AP STATEMENT NO. 4

AQUA PENNSYLVANIA, INC.

Docket No. R-2011-2267958

DIRECT TESTIMONY OF PAUL R. MOUL WITH REGARD TO COST OF CAPITAL

BEFORE THE

PENNSYLVANIA PUBLIC UTILITY COMMISSION

November 18, 2011

Aqua Pennsylvania, Inc.
Direct Testimony of Paul R. Moul
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GLOSSARY OF ACRONYMS AND DEFINED TERMS	
ACRONYM	**DEFINED TERM**
AFUDC	Allowance for Funds Used During Construction
AA	Aqua America, Inc.
AP	Aqua Pennsylvania, Inc.
b	Represents the retention rate that consists of the fraction of earnings that are not paid out as dividends
β	Beta
b x r	Represents internal growth
CAPM	Capital Asset Pricing Model
CCR	Corporate Credit Rating
CE	Comparable Earnings
CWIP	Construction Work in Progress
DCF	Discounted Cash Flow
DDBP	Disinfectants/Disinfection By-Products
EPA	Environmental Protection Agency
ESWTR	Enhanced Surface Water Treatment Rule
FOMC	Federal Open Market Committee
g	Growth rate
GAAP	Generally Accepted Accounting Principles
GDP	Gross Domestic Product
IDB	Industrial Development Bonds
IGF	Internally generated funds
Lev	Leverage modification
M&A	Merger and Acquisition
MTBE	Methyl Tertiary Butyl Ether
MTN	Medium Term Notes
PPUC	Pennsylvania Public Utility Commission
r	Represents the expected rate of return on common equity

GLOSSARY OF ACRONYMS AND DEFINED TERMS	
ACRONYM	**DEFINED TERM**
Rf	Risk-free rate of return
Rm	Market return
Rm-Rf	Market premium
RP	Risk Premium
s	Represents the new common shares expected to be issued by a firm
s x v	Represents external growth
S&P	Standard & Poor's
SDWA	Safe Drinking Water Act Amendments of 1996
v	Represents the value that accrues to existing shareholders from selling stock at a price different from book value.

DIRECT TESTIMONY OF PAUL R. MOUL

INTRODUCTION AND SUMMARY OF RECOMMENDATIONS

1. Q. PLEASE STATE YOUR NAME, OCCUPATION AND BUSINESS ADDRESS.

A. My name is Paul Ronald Moul. My business address is 251 Hopkins Road, Haddonfield, New Jersey 08033-3062. I am Managing Consultant at the firm P. Moul & Associates, an independent financial and regulatory consulting firm. My educational background, business experience and qualifications are provided in Appendix A that follows my direct testimony.

2. Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. My testimony presents evidence, analysis and a recommendation concerning the appropriate cost of equity and overall rate of return that the Pennsylvania Public Utility Commission ("PPUC" or the "Commission") should recognize in the determination of the revenues that Aqua Pennsylvania, Inc. ("AP" or the "Company") should realize as a result of this proceeding. My analysis and recommendation are supported by the detailed financial data contained in AP Exhibit 4-A, which is a multi-page document divided into thirteen (13) schedules. Additional evidence, in the form of appendices, follows my direct testimony. The items covered in these appendices provide additional detailed information concerning the explanation and application of the various financial models upon which I rely.

3. Q. BASED UPON YOUR ANALYSIS, WHAT IS YOUR CONCLUSION CONCERNING THE APPROPRIATE RATE OF RETURN FOR THE COMPANY?

A. Based upon my independent analysis, my conclusion is that the Company should be afforded an opportunity to earn a rate of return on common equity of 11.75%. The Company has proposed an 11.75% rate of return on common equity, which

consists of an 11.50% cost of equity plus twenty-five basis points (i.e., 0.25%) in recognition of the exemplary performance of its management, as a provider of high quality customer service and as a leader in the consolidation of small troubled water companies in Pennsylvania. The rate of return on common equity proposed in this case is within the range of returns indicated by the various models of the cost of equity that I have determined. As shown on Schedule 1, I have provided the weighted average cost of capital, which includes my recommended rate of return on common equity. The calculation of the weighted average cost of capital, which is 8.77% for the future test year, requires the selection of appropriate capital structure ratios and a determination of the cost rate for each capital component. In the case of the capital structure ratios, the components are projected based upon the future test year ending June 30, 2012. The resulting overall cost of capital is the product of weighting the individual capital costs by the proportion of each respective type of capital. The resulting weighted average cost of capital must provide a compensatory level of return for the use of capital and to provide the Company with the ability to attract capital on reasonable terms.

4. Q. WHAT BACKGROUND INFORMATION CONCERNING THE COMPANY HAVE YOU CONSIDERED AS PART OF YOUR TESTIMONY?

A. At June 30, 2011, AP provided water service to 405,571 customers in the five counties that comprise the Philadelphia suburbs, as well as in twenty-four (24) additional counties in the northwestern, central, and Pocono Mountains regions of Pennsylvania. The Company meets its customers' needs from surface and ground water supplies and from purchases.

AP has taken a leadership position in the consolidation of separate water

utility systems throughout Pennsylvania. The Company's first major acquisition occurred in 1985 with the purchase of the assets of Great Valley Water Company; AP has completed 124 acquisitions since 1995. Some of these acquisitions included multiple systems.

The benefits of regionalization accrue to all of the Company's constituencies -- new customers benefit from the Company's management expertise which enhances service reliability and water quality of the acquired systems; existing customers benefit from the economies of scale derived from adding new customers; the Company's employees benefit from a wider scope of responsibilities and opportunities for professional development; and investors benefit from the additional growth obtained by Aqua America, Inc. ("AA"), the parent company of AP.

5. Q. IN YOUR OPINION, WHAT FACTORS SHOULD THE COMMISSION CONSIDER WHEN DETERMINING THE COMPANY'S COST OF CAPITAL IN THIS PROCEEDING?

A. The Commission should consider the ratesetting principles that I have set forth in Appendix B. In this regard, the Commission's rate of return allowance must be set to cover the Company's interest and dividend payments, provide a reasonable level of earnings retention, produce an adequate level of internally generated funds to meet capital requirements, be commensurate with the risk to which the Company's capital is exposed, support reasonable credit quality, and allow the Company to raise capital on reasonable terms.

6. Q. HOW HAVE YOU DETERMINED THE COST OF EQUITY FOR THE COMPANY?

A. My recommended cost of equity was developed using capital market and financial

data relied upon by investors when assessing the relative risk, and hence cost of equity, for a water utility, such as AP. In analyzing the Company's cost of equity, I have relied on four well-recognized measures: the Discounted Cash Flow ("DCF") model, the Risk Premium ("RP") analysis, the Capital Asset Pricing Model ("CAPM"), and the Comparable Earnings ("CE") approach. By considering the results of a variety of approaches, my analysis is consistent with well-recognized principles for determining a fair rate of return. I have measured the cost of equity for the Company using data from a proxy group of nine (9) water companies that are identified on page 2 of Schedule 3. I will refer to my proxy group of nine water companies as the "Water Group."

7. Q. HOW HAVE YOU PERFORMED YOUR COST OF EQUITY ANALYSIS WITH THE MARKET DATA FOR THE WATER GROUP?

A. I have applied the models/methods for estimating the cost of equity using the average data for the Water Group. I have not measured separately the cost of equity for the individual companies within the Water Group, because the determination of the cost of equity for an individual company has become increasingly problematic. By employing group average data, rather than individual company analysis, I have helped to minimize the effect of extraneous influences on the market data for an individual company.

8. Q. PLEASE SUMMARIZE THE BASIS FOR YOUR COST OF EQUITY RECOMMENDATION IN THIS PROCEEDING.

A. My recommendation is derived from the results of the four methods/models previously identified. In general, the use of more than one approach provides a superior foundation to arrive at the cost of equity. At any point in time, any single

method can provide an incomplete measure of the cost of equity depending upon extraneous factors which may influence market sentiment. The specific application of these methods/models will be described later in my testimony.

The following table provides a summary of the indicated costs of equity using each of these approaches.

	Water Group
DCF	10.58%
Risk Premium	11.00%
CAPM	12.91%
Comparable Earnings	11.90%
Average	11.60%
Median	11.45%
Mid-point	11.75%

An average of the results of the DCF, Risk Premium and CAPM models is 11.50% (10.58% + 11.00% + 12.91% = 34.49% ÷ 3). An 11.75% rate of return on common equity, which contains recognition of exemplary management performance, falls at the midpoint of the overall range.

The exemplary performance of the Company's management is described in the direct testimony of Mr. Smeltzer. Mr. Smeltzer describes the many initiatives that the Company has undertaken, which have produced high quality service at reasonable prices. In recognition of its outstanding performance and its goal of maintaining reasonably priced water service, the Company should be granted an opportunity to earn an 11.75% rate of return on common equity.

WATER UTILITY RISK FACTORS

9. Q. PLEASE IDENTIFY SOME OF THE RISK FACTORS WHICH IMPACT THE WATER UTILITY INDUSTRY.

A. The business risk of the water utilities has been strongly influenced by water quality concerns. The Safe Drinking Water Act Amendments of 1996 ("SDWA"), which re-authorized the SDWA for the second time since its original passage in 1974, instituted policies and procedures governing water quality. Significant aspects of the 1996 Act provide that the federal Environmental Protection Agency ("EPA"), in conjunction with other interested parties, will develop a list of contaminants for possible regulation and must update that list every 5 years. From that list, EPA must select at least five contaminants and determine whether to regulate them. This process must be repeated every five years. The EPA may bypass this process and adopt interim regulations for contaminants which pose an urgent health threat. The headlines surrounding per chlorate, NDMA and MTBE contamination and the regulation of arsenic are cases-in-point.

The current priorities of the EPA include regulations directed to: microbial, disinfectants and disinfection byproducts, per chlorate and other emerging contaminants such as pharmaceuticals, lead and copper, and radio nuclides. The regulations which emanate from the EPA concerning certain potentially hazardous substances noted above, together with the Federal Clean Water Act and the Resource Conservation and Recovery Act, bear upon the risk of all water utilities. Most of these regulations affect the entire water industry in contrast with certain regulations issued pursuant to the Clean Air Act, which may impact only selected electric utilities. Other business risks relate to the adverse effects of global climate

change. This business risk factor, together with the important role that water service facilities play within the infrastructure, underscores the public policy concerns which are focused on the water utilities. Moreover, since September 11, 2001, water utilities are operating on heightened alert to protect drinking water supplies. Water utilities have taken additional security safeguards including (i) limiting access to treatment and storage facilities, (ii) conducting additional testing and monitoring, (iii) reassessing security procedures and systems, and (iv) providing additional training to their personnel.

10. Q. HOW DO THESE ISSUES IMPACT THE WATER UTILITY INDUSTRY?

A. The Company must conform its operations to the requirements of the SDWA, and comply with the lead and copper rule, the Disinfectants/Disinfection By-Products ("DDBP") rule, and other contaminant standards. Managers of water utilities have in the past and will in the future focus increased attention on environmental and related regulatory issues. Drinking water quality has also received heightened attention out of concern over the integrity of the source of supply which is often threatened by changing land use and the permissible level of discharged contaminants established by state and federal agencies, and now potential threats from terrorists. Moreover, water companies have experienced increased water treatment and monitoring requirements and escalating costs in order to comply with the increasingly stringent regulatory requirements noted above. Chemical costs have also been affected as a result of general increases in commodity prices. Water utilities may also be required to expend resources to undertake research and employ technological innovations to comply with potential regulatory requirements. These factors are symptomatic of the changing business risk faced

by water utilities.

11. Q. ARE THERE OTHER FACTORS THAT INFLUENCE THE BUSINESS RISK OF WATER UTILITIES?

A. Yes. Being the sole purveyor of potable water from an established infrastructure does not insulate a water utility's operations from general business conditions, regulatory policy, the influence of weather, and customers' usage habits. It is also important to recognize that water companies face higher degrees of capital intensity than other utilities, more costly waste disposal requirements, and threats to their sources of supply. Notably, the Company's investment in net plant is 5.16 times its revenue, as compared to the Water Group's investment in net plant which is 3.57 times its revenue.

12. Q. ARE THERE OTHER STRUCTURAL ISSUES WHICH AFFECT THE BUSINESS RISK OF WATER UTILITIES?

A. Yes. As noted above, the high fixed costs of water utilities makes earnings vulnerable to significant variations when usage fluctuates with weather, the economy, and customer conservation efforts. Conservation efforts can take the form of low water usage clothes washers, toilets and shower heads, and other reductions due to changes in usage. While the wise use of water is always the objective, the business risk of the water utility industry can be affected by increased customer awareness of conservation. Moreover, current building standards have mandated the use of fixtures which must comply with more stringent water use requirements.

13. Q. HOW IS THE COMPANY'S RISK PROFILE AFFECTED BY ITS CONSTRUCTION PROGRAM?

A. The Company is engaged in a continuing capital expenditure program necessary to meet the needs of its customers and to comply with various regulations. For the future, the Company expects its capital expenditures to be:

Year	Capital Expenditures
2011	$ 253,237,000
2012	211,274,000
2013	245,102,000
2014	212,954,000
2015	210,011,000
Total	$1,132,578,000

The Company's total capital expenditures over the next five years will represent approximately 58% ($1,132,578,000 ÷ $1,956,152,000) of its net utility plant in service at December 31, 2010. As previously noted, a fair rate of return for the Company represents a key to a financial profile that will provide the Company with the ability to raise the capital necessary to meet its capital needs on reasonable terms.

14. Q. HOW SHOULD THE COMMISSION RESPOND TO THE EVOLVING BUSINESS RISK FACING THE COMPANY?

A. The Company is faced with the requirement to invest in new facilities and to maintain and upgrade existing facilities in its service territory. Where substantial ongoing capital investment is required to meet the high quality of product and service that customers demand, supportive regulation is absolutely essential.

FUNDAMENTAL RISK ANALYSIS

15. Q. IS IT NECESSARY TO CONDUCT A FUNDAMENTAL RISK ANALYSIS TO PROVIDE A FRAMEWORK FOR A DETERMINATION OF A UTILITY'S COST OF

EQUITY?

A. Yes. It is necessary to establish a company's relative risk position within its industry through a fundamental analysis of various quantitative and qualitative factors that bear upon investors' assessment of overall risk. The qualitative factors have already been discussed. The quantitative risk analysis follows. The items that influence investors' evaluation of risk and their required returns are described in Appendix C. For this purpose, I have compared the Company to the S&P Public Utilities, an industry-wide proxy consisting of various public utility endeavors, and the Water Group.

16. Q. WHAT ARE THE COMPONENTS OF THE S&P PUBLIC UTILITIES?

A. The S&P Public Utilities is a widely recognized index which is comprised of electric power and natural gas companies. These companies are identified on page 3 of Schedule 4.

17. Q. WHAT CRITERIA HAVE YOU EMPLOYED TO ASSEMBLE YOUR WATER GROUP?

A. The Water Group companies have the following common characteristics: (i) they are listed in the "Water Utility Industry" section (basic and expanded) of The Value Line Investment Survey, (ii) their stock is publicly traded, and (iii) they are not currently the target of a publicly-announced merger or acquisition. In assembling my Water Group, I included companies from the basic Value Line survey, i.e., American States Water, American Water Works, Aqua America, California Water Service, and SJW Corporation and the expanded edition of Value Line, i.e., Artesian Resources, Connecticut Water Service, Middlesex Water, and York Water Co. It would be inappropriate to include a company that is a target of a takeover in

a proxy group because the stock price of that company would not reflect its underlying fundamentals.

18. Q. IS KNOWLEDGE OF A UTILITY'S CREDIT QUALITY RATING AN IMPORTANT FACTOR IN ASSESSING ITS RISK AND COST OF CAPITAL?

A. Yes. Knowledge of a company's credit quality rating is important because the cost of each type of capital is directly related to the associated risk of the firm. So while a company's credit quality risk is shown directly by the rating and yield on its bonds, these relative risk assessments also bear upon the cost of equity. This is because a firm's cost of equity is represented by its borrowing cost plus compensation to recognize the higher risk of an equity investment compared to debt.

19. Q. HOW DO THE CREDIT QUALITY RATINGS COMPARE FOR AP, THE WATER GROUP, AND THE S&P PUBLIC UTILITIES?

A. The corporate credit quality ("CCR") rating for AP is A+ from S&P. The average CCR from Standard & Poor's Corporation ("S&P") is A for the Water Group and Long Term ("LT") issuer rating from Moody's is A3 for the Water Group. The CCR designation by S&P and LT issuer rating by Moody's focuses upon the credit quality of the issuer of the debt, rather than upon the debt obligation itself. For the S&P Public Utilities, the average composite rating is BBB+ by S&P and Baa1 by Moody's. Many of the financial indicators that I will subsequently discuss are considered during the rating process.

20. Q. HOW DO THE FINANCIAL DATA COMPARE FOR AP, THE WATER GROUP, AND THE S&P PUBLIC UTILITIES?

A. The broad categories of financial data that I will discuss are shown on Schedules 2,

3, and 4. The data cover the five-year period 2006-2010. The important categories of relative risk may be summarized as follows:

Size. In terms of capitalization, the Company is fairly similar to the average size of the Water Group. The average size of the S&P Public Utilities is, however, many times larger than the Water Group and AP. All other things being equal, a smaller company is riskier than a larger company because a given change in revenue and expense has a proportionately greater impact on a small firm. As I will demonstrate later, the size of a firm can impact its cost of equity.

Market Ratios. Market-based financial ratios, such as earnings/price ratios and dividend yields, provide a partial measure of the investor-required cost of equity. If all other factors are equal, investors will require a higher return on equity for companies that exhibit greater risk as compensation for that risk. That is to say, a firm that investors perceive to have higher risks will experience a lower price per share in relation to expected earnings.

There are no market ratios available for AP because its stock is owned by AA. The five-year average price-earnings multiple for the Water Group was higher than that of the S&P Public Utilities. The five-year average dividend yield was lower for the Water Group than for the S&P Public Utilities. On average, the historical market-to-book ratios were higher for the Water Group than the S&P Public Utilities.

Common Equity Ratio. The level of financial risk is measured by the proportion of long-term debt and other senior capital that is contained in a company's capitalization. Financial risk is also analyzed by comparing common equity ratios (the complement of the ratio of debt and other senior capital). That is

to say, a firm with a high common equity ratio has low financial risk, while a firm with a low common equity ratio has high financial risk. The five-year average common equity ratios, based on permanent capital, were 49.1% for the Company, 49.5% for the Water Group, and 45.3% for the S&P Public Utilities. I should note that the capital structure ratios of AP have been adjusted to reflect the restricted cash held by the trustee of the Industrial Development Bonds ("IDB"), which have been issued but the designated capital expenditures associated with these bonds have not yet been completed. For ratesetting purposes, the amounts held by the trustee are netted against the principal amount because the rate base does not include the full cost of the projects financed with that debt.

Return on Book Equity. Greater variability (i.e., uncertainty) of a firm's earned returns signifies relative levels of risk, as shown by the coefficient of variation (standard deviation ÷ mean) of the rate of return on book common equity. The higher the coefficient of variation, the greater the degree of variability. For the five-year period, the coefficients of variation were 0.042 (0.5% ÷ 11.8%) for the Company, 0.077 (0.7% ÷ 9.1%) for the Water Group, and 0.096 (1.1% ÷ 11.5%) for the S&P Public Utilities.

Operating Ratios. I have also compared operating ratios (the percentage of revenues consumed by operating expense, depreciation and taxes other than income).[1] The five-year average operating ratios were 50.7% for the Company, 72.6% for the Water Group, and 84.1% for the S&P Public Utilities. The Company's lower operating ratio can be traced to its high capital intensity because a larger operating margin (i.e., the complement of the operating ratio) derives from

[1] The complement of the operating ratio is the operating margin which provides a measure of profitability. The higher the operating ratio, the lower the operating margin.

the income taxes and return associated with a larger capital investment per dollar of revenue.

Coverage. The level of fixed charge coverage (i.e., the multiple by which available earnings cover fixed charges, such as interest expense and preferred stock dividends) provides an indication of the earnings protection for creditors. Higher levels of coverage, and hence earnings protection for fixed charges, are usually associated with superior grades of creditworthiness. The five-year average pre-tax interest coverage (excluding AFUDC) was 4.05 times for the Company, 3.31 times for the Water Group, and 3.23 times for the S&P Public Utilities.

Quality of Earnings. Measures of earnings quality are usually revealed by the percentage of Allowance for Funds Used During Construction ("AFUDC") related to income available for common equity, the effective income tax rate, and other cost deferrals. These measures of earnings quality usually influence a firm's internally generated funds because poor quality of earnings would not generate high levels of cash flow. Quality of earnings has not been a significant concern for the Company, the Water Group and the S&P Utilities in recent years.

Internally Generated Funds. Internally generated funds ("IGF") provide an important source of new investment capital for a utility and represent a key measure of credit strength. Historically, the five-year average percentage of IGF to capital expenditures was 70.6% for the Company, 56.6% for the Water Group, and 93.7% for the S&P Public Utilities. The Company expects that it will continue to require external capital to finance construction expenditures.

Betas. The financial data I have been discussing relate primarily to company-specific risks. Market risk for firms with traded stock is measured by beta

coefficients. Beta coefficients attempt to identify systematic risk, i.e., the risk associated with changes in the overall market for common equities. Value Line publishes such a statistical measure of a stock's relative historical volatility to the rest of the market. A comparison of market risk is shown by the average betas of .72 for the Water Group (see page 2 of Schedule 3) and .76 for the S&P Public Utilities (see page 3 of Schedule 4).

21. Q. PLEASE SUMMARIZE YOUR RISK EVALUATION OF THE COMPANY AND THE WATER GROUP.

A. The risk of the Company parallels that of the Water Group in certain respects. For the future, the risk of the water industry will be strongly influenced by the regulatory requirements associated with the SDWA, the need to maintain adequate supply, the need to rehabilitate infrastructure, high capital intensity, a low rate of capital recovery, and relatively low percentages of IGF to construction. As such, the Water Group provides a reasonable basis for measuring the Company's cost of equity.

CAPITAL STRUCTURE RATIOS

22. Q. PLEASE EXPLAIN THE SELECTION OF CAPITAL STRUCTURE RATIOS FOR AP.

A. In the situation where the operating public utility raises its own debt directly in the capital markets, as is the case for the Company, it is proper to employ the capital structure ratios and senior capital cost rates of the regulated public utility for rate of return purposes. Furthermore, consistency requires that the embedded cost rate of the Company's senior securities also be employed. This procedure is consistent with the ratesetting procedures used by the Commission in numerous prior rate

cases for AP.

23. Q. DOES SCHEDULE 5 PROVIDE THE CAPITALIZATION AND CAPITAL STRUCTURE RATIOS YOU HAVE CONSIDERED?

A. Yes. Schedule 5 presents the Company's capitalization and related capital structure ratios based upon investor-provided capital. The June 30, 2011 capitalization corresponds with the end of the historic test year in this case. The capital structure includes the First Mortgage Bonds, Medium Term Notes ("MTN"), Notes, Industrial Development Bonds ("IDB"), debt issued by the Pennsylvania Economic Development Financing Authority ("PEDFA") and PENNVEST loans, which are related to water operations only, i.e., it excludes debt issued for the benefit of AP's wastewater operations.

The June 30, 2012 capitalization is estimated at the end of the future test year. The June 30, 2012 forecast capital structure reflects redemptions and maturities of $24.147 million on existing debt (including an early redemption of high cost Roaring Creek debt), PENNVEST loan payments of $5.888 million, new PENNVEST loans of $17.444 million, and a change in restricted cash of $95.691 million related to debt previously issued by PEDFA. For both the historical and future test years, funds restricted for construction activity have been netted against the principal amount of debt outstanding. This process is necessary because unexpended funds have not yet been invested in property, plant, and equipment, yet the full principal amount is shown on the Company's balance sheet. At June 30, 2011, the funds restricted for construction activity was $134.191 million. By June 30, 2012, that amount is projected to be $38.500 million on PEDFA debt. The Company also projects an infusion of $72.203 million of new common equity in the

future test year. A forecast increase in retained earnings is indicated for the June 30, 2012 consisting of the net income of $98.000 million less common dividend payments of $24.000 million. I have also adjusted the Company's capital structure to recognize the ratesetting treatment of the call premiums on the early redemption of high cost long-term debt that has been redeemed.

24. Q. WHAT CAPITAL STRUCTURE RATIOS DO YOU RECOMMEND BE ADOPTED FOR RATE OF RETURN PURPOSES IN THIS PROCEEDING?

A. Since ratesetting is prospective, the rate of return should, at a minimum, reflect known or reasonably foreseeable changes which will occur during the course of the future test year. As a result, I will adopt the Company's projected future test year-end capital structure ratios of 47.02% long-term debt and 52.98% common equity. These capital structure ratios are the best approximation of the mix of capital the Company will employ to finance its rate base during the period new rates are in effect. I have excluded short-term debt from these ratios because the amount roughly approximates the balance of construction work in progress ("CWIP"). Short-term debt provides bridge financing for construction work in progress, until the magnitude of short-term debt reaches a point where a permanent financing with long-term debt and equity is economic. That is to say, short-term debt is temporary financing pending the issuance of long-term debt and equity in the desired proportions that support the Company's capital structure goals. The Commission uses a formula for computing the AFUDC that assigns short-term debt first to the AFUDC rate and additional amounts, if any, above the CWIP balance are assigned the overall rate of return. Given the Company's procedure of calculating its AFUDC, it has been the Commission's policy to exclude short-term debt from the

capital structure. In addition to financing CWIP, the Company also uses short-term debt to finance acquisitions and for plant additions added between rate cases. Those amounts must also be excluded from the capital structure ratios used to set base rates.

COST OF SENIOR CAPITAL

25. Q. WHAT COST RATE HAVE YOU ASSIGNED TO THE LONG-TERM DEBT PORTION OF AP'S CAPITAL STRUCTURE?

A. Consistent with the capital structure ratios of the Company, the embedded cost of AP's senior securities must also be employed. This procedure is consistent with the ratesetting procedures used by the Commission in numerous prior AP rate cases. The determination of the cost of debt is essentially an arithmetic exercise. This is due to the fact that the Company has contracted for the use of this capital for a specific period of time at a specified cost rate. As shown on page 1 of Schedule 6, the actual embedded cost rate of long-term debt was 5.56% on June 30, 2011. By June 30, 2012, the embedded debt cost rate is estimated to be 5.41%, as shown on page 3 of Schedule 6. The Company's future test year embedded cost of debt reflects the application of funds held by the trustee on debt previously issued to finance construction expenditures that are included in the future test year rate base and new PENNVEST loans having an average composite cost rate of 2.5%. The details leading to the development of the individual effective cost rates for each series of long-term debt, using the cost rate to maturity technique, are shown on pages 2 and 4 of Schedule 6. The cost rate, or yield to maturity, is the rate of discount that equates the present value of all future interest and principal payments with the net proceeds of the bond. In my calculation of the

embedded cost of long-term debt, I have recognized the costs associated with the Company's early redemption of high cost debt. As previously explained, it is necessary to compensate AP for the costs incurred to lower the embedded debt cost rate which reduces the cost of capital charged to customers.

I will adopt the 5.41% prospective embedded cost of long-term debt for rate of return purposes. The 5.41% long-term debt cost rate is related to the amount of long-term debt shown on Schedule 5 that provides the basis for the 47.02% long-term debt ratio.

COST OF EQUITY – GENERAL APPROACH

26. Q. Please describe the process you employed to determine the cost of equity for the Companies.

A. Although my fundamental financial analysis provides the required framework to establish the risk relationships among AP, the Water Group and the S&P Public Utilities, the cost of equity must be measured by standard financial models that I describe in Appendix D. Differences in risk traits, such as size, business diversification, geographical diversity, regulatory policy, financial leverage, and bond ratings must be considered when analyzing the cost of equity indicated by the models.

It also is important to reiterate that no one method or model of the cost of equity can be applied in an isolated manner. Rather, informed judgment must be used to take into consideration the relative risk traits of the firm. It is for this reason that I have used more than one method to measure the Company's cost of equity. As noted in Appendix D, and elsewhere in my direct testimony, each of the methods used to measure the cost of equity contains certain incomplete and/or

overly restrictive assumptions and constraints that are not optimal. Therefore, I favor considering the results from a variety of methods. In this regard, I have applied each of these methods with data taken from the Water Group and determined that the cost of equity is 11.50%. To that return, 0.25% has been added in recognition of the exemplary performance of the Company's management to arrive at the 11.75% return on equity reflected in the Company's filing.

DISCOUNTED CASH FLOW ANALYSIS

27. Q. Please describe your use of the Discounted Cash Flow approach to determine the cost of equity.

A. The details of my use of the DCF approach and the calculations and evidence in support of my conclusions are set forth in Appendix E. I will summarize them here. The DCF model seeks to explain the value of an asset as the present value of future expected cash flows discounted at the appropriate risk-adjusted rate of return. In its simplest form, the DCF return on common stock consists of a current cash (dividend) yield and future price appreciation (growth) of the investment.

Among other limitations of the model, there is a certain element of circularity in the DCF method when applied in rate cases. This is because investors' expectations for the future depend in part upon regulatory decisions. In turn, when regulators depend upon the DCF model to set the cost of equity, they rely upon investor expectations that already include an assessment of how they will decide rate cases. Due to this circularity, the DCF model may not fully reflect the true risk of a utility.

As I describe in Appendix E, the DCF approach has other limitations that diminish its usefulness in the ratesetting process where, as in this case, the firm's

market capitalization diverges significantly from the book value capitalization. When this situation exists, the market cost of equity generated by the DCF model will be mis-specified if it is applied to a book value capital structure.

28. Q. Please explain the dividend yield component of a DCF analysis.

A. The DCF methodology requires the use of an expected dividend yield to establish the investor-required cost of equity. For the twelve months ended August 2011, the monthly dividend yields of the Water Group are shown graphically on Schedule 7. The monthly dividend yields shown on Schedule 7 reflect an adjustment to the month-end prices to reflect the buildup of the dividend in the price that has occurred since the last ex-dividend date (i.e., the date by which a shareholder must own the shares to be entitled to the dividend payment – usually about two to three weeks prior to the actual payment). An explanation of this adjustment is provided in Appendix E.

For the twelve months ending August 2011, the average dividend yield was 3.36% for the Water Group based upon a calculation using annualized dividend payments and adjusted month-end stock prices. The dividend yields for the more recent six- and three- month periods were 3.34% and 3.38%, respectively. I have used, for the purpose of my direct testimony, a dividend yield of 3.34% for the Water Group, which represents the six-month average yield. The use of this dividend yield will reflect current capital costs, while avoiding spot yields.

For the purpose of a DCF calculation, the average dividend yield must be adjusted to reflect the prospective nature of the dividend payments i.e., the higher expected dividends for the future. Recall that the DCF is an expectational model that must reflect investor anticipated cash flows for the Water Group. I have

adjusted the six-month average dividend yield in three different, but generally accepted manners, and used the average of the three adjusted values as calculated in Appendix E. That adjusted dividend yield is 3.45% for the Water Group.

29. Q. Please explain the underlying factors that influence investor's growth expectations.

A. In conducting a growth rate analysis, a wide variety of variables can be considered when reaching a consensus of prospective growth. The variables that can be considered include: earnings, dividends, book value, and cash flow stated on a per share basis. Historical values for these variables can be considered, but their consideration is typically incorporated into analysts' forecasts that are widely available to investors. A fundamental growth rate analysis also can be formulated, which consists of internal growth ("b x r"), where "r" represents the expected rate of return on common equity and "b" is the retention rate that consists of the fraction of earnings that are not paid out as dividends. The internal growth rate can be modified to account for sales of new common stock -- this is called external growth ("s x v"), where "s" represents the new common shares expected to be issued by a firm and "v" represents the value that accrues to existing shareholders from selling stock at a price different from book value. Fundamental growth, which combines internal and external growth, provides an explanation of the factors that cause book value per share to grow over time. Hence, a fundamental growth rate analysis is duplicative of expected book value per share growth.

30. Q. Did you assume a non-constant growth rate in your analysis?

A. No. I acknowledge that growth can also be expressed in multiple stages. When non-constant growth is considered, it usually consists of an initial "growth" stage where a firm enjoys rapidly expanding markets, high profit margins, and abnormally high growth in earnings per share. Thereafter, a firm enters a "transition" stage where fewer technological advances and increased product saturation begin to reduce the growth rate and profit margins come under pressure. During the "transition" phase, investment opportunities begin to mature, capital requirements decline, and a firm begins to pay out a larger percentage of earnings to shareholders. Finally, the mature or "steady-state" stage is reached when a firm's earnings growth, payout ratio, and return on equity stabilize at levels where they remain for the life of a firm. The three stages of growth assume a step-down of high initial growth to lower sustainable growth. Even if these three stages of growth can be envisioned for a firm, the third "steady-state" growth stage, which is assumed to remain fixed in perpetuity, represents an unrealistic expectation because the three stages of growth can be repeated. That is to say, the stages can be repeated where growth for a firm ramps-up and ramps-down in cycles over time.

31. Q. What investor-expected growth rate is appropriate in a DCF calculation?

A. Investors are interested principally in the future growth of their investment (i.e., the price per share of the stock). The DCF model assumes a constant price-earnings multiple, which in turn assumes that the price per share of stock will grow at the same rate as earnings per share. As I explain in Appendix E, future earnings per share growth represent the DCF model's primary focus. Investors consider both company-specific variables and overall market sentiment (i.e., level of inflation

rates, interest rates, economic conditions, etc.) when balancing a company's capital gains expectations with its dividend yield requirements. I follow an approach that is not rigidly formatted because investors are not influenced by a single set of company-specific variables weighted in a formulaic manner. Therefore, in my opinion, all relevant growth rate indicators using a variety of techniques must be evaluated when formulating a judgment of investor expected growth.

32. Q. What company-specific data have you considered in your growth rate analysis?

A. In Schedules 8 and 9, I have considered both historical and projected growth rates in earnings per share, dividends per share, book value per share, and cash flow per share for the Water Group. While analysts will review all measures of growth as I have done, it is earnings per share growth that influences directly the expectations of investors for utility stocks.[2] Forecasts of earnings growth are required within the context of the DCF because the model is a forward-looking concept, and with a constant price-earnings multiple and payout ratio, all other measures of growth will mirror earnings growth. So with the assumptions underlying the DCF, all forward-looking projections should be similar with a constant price-earnings multiple, earned return, and payout ratio.

As to the issue of historical data, investors cannot purchase past earnings of a utility, rather they are only entitled to future earnings. In addition, assigning significant weight to historical performance results in a double-counting of the

[2] Gordon, Gordon & Gould ,"Choice Among Methods of Estimating Share Yield," The Journal of Portfolio Management (Spring 1989).

historical data. While history cannot be ignored, it is already factored into the analysts' forecasts of earnings growth. In developing a forecast of future earnings growth, an analyst would first apprise himself/herself of the historical performance of a company. Hence, there is no need to count historical growth rates a second time, because historical performance is already reflected in analysts' forecasts which reflect an assessment of how the future will diverge from historical performance.

The bar graph provided on Schedule 8 shows the historical growth rates in earnings per share, dividends per share, book value per share, and cash flow per share for the Water Group. The historical growth rates were taken from the Value Line publication that provides these data. As shown on Schedule 8, the historical growth of earnings per share was in the range of 4.00% to 4.69% for the Water Group.

33. Q. Should negative growth rates be considered?

A. No. Negative growth rates reflected in the historical data provide no reliable guide to gauge investor expected growth for the future. Investor expectations encompass long-term positive growth rates and, as such, could not be represented by sustainable negative rates of change. Therefore, statistics that include negative growth rates should not be given any weight when formulating a composite growth rate expectation. The prospect of rate increases granted by regulators, the continued obligation to provide service as required by customers and the ongoing growth of customers mandate investor expectations of positive future growth rates. Stated simply, there is no reason for investors to expect that a utility will wind up its business and distribute its common equity capital to shareholders, which would be

symptomatic of a long-term permanent earnings decline. Although investors have knowledge that negative growth and losses can occur, their expectations include positive growth. Negative historic values will not provide a reasonable representation of future growth expectations because, in the long run, investors will always expect positive growth. Indeed, rational investors expect positive returns, otherwise they will hold cash rather than invest with the expectation of a loss.

34. Q. What is presented in Schedule 9?

A. Schedule 9 provides projected earnings per share growth rates taken from analysts' forecasts compiled by IBES/First Call, Zacks, Morningstar, and from the Value Line publication. IBES/First Call, Zacks, and Morningstar represent reliable authorities of projected growth upon which investors rely. The IBES/First Call, Zacks, and Morningstar forecasts are limited to earnings per share growth, while Value Line makes projections of other financial variables. The Value Line forecasts of dividends per share, book value per share, and cash flow per share have also been included on Schedule 9 for the Water Group.

Although five-year forecasts usually receive the most attention in the growth analysis for DCF purposes, present market performance has been strongly influenced by short-term earnings forecasts. Each of the major publications provides earnings forecasts for the current and subsequent year. These short-term earnings forecasts receive prominent coverage, and indeed they dominate these publications.

35. Q. Is a five-year investment horizon associated with the analysts' forecasts consistent with the traditional DCF model?

A. Yes. In fact, it illustrates that the infinite form of the DCF model contains an unrealistic assumption. Rather than viewing the DCF in the context of an endless stream of growing dividends (e.g., a century of cash flows), the growth in the share value (i.e., capital appreciation, or capital gains yield) is most relevant to investors' total return expectations. Hence, the sale price of a stock can be viewed as a liquidating dividend that can be discounted along with the annual dividend receipts during the investment-holding period to arrive at the investor expected return. The growth in the price per share will equal the growth in earnings per share absent any change in price-earnings ("P-E") multiple -- a necessary assumption of the DCF. As such, my company-specific growth analysis, which focuses principally upon five-year forecasts of earnings per share growth, conforms with the type of analysis that influences the actual total return expectation of investors. Moreover, academic research focuses on five-year growth rates as they influence stock prices. Indeed, if investors really required forecasts which extended beyond five years in order to properly value common stocks, then I am sure that some investment advisory service would begin publishing that information for individual stocks in order to meet the demands of investors. The absence of such a publication is proof that investors do not require infinite forecasts in order to purchase and sell stocks in the marketplace.

36. Q. What specific evidence have you considered in the DCF growth analysis?

A. Ideally, historical and projected earnings per share and dividends per share growth indicators would be used to provide an assessment of investor growth expectations for a firm; however, projections of future earnings growth provide the principal focus of investor expectations. In this regard, it is worthwhile to note that Professor

Myron Gordon, the foremost proponent of the DCF model in rate cases, concluded that the best measure of growth in the DCF model is a forecast of earnings per share growth. Hence, to follow Professor Gordon's findings, projections of earnings per share growth, such as those published by IBES/First Call, Zacks, Morningstar, and Value Line, represent a reasonable assessment of investor expectations.

37. Q. What does Schedule 9 show as the projected growth rates?

A. As to the five-year forecast growth rates, Schedule 9 indicates that the projected earnings per share growth rates for the Water Group are 6.74% by IBES/First Call, 7.39% by Zacks, 5.14% by Morningstar, and 5.84% by Value Line. The Value Line projections indicate that earnings per share for the Water Group will grow prospectively at a higher rate (i.e., 5.84%) than the dividends per share (i.e., 4.80%), which indicates a declining dividend payout ratio for the future. As indicated earlier, and in Appendix E, with the constant price-earnings multiple assumption of the DCF model, growth for these companies will occur at the higher earnings per share growth rate, thus producing the capital gains yield expected by investors.

38. Q. What conclusion have you drawn from these data regarding the applicable growth rate to be used in the DCF model?

A. It is appropriate to consider all forecasts of earnings growth rates that are available to investors. In this regard, I have considered the forecasts from IBES/First Call, Zacks, Morningstar, and Value Line. The IBES/First Call, Zacks, and Morningstar growth rates are consensus forecasts taken from a survey of analysts that make projections of growth for these companies. The IBES/First Call, Zacks, and

Morningstar estimates are obtained from the Internet and are widely available to investors free-of-charge. First Call is probably quoted most frequently in the financial press when reporting on earnings forecasts. The Value Line forecasts are also widely available to investors and can be obtained by subscription or free-of-charge at most public and collegiate libraries.

The forecasts of earnings per share growth, as shown on Schedule 9 provide a range of growth rates of 5.14% to 7.39% for the Water Group. Although the DCF growth rates cannot be established solely with a mathematical formulation, it is my opinion that investor-expected growth rate of 6.25% for the Water Group is a reasonable estimate for earnings per share growth rates for the DCF analyses in this case. The Value Line forecast of dividend per share growth is inadequate in this regard due to the forecast decline in the dividend payout that I previously described.

39. Q. Are the dividend yield and growth components of the DCF adequate to explain the rate of return on common equity when it is used in the calculation of the weighted average cost of capital?

A. Only if the capital structure ratios are measured with the market value of debt and equity. If book values are used to compute the capital structure ratios, then an adjustment is required.

40. Q. Please explain why.

A. If regulators use the results of the DCF (which are based on the market price of the stock of the companies analyzed) to compute the weighted average cost of capital with a book value capital structure used for ratesetting purposes, those results will not reflect the higher level of financial risk associated with the book value capital

structure. Where, as here, a stock's market price diverges from a utility's book value, the potential exists for a financial risk difference, because the capitalization of a utility measured at its market value contains more equity, less debt and therefore less risk than the capitalization measured at its book value.

This shortcoming of the DCF has persuaded the Commission to adjust the cost of equity upward to make the return consistent with the book value capital structure. Provisions for this risk difference were made by the Commission in the following cases:

- January 10, 2002 for Pennsylvania-American Water Company in Docket No. R-00016339 -- 60 basis points adjustment.
- August 1, 2002 for Philadelphia Suburban Water Company in Docket No.R-00016750 -- 80 basis points adjustment.
- January 29, 2004 for Pennsylvania-American Water Company in Docket No. R-00038304 (affirmed by the Commonwealth Court on November 8, 2004) – 60 basis points adjustment.
- August 5, 2004 for Aqua Pennsylvania, Inc. in Docket No. R-00038805 – 60 basis points adjustment.
- December 22, 2004 for PPL Electric Utilities Corporation in Docket No. R-00049255 -- 45 basis points.
- February 8, 2007 for PPL Gas Utilities Corporation in Docket No. R-00061398 -- 70 basis points adjustment.

It must be recognized that in order to make the DCF results relevant to the capitalization measured at book value (as is done for rate setting purposes); the market-derived cost rate cannot be used without modification. As I will explain later in my testimony, the results of the DCF model can be modified to account for differences in risk when the book value capital structure contains more financial leverage than the market value capital structure.

41. Q. Please continue with your discussion of the calculation of the leverage adjustment.

A. The only perspective that is important to investors is the return that they can realize on the market value of their investment. As I have measured the DCF, the simple yield (D/P) plus growth (g) provides a return applicable strictly to the price (P) that an investor is willing to pay for a share of stock. The DCF formula is derived from the standard valuation model: P = D/(k-g), where P = price, D = dividend, k = the cost of equity, and g = growth in cash flows. By rearranging the terms, we obtain the familiar DCF equation: k= D/P + g. All of the terms in the DCF equation represent investors' assessment of expected future cash flows that they will receive in relation to the value that they set for a share of stock (P). The need for the leverage adjustment arises when the results of the DCF model (k) are to be applied to a capital structure that is different than indicated by the market price (P). From the market perspective, the financial risk of the Water Group is accurately measured by the capital structure ratios calculated from the market capitalization of a firm. If the ratesetting process utilized the market capitalization ratios, then no additional analysis or adjustment would be required, and the simple yield (D/P) plus growth (g) components of the DCF would satisfy the financial risk associated with the market value of the equity capitalization. Since the ratesetting process uses a different set of ratios calculated from the book value capitalization, then further analysis is required to synchronize the financial risk of the book capitalization with the required return on the book value of the equity. This adjustment is developed through precise mathematical calculations, using well recognized analytical procedures that are widely accepted in the financial literature. To arrive at that return, the rate of return on common equity is the unleveraged cost of capital (or equity return at 100% equity) plus one or more terms reflecting the increase in

financial risk resulting from the use of leverage in the capital structure. Multiple terms are used in the case of debt and preferred stock. The resulting return is the one that is necessary for the utility to earn on its book value capital structure in order to earn the return that is based on the market value capital structure.

42. Q. Are there specific factors that influence market-to-book ratios that determine whether the leverage adjustment should be made?

A. No. The leverage adjustment is not intended, nor was it designed, to address the reasons that stock prices vary from book value. Hence, any observations concerning market prices relative to book are not on point. The leverage adjustment deals with the issue of financial risk and does not transform the DCF result to a book value return through a market-to-book adjustment. Again, the leverage adjustment that I propose is based on the fundamental financial precept that the cost of equity is equal to the rate of return for an unleveraged firm (i.e., where the overall rate of return equates to the cost of equity with a capital structure that contains 100% equity) plus the additional return required for introducing debt and/or preferred stock leverage into the capital structure.

Further, as noted previously, the relatively high market prices of utility stocks cannot be attributed solely to the notion that these companies are expected to earn a return on equity that differs from their cost of equity. Stock prices above book value are common for utility stocks, and indeed the stock prices of non-regulated companies exceed book values by even greater margins. In this regard, according to the Barron's issue of August 8, 2011, the major market indices' market-to-book ratios are well above unity. The Dow Jones Utility index traded at a multiple of 1.61 times book value, which is below the market multiple of other

indices. For example, the S&P Industrial index was at 2.95 times book value, and the Dow Jones Industrial index was at 2.76 times book value. It is difficult to accept that the vast majority of all firms operating in our economy are generating returns far in excess of their cost of capital. Certainly, in our free-market economy, competition should contain such "excesses" if they indeed exist.

Finally, the leverage adjustment adds stability to the final DCF cost rate. That is to say, as the market capitalization increases relative to its book value, the leverage adjustment increases while the simple yield (D/P) plus growth (g) result declines. The reverse is also true that when the market capitalization declines, the leverage adjustment also declines as the simple yield (D/P) plus growth (g) result increases.

43. Q. Is the leverage adjustment that you propose intended to produce a particular market-to-book ratio?

A. No, it is not. The adjustment that I label as a "leverage adjustment" is merely a convenient way of relating the result of the simple DCF model (i.e., D/P + g), which is premised on a market-value capital structure, to results appropriate for the capital structure used in ratemaking, which is computed with book value weights rather than market value weights. The capital structure ratios measured at the utility's book value show more financial leverage, and higher risk, than the capitalization measured at its market value. Please refer to Appendix E for the comparison. In pioneering work, Nobel laureates Modigliani and Miller developed several theories about the role of leverage in a firm's capital structure.[3] As part of

[3] F. Modigliani and M.H. Miller "The Cost of Capital, Corporation Finance, and the Theory of Investments," American Economic Review, (June 1958), at 261-297. F. Modigliani and M.H. Miller "Taxes and the Cost of Capital: A Correction." American Economic Review, (June 1963), 433-443.

that work, Modigliani and Miller established that, as the borrowing of a firm increases, the expected return on stockholders' equity also increases. This principle is the basis for my leverage adjustment which recognizes that the expected return on equity increases with the increased risk associated with the higher financial leverage shown by the book value capital structure, as compared to the market value capital structure that contains lower financial risk. If I expressed my return solely in the context of the book value weights that we use to set the weighted average cost of capital, and ignore the familiar D/P + g expression entirely, then there would be no separate element to reflect the financial leverage change. This is because the equity return applicable to the book value common equity ratio is equal to 8.43%, which is the return for the Water Group applicable to its equity with no debt in its capital structure (i.e., the cost of capital is equal to the cost of equity with a 100% equity ratio) plus 2.14% compensation for having a 50.94% debt ratio, plus 0.01% for having a 0.19% preferred stock ratio (see page E-11 of Appendix E). The sum of the parts is 10.58% (8.43% + 2.14% + 0.01%) and there is no need to even address the cost of equity in terms of D/P + g. To be completely transparent, I identify a separate leverage "adjustment" in the traditional DCF formula, but there is no need to do so other than providing separate identification for this factor. To express this same return in the context of the familiar DCF model, I summed the 3.45% dividend yield, the 6.25% growth rate, and the 0.88% for the leverage adjustment in order to arrive at the same 10.58% (3.45% + 6.25% + 0.88%) return. I know of no means to mathematically solve for the 0.88% leverage adjustment by expressing it in the terms of any particular relationship of market price to book value. The 0.88% adjustment is merely a

convenient way to compare the 10.58% return computed directly with the Modigliani & Miller formulas to the 9.70% return generated by the DCF model based on a market value capital structure. My point is that when we use a market-determined cost of equity developed from the DCF model, it reflects a level of financial risk that is different (in this case, lower) from the Company's capital structure stated at book value. My point has nothing to do with targeting any particular market-to-book ratio.

44. Q. Please provide the DCF return based upon your preceding discussion of dividend yield, growth, and leverage.

A. As explained previously, I have utilized a six-month average dividend yield ("D_1/P_0") adjusted in a forward-looking manner for my DCF calculation. This dividend yield is used in conjunction with the growth rate ("g") previously developed. The DCF also includes the leverage modification ("lev.") required when the book value equity ratio is used in determining the weighted average cost of capital in the ratesetting process rather than the market value equity ratio related to the price of stock. The resulting DCF cost rate is:

	D_1/P_0	+	g	+	$lev.$	=	k
Water Group	3.45%	+	6.25%	+	0.88%	=	10.58%

The DCF result shown above represents the simplified (i.e., Gordon) form of the model that contains a constant growth assumption. I should reiterate, however, that the DCF indicated cost rate provides an explanation of the rate of return on common stock market prices without regard to the prospect of a change in the price-earnings multiple. An assumption that there will be no change in the price-earnings multiple is not supported by the realities of the equity market, because

price-earnings multiples do not remain constant. This is one of the constraints of this model that makes it important to consider other model results when determining a company's cost of equity.

RISK PREMIUM ANALYSIS

45. Q. Please describe your use of the risk premium approach to determine the cost of equity.

A. The details of my use of the Risk Premium approach and the evidence in support of my conclusions are set forth in Appendix G. I will summarize them here. With this method, the cost of equity capital is determined by corporate bond yields plus a premium to account for the fact that common equity is exposed to greater investment risk than debt capital. As with other models used to determine the cost of equity, the Risk Premium approach has its limitations, including potential imprecision in the assessment of the future cost of corporate debt and the measurement of the risk-adjusted common equity premium. That said, the Risk Premium approach is a well-recognized and accepted method of calculating the estimated cost of common equity and the results of its application need to be considered.

46. Q. What long-term public utility debt cost rate did you use in your risk premium analysis?

A. In my opinion, a 5.50% yield represents a reasonable estimate of the prospective yield on long-term A-rated public utility bonds. As I will subsequently show, the Moody's index and the Blue Chip forecasts support this figure.

47. Q. What historical data is shown by the Moody's data?

A. The historical yields for long-term public utility debt are shown graphically on page 1 of Schedule 10. For the twelve months ended August 2011, the average monthly yield on Moody's A-rated index of public utility bonds was 5.33%. For the six and three-month periods ended August 2011, the yields were 5.28% and 5.07%, respectively. During the twelve-months ended August 2011, the range of the yields on A-rated public utility bonds was 4.69% to 5.68%.

48. Q. What forecasts of interest rates have you considered in your analysis?

A. I have determined the prospective yield on A-rated public utility debt by using the Blue Chip Financial Forecasts ("Blue Chip") along with the spread in the yields that I describe in Appendix F. The Blue Chip is a reliable authority and contains consensus forecasts of a variety of interest rates compiled from a panel of banking, brokerage, and investment advisory services. In early 1999, Blue Chip stopped publishing forecasts of yields on A-rated public utility bonds because the Federal Reserve deleted these yields from its Statistical Release H.15. To independently project a forecast of the yields on A-rated public utility bonds, I have combined the forecast yields on long-term Treasury bonds published on September 1, 2011, and a yield spread of 1.50%. As shown on page 5 of Schedule 10, the yields on A-rated public utility bonds have exceeded the yields on Treasury bonds by 1.38% on a twelve-month average basis, 1.33% on a six-month average basis, and 1.37% on a the three-month average basis. From these averages, 1.50% represents a reasonable spread for the yield on A-rated public utility bonds over Treasury bonds. For comparative purposes, I also have shown the Blue Chip forecasts of Aaa-rated and Baa-rated corporate bonds. These forecasts are:

		Blue Chip Financial Forecasts				
		Corporate		30-Year	A-rated Public Utility	
Year	Quarter	Aaa-rated	Baa-rated	Treasury	Spread	Yield
2011	3rd	4.5%	5.5%	3.8%	1.50%	5.30%
2011	4th	4.5%	5.4%	3.8%	1.50%	5.30%
2012	1st	4.6%	5.5%	3.9%	1.50%	5.40%
2012	2nd	4.6%	5.6%	4.0%	1.50%	5.50%
2012	3rd	4.7%	5.7%	4.1%	1.50%	5.60%
2012	4th	4.9%	5.8%	4.2%	1.50%	5.70%

49. Q. Are there additional forecasts of interest rates that extend beyond those shown above?

A. Yes. Twice yearly, Blue Chip provides long-term forecasts of interest rates. In its June 1, 2011 publication, the Blue Chip published longer-term forecasts of interest rates, which were reported to be:

	Blue Chip Financial Forecasts		
	Corporate		30-Year
Averages	Aaa-rated	Baa-rated	Treasury
2013-17	6.3%	7.2%	5.6%
2018-22	6.4%	7.3%	5.7%

Given these forecasted interest rates, a 5.50% yield on A-rated public utility bonds represents a reasonable expectation.

50. Q. What equity risk premium have you determined for public utilities?

A. Appendix G provides a discussion of the financial returns that I relied upon to develop the appropriate equity risk premium for the S&P Public Utilities. I have calculated the equity risk premium by comparing the market returns on utility stocks and the market returns on utility bonds. I chose the S&P Public Utility index for the purpose of measuring the market returns for utility stocks. The S&P Public Utility index is reflective of the risk associated with regulated utilities, rather than some broader market indexes, such as the S&P 500 Composite index. The S&P Public

Utility index is a subset of the overall S&P 500 Composite index. Use of the S&P Public Utility index reduces the role of judgment in establishing the risk premium for public utilities. With the equity risk premiums developed for the S&P Public Utilities as a base, I derived the equity risk premium for the Water Group.

51. Q. What equity risk premium for the S&P Public Utilities have you determined for this case?

A. To develop an appropriate risk premium, I analyzed the results for the S&P Public Utilities by averaging (i) the midpoint of the range shown by the geometric mean and median and (ii) the arithmetic mean. This procedure has been employed to provide a comprehensive way of measuring the central tendency of the historical returns. As shown by the values set forth on page 2 of Schedule 11, the indicated risk premiums for the various time periods analyzed are 5.51% (1928-2007), 6.58% (1952-2007), 6.08% (1974-2007), and 6.37% (1979-2007). The selection of the shorter periods taken from the entire historical series is designed to provide a risk premium that conforms more nearly to present investment fundamentals, and removes some of the more distant data from the analysis.

52. Q. Are the time periods shown on Schedule 11 relevant for today?

A. Yes. First, let me explain why the terminal year of my analysis presented on Schedule 11 represents the returns realized through 2007. It does not terminate with 2007 by my own choosing but rather because of the inability to obtain more recent data. An update beyond 2007 has not been prepared because of the difficulty in obtaining the return on public utility bonds from Lehman Brothers, which is in bankruptcy. Although ending with 2007 data, the cumulative returns since then have largely offset the negative returns on stocks during the financial crisis

and include the recovery following the resolution of the financial crisis. That is to say, the fall and rebound in stock prices after 2007 indicate that the cumulative returns up to 2007 continue to be relevant today in measuring the common equity risk premium. Second, the selection of the initial year of each period was based upon the financial market defining events that I note here and describe in Appendix G. These events were fixed in history and cannot be manipulated as later financial data becomes available. That is to say, using the Treasury-Federal Reserve Accord as a defining event, the year 1952 is fixed as the beginning point for the measurement period regardless of the financial results that subsequently occurred. Likewise, 1974 represented a benchmark year because it followed the 1973 Arab Oil embargo. Also, the year 1979 was chosen because it began the deregulation of the financial markets. I consistently use these periods in my work, and additional data are merely added to the earlier results when they become available. The periods chosen are, therefore, not driven by the desired results of the study.

53. Q. What conclusions have you drawn from these data?

A. Using the summary values provided on page 2 of Schedule 11, the 1928-2007 period provides the lowest indicated risk premium, while the 1952-2007 period provides the highest risk premium for the S&P Public Utilities. Within these bounds, a common equity risk premium of 6.23% (6.08% + 6.37% = 12.45% ÷ 2) is derived by averaging data covering the periods 1974-2007 and 1979-2007. Therefore, 6.23% represents a reasonable risk premium for the S&P Public Utilities in this case.

As noted earlier in my fundamental risk analysis, differences in risk characteristics must be taken into account when applying the results for the S&P

Public Utilities to the Water Group. I recognized these differences in the development of the equity risk premium in this case. I previously enumerated various differences in fundamentals between the Water Group and the S&P Public Utilities, including size, market ratios, common equity ratio, return on book equity, operating ratios, coverage, quality of earnings, internally generated funds, and betas. Based on these factors, the Company's overall risk is higher than that of the Water Group. In my opinion, these differences indicate that 5.50% represents a reasonable common equity risk premium in this case. This represents approximately 88% (5.50% ÷ 6.23% = 0.88) of the risk premium of the S&P Public Utilities and is reflective of the lower risk of the Water Group compared to the S&P Public Utilities.

54. Q. What common equity cost rate did you determine based on your risk premium analysis?

A. The cost of equity (i.e., "k") is represented by the sum of the prospective yield for long-term public utility debt (i.e., "i"), and the equity risk premium (i.e., "RP"). The Risk Premium approach provides a cost of equity of:

	i	+	*RP*	=	*k*
Water Group	5.50%	+	5.50%	=	11.00%

CAPITAL ASSET PRICING MODEL

55. Q. Have you used the Capital Asset Pricing Model to measure the cost of equity in this case?

A. Yes. As with other models of the cost of equity, the CAPM contains a variety of assumptions and shortcomings that I discuss in Appendix H. Therefore, this method should be used with other methods to measure the cost of equity, as each

will complement the other and will provide a result that will help reduce the unavoidable defects found in each method.

56. Q. What are the features of the CAPM as you have used it?

A. The CAPM uses the yield on a risk-free interest bearing obligation plus a rate of return premium that is proportional to the systematic risk of an investment. Traditionally, obligations of the U.S. Treasury (i.e., bills, notes on bonds) have been the obvious choice for the risk-free rate of return. As indicated previously, there is now reason to question the truly risk-free nature of Treasury obligations. The details of my use of the CAPM and evidence in support of my conclusions are set forth in Appendix H. To compute the cost of equity with the CAPM, three components are necessary: a risk-free rate of return ("Rf"), the beta measure of systematic risk ("β"), and the market risk premium ("Rm-Rf") derived from the total return on the market of equities reduced by the risk-free rate of return. The CAPM specifically accounts for differences in systematic risk (i.e., market risk as measured by the beta) between an individual firm or group of firms and the entire market of equities. As such, to calculate the CAPM, it is necessary to employ firms with traded stocks. In this regard, I performed a CAPM calculation for the Water Group.

By contrast, my Risk Premium approach also considers industry- and company-specific factors, because it is not limited to measuring just systematic risk. As a consequence, the Risk Premium approach is more comprehensive than the CAPM. In addition, the Risk Premium approach provides a better measure of the cost of equity, because it is founded upon the yields on corporate bonds rather than Treasury bonds.

57. Q. What betas have you considered in the CAPM?

A. For my CAPM analysis, I initially considered the Value Line betas. As shown on page 1 of Schedule 12, the average beta is 0.72 for the Water Group.

58. Q. What betas have you used in the CAPM determined cost of equity?

A. The betas must be reflective of the financial risk associated with the ratesetting capital structure that is measured at book value. Therefore, Value Line betas cannot be used directly in the CAPM, unless those betas are applied to a capital structure measured with market values. To develop a CAPM cost rate applicable to a book-value capital structure, the Value Line (market value) betas have been unleveraged and releveraged for the book value common equity ratios using the Hamada formula[4], as follows:

$$\beta l = \beta u \, [1 + (1 - t) \, D/E + P/E]$$

where ßl = the leveraged beta, ßu = the unleveraged beta, t = income tax rate, D = debt ratio, P = preferred stock ratio, and E = common equity ratio. The betas published by Value Line have been calculated with the market price of stock and, therefore, are related to the market value capitalization. This is consistent with my earlier discussion regarding the need to make a correction for the mismatch that results when we apply market returns to a book value capital structure. By using the formula shown above and the capital structure ratios measured at market value, the beta would become 0.51 for the Water Group if it employed no leverage and was 100% equity financed. With the unleveraged beta as a base, I calculated

[4] Robert S. Hamada, "The Effects of the Firm's Capital Structure on the Systematic Risk of Common Stocks" *The Journal of Finance* Vol. 27, No. 2, Papers and Proceedings of the Thirtieth Annual Meeting of the American Finance Association, New Orleans, Louisiana, December 27-29, 1971. (May 1972), pp.435-452

the leveraged beta of 0.86 for the book value capital structure of the Water Group. The betas and corresponding common equity ratios are:

Market Values		Book Values	
Beta	Common Equity Ratio	Beta	Common Equity Ratio
0.72	61.78%	0.86	48.87%

The book value leveraged beta that I employed in the CAPM cost of equity is 0.86 for the Water Group.

59. Q. What risk-free rate have you used in the CAPM?

A. For the reasons explained in Appendix H, I have employed the yields on 20-year Treasury bonds using historical data. For forecasts, I have used the yields on 30-year Treasury bonds that are published by Blue Chip. The reason that I used the 20-year Treasury yield in my historical analysis relates to the interruption in the 30-year series, which had no data reported for the months of March 2002 to January 2006. That is to say, 48-months of data were missing from the 60-months that I used for my five-year historical analysis shown on page 2 of Schedule 12. As shown on pages 2 and 3 of Schedule 12, I provided the historical yields on Treasury notes and bonds. For the twelve months ended August 2011, the average yield on 20-year Treasury bonds was 3.95%, as shown on page 3 of that schedule. For the six- and three-months ended August 2011, the yields on 20-year Treasury bonds were 3.94% and 3.70%, respectively. During the twelve-months ended August 2011, the range of the yields on 20-year Treasury bonds was 3.24% to 4.42%. During the second half of 2011, there was a significant decline in the yields on Treasury obligations, which can be traced to a number of factors, including: the sovereign debt crisis, concern over a possible double dip recession,

the potential for deflation, and the Fed's maintenance of its large balance sheet through the reinvestment of the proceeds from maturing mortgage-backed securities through the purchase of Treasury obligations (also shown as QE2). As shown on page 4 of Schedule 12, forecasts published by Blue Chip June 1, 2011 indicate that the yields on long-term Treasury bonds are expected to be in the range of 3.8% to 4.2% during the next six quarters. The longer term forecasts described previously (see Blue Chip Financial Forecast presented earlier) show that the yields on 30-year Treasury bonds will average 5.6% from 2013 through 2017 and 5.7% from 2018 to 2022. For the reasons explained previously, forecasts of interest rates should be emphasized at this time in selecting the risk-free rate of return in CAPM. Hence, I have used a 4.00% risk-free rate of return for CAPM purposes, which considers not only the Blue Chip forecasts, but also the recent trend in the yields on long-term Treasury bonds.

60. Q. What market premium have you used in the CAPM?

A. As developed in Appendix H, the market premium is derived from the SBBI Classic Yearbook (i.e., 6.35%) and the Value Line and S&P 500 returns (i.e., 11.56%). For purposes of my analysis, I have utilized a market premium of 8.96% (6.35% + 11.56% = 17.91% ÷ 2) as taken from these sources.

61. Q. Are there adjustments to the CAPM results that are necessary to fully reflect the rate of return on common equity?

A. Yes. The finance literature supports an adjustment relating to the size of the company or portfolio for which the calculation is performed. As the size of a firm decreases, its risk and, hence, its required return increases. Moreover, in his discussion of the cost of capital, Professor Brigham has indicated that smaller firms

have higher capital costs than otherwise similar larger firms (see Fundamentals of Financial Management, 5th Edition, page 623). Also, the Fama/French study (see "The Cross-Section of Expected Stock Returns," The Journal of Finance, June 1992) established that size of a firm helps explain stock returns. In an October 15, 1995 article in Public Utilities Fortnightly, entitled "Equity and the Small-Stock Effect," it was demonstrated that the CAPM could understate the cost of equity significantly according to a utility's size. Indeed, it was demonstrated in the SBBI Yearbook that the returns for stocks in lower deciles (i.e., smaller stocks) had returns in excess of those shown by the simple CAPM. The Ibbotson data confirm this phenomenon for electric and gas companies, where small-cap companies have outperformed large-cap companies by over 300 basis points over the last 80 years.[5]

In this regard, the Water Group has an average market capitalization of its equity of $1,147 million, which would make it a low-cap portfolio. However, for my CAPM analysis, I have adopted a more conservative size adjustment of 1.20%, which represents the mid-cap adjustment, because the Water Group is somewhat below the threshold for the mid-cap category, which has a $1,776 million market capitalization. Absent such an adjustment, the CAPM would understate the required return.

62. Q. What result have you determined using the CAPM?

A. Using the 4.00% risk-free rate of return, the leverage adjusted beta of 0.86 for the Water Group, the 8.96% market premium, and the size adjustment, the following result is indicated.

[5] R. Morin, New Regulatory Finance 181-182 (2006).

	Rf	+	*ß*	x (	*Rm-Rf*	) +	*size*	=	*k*
Water Group	4.00%	+	0.86	x (	8.96%	) +	1.20%	=	12.91%

COMPARABLE EARNINGS APPROACH

63. Q. How have you applied the Comparable Earnings approach in this case?

A. The technical aspects of the Comparable Earnings approach are set forth in Appendix I. Because regulation is a substitute for competitively-determined prices, the returns realized by non-regulated firms with comparable risks to a public utility provide useful insight into a fair rate of return. In order to identify the appropriate return, it is necessary to analyze returns earned (or realized) by other firms within the context of the Comparable Earnings standard. The firms selected for the Comparable Earnings approach should be companies whose prices are not subject to cost-based price ceilings (i.e., non-regulated firms) so that circularity is avoided.

There are two avenues available to implement the Comparable Earnings approach. One method would involve the selection of another industry (or industries) with comparable risks to the public utility in question, and the results for all companies within that industry would serve as a benchmark. The second approach requires the selection of parameters that represent similar risk traits for the public utility and the comparable risk companies. Using this approach, the business lines of the comparable companies become unimportant. The latter approach is preferable with the further qualification that the comparable risk companies exclude regulated firms in order to avoid the circular reasoning implicit in the use of the achieved earnings/book ratios of other regulated firms. The United States Supreme Court has held that:

> A public utility is entitled to such rates as will permit it to earn a return on the value of the property which it employs for the convenience of the public equal to that generally being made at the same time and in the same general part of the country on investments in other business undertakings which are attended by corresponding risks and uncertainties.... The return should be reasonably sufficient to assure confidence in the financial soundness of the utility and should be adequate, under efficient and economical management, to maintain and support its credit and enable it to raise the money necessary for the proper discharge of its public duties. Bluefield Water Works vs. Public Service Commission, 262 U.S. 668 (1923).

Therefore, it is important to identify the returns earned by firms that compete for capital with a public utility. This can be accomplished by analyzing the returns of non-regulated firms that are subject to the competitive forces of the marketplace.

64. Q. How have you implemented the Comparable Earnings approach?

A. In order to implement the Comparable Earnings approach, non-regulated companies were selected from the Value Line Investment Survey for Windows that have six categories (see Appendix I for definitions) of comparability designed to reflect the risk of the Water Group. These screening criteria were based upon the range as defined by the rankings of the companies in the Water Group. The items considered were: Timeliness Rank, Safety Rank, Financial Strength, Price Stability, Value Line betas, and Technical Rank. The identities of the companies comprising the Comparable Earnings group and its associated rankings within the ranges are identified on page 1 of Schedule 13.

I relied on Value Line data because they provide a comprehensive basis for evaluating the risks of the comparable firms. As to the returns calculated by Value Line for these companies, there is some downward bias in the figures shown

on page 2 of Schedule 13 because Value Line computes the returns on year-end rather than average book value. If average book values had been employed, the rates of return would have been slightly higher. Nevertheless, these are the returns considered by investors when taking positions in these stocks. Because many of the comparability factors, as well as the published returns, are used by investors for selecting stocks, and to the extent that investors rely on the Value Line service to gauge its returns, it is, therefore, an appropriate database for measuring comparable return opportunities.

65. Q. What data have you used in your Comparable Earnings analysis?

A. I have used both historical realized returns and forecasted returns for non-utility companies. As noted previously, I have not used returns for utility companies in order to avoid the circularity that arises from using regulatory-influenced returns to determine a regulated return. It is appropriate to consider a relatively long measurement period in the Comparable Earnings approach in order to cover conditions over an entire business cycle. A ten-year period (5 historical years and 5 projected years) is sufficient to cover an average business cycle. Unlike the DCF and CAPM, the results of the Comparable Earnings method can be applied directly to the book value capitalization because, the nature of the analysis relates to book value. Hence, Comparable Earnings does not present, as the other models do, the potential misapplication of results when the market capitalization and book value capitalization diverge significantly. The average historical rate of return on book common equity was 11.6% using only the returns that were less than 20% as shown on page 2 of Schedule 13. A point of demarcation was chosen to identify the results of highly profitable enterprises, which the Bluefield case stated were not

the type of returns that a utility was entitled to earn. For this purpose, I used 20% as the point where those returns could be viewed as highly profitable and should be excluded from the Comparable Earnings approach. The average forecast rate of return as published by Value Line is 12.2% also using values less than 20%, as provided on page 2 of Schedule 13.

66. Q. What rate of return on common equity have you determined in this case using the Comparable Earnings approach?

A. The average of the historical and forecast median rates of return is:

	Historical	*Forecast*	*Average*
Comparable Earnings Group	11.6%	12.2%	11.90%

CONCLUSION ON COST OF EQUITY

67. Q. What is your conclusion concerning the Company's cost of common equity?

A. Based upon the application of a variety of methods and models it is my opinion that the Company should be granted an equity allowance of 11.75%. For reasons explained previously, that return should be comprised of 11.50% plus the twenty-five basis points (i.e., 0.25%) supported by Mr. Smeltzer. In summary, the Company should be provided an opportunity to realize a 11.75% rate of return on common equity so that it can compete in the capital markets, attain reasonable credit quality, and receive recognition of the significant accomplishments that management has achieved.

68. Q. Does this conclude your prepared direct testimony?

A. Yes.

AQUA PENNSYLVANIA, INC.

Docket No. R-2011-2267958

Appendices A Through I to Accompany

the Direct Testimony

of

Paul R. Moul
Managing Consultant
P. Moul & Associates

Concerning

Cost of Equity
and
Rate of Return

November 18, 2011

APPENDIX A TO DIRECT TESTIMONY OF PAUL R. MOUL

EDUCATIONAL BACKGROUND, BUSINESS EXPERIENCE AND QUALIFICATIONS

I was awarded a degree of Bachelor of Science in Business Administration by Drexel University in 1971. While at Drexel, I participated in the Cooperative Education Program which included employment, for one year, with American Water Works Service Company, Inc., as an internal auditor, where I was involved in the audits of several operating water companies of the American Water Works System and participated in the preparation of annual reports to regulatory agencies and assisted in other general accounting matters.

Upon graduation from Drexel University, I was employed by American Water Works Service Company, Inc., in the Eastern Regional Treasury Department where my duties included preparation of rate case exhibits for submission to regulatory agencies, as well as responsibility for various treasury functions of the thirteen New England operating subsidiaries.

In 1973, I joined the Municipal Financial Services Department of Betz Environmental Engineers, a consulting engineering firm, where I specialized in financial studies for municipal water and wastewater systems.

In 1974, I joined Associated Utility Services, Inc., now known as AUS Consultants. I held various positions with the Utility Services Group of AUS Consultants, concluding my employment there as a Senior Vice President.

In 1994, I formed P. Moul & Associates, an independent financial and regulatory consulting firm. In my capacity as Managing Consultant and for the past twenty-nine years, I have continuously studied the rate of return requirements for cost of service-regulated firms. In this regard, I have supervised the preparation of rate of return studies, which were employed, in connection with my testimony and in the past for other individuals. I have presented direct testimony on the subject of fair rate of return, evaluated rate of return testimony of other witnesses, and presented rebuttal testimony.

APPENDIX A TO DIRECT TESTIMONY OF PAUL R. MOUL

My studies and prepared direct testimony have been presented before thirty-six (36) federal, state and municipal regulatory commissions, consisting of: the Federal Energy Regulatory Commission; state public utility commissions in Alabama, Alaska, California, Colorado, Connecticut, Delaware, Florida, Georgia, Hawaii, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, New Jersey, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Virginia, West Virginia, Wisconsin, and the Philadelphia Gas Commission. My testimony has been offered in over 200 rate cases involving electric power, natural gas distribution and transmission, resource recovery, solid waste collection and disposal, telephone, wastewater, and water service utility companies. While my testimony has involved principally fair rate of return and financial matters, I have also testified on capital allocations, capital recovery, cash working capital, income taxes, factoring of accounts receivable, and take-or-pay expense recovery. My testimony has been offered on behalf of municipal and investor-owned public utilities and for the staff of a regulatory commission. I have also testified at an Executive Session of the State of New Jersey Commission of Investigation concerning the BPU regulation of solid waste collection and disposal.

I was a co-author of a verified statement submitted to the Interstate Commerce Commission concerning the 1983 Railroad Cost of Capital (Ex Parte No. 452). I was also co-author of comments submitted to the Federal Energy Regulatory Commission regarding the Generic Determination of Rate of Return on Common Equity for Public Utilities in 1985, 1986 and 1987 (Docket Nos. RM85-19-000, RM86-12-000, RM87-35-000 and RM88-25-000). Further, I have been the consultant to the New York Chapter of the National Association of Water Companies, which represented the water utility group in the Proceeding on Motion of the Commission to Consider Financial Regulatory Policies for New York Utilities (Case 91-M-0509). I have also submitted comments to the Federal Energy Regulatory Commission in its

Notice of Proposed Rulemaking (Docket No. RM99-2-000) concerning Regional Transmission Organizations and on behalf of the Edison Electric Institute in its intervention in the case of Southern California Edison Company (Docket No. ER97-2355-000). Also, I was a member of the panel of participants at the Technical Conference in Docket No. PL07-2 on the Composition of Proxy Groups for Determining Gas and Oil Pipeline Return on Equity.

In late 1978, I arranged for the private placement of bonds on behalf of an investor-owned public utility. I have assisted in the preparation of a report to the Delaware Public Service Commission relative to the operations of the Lincoln and Ellendale Electric Company. I was also engaged by the Delaware P.S.C. to review and report on the proposed financing and disposition of certain assets of Sussex Shores Water Company (P.S.C. Docket Nos. 24-79 and 47-79). I was a co-author of a Report on Proposed Mandatory Solid Waste Collection Ordinance prepared for the Board of County Commissioners of Collier County, Florida.

I have been a consultant to the Bucks County Water and Sewer Authority concerning rates and charges for wholesale contract service with the City of Philadelphia. My municipal consulting experience also included an assignment for Baltimore County, Maryland, regarding the City/County Water Agreement for Metropolitan District customers (Circuit Court for Baltimore County in Case 34/153/87-CSP-2636).

APPENDIX B TO DIRECT TESTIMONY OF PAUL R. MOUL

RATESETTING PRINCIPLES

Traditional cost of service regulation, as implemented by a regulatory agency engaged in ratesetting, such as the Commission, serves as a substitute for competition. In setting rates, a regulatory agency must carefully consider the public's interest in reasonably priced, as well as safe and reliable, service. The level of rates must also provide the public utility and its investors with an opportunity to earn a rate of return for the public utility and its investors that is commensurate with the risk to which the invested capital is exposed so that the public utility has access to the capital required to meet its service responsibilities to its customers. Without an opportunity to earn a fair rate of return, a public utility will be unable to attract sufficient capital required to meet its responsibilities over time.

It is important to remember that regulated firms must compete for capital in a global market with non-regulated firms, as well as municipal, state and federal governments. Traditionally, a public utility has been responsible for providing a particular type of service to its customers within a specific market area. Although this relationship with customers has been changing, a regulated utility remains quite different from a non-regulated firm, which is free to enter and exit competitive markets in accordance with available business opportunities.

As established by the landmark Bluefield and Hope cases,[1] several tests have been articulated through which the regulator can determine the fairness or reasonableness of the rate of return. These tests include a determination of whether the rate of return is (i) similar to that of other financially sound businesses having similar or comparable risks, (ii) sufficient to ensure confidence in the financial integrity of the public utility, and (iii) adequate to maintain and support the credit of the utility, thereby enabling it to attract, on a reasonable

[1] Bluefield Water Works & Improvement Co. v. P.S.C. of West Virginia, 262 U.S. 679 (1923) and F.P.C. v. Hope Natural Gas Co., 320 U.S. 591 (1944).

cost basis, the funds necessary to satisfy its capital requirements so that it can meet the obligation to provide adequate and reliable service to the public.

A fair rate of return must not only provide the utility with the ability to attract new capital it must also be fair to existing investors. An appropriate rate of return which may have been reasonable at one point in time may become too high or too low at a subsequent point in time, based upon changing business risks, economic conditions and alternative investment opportunities. When applying the standards of a fair rate of return, it must be recognized that the end result must provide for the payment of interest on the company's debt, the payment of dividends on the company's stock, the recovery of costs associated with securing capital, the maintenance of reasonable credit quality for the company, and support of the company's financial condition, which today would include those measures of financial performance in the areas of interest coverage and adequate cash flow derived from a reasonable level of earnings.

APPENDIX C TO DIRECT TESTIMONY OF PAUL R. MOUL

EVALUATION OF RISK

The rate of return required by investors is directly linked to the perceived level of risk. The greater the risk of an investment, the higher is the required rate of return necessary to compensate for that risk all else being equal. Because investors will seek the highest rate of return available, considering the risk involved, the rate of return must at least equal the investor-required, market-determined cost of capital if public utilities are to attract the necessary investment capital on reasonable terms.

In the measurement of the cost of capital, it is necessary to assess the risk of a firm. The level of risk for a firm is often defined as the uncertainty of achieving expected performance, and is sometimes viewed as a probability distribution of possible outcomes. Hence, if the uncertainty of achieving an expected outcome is high, the risk is also high. As a consequence, high risk firms must offer investors higher returns than low risk firms, which pay less to attract capital from investors. This is because the level of uncertainty, or risk of not realizing expected returns, establishes the compensation required by investors in the capital markets. Of course, the risk of a firm must also be considered in the context of its ability to actually experience adequate earnings, which conform with a fair rate of return. Thus, if there is a high probability that a firm will not perform well due to fundamentally poor market conditions, investors will demand a higher return.

The investment risk of a firm is comprised of its business risk and financial risk. Business risk is all risk other than financial risk, and is sometimes defined as the staying power of the market demand for a firm's product or service and the resulting inherent uncertainty of realizing expected pre-tax returns on the firm's assets. Business risk encompasses all operating factors, e.g., productivity, competition, management ability, etc. that bear upon the expected pre-tax operating income attributed to the fundamental nature of a firm's business. Financial risk results from a firm's use of borrowed funds (or similar sources

of capital with fixed payments) in its capital structure, i.e., financial leverage. Thus, if a firm did not employ financial leverage by borrowing any capital, its investment risk would be represented by its business risk.

It is important to note that in evaluating the risk of regulated companies, financial leverage cannot be considered in the same context as it is for non-regulated companies. Financial leverage has a different meaning for regulated firms than for non-regulated companies. For regulated public utilities, the cost of service formula gives the benefits of financial leverage to consumers in the form of lower revenue requirements. For non-regulated companies, all benefits of financial leverage are retained by the common stockholder. Although retaining none of the benefits, regulated firms bear the risk of financial leverage. Therefore, a regulated firm's rate of return on common equity must recognize the greater financial risk shown by the higher leverage typically employed by public utilities.

Although no single index or group of indices can precisely quantify the relative investment risk of a firm, financial analysts use a variety of indicators to assess that risk. For example, the creditworthiness of a firm is revealed by its bond ratings. If the stock is traded, the price-earnings multiple, dividend yield, and beta coefficients (a statistical measure of a stock's relative volatility to the rest of the market) provide some gauge of overall risk. Other indicators, which are reflective of business risk, include the variability of the rate of return on equity, which is indicative of the uncertainty of actually achieving the expected earnings; operating ratios (the percentage of revenues consumed by operating expenses, depreciation, and taxes other than income tax), which are indicative of profitability; the quality of earnings, which considers the degree to which earnings are the product of accounting principles or cost deferrals; and the level of internally generated funds. Similarly, the proportion of senior capital in a company's capitalization is the measure of financial risk, which is often analyzed in the

context of the equity ratio (i.e., the complement of the debt ratio).

APPENDIX D TO DIRECT TESTIMONY OF PAUL R. MOUL

COST OF EQUITY--GENERAL APPROACH

Through a fundamental financial analysis, the relative risk of a firm must be established prior to the determination of its cost of equity. Any rate of return recommendation, which lacks such a basis, will inevitably fail to provide a utility with a fair rate of return except by coincidence. With a fundamental risk analysis as a foundation, standard financial models can be employed by using informed judgment. The methods, which have been employed to measure the cost of equity, include: the Discounted Cash Flow ("DCF") model, the Risk Premium ("RP") approach, the Capital Asset Pricing Model ("CAPM") and the Comparable Earnings ("CE") approach.

The traditional DCF model, while useful in providing some insight into the cost of equity, is not an approach that should be used exclusively. The divergence of stock prices from company-specific fundamentals can provide a misleading cost of equity calculation. As reported in The Wall Street Journal on June 6, 1991, a statistical study published by Goldman Sachs indicated that only 35% of stock price growth in the 1980's could be attributed to earnings and interest rates. Further, 38% of the rise in stock prices during the 1980's was attributed to unknown factors. The Goldman Sachs study highlights the serious limitations of a model, such as DCF, which is founded upon identification of specific variables to explain stock price growth. That is to say, when stock price growth exceeds growth in a company's earnings per share, models such as DCF will misspecify investor expected returns, which are comprised of capital gains, as well as dividend receipts. As such, a combination of methods should be used to measure the cost of equity.

The Risk Premium analysis is founded upon the prospective cost of long-term debt, i.e., the yield that the public utility must offer to raise long-term debt capital directly from investors. To that yield must be added a risk premium in recognition of the greater risk of common equity over debt. This additional risk is, of course, attributable to the fact that the

payment of interest and principal to creditors has priority over the payment of dividends and return of capital to equity investors. Hence, equity investors require a higher rate of return than the yield on long-term corporate bonds.

The CAPM is a model not unlike the traditional Risk Premium. The CAPM employs the yield on a risk-free interest-bearing obligation plus a premium as compensation for risk. Aside from the reliance on the risk-free rate of return, the CAPM gives specific quantification to systematic (or market) risk as measured by beta.

The Comparable Earnings approach measures the returns expected/experienced by other non-regulated firms and has been used extensively in rate of return analysis for over a half century. However, its popularity diminished in the 1970s and 1980s with the popularization of market-based models. Recently, there has been renewed interest in this approach. Indeed, the financial community has expressed the view that the regulatory process must consider the returns, which are being achieved in the non-regulated sector so that public utilities can compete effectively in the capital markets. Indeed, with additional competition being introduced throughout the traditionally regulated public utility industry, returns expected to be realized by non-regulated firms have become increasing relevant in the ratesetting process. The Comparable Earnings approach considers directly those requirements and it fits the established standards for a fair rate of return set forth in the landmark decisions on the issue of rate of return. These decisions require that a fair return for a utility must be equal to that earned by firms of comparable risk.

APPENDIX E TO DIRECT TESTIMONY OF PAUL R. MOUL

DISCOUNTED CASH FLOW ANALYSIS

Discounted Cash Flow ("DCF") theory seeks to explain the value of an economic or financial asset as the present value of future expected cash flows discounted at the appropriate risk-adjusted rate of return. Thus, if $100 is to be received in a single payment 10 years subsequent to the acquisition of an asset, and the appropriate risk-related interest rate is 8%, the present value of the asset would be $46.32 (Value = $100 ÷ $(1.08)^{10}$) arising from the discounted future cash flow. Conversely, knowing the present $46.32 price of an asset (where price = value), the $100 future expected cash flow to be received 10 years hence shows an 8% annual rate of return implicit in the price and future cash flows expected to be received.

In its simplest form, the DCF theory considers the number of years from which the cash flow will be derived and the annual compound interest rate, which reflects the risk or uncertainty, associated with the cash flows. It is appropriate to reiterate that the dollar values to be discounted are future cash flows.

DCF theory is flexible and can be used to estimate value (or price) or the annual required rate of return under a wide variety of conditions. The theory underlying the DCF methodology can be easily illustrated by utilizing the investment horizon associated with a preferred stock not having an annual sinking fund provision. In this case, the investment horizon is infinite, which reflects the perpetuity of a preferred stock. If *P* represents price, *Kp* is the required rate of return on a preferred stock, and *D* is the annual dividend (*P* and *D* with time subscripts), the value of a preferred share is equal to the present value of the dividends to be received in the future discounted at the appropriate risk-adjusted interest rate, *Kp*. In this circumstance:

$$P_0 = \frac{D_1}{(1 + Kp)} + \frac{D_2}{(1 + Kp)^2} + \frac{D_3}{(1 + Kp)^3} + \ldots + \frac{D_n}{(1 + Kp)^n}$$

If $D_1 = D_2 = D_3 = \ldots D_n$ as is the case for preferred stock, and n approaches infinity, as is the case for non-callable preferred stock without a sinking fund, then this equation reduces to:

$$P_0 = \frac{D_1}{Kp}$$

This equation can be used to solve for the annual rate of return on a preferred stock when the current price and subsequent annual dividends are known. For example, with D_1 = \$1.00, and P_0 = \$10, then Kp = \$1.00 ÷ \$10, or 10%.

The dividend discount equation, first shown, is the generic DCF valuation model for all equities, both preferred and common. While preferred stock generally pays a constant dividend, permitting the simplification subsequently noted, common stock dividends are not constant. Therefore, absent some other simplifying condition, it is necessary to rely upon the generic form of the DCF. If, however, it is assumed that D_1, D_2, D_3, ...D_n are systematically related to one another by a constant growth rate (g), so that $D_0 (1 + g) = D_1$, $D_1 (1 + g) = D_2$, $D_2 (1 + g) = D_3$ and so on approaching infinity, and if Ks (the required rate of return on a common stock) is greater than g, then the DCF equation can be reduced to:

$$P_0 = \frac{D_1}{Ks - g} \quad or \quad P_0 = \frac{D_0 (1 + g)}{Ks - g}$$

which is the periodic form of the "Gordon" model.[2] Proof of the DCF equation is found in all modern basic finance textbooks. This DCF equation can be easily solved as:

$$Ks = \frac{D_0 (1 + g)}{P_0} + g$$

[2]Although the popular application of the DCF model is often attributed to the work of Myron J. Gordon in the mid-1950's, J. B. Williams exposited the DCF model in its present form nearly two decades earlier.

which is the periodic form of the Gordon Model commonly applied in estimating equity rates of return in rate cases. When used for this purpose, *Ks* is the annual rate of return on common equity demanded by investors to induce them to hold a firm's common stock. Therefore, the variables D_0, P_0 and *g* must be estimated in the context of the market for equities, so that the rate of return, which a public utility is permitted the opportunity to earn, has meaning and reflects the investor-required cost rate.

Application of the Gordon model with market derived variables is straightforward. For example, using the most recent prior annualized dividend *(D_0)* of $0.80, the current price *(P_0)* of $10.00, and the investor expected dividend growth rate *(g)* of 5%, the solution of the DCF formula provides a 13.4% rate of return. The dividend yield component in this instance is 8.4%, and the capital gain component is 5%, which together represent the total 13.4% annual rate of return required by investors. The capital gain component of the total return may be calculated with two adjacent future year prices. For example, in the eleventh year of the holding period, the price per share would be $17.10 as compared with the price per share of $16.29 in the tenth year which demonstrates the 5% annual capital gain yield.

Dividend Yield

The historical annual dividend yield for the Water Group is shown on Schedule 3. The 2006-2010 five-year average dividend yield was 3.2% for the Water Group. The monthly dividend yields for the past twelve months are shown graphically on Schedule 7. These dividend yields reflect an adjustment to the month-end closing prices to remove the pro rata accumulation of the quarterly dividend amount since the last ex-dividend date.

The ex-dividend date usually occurs two business days before the record date of the dividend (i.e., the date by which a shareholder must own the shares to be entitled to the dividend payment--usually about two to three weeks prior to the actual payment). During a quarter (here defined as 91 days), the price of a stock moves up ratably by the dividend

amount as the ex-dividend date approaches. The stock's price then falls by the amount of the dividend on the ex-dividend date. Therefore, it is necessary to calculate the fraction of the quarterly dividend since the time of the last ex-dividend date and to remove that amount from the price. This adjustment reflects normal recurring pricing of stocks in the market, and establishes a price which will reflect the true yield on a stock.

A six-month average dividend yield has been used to recognize the prospective orientation of the ratesetting process as explained in the direct testimony. For the purpose of a DCF calculation, the average dividend yields must be adjusted to reflect the prospective nature of the dividend payments, i.e., the higher expected dividends for the future rather than the recent dividend payment annualized. An adjustment to the dividend yield component, when computed with annualized dividends, is required based upon investor expectation of quarterly dividend increases.

The procedure to adjust the average dividend yield for the expectation of a dividend increase during the initial investment period will be at a rate of one-half the growth component, developed below. The DCF equation, showing the quarterly dividend payments as D_0, may be stated in this fashion:

$$K = \frac{D_0(1+g)^0 + D_0(1+g)^0 + D_0(1+g)^1 + D_0(1+g)^1}{P_0} + g$$

The adjustment factor, based upon one-half the expected growth rate developed in my direct testimony, will be 3.125% (6.25% x .5) for the Water Group, which assumes that two dividend payments will be at the expected higher rate during the initial investment period. Using the six-month average dividend yield as a base, the prospective (forward) dividend yield would be 3.44% (3.34% x 1.03125) for the Water Group.

Another DCF model that reflects the discrete growth in the quarterly dividend (D_0) is as follows:

$$K = \frac{D_0(1+g)^{.25} + D_0(1+g)^{.50} + D_0(1+g)^{.75} + D_0(1+g)^{1.00}}{P_0} + g$$

This procedure confirms the reasonableness of the forward dividend yield previously calculated. The quarterly discrete adjustment provides a dividend yield of 3.47% (3.34% x 1.03877) for the Water Group. The use of an adjustment is required for the periodic form of the DCF in order to properly recognize that dividends grow on a discrete basis.

In either of the preceding DCF dividend yield adjustments, there is no recognition for the compound returns attributed to the quarterly dividend payments. Investors have the opportunity to reinvest quarterly dividend receipts. Recognizing the compounding of the periodic quarterly dividend payments *(D_0)*, results in a third DCF formulation:

$$k = \left[\left(1 + \frac{D_0}{P_0}\right)^4 - 1\right] + g$$

This DCF equation provides no further recognition of growth in the quarterly dividend. Combining discrete quarterly dividend growth with quarterly compounding would provide the following DCF formulation, stating the quarterly dividend payments *(D_0)*:

$$k = \left[\left(1 + \frac{D_0(1+g)^{.25}}{P_0}\right)^4 - 1\right] + g$$

A compounding of the quarterly dividend yield provides another procedure to recognize the necessity for an adjusted dividend yield. The unadjusted average quarterly dividend yield was 0.8350% (3.34% ÷ 4) for the Water Group. The compound dividend yield would be 3.43% (1.008478^4-1) for the Water Group, recognizing quarterly dividend payments in a forward-looking manner. These dividend yields conform with investors' expectations in the context of reinvestment of their cash dividend.

For the Water Group, a 3.45% forward-looking dividend yield is the average (3.44%

+ 3.47% + 3.43% = 10.34% ÷ 3) of the adjusted dividend yield using the form D_0/P_0 *(1+.5g)*, the dividend yield recognizing discrete quarterly growth, and the quarterly compound dividend yield with discrete quarterly growth.

Growth Rate

If viewed in its infinite form, the DCF model is represented by the discounted value of an endless stream of growing dividends. It would, however, require 100 years of future dividend payments so that the discounted value of those payments would equate to the present price so that the discount rate and the rate of return shown by the simplified Gordon form of the DCF model would be about the same. A century of dividend receipts represents an unrealistic investment horizon from almost any perspective. Because stocks are not held by investors forever, the growth in the share value (i.e., capital appreciation, or capital gains yield) is most relevant to investors' total return expectations. Hence, investor expected returns in the equity market are provided by capital appreciation of the investment as well as receipt of dividends. As such, the sale price of a stock can be viewed as a liquidating dividend which can be discounted along with the annual dividend receipts during the investment holding period to arrive at the investor expected return.

In its constant growth form, the DCF assumes that with a constant return on book common equity and constant dividend payout ratio, a firm's earnings per share, dividends per share and book value per share will grow at the same constant rate, absent any external financing by a firm. Because these constant growth assumptions do not actually prevail in the capital markets, the capital appreciation potential of an equity investment is best measured by the expected growth in earnings per share. Since the traditional form of the DCF assumes no change in the price-earnings multiple, the value of a firm's equity will grow at the same rate as earnings per share. Hence, the capital gains yield is best measured by earnings per share growth using company-specific variables.