEs for year t+1 and the 3-5
8 year projected ROE; and (3) Projected ROE - the expected ROE equals the 3-5 year projected ROE.

9 I regress the risk premium (using the alternative definitions of ROE) on the market-to-book ratio
10 for the firms in the water group. Finally, I add the indicated average risk premium to the current
11 yield on long-term Treasury securities to obtain an equity cost rate for the Company.

12 **Q. PLEASE DISCUSS SCHEDULE JRW-5.**

13 A. Page 1 of Schedule JRW-5 summarizes the results of my risk premium study. Pages 2-5
14 show the summary regression results and the data employed. The risk premium, which signifies
15 the premium investors require above the long-term Treasury yield, is derived from the regression of
16 the premiums on the market-to-book ratios and is computed as the sum of the Constant and X-
17 Coefficient.

18 For the Value Line group, the risk premium has ranged from 3.15% to 4.51% over the past
19 year. The mean risk premium over this period is 3.6 percent.

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

1 **USING THE RISK PREMIUM APPROACH?**

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

3 Value Line Group 5.90% + 3.6% = 9.5%

4

5 **D. EQUITY COST RATE SUMMARY**

6

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

8 A. My equity cost rate study is summarized in Table 2. My DCF and risk premium analyses
9 for the Value Line Water Group indicates equity cost rates of 8.6% and 9.5%. Giving primary
10 weight to the DCF results, an equity cost rate of 9.0% is indicated.

11 **Q. GIVEN THESE RESULTS, WHAT EQUITY COST RATE RECOMMENDATION**
12 **ARE YOU MAKING FOR PAWC?**

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

14 **Q. HOW DO YOU TEST THE REASONABLENESS OF YOUR 9.0%**
15 **RECOMMENDATION?**

16 A. To test the reasonableness of my 9.0% recommendation, I have examined the relationship
17 between the return on common equity and the market-to-book ratios for the Value Line Water
18 Group.

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Table 2	
Equity Cost Rate Summary	
DCF APPROACH	
<u>Value Line Water Group</u>	
Adjusted Dividend Yield	
Expected Growth	<u>4.75%</u>
DCF Equity Cost Rate	8.64%
RISK PREMIUM APPROACH	
<u>Value Line Water Group</u>	
Risk-Free Interest Rate	5.90%
Risk Premium	<u>3.56%</u>
RP Equity Cost Rate	9.46%

3.

12 **Q. WHAT DO THE RETURNS ON COMMON EQUITY AND MARKET-TO-BOOK**
 13 **RATIOS FOR THE GROUP INDICATE ABOUT THE REASONABLENESS OF YOUR**
 14 **9.0% RECOMMENDATION?**

15 **A.** Schedules JRW-2 and JRW-4 provide financial performance and market valuation statistics
 16 for the group. The average current and projected returns on equity are 12.0%/11.6% and
 17 10.9%/10.8%, respectively. The average market-to-book ratios for the group is 1.96. These results
 18 - current and projected returns on equity in the 11-12 percent range and a market-to-book ratio of
 19 almost 2.0 - indicate that these companies have been earning and/or are expected to continue to earn
 20 returns on equity well in excess of their equity cost rates. As such, the current and expected returns

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1 on equity for these companies are clearly above the equity cost rates for these companies. These
2 observations provide clear evidence that my recommended equity cost rate of 9.0% is reasonable
3 and fully consistent with the financial performance and market valuation of water utilities.

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

6 A. In recent months the yields on public utility have been in the 7.0-7.5 percent range. By
7 historical comparisons, my recommended rate of return may not appear to offer a sufficient
8 premium over this yield. However, it is important to recognize that there has been a significant
9 shift in the risk and return characteristics of bonds and stocks over the past decade. This change
10 and its implications for equity risk premiums are discussed in depth in my critique of Mr.
11 Harrison's testimony. In short, the relative risk of stock and bonds has changed in recent years as
12 stocks have become less volatile and risky while bonds have become more volatile and risky. This
13 change is readily evidenced by the high level of real interest rates (nominal yields minus inflation)
14 in the economy. Today, with 30-year Treasuries yielding about 6.0% and inflation of about 2.0%,
15 the real rate of interest is approximately 4.0 percent. Historically, this figure has averaged 2.0 to
16 3.0 percent. The fact that stocks and bonds are nearly equal in terms of volatility and risk implies
17 that investors' required rates of returns on stocks and bonds are much closer today than in the past.
18 Accordingly, the return premium that equity investors require over bond yields is much lower than

1 it was when stock returns were much more volatile than bond returns.⁴

2
3 **V. CRITIQUE OF PAWC'S RATE OF RETURN TESTIMONY**

4
5 **Q. PLEASE SUMMARIZE MR. HARRISON'S OVERALL RATE OF RETURN**
6 **RECOMMENDATION.**

7 A. As summarized below, Mr. Harrison's overall rate of return recommendation is 9.41%.

8

<u>Source</u>	<u>Capital Ratio</u>	<u>Cost Rate</u>	<u>Weighted Cost Rate</u>
L-T Debt	56.32%	7.69%	4.33%
Preferred Stock	1.37%	8.04%	0.11%
<u>Common Equity</u>	<u>42.31%</u>	<u>11.75%</u>	<u>4.97%</u>
Cost of Capital			9.41%

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15 Whereas I have adopted Mr. Harrison's capital structure and senior capital cost rates, I believe that
16 his equity cost rate is excessive and his adjustment for management efficiency is not justified.

17 **Q. PLEASE REVIEW MR. HARRISON'S EQUITY COST RATE APPROACHES.**

18 A. Mr. Harrison estimates an equity cost rate for PAWC by applying two equity cost rate
19 models to the Value Line Water Group. He performs both a DCF and a risk premium analysis. His
20 equity cost rate estimates are summarized below:

21

⁴ 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.

Summary of Approaches and Results

DCF	Risk
<u>Current/52 Week</u>	<u>Premium</u>
11.24%/10.99%	11.50%

Based on these figures, he arrives at an equity cost rate estimate for PAWC of 11.30%. He then makes a 45 basis point adjustment for company-specific factors to arrive at his overall equity cost rate recommendation of 11.75%.

The primary errors in his equity cost rate recommendation are (1) he only considers two measures of growth for the Value Line Water Group in arriving at his inflated DCF growth rate of 6.88%, (2) he has performed an outdated and biased equity risk premium study which ignores changes in investment fundamentals, and (3) he has provided inadequate justification for his 45 basis point adjustment.

Q. PLEASE SUMMARIZE MR. HARRISON'S DCF ESTIMATES.

A. Mr. Harrison performs a traditional DCF analyses. For the dividend component of his DCF, he uses both a 52-week (4.12%) and spot (4.37%) adjusted dividend yield. For the growth component of the DCF, he employs only two measures of growth: Value Line's (8.0%) and S&P's (5.8%) projected 5-year earnings per share growth rate. He then uses the average of these figures, 6.88%, as his DCF growth rate. Using the two dividend yields and the growth rate, his DCF-derived equity cost rates are 10.99% using the 52-week dividend yield and 11.24% using the spot dividend yield. He concludes that the average of these figures - 11.10% - is the appropriate DCF equity cost rate for the Value Line Water Group.

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

3 A. My primary concern with Mr. Harrison's DCF study is his growth rate methodology. As
 4 noted, he arrives at his 6.88% DCF growth rate using only Value Line and S&P projections
 5 for EPS. His 6.88% projected growth rate is excessive. Below I have reprinted Table 1
 6 from above. It shows six measures of historic growth and six measures of projected growth
 7 for the Value Line Water Group. Reviewing these figures in light of Mr. Harrison's 6.88%
 8 DCF growth rate illustrates how inflated his figure is.

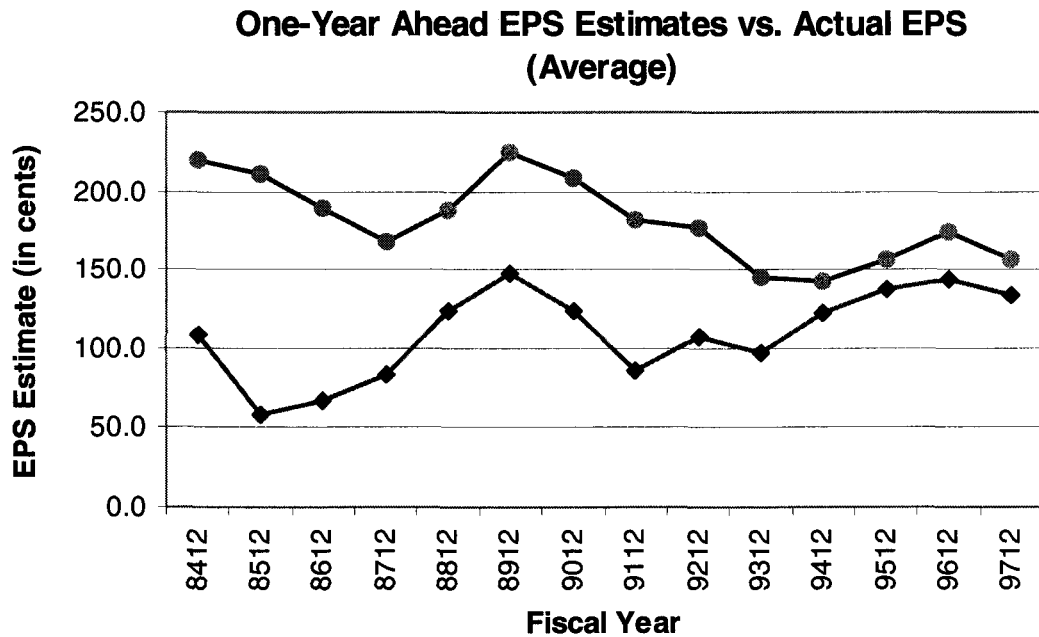
**Table 1
(Reprinted)
Value Line Water Group
Growth Rate Indicators**

<u>Historic Growth</u>	
5-Year Historic EPS Growth	4.7%
5-Year Historic DPS Growth	2.9%
5-Year Historic BVPS Growth	4.3%
10-Year Historic EPS Growth	1.5%
10-Year Historic DPS Growth	3.4%
10-Year Historic BVPS Growth	3.6%
<u>Projected Growth</u>	
Prospective Internal Growth	4.8%
Projected EPS Growth (Value Line)	7.3%
Projected DPS Growth (Value Line)	3.7%
Projected BVPS Growth (Value Line)	6.0%
Projected EPS Growth (Zacks)	4.6%
Projected Industry EPS Growth (Yahoo)	4.2%

20 Several observations are worth noting concerning these figures and Mr. Harrison's 6.88% growth

1 rate estimate:

- 2 (1) Mr. Harrison has totally ignored the historic growth rate figures for the group
3 which range from 1.5% to 4.7%. Historic growth rate figures are provided by
4 virtually all investment firms and presumably influence investors' expectations;
- 5 (2) The updated *Value Line* projected EPS figure is only 7.3% as opposed to 8.0%;
- 6 (3) Of the all the historic and projected figures, only the *Value Line* projected EPS
7 figure is as large as 6.88%. It is larger in this case because *Value Line* does not
8 measure growth from the present, but it uses a three-year moving average of
9 projected growth. In this case, *Value Line* is measuring projected EPS growth
10 from a base period of 1996-1998 to 2002-2004. Obviously, going back three
11 years in the base period establishes a smaller base using historic earnings and
12 thereby inflates projected earnings growth from the present (1999);
- 13 (4) Zacks, S&P, and I/B/E/S retrieve and compile EPS forecasts from Wall Street
14 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. It has been my experience that this bias is especially noteworthy for
19 S&P's EPS forecasts. The graph below, which comes from a study I am
20 currently doing, shows the magnitude of the bias. The top line is the analysts'



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

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

3 for the one-year ahead forecasts;

4 (5) The relevant growth variable in the DCF model is dividends. The average

5 Value Line projected dividend growth rate for the group is only 3.7%, far below

6 Mr. Harrison's 6.88%.

7 **Q. PLEASE REVIEW MR. HARRISON'S RISK PREMIUM ANALYSIS.**

8 A. Mr. Harrison arrives at a risk premium derived equity cost rate of 11.5% for the Company.

9 This figure includes a base yield of 7.50% and an equity risk premium of 4.00%. The equity cost

10 estimate is excessive due to an overstated base yield and a biased and inflated risk premium which

1 does not reflect today's investment fundamentals.

2 **Q. PLEASE DISCUSS THE BASE YIELD OF MR. HARRISON'S RISK PREMIUM**
3 **ANALYSIS.**

4 A. The base yield in Mr. Harrison's risk premium analysis is the prospective yield on the
5 Company's \$30M Medium Term Note that is to be issued this year. Using the yield on these
6 securities inflates the required return of equity investors in two ways. The primary error with using
7 this base is that medium- and long- term bonds are subject to interest rate risk, a risk which does not
8 affect common stockholders since dividend payments (unlike bond interest payments) are not fixed
9 but tend to increase over time. The bias problem of using such yields on medium-term or long-term
10 bonds in an equity risk premium study is recognized in the 1987 Ibbotson Associates yearbook:
11 "Because common stocks are not strictly comparable to bonds, horizon and default premia are
12 omitted in the analysis of the component of equity returns."⁵ The second reason that this base yield
13 is inflated is that the expected return on a note or bond subject to credit risk is above its yield-to-
14 maturity and, hence, overstates investors' return expectations.

15 **Q. PLEASE EVALUATE MR. HARRISON'S RISK PREMIUM STUDIES.**

16 A. Mr. Harrison performs two historic risk premium studies. The results are provided in
17 Schedule 6. One study represents an analysis of historic stock and bond returns for the S&P Public
18 Utilities. This study involves an assessment of the historic difference between S&P Public Utility

⁵ See Ibbotson Associates, *Stocks, Bonds, Bills, and Inflation: 1987 Yearbook* (Chicago: Ibbotson Associates, 1987), p. 53.

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1 Index stock returns and 'A' rated public utility bond returns over the years 1928-1998. This type of
2 evaluation is sometimes called the "Ibbotson methodology." This study suggests a historic equity
3 risk premium of 5.45% using the arithmetic mean return and of 3.61% using the geometric mean
4 return.

5 Mr. Harrison's second risk premium study is a comparison of the historic difference
6 between the annual stock returns for the Value Line Water Group and the returns on 'A' rated public
7 utility bonds. The time period for this study is 1988-1998. This study indicates a historic equity
8 risk premium of 4.94% using the arithmetic mean return and of 4.18% using the geometric mean
9 return.

10 Using the historic relationship between stock and bond returns is erroneous and overstates
11 the true market equity risk premium. In particular, using historic returns masks the dramatic change
12 in the risk and return relationship between stocks and bonds which suggests that the market risk
13 premium has declined.

14 **Q. PLEASE DISCUSS THE ERRORS IN USING HISTORIC STOCK AND BOND**
15 **RETURNS TO ESTIMATE AN EQUITY RISK PREMIUM.**

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

1 Specific problems with the methodology include:

- 2 (A) Biased historical bond returns;
- 3 (B) The arithmetic versus the geometric mean return;
- 4 (C) Unattainable and biased stock historical returns; and
- 5 (D) The change in risk and return.

6 These issues will be addressed in this order.

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

8 A. An essential assumption of these studies is that over long periods of time investors'
9 expectations are realized. However, the experienced returns of bondholders in the past violates this
10 critical assumption. As indicated in the 1987 Ibbotson yearbook, historic bond returns are biased
11 downward as a measure of expectancy because of capital losses suffered by bondholders over the
12 period.⁶ As such, risk premiums derived from this data are biased upwards.

13 **Q. PLEASE DISCUSS THE ISSUE RELATING TO THE USE OF THE**
14 **ARITHMETIC VERSUS THE GEOMETRIC MEAN RETURNS IN THE IBBOTSON**
15 **METHODOLOGY.**

16 A. The measure of investment return has a significant effect on the interpretation of the risk
17 premium results. When analyzing a single security price series over time (i.e., a time series), the
18 best measure of investment performance is the geometric mean return. Using the arithmetic mean

⁶ See Ibbotson Associates, *Stocks, Bonds, Bills, and Inflation: 1987 Yearbook* (Chicago: Ibbotson Associates, 1987), p. 91.

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1 overstates the return experienced by investors. A study by Carleton and Lakonishok entitled "Risk
2 and Return on Equity: The Use and Misuse of Historical Estimates" demonstrates the potential
3 biases introduced by using alternative return measures. The authors make the following
4 observation: "The geometric mean measures the changes in wealth over more than one period on a
5 buy and hold (with dividends invested) strategy."⁷ Since Mr. Harrison is using two studies which
6 both cover more than one period (and he assumes that dividends are reinvested), he should be
7 employing the geometric mean and not the arithmetic mean.

8 **Q. PLEASE PROVIDE AN EXAMPLE DEMONSTRATING THE PROBLEM WITH**
9 **USING THE ARITHMETIC MEAN RETURN.**

10 A. When stock returns and earnings growth rates are reported in the financial press, they are
11 normally reported using the geometric mean. This is because of the upward bias of the arithmetic
12 mean. To demonstrate this bias, consider the following example. Assume that you have a stock
13 (that pays no dividend) that is selling for \$100 today, increases to \$200 in one year, and then falls
14 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%

⁷ 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.

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

7 **Q. YOU NOTE THAT HISTORIC STOCK RETURNS ARE BIASED USING THE**
8 **IBBOTSON METHODOLOGY. PLEASE ELABORATE.**

9 A. Returns developed using Ibbotson's methodology (1) cannot be reflective of expectations
10 because these returns are unattainable to investors, and (2) produce biased results. This
11 methodology assumes (a) monthly portfolio rebalancing and (b) reinvestment of interest and
12 dividends. Monthly portfolio rebalancing presumes that investors rebalance their portfolios at the
13 end of each month so as to have an equal dollar amount invested in each security at the beginning
14 of each month. The assumption would obviously generate extremely high transactions costs and, as
15 such, these returns are unattainable to investors. In addition, an academic study demonstrates that
16 the monthly portfolio rebalancing assumption produces biased estimates of stock returns.⁸

17 It should be noted that the assumption of monthly portfolio rebalancing, implicit in the
18 Ibbotson return computation methodology, effectively presumes a monthly investment horizon for

⁸ See Richard Roll, "On Computing Mean Returns and the Small Firm Premium," *Journal of Financial Economics* (1983), pp. 371-86.

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1 investors. This monthly rebalancing horizon is nearly impossible to replicate due to the large
2 transactions costs it would generate.

3 **Q. FINALLY, PLEASE DISCUSS THE NOTION THAT MR. HARRISON'S RISK**
4 **PREMIUM STUDIES DO NOT REFLECT THE CHANGE IN RISK AND RETURN IN**
5 **TODAY'S FINANCIAL MARKETS.**

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

12 Page 1 of Schedule JRW-9 shows interest rates on long-term government bonds since 1926.
13 Obviously, the interest rate levels of the past twenty years are significantly above those of the
14 previous 50 years. Page 2 of Schedule JRW-9 provides the annual market risk premiums for the
15 1926 to 1997 period where the annual premium is defined as the return on common stock minus the
16 return on long-term Treasury Bonds. There is considerable variability in this series and a clear
17 decline in recent decades. The high was 54% in 1933 and the low was -38% in 1931. Clear
18 evidence of a change in the relative riskiness of bonds and stocks is provided on page 3 of Schedule

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1 JRW-9 which plots the standard deviation of annual stock and bond returns since 1926. The plot
2 shows that, whereas stock returns were much more volatile than bond returns from the 1920s to the
3 1970s, bond returns became more variable than stock returns during the 1980s. In recent years
4 stocks and bonds have been almost equally volatile. The increase in the relative volatility of bonds
5 has been attributed to several factors, including greater economic volatility, deregulation of the
6 financial system and the increase in the use of debt financing. Further evidence of the greater
7 relative riskiness of bonds is shown on page 4 of Schedule JRW-9, which plots real interest rates
8 (the nominal interest rate minus inflation) from 1926 to 1997. Real rates have been well above
9 historic norms during the past 10-15 years. These high real interest rates reflect the fact that
10 investors view bonds as riskier investments.

11 The net effect of the change in risk and return has been a significant decrease in the return
12 premium that stock investors require over bond yields. In short, the market risk premium has
13 declined in recent years. As such, Mr. Harrison's historic market risk premium analysis is simply
14 outdated and not reflective of current investor expectations and investment fundamentals.⁹

15 **Q. HAS THIS CHANGE IN THE RISK AND RETURN RELATIONSHIP BETWEEN**
16 **STOCKS AND BONDS BEEN RECOGNIZED BY THE INVESTMENT COMMUNITY?**

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

⁹ While Mr. Harrison's second risk premium study using the Value Line Water Group covers a shorter historic time period, it is highly unlikely to be reflective of investor expectations since it covers a ten-year period which ranks among the very best in terms of stock market performance.

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1 leading investment strategists.¹⁰ His study showed that the market or equity risk premium had
2 declined to the 2.0 to 3.0 percent range by the early 1990s. Among the evidence he provided in
3 support of a lower equity risk premium is the inverse relationship between real interest rates
4 (observed interest rates minus inflation) and stock prices. He noted that the decline in the market
5 risk premium has led to a significant change in the relationship between interest rates and stock
6 prices. One implication of this development was that stock prices had increased higher than would
7 be suggested by the historic relationship between valuation levels and interest rates.

8 **Q. DOES THE RECOGNITION OF A LOWER EQUITY RISK PREMIUM EXTEND**
9 **TO TODAY'S STOCK MARKET?**

10 A. Yes. Goldman, Sachs has recently published a report on the "Brave New Business Cycle"
11 of the 1990s and its implications for corporate profitability and stock market valuation. According
12 to the report, the "Brave New Business Cycle," which features longer periods of business
13 expansion, has resulted from heightened competition, globalization, deregulation, and technology.
14 Among the implications of the new business cycle is higher stock valuation levels (higher P/E
15 ratios) due to a lower equity risk premium. According to the report:¹¹

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

¹⁰ 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).

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

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

12 **Q. CAN YOU PROVIDE ADDITIONAL INSIGHT INTO THE IMPLICATIONS OF A**
13 **LOWER EQUITY RISK PREMIUM?**

14 A. More and more market observers are identifying the lower equity risk premium as a primary
15 reason for the advance of the stock market in the 1990s. They indicate that analyzing historic stock
16 and bond returns (as Mr. Harrison has) overstates the current, forward-looking equity risk premium.
17 They indicate that investors no longer view the stock market to be as risky as in the past, and cite
18 as evidence that fact that stocks and bonds are almost equally volatile and (therefore almost equally
19 risky) today. Or, in other words, the equity risk premium is lower today than in the past.¹²

20 **Q. PLEASE SUMMARIZE YOUR ASSESSMENT OF MR. HARRISON'S RISK**
21 **PREMIUM ANALYSIS.**

22 A. Mr. Harrison's risk premium studies and analysis is erroneous and should be disregarded in
23 estimating PAWC's equity cost rate. As indicated, the base yield of 7.50% (1) includes interest rate

¹² 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.

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1 risk, a risk not generally faced by equity investors, and (2) is above investors' expected return on
2 medium-term public utility bonds. The equity risk premium of 4.0% is based on two historic risk
3 premium studies of stock and bond returns over periods of up to 70 years that (1) erroneously use
4 the arithmetic and not the geometric mean, (2) employ biased and unattainable stock and bond
5 returns, and (3) most importantly, masks the change in the relative risk of stocks and bonds and the
6 resulting decline in the equity risk premium. As indicated, this latter point reflects a dramatic
7 change in investment fundamentals that has been recognized by the investment community and is
8 responsible in part for the bull market for stocks in the 1990s.

9 **Q. PLEASE DISCUSS MR. HARRISON'S EQUITY COST ADJUSTMENT.**

10 A. The average of Mr. Harrison's DCF and risk premium studies is 11.3%. He has
11 recommended an equity cost rate for the Company of 11.75%, which represents a 45 basis point
12 upward adjustment. He argues that this adjustment is appropriate for three reasons: (1) the impact
13 of the Company's sales erosion, (2) the Commission's practice of reducing the revenue requirement
14 to reflect consolidated tax savings, and (3) a reward to the Company for acquiring small water
15 systems.

16 **Q. HOW HAS MR. HARRISON'S JUSTIFIED THIS 45 BASIS POINT**
17 **ADJUSTMENT, AND IS THE ADJUSTMENT WARRANTED?**

18 A. Mr. Harrison has not justified or quantified this adjustment in any way in his testimony. It
19 is totally arbitrary. Absent a quantified justification for these factors, he is simply asking the

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1 Commission to make an ad hoc adjustment to his estimated equity cost rate.

2 In fact, these factors are actually revenue and expense items that, as opposed to providing a
3 revenue/expense justification for, he has chosen to seek rate relief through an ad hoc adjustment to
4 the allowed return on equity.

5 With regards to the sales erosion issue, the purpose of applying a rate of return to the rate
6 base in regulation is to provide adequate earnings to cover the cost of capital. Thus, the key issue is
7 the amount of earnings and not the amount of sales that are needed to cover capital costs. As part of
8 its current filing, the Company has made its case on revenues and expenses. If sales erosion will
9 affect earnings over the future test year, the issue involves revenues and expenses and not rate of
10 return.

11 The second issue involves consolidated tax savings. Again, this issue revolves around
12 revenues and expenses and not rate of return. The textbook treatment for calculating the cost of
13 capital for a company includes multiplying the cost of debt by one minus the tax rate to reflect the
14 fact that interest payments are tax deductible and therefore the after-tax cost of debt is effectively
15 lower. As taxpayers, we understand this concept when we can deduct the interest on our mortgage
16 in computing our tax liability. In determining revenue requirements in setting service rates, it is the
17 Commission's policy to recognize this tax-shielding effect of interest payments not as an
18 adjustment to the debt cost rate but instead as an adjustment to the revenue requirement.

19 The final equity cost adjustment issue involves a reward to PAWC for acquiring small
20 water systems. This request is not substantiated in any way. According to Pennsylvania statute and

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1 the Commission's policy, of course, the premiums paid in water company acquisitions are included
2 in rate base and amortized over a reasonable period of time to provide earnings to cover the costs of
3 small water company acquisitions. As such, the Company does recover the dilutive element of
4 these acquisitions through the ratemaking process and, through the DSIC, can recover capital
5 investments on a timely basis.

6 **Q. MR. HARRISON ARGUES THAT THIS ADJUSTMENT IS NECESSARY TO**
7 **MAINTAIN PAWC'S CREDIT WORTHINESS. DO YOU AGREE?**

8 A. No. The Commission has taken steps in many areas to ensure the credit worthiness of water
9 companies in the Commonwealth and therefore unsupported ad hoc equity cost rate adjustments are
10 not necessary. In fact, the Commission's policies, as they pertain to the credit worthiness of
11 PAWC, were highlighted in a July 1998 S&P Utility Credit Report on PAWC which may be found
12 in PAWC Exhibit 3-H (Response to Question No. 4, at page 59):

13 The PPUC is considered progressive and supportive of PAWC's credit quality. Favorable ratemaking principles
14 include using a future-test year methodology, which helps minimize lags in recovering fixed and operating
15 costs, and the allowance to recover acquisition premiums of smaller, troubled systems. Recognizing the rising
16 cost of water service and the need to rehabilitate aging water mains, the PPUC recently approved the allowance
17 of a Distribution System Improvement Charge (DSIC). This mechanism allows water companies to recover
18 capital costs, return on equity, and depreciation related to certain infrastructure improvements via an additional
19 charge on a customer bill. The surcharge is believed to be the first of its kind in the water industry.
20

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

22 A. Yes it does.

Appendix A

EDUCATIONAL BACKGROUND, RESEARCH,
AND RELATED BUSINESS EXPERIENCE

J. RANDALL WOOLRIDGE

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

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

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

Dr. Woolridge co-authored two books that have been published in 1999 – *Spin-Offs and Equity Carve-Outs: Achieving Faster Growth and Better Performance* (Financial Executives Research Foundation) and *The Streetsmart Guide to Valuing a Stock* (McGraw Hill).

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

Dr. Woolridge has prepared testimony on behalf of the Pennsylvania Office of Consumer Advocate in the following cases before the Pennsylvania Public Utility Commission: Bell Telephone Company (R-811819), Peoples Natural Gas Company (R-832315), Pennsylvania Power Company (R-832409), Western Pennsylvania Water Company

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