DIRECT TESTIMONY

of

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Finance Department
Financial Analysis Division
Public Utilities Bureau
Illinois Commerce Commission

Aqua Illinois, Inc.

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WITNESS IDENTIFICATION

1. Q. Please state your name and business address.

A. My name is Rochelle Phipps. My business address is 527 East Capitol Avenue, Springfield, Illinois 62701.

2. Q. By whom are you employed and in what capacity?

A. I am employed by the Illinois Commerce Commission ("Commission") as a Senior Financial Analyst in the Finance Department of the Financial Analysis Division.

3. Q. Please describe your qualifications and background.

A. I received a Bachelor of Arts degree in Finance from Illinois College, Jacksonville, Illinois, and a Master of Business Administration degree from the University of Illinois at Springfield. I have been employed by the Commission since June 2000.

4. Q. What is the purpose of your testimony in this proceeding?

A. I will present my analysis of Aqua Illinois, Inc.'s ("Aqua" or the "Company") overall cost of capital and my recommendation for a fair rate of return on rate base. I will also respond to Company witness Ms. Pauline Ahern's direct testimony.

COST OF CAPITAL

5. Q. Please summarize your cost of capital findings.

A. I recommend an 8.78% overall rate of return for the Company, as shown on Schedule 3.01. The Company's proposed 9.02% overall rate of return for Aqua is also presented on Schedule 3.01.

6. Q. Why must one determine the overall rate of return for a public utility?

A. A primary goal of regulation is to properly balance the interests of a utility's ratepayers and investors. This is accomplished by minimizing the cost of reliable service to ratepayers while allowing utilities to earn a fair and reasonable rate of return on rate base.

Regulators should determine an allowable rate of return for a public utility that equals the investor-required rate of return for companies with similar risk characteristics.[1] When public utilities charge rates that reflect an authorized rate of return that exceeds the cost of capital, consumers are encumbered with excessive prices. Conversely, when public utilities charge rates that reflect an authorized rate of return below the cost of capital, the financial integrity of the utility suffers, making it difficult for the utility to attract capital at a reasonable cost. Ultimately, the utility's inability to raise sufficient capital would impair service quality. Consumers are best served when the authorized rate of return on rate base equals the overall cost of capital.

In authorizing a rate of return on rate base equal to the overall cost of capital, all costs of service are assumed reasonable and accurately measured. If unreasonable costs continue to be incurred, or if any reasonable cost of service component is measured inaccurately, then the allowed rate of return on rate base will not balance ratepayer and investor interests.

7. Q. Mathematically define the overall cost of capital for a public utility.

A. The overall cost of capital equals the sum of the costs of the capital structure components (*i.e.*, debt, preferred stock and common equity) after weighting each component according to its proportion of total capitalization.

CAPITAL STRUCTURE

8. Q. What capital structure does the Company propose for determining the rate of return on rate base?

A. The Company proposes determining the rate of return on rate base on the basis of a forecasted average 2007 capital structure comprising 40.73% long-term debt, 52.00% common equity, 0.27% preferred stock and 7.00% short-term debt.[2] The Company's proposed capital structure appears on Schedule 3.01.

[1] This discussion assumes the utility's cost of capital strikes a reasonable balance of financial strength and cost.
[2] Co. Sch. D-1, p. 1.

9. Q. What capital structure do you recommend for setting rates in this proceeding?

A. I used a forecasted average 2007 capital structure, which comprises 41.04% long-term debt, 52.35% common equity, 0.27% preferred stock and 6.33% short-term debt. My proposed capital structure is shown on Schedule 3.01.

10. Q. How did you adjust the Company's proposed short-term debt balance?

A. I made two adjustments to the Company's proposed average 2007 short-term debt balance. First, I added $1,100,000 to every projected 2007 month-end short-term debt balance, which is the difference between the Company's projected March 2006 short-term debt balance presented on Schedule D-2 and the Company's actual March 2006 month-end short-term debt balance. Additionally, I added $984,547 to every projected 2007 month-end balance of construction work in progress ("CWIP") and CWIP accruing an allowance for funds used during construction ("AFUDC"), which is the difference between the Company's projected March 2006 balances presented on Schedule D-2 and the Company's actual March 2006 month-end balances for those two items.[3]

Second, I adjusted the monthly balance of short-term debt for the portion supporting CWIP. To calculate the short-term debt balance, I first calculated the monthly ending net balance of short-term debt outstanding

[3] Co. response to Staff data request FD 1.09.

each month. The net balance of short-term debt is the greater of: a) the monthly ending gross balance of short-term debt outstanding minus the corresponding monthly ending balance of CWIP accruing AFUDC; or b) CWIP accruing AFUDC times the ratio of short-term debt to total CWIP. That adjustment recognizes that the Commission's formula for calculating AFUDC assumes short-term debt is the first source of funds financing CWIP and addresses the concern the Commission has raised in a previous Order[4] about double-counting short-term debt balances. Next, I calculated twelve monthly averages from the monthly ending net short-term debt balances. Finally, I averaged the twelve monthly average net balances of short-term debt for January 2007 through December 2007, which is consistent with the other components of the Company's proposed capital structure. Schedule 3.02 presents the calculation of the average adjusted balances of short-term debt and Aqua's 2007 average short-term debt balance.

11. Q. Did you adjust the Company's proposed long-term debt balance?

A. Yes. I adjusted the unamortized debt expense and premium for Series W and P debt issuances, respectively. My proposed average 2007 long-term debt balance for Aqua is presented on Schedule 3.03.

12. Q. Did you adjust the Company's proposed preferred stock balance?

A. No. The average preferred stock balance is presented on Schedule 3.04.

[4] *Order* at 51, Illinois-American Water Company: Proposed general increase in water rates, ICC Docket No. 95-0076, 1995 Ill. PUC Lexis 884 (December 20, 1995).

13. Q. Did you adjust the Company's proposed common equity balance?

A. Yes. I reduced the Company's proposed common equity balance by deducting the capital stock expense from the common equity balance. The Company's average common equity balance is presented on Schedule 3.05.

14. Q. Does capital structure affect the overall cost of capital?

A. Yes. Financial theory suggests capital structure will affect the value of a firm and, therefore, its cost of capital, to the extent capital structure affects the expected level of cash flows that accrue to outside parties (i.e., other than debt and stock holders). Employing debt as a source of capital reduces a company's income taxes,[5] thereby reducing the cost of capital. However, as reliance on debt as a source of capital increases, so does the probability of default. As default becomes more probable, expected payments to attorneys, trustees, accountants and other outside parties increase; simultaneously, the expected value of the income tax shield provided by debt financing declines. Beyond a certain point, a growing dependence on debt as a source of funds increases the overall cost of capital. Therefore, the Commission should not determine the overall rate of return from a utility's actual capital structure if the Commission concludes that capital structure adversely affects the overall cost of capital.

[5] The tax advantage debt has over equity at the corporate level is partially offset at the individual investor level. Debt investors receive returns largely in the form of current income (i.e., interest). In contrast, equity investors receive returns in the form of both current income (i.e., dividends) and capital appreciation (i.e.,

An optimal capital structure would minimize the cost of capital and maintain a utility's financial integrity. Unfortunately, determining whether a capital structure is optimal remains problematic because (1) the cost of capital is a continuous function of the capital structure, rendering precise measurement along each point of the range of possible capital structures problematic; (2) the optimal capital structure is a function of operating risk, which is dynamic; and (3) the relative costs of the different types of capital vary with dynamic market conditions. Consequently, one should determine whether the capital structure is consistent with the financial strength necessary to access the capital markets under most conditions, and if so, whether the cost of that financial strength is reasonable.

Towards that end, I compared the Company's average 2007 capital structure to industry standards. Standard & Poor's ("S&P") categorizes debt securities on the basis of the risk that a company will default on its interest or principal payment obligations. The resulting credit rating reflects both the operating and financial risks of a utility.[6] The mean total debt ratio of water utilities that have an S&P 'A' credit rating equals 51.51%. The mean common equity ratio for S&P A-rated water utilities equals 48.03%.[7] The above ratios are shown in Table 1 for comparative purposes.

capital gains). Taxes on capital gains and dividend income are lower than taxes on interest income because capital gains and dividend tax rates are lower and taxes on capital gains are deferred until realized.

[6] Standard & Poor's, *Utility Financial Statistics*, June 1999, p. 3.

[7] *S&P Utility Compustat*

Table 1: Capital Structure Ratios

	A-Rated Water Utilities		S&P Benchmark Debt Ratios				Aqua's Forecasted 2007 Total Debt Ratio
			A-Rated Utilities		AA-Rated Utilities		
	Mean	Standard Deviation	Business Profile Score of 2	Business Profile Score of 3	Business Profile Score of 2	Business Profile Score of 3	
Debt Ratio	51.51%	3.59%	52%-58%	50%-55%	**45%-52%**	**42%-50%**	**47.37%**
Equity Ratio	48.03%	3.85%					52.35%

Aqua's average 2007 capital structure comprises a lower proportion of debt and a higher proportion of equity than A-rated water utilities. Aqua's debt ratio is also less than the debt ratio benchmarks for A-rated utilities with business profile scores of 2 or 3. Aqua's average 2007 total debt ratio is also lower than the 52.9% median debt ratio for all S&P-rated water utilities.[8] Aqua's average 2007 capital structure is closer to the S&P Benchmark Debt Ratio ranges for AA-rated water utilities with business profile scores of 2 and 3, which suggest Aqua has a lower degree of financial risk than A-rated water utilities. Nevertheless, Aqua's average 2007 total debt and equity ratios are reasonably close to the mean total debt and equity ratios for S&P A-rated water utilities. According to S&P, an obligor rated 'A' has a strong capacity to meet its financial commitments.[9] The above suggests that the Company's average 2007 capital structure as presented by Staff on Schedule 3.01 is commensurate with a strong degree of financial strength.

15. Q. S&P currently does not rate Aqua. Why did you compare Aqua's capital structure ratios to water utilities with 'A' credit ratings?

A. S&P publishes targets for the following three ratios (collectively, the "Benchmark Ratios") that it uses in its analysis of investor-owned utilities: (1) funds from operations ("FFO") interest coverage; (2) FFO to total debt; and (3) total debt to total capital. The Benchmark Ratios measure financial risk. The financial targets vary with the business profile score.[10] The S&P published targets for utilities with business profile scores of 2 and 3 indicate that Aqua's financial strength is consistent with a strong A credit rating. Table 2 presents Aqua's financial ratios for the 2003-2005 period.

Table 2: S&P Utility Benchmark Credit Ratio Analysis

		S&P Financial Benchmark Ratio Targets			
		AA-Rated Utilities		A-Rated Utilities	
Financial Benchmark Ratio	Aqua 3-Year Average	Business Profile Score of 2	Business Profile Score of 3	Business Profile Score of 2	Business Profile Score of 3
FFO Interest Coverage	3.8X	**3X – 4X**	**3.5X – 4.5X**	2X – 3X	2.5X – 3.5X
FFO to Total Debt	19%	20% - 25%	25% - 30%	**12% - 20%**	**15% - 25%**
Total Debt to Total Capital	50%	**45% - 52%**	**42% - 50%**	52% - 58%	**50% - 55%**

[8] Standard & Poor's, "Research: CreditStats: Water Transmission & Distribution Utilities – Regulated," August 11, 2005.
[9] Standard & Poor's, *Utility Financial Statistics,* June 1999, p. 4.
[10] Standard & Poor's, "Research: New Business Profile Scores Assigned for U.S. Utility and Power Companies; Financial Guidelines Revised," June 2, 2004.

16. Q. Why did you compare Aqua's Benchmark Ratio values to the ranges S&P established for the business profile scores of 2 and 3?

A. A firm's market-required return on common equity is a function of its operating and financial risks. S&P business profile scores reflect the operating risk of a utility. S&P focuses on industry characteristics as well as the company's competitive position and management. A utility's business profile score is evaluated on a scale of one to ten. A rating of one denotes below average business risk, while a rating of ten denotes above average business risk.[11] I imputed an S&P business profile score for the Company since it does not have one. I began with 10 water companies with business profile scores listed in S&P *Utilities & Perspectives*. Of these 10 water utilities, 1 is assigned a business profile score of "1"; 4 are assigned a business profile score of "2"; 4 are assigned a business profile score of "3"; and 1 is assigned a business profile score of "4".[12] The average business profile score of the 10 water utilities is 2.5. Additionally, Aqua's A+-rated affiliate, Aqua Pennsylvania, has also been assigned an S&P business profile score of 2.[13] Based on the average business profile score of 2.5 for S&P-rated water utilities and the S&P business profile score of 2 for Aqua Pennsylvania, I concluded that a business profile score of 2 to 3 would be a reasonable estimate for Aqua.

COST OF SHORT-TERM DEBT

17. Q. What is Aqua's cost of short-term debt?

[11] Standard & Poor's, "Research: New Business Profile Scores Assigned for U.S. Utility and Power Companies; Financial Guidelines Revised," June 2, 2004.
[12] Standard & Poor's, "Research: U.S. Utility and Power Ranking List," April 28, 2006.
[13] Standard & Poor's, "Research: U.S. Utility and Power Ranking List," April 28, 2006.

A. Aqua issues short-term debt in the form of bank loans. The interest rate on those loans equals the 30 to 360-day London Interbank Offered Rate ("LIBOR") plus sixty-five basis points.[14] For the cost of short-term debt, I added 65 basis points to the June 14, 2006, one-month LIBOR rate, 5.21%, for a total cost of 5.86%.[15]

COST OF LONG-TERM DEBT

18. Q. What is Aqua's embedded cost of long-term debt?

A. As shown on Schedule 3.03, Aqua's average embedded cost of long-term debt for 2007 is 7.12%.

19. Q. Did you make any substantive adjustments to the Company's long-term debt schedule?

A. No. I made only non-substantive changes to the Company's long-term debt schedule. Specifically, I modified issuance and maturity dates for four debt issues so that the debt schedule would be consistent with the Company's 2005 ILCC Form 22 annual report. I also adjusted the unamortized debt expense balance and annual amortization expense for Aqua's Series W 5.32% debt issue as well as the unamortized premium balance and annual amortization expense for Aqua's refunded Series P 9.19% debt issue. I also used straight-line amortization to calculate the annual amortization expense for redeemed debt issues Series Q and

[14] Co. Sch. D-2.
[15] Value Line Investment Survey, Selection & Opinion, June 16, 2006.

Series R. Those changes result in a 7.12% average 2007 embedded cost of long-term debt for Aqua, as shown on Schedule 3.03.

COST OF PREFERRED STOCK

20. Q. What is Aqua's embedded cost of preferred stock?

A. As shown on Schedule 3.04, the average embedded cost of preferred stock is 5.48%.

COST OF COMMON EQUITY

21. Q. What is Aqua's cost of common equity?

A. My analysis indicates that Aqua's cost of common equity is 10.45%, as presented on Schedule 3.01.

22. Q. How did you measure the investor-required rate of return on common equity for Aqua?

A. I measured the investor-required rate of return on common equity for Aqua with discounted cash flow ("DCF") and risk premium models. Since current market data is not available for Aqua, DCF and risk premium models cannot be applied directly to Aqua; therefore, I applied both models to water utility and public utility samples (hereafter, referred to as *water sample* and *utility sample*, respectively).

Sample Selection

23. Q. How did you select your water sample?

A. I selected my water sample based on two criteria. First, I began with a list of all domestic corporations assigned an industry number of 4941 (i.e., water utilities) within S&P's *Utility Compustat II*. Second, I removed any company that did not have Zacks Investment Research ("Zacks") long-term growth rates. The remaining companies, American States Water Company, Aqua America, Inc., Artesian Resources, California Water Service Group, Middlesex Water Company, Pennichuck Corp., Southwest Water Company and York Water Company, compose my sample.

24. Q. How did you select a utility sample comparable in risk to Aqua?

A. According to financial theory, the market-required rate of return on common equity is a function of operating and financial risk. Thus, the method used to select a sample should reflect both the operating and financial characteristics of a firm. I calculated the following twelve financial and operating ratios for Aqua for the measurement period 2003-2005: (1) common equity to capitalization; (2) cash flow to capitalization; (3) cash flow to debt; (4) fixed asset turnover; (5) free cash flow to capitalization; (6) fund flow interest coverage; (7) gross utility additions to net utility plant; (8) net cash flows to gross utility additions; (9) operating profit margin; (10) operating revenue stability; (11) earnings before interest and taxes stability; and (12) earnings stability. The last three ratios were measured over the period 2001-2005 with the coefficient of determination of a

least-squares regression of the natural logarithm of the respective quarterly data against time.[16] Data from the period 2003-2005 were averaged to normalize the remaining ratios. Using those ratios, I compared Aqua to the utility industry.

The utility group comprises the 99 market-traded electric, natural gas and water companies in the Standard & Poor's *Utility Compustat* database that had sufficient data to calculate the financial and operating ratios described above. Next, I conducted a principal components analysis of the financial and operating ratios. Principal components constitute linear combinations of optimally-weighted variables that are uncorrelated with one another.[17,18] For each utility in the data base, the principal components analysis calculates values for each component, known as principal component scores, which have a mean of zero and a standard deviation of one. From the principal components analysis, I retained four components for risk analysis. After calculating the scores for each principal component, I rank-ordered the utilities in the database in terms of the least relative distance from Aqua. Distance was measured by calculating the difference between each principal component score for each utility and Aqua, summing the squared differences and taking the square root of the summation. I then eliminated water utilities that were included in my water sample to avoid doubling the weight given to the water utilities. Water utilities are not as widely followed as other utilities; fewer analysts forecast

[16] Dummy variables were added to the regression model to incorporate seasonality.
[17] A principal component can be described mathematically as follows:

$$c_i = b_{i1} * x_1 + b_{i2} * x_2 + \ldots + b_{in} * x_n$$

Where c_i = the utility's score on principal component i;
b_{in} = the weight for ratio xn to create component c_i; and
x_n = the utility's value on variable n.

[18] The variables are optimally weighted when the resulting principal components explain the maximum amount of variance in the database.

growth rates for water utilities and their securities usually trade less frequently. Hence, estimates of the cost of common equity for water utilities are prone to larger measurement error. Next, I excluded any companies that were rated below investment grade by S&P or lacked Zacks growth rates. I also eliminated Idacorp because its common dividend was reduced in 2003. Consequently, some of Idacorp's cash flow ratios for 2003 may be biased measures of its prospective operating risk. Finally, I eliminated companies due to significant acquisition activity.[19] The remaining nine utilities, Dominion Resources Inc., Pinnacle West Capital Corp., Puget Energy, Inc., Northwest Natural Gas, Southwest Gas Corp., Consolidated Edison Inc., Hawaiian Electric Industries, Progress Energy Inc. and Vectren Corp., compose my sample. Schedule 3.06 presents the four principal component scores and the cumulative distance for the remaining nine utilities that are the least distance from and therefore the most comparable to, Aqua. Schedule 3.06 also presents the four principal component scores and the cumulative distance for the companies in my water sample.

DCF Analysis

25. Q. Describe DCF analysis.

A. For a utility to attract common equity capital, it must provide a rate of return on common equity sufficient to meet investor requirements. DCF analysis establishes a rate of return directly from investor requirements. A comprehensive analysis of a utility's operating and financial risk is

[19] I eliminated the following companies due to acquisition activity: Ameren Corp., Alliant Energy Corp.,

unnecessary to estimate a utility's cost of common equity with DCF analysis since the market price of a utility's stock already embodies the market consensus of those risks.

According to DCF theory, a security price equals the present value of the cash flows investors expect it to generate. Specifically, the market value of a firm's common stock equals the aggregate value of its expected stream of future dividends, discounted at the investor-required rate of return.

26. Q. Describe the DCF model with which you measured the investor-required rate of return on common equity.

A. As it applies to common stocks, DCF analysis is generally employed to determine the appropriate stock prices given a specified discount rate. Since a DCF model incorporates time-sensitive valuation factors, it must correctly reflect the timing of the dividend payments that stock prices embody. As such, incorporating stock prices that the financial market sets on the basis of quarterly dividend payments into a model that ignores the time value of quarterly cash flows constitutes a misapplication of DCF analysis.

The companies in both samples pay dividends quarterly; therefore, I applied a constant-growth DCF model that measures the annual required rate of return on common equity as follows:

FPL Group, and Edison International.

$$k = \frac{\sum_{q=1}^{4} D_{1,q}(1+k)^{1-[x+0.25(q-1)]}}{P} + g.$$

Where: P ≡ The current stock price;

$D_{1,q}$ ≡ The next dividend paid at the end of quarter q, where q=1 to 4;

K ≡ The cost of common equity;

X ≡ The elapsed time between the stock observation and first dividend payment dates, in years; and

G ≡ The expected dividend growth rate.

The expression $(1+k)^{1-[x+0.25(q-1)]}$ is a future value factor that measures the value of the expected dividend ($D_{1,q}$) one year from the stock price measurement date. The DCF model above assumes dividends will grow at a constant rate and the market value of common stock (i.e., stock price) equals the sum of the discounted value of each dividend.

27. Q. How did you estimate the growth rate parameter?

A. Determining the market-required rate of return with the DCF methodology requires a growth rate that reflects the expectations of investors. Although the current market price reflects aggregate investor growth expectations, market-consensus expected growth rates cannot be measured directly. Therefore, I measured market-consensus expected growth rates indirectly with Zacks growth estimates, which summarize security analysts' growth rate forecasts that are disseminated to investors.

Zacks summarizes the forward-looking, earnings growth expectations of financial analysts employed by the research departments of investment brokerage firms. The Zacks growth rate estimate for each firm in my samples are presented on Schedule 3.07.

28. Q. How did you measure stock price?

A. A current stock price reflects all relevant information that is available and relevant to the market; thus, it represents the market's assessment of the common stock's current value. I measured each firm's current stock price with its closing stock price from June 8, 2006. Those stock prices appear on Schedule 3.08.

Since current stock prices reflect the market's current expectations of the cash flows the securities will produce and the rate at which those cash flows are discounted, an observed change in the market price does not necessarily indicate a change in the required rate of return on common equity. Price changes may reflect investors' re-evaluation of the expected dividend growth rate. In addition, stock prices change with the approach of dividend payment dates. Consequently, when estimating the required rate of return on common equity with the DCF model, one should measure the expected dividend yield and the corresponding growth rate concurrently. Using historical stock prices along with current growth expectations or combining an updated stock price with past expectations will likely produce an inaccurate estimate of the market-required rate of return on common equity.

29. Q. Explain the significance of the column titled, "Next Dividend Payment Date" shown on Schedule 3.08.

A. Estimating year-end dividend values requires measuring the length of time between each dividend payment date and the first anniversary of the stock observation date. For the first dividend payment, that length of time is measured from the "Next Dividend Payment Date." Subsequent dividend payments occur in quarterly intervals.

30. Q. How did you estimate the next four expected quarterly dividends?

A. Most utilities declare and pay the same dividend per share for four consecutive quarters before adjusting the rate. Consequently, I assumed the dividend rate will remain in effect for a minimum of four quarters and then adjust during the same quarter it changed the previous year. If the utility did not increase its dividend over the previous four quarters, I assumed the dividend would be increased during the next quarter.[20] For those companies that had announced the next dividend payment by the date I preformed my analysis, I input the announced dividend. Otherwise, the expected dividend rate equals the sum of one plus the expected growth rate ($1+g$) times the current dividend rate $D_{0,q}$. Schedule 3.08 presents the current quarterly dividends. Schedule 3.09 presents the expected quarterly dividends.

[20] Artesian Resources is an exception. It has been increasing its common dividend rate every two quarters. I assumed this practice would continue.

31. Q. Based on your DCF analysis, what is the estimated required rate of return on common equity for the water sample and the utility sample?

A. The DCF analysis estimates the required rate of return on common equity is 10.43% for the water sample and 10.57% for the utility sample, as shown on Schedule 3.10. Those estimates are derived from the growth rates presented on Schedule 3.07, the stock price and dividend payments presented on Schedule 3.08 and the expected quarterly dividends presented on Schedule 3.09

Risk Premium Analysis

32. Q. Describe the risk premium model.

A. The risk premium model is based on the theory that the market-required rate of return for a given security equals the risk-free rate of return plus a risk premium associated with that security. A risk premium represents the additional return investors expect in exchange for assuming the risk inherent in an investment. Mathematically, a risk premium equals the difference between the expected rate of return on a risk factor and the risk-free rate. If the risk of a security is measured relative to a portfolio, then multiplying that relative measure of risk and the portfolio's risk premium produces a security-specific risk premium for that risk factor.

The risk premium methodology is consistent with the theory that investors are risk-averse. That is, investors require higher returns to accept greater

exposure to risk. Thus, if investors had an opportunity to purchase one of two securities with equal expected return, they would purchase the security with less risk. Conversely, if investors had an opportunity to purchase one of two securities with equal risk, they would purchase the security with the higher expected return. In equilibrium, two securities with equal quantities of risk have equal required rates of return.

The Capital Asset Pricing Model ("CAPM") is a one-factor risk premium model that mathematically depicts the relationship between risk and return as:

$$R_j = R_f + \beta_j \times (R_m - R_f)$$

Where:
R_j ≡ The required rate of return for security *j*;
R_f ≡ The risk-free rate;
R_m ≡ The expected rate of return for the market portfolio; and
β_j ≡ The measure of market risk for security *j*.

In the CAPM, the risk factor is market risk, which is defined as risk that cannot be eliminated through diversification. To implement the CAPM, one must estimate the risk-free rate of return, the expected rate of return on the market portfolio, and a security or portfolio-specific measure of market risk.

33. Q. How did you measure the risk-free rate of return?

A. I examined the suitability of the yields on four-week U.S. Treasury bills and long-term U.S. Treasury bonds as estimates of the risk-free rate of return.

34. Q. Why did you examine the yields on U.S. Treasury bills and bonds as measures of the risk-free rate?

A. The proxy for the nominal risk-free rate should contain no risk premium and reflect similar inflation and real risk-free rate expectations to the security being analyzed through the risk premium methodology.[21] The yields of fixed income securities include premiums for default and interest rate risk. Default risk pertains to the possibility of default on principal or interest payments. Securities of the United States Treasury are virtually free of default risk by virtue of the federal government's fiscal and monetary authority. Interest rate risk pertains to the effect of interest rate fluctuations on the value of securities.

Since common equity theoretically has an infinite life, its market-required rate of return reflects the inflation and real risk-free rates anticipated to prevail over the long run. U.S. Treasury bonds, the longest term U.S. Treasury securities, are issued with terms to maturity of thirty years; U.S. Treasury notes are issued with terms to maturity ranging from two to ten years; U.S. Treasury bills are issued with terms to maturity ranging from four weeks to six months. Therefore, U.S. Treasury bond yields are more likely to incorporate the inflation and real risk-free rate expectations that

[21] Real risk-free rate and inflation expectations comprise the non-risk related portion of a security's rate of return.

drive, in part, the prices of common stocks than either U.S. Treasury notes or U.S. Treasury bills.

However, due to relatively long terms to maturity, U.S. Treasury bond yields also contain an interest rate risk premium that diminishes their usefulness as measures of the risk-free rate. U.S. Treasury bill yields contain a smaller premium for interest rate risk. Thus, in terms of interest rate risk, U.S. Treasury bill yields more accurately measure the risk-free rate.

35. Q. Given the similarity in the inflation and real risk-free rate expectations that are reflected in the yields on U.S. Treasury bonds and the prices of common stocks, does it necessarily follow that inflation and real risk-free rate expectations that are reflected in the yields on U.S. Treasury bills and the prices of common stocks are dissimilar?

A. No. To the contrary, short and long-term inflation and real risk-free rate expectations, including those that are reflected in the yields on U.S. Treasury bills, U.S. Treasury bonds, and the prices of common stocks, should equal over time. Any other assumption implies that the real risk-free rate and inflation are expected to systematically and continuously rise or fall.

Although expectations for short and long-term real risk-free rates and inflation should equal over time, during finite time periods, short and long-term expectations may differ. Short-term interest rates tend to be

more volatile than long-term interest rates.[22] Consequently, over time U.S. Treasury bill yields are less biased (i.e., more accurate) but less reliable (i.e., more volatile) estimators of the long-term risk-free rate than U.S. Treasury bond yields. Conversely, U.S. Treasury bond yields are more biased (i.e., less accurate) but more reliable (i.e., less volatile) estimators of the long-term risk-free rate. Therefore, an estimator of the long-term nominal risk-free rate should not be chosen mechanistically. Rather, the similarity in current short and long-term nominal risk-free rates should be evaluated. If those risk-free rates are similar, then U.S. Treasury bill yields should be used to measure the long-term nominal risk-free rate. If not, some other proxy or combination of proxies should be used.

36. Q. What are the current yields on four-week U.S. Treasury bills and thirty-year U.S. Treasury bonds?

A. Four-week U.S. Treasury bills are currently yielding 4.89%. Thirty-year U.S. Treasury bonds are currently yielding 5.12%. Both estimates are derived from quotes for June 8, 2006.[23] Schedule 3.11 presents the published quotes and effective yields.

37. Q. Of the U.S. Treasury bill and bond yields, which is currently a better proxy for the long-term risk-free rate?

A. In terms of the gross domestic product ("GDP") price index, the Energy Information Administration ("EIA") forecasts the inflation rate will average

[22] Fabozzi and Pollack, ed., *The Handbook of Fixed Income Securities,* 4th edition, Irwin, p. 789.
[23] The Federal Reserve Board, *Federal Reserve Statistical Release: Selected Interest Rates, H.15 Daily Update*, www.federalreserve.gov/releases/H15/update, June 12, 2006.

2.4% annually during the 2005-2030 period. In terms of the consumer price index ("CPI"), the EIA forecasts the inflation rate will average 2.7% annually during the 2005-2030 period.[24] In comparison, Global Insight forecasts that the GDP price inflation will average 2.0% annually during the 2006-2036 period.[25] In terms of CPI, the *Survey of Professional Forecasters* ("*Survey*") forecasts the inflation rate will average 2.5% during the next ten years.[26] Although EIA, Global Insight and the *Survey* do not forecast the real risk-free rate, they do forecast real GDP growth, which is a proxy for the real risk-free rate. EIA forecasts the real GDP growth rate will average 3.0% during the 2005-2030 period;[27] Global Insight forecasts the real GDP growth rate will average 2.8% during the 2006-2036 period;[28] and the *Survey* forecasts real GDP growth will average 3.2% during the next ten years.[29] Those forecasts imply a long-term, nominal risk-free rate between 4.9% and 5.8%.[30] Therefore, EIA, Global Insight and *Survey* forecasts of inflation and real GDP growth expectations suggest that, currently, both the U.S. Treasury bill yield and the U.S. Treasury bond yield closely approximate the long-term risk-free rate. Thus, I averaged the yields to estimate the risk-free rate of return. It should be noted, however, that the U.S. Treasury bond yield is an

[24] Energy Information Administration, *EIA 2005 Long-Term Forecast*, Table 19, Macroeconomic Indicators.
[25] Global Insight, "The U.S. Economy: The 30 Year Focus," First Quarter 2006, p. 1.
[26] *Survey of Professional Forecasters,* Federal Reserve Bank of Philadelphia, www.phil.frb.org, February 13, 2006. The *Survey* aggregates the forecasts of approximately 30 forecasters.
[27] Energy Information Administration, *EIA 2004 Long-Term Forecast*, Table 19, Macroeconomic Indicators.
[28] Global Insight, "The U.S. Economy: The 30 Year Focus," First Quarter 2006, p. 1.
[29] *Survey of Professional Forecasters,* Federal Reserve Bank of Philadelphia, www.phil.frb.org, February 13, 2006.
[30] Nominal interest rates are calculated as follows:

$$r = (1+R) \times (1+i) - 1$$

Where: R ≡ Nominal interest rate;
R ≡ Real interest rate; and
I ≡ Inflation rate.

upwardly biased estimator of the long-term risk-free rate due to the inclusion of an interest rate risk premium associated with its relatively long term to maturity.

38. Q. Explain why the real risk-free rate and the GDP growth rate should be similar.

A. A risk-free security would provide a rate of return sufficient to compensate investors for the time value of money, which is a function of production opportunities, time preferences for consumption and inflation. The real risk-free rate excludes the premium for inflation.[31] The real GDP growth rate measures output of goods and services without reflecting inflation expectations and, as such, also reflects both production and consumers' consumption preferences. Therefore, both the real GDP growth rate and the real risk-free rate of return should be similar since both are a function of production opportunities and consumption preferences without the effects of either a risk premium or an inflation premium.

39. Q. How was the expected rate of return on the market portfolio estimated?

A. The expected rate of return on the market was estimated by conducting a DCF analysis on the firms comprising the S&P 500 Index ("S&P 500") as of April 1, 2006. That analysis used dividend information and closing market prices reported by Zacks Research Wizard and the April 2006 edition of *Standard & Poor's Security Owner's Stock Guide*. Firms not

[31] Brigham and Houston, *Fundamentals of Financial Management,* 8th edition.

paying a dividend as of March 31, 2006, or for which Zacks growth rates were not available, were eliminated from the analysis. The resulting company-specific estimates of the expected rate of return on common equity were then weighted using market value data from April 1, 2006, as provided by Zacks Research Wizard. The estimated weighted average expected rate of return for the remaining 384 firms, composing 86.5% of the market capitalization of the S&P 500, equals 13.42%.

40. Q. How did you measure market risk on a security-specific basis?

A. Beta measures risk in a portfolio context. When multiplied by the market risk premium, a security's beta produces a market risk premium specific to that security. I developed two distinct sample average betas for each of my samples, one based on the Value Line methodology ("Value Line beta") and the other based on the Merrill Lynch methodology ("Regression beta").[32]

When available, I used published Value Line estimates for each company in each sample. For those companies that did not have published Value Line beta estimates, I calculated beta estimates using the Value Line beta

[32] The Regression beta methodology is the same as the Merrill Lynch methodology except Regression beta methodology substitutes (1) total excess return data for the total price change data that the Merrill Lynch methodology uses and (2) the NYSE Composite Index for the S&P500 Index as a proxy for the market return. The former substitution does not significantly affect the beta estimate; however, using the NYSE Composite Index as a proxy for the market return produced higher utility betas than using the S&P500 Index.

methodology.[33] Value Line estimates beta for a security with the following model using an ordinary least-squares technique:[34]

$$R_{j,t} = a_j + \beta_j \times R_{m,t} + e_{j,t}$$

Where: $R_{j,t}$ ≡ The return on security *j* in period *t*;

$R_{m,t}$ ≡ The return on the market portfolio in period *t*;

a_j ≡ The intercept for security *j*;

β_j ≡ Beta, the measure of market risk for security *j*; and

$e_{j,t}$ ≡ The residual term in period *t* for security *j*.

A beta can be calculated for firms with market-traded common stock. Value Line calculates its betas in two steps. First, the returns of each company are regressed against the returns of the New York Stock Exchange Composite Index ("NYSE Index") to estimate a raw beta. The regression analysis employs 260 weekly observations of stock price data. Then, an adjusted beta is estimated through the following equation:

$$\beta_{adjusted} = 0.35 + 0.67 \times \beta_{raw}.$$

The regression analysis applies an ordinary least-squares technique to the following model to estimate beta for a security or portfolio of securities.

[33] The Value Line service to which the Commission subscribes does not provide beta estimates for Artesian Resources, Middlesex Water Company, Pennichuck and York Water Company.
[34] Statman, "Betas Compared: Merrill Lynch vs. Value Line", *The Journal of Portfolio Management,* Winter 1981.

$$R_{j,t} - R_{f,t} = a + \beta(R_{m,t} - R_{f,t}) + e_t.$$

Where:
$R_{j,t}$ ≡ The return on security *j* in period *t*;
$R_{f,t}$ ≡ The risk-free rate of return in period *t*;
$R_{m,t}$ ≡ The return on the market portfolio in period *t*;
a ≡ The intercept term for security *j*;
β ≡ Beta, the measure of market risk for security *j*; and
e_t ≡ The residual term in period *t* for security *j*.

The beta estimates for the samples were calculated in three steps using regression analysis. First, the U.S. Treasury bill return was subtracted from the average percentage change in the two samples' stock prices and the percentage change in the NYSE Index to estimate each portfolio's return in excess of the risk-free rate. Second, the excess returns of each of the two samples are regressed against the excess returns of the NYSE Index to estimate a raw beta. The regression analysis employs sixty monthly observations of stock and U.S. Treasury bill return data. Third, an adjusted beta is estimated through the following equation:

$$\beta_{adjusted} = 0.33743 + 0.66257 \times \beta_{raw}.$$

41. Q. Why do you use an adjusted beta estimate?

A. Some empirical tests of the CAPM suggest that the linear relationship between risk, as measured by raw beta, and return is flatter than the CAPM predicts. That is, securities with raw betas less than one tend to realize higher returns that the CAPM predicts. Conversely, securities with

raw betas greater than one tend to realize lower returns than the CAPM predicts. Adjusting the raw beta estimate towards the market mean of 1.0 results in a linear relationship between the beta estimate and realized return that more closely conforms to the CAPM prediction.[35] Securities with betas less than one are adjusted upwards thereby increasing the predicted required rate of return towards observed realized rates of return. Conversely, securities with betas greater than one are adjusted downwards thereby decreasing the predicted rate of return towards observed realized rates of return.

42. Q. What are the beta estimates for the water sample and the utility sample?

A. The Value Line beta estimates average 0.66 for the water sample and 0.83 for the utility sample. The regression beta estimates are 0.54 and 0.63, respectively. The average of the Value Line and regression beta estimates equals 0.60 for the water sample and 0.73 for the utility sample.

43. Q. What required rate of return on common equity does the risk premium model estimate for the two samples?

A. The risk premium model estimates a required rate of return on common equity of 10.06% for the water sample and 11.15% for the utility sample. The computation of those estimates appears on Schedule 3.11.

[35] Litzenberger, Ramaswamy and Sosin, "On the CAPM Approach to the Estimation of a Public Utility's Cost of Equity Capital," *Journal of Finance,* May 1980.

Cost of Equity Recommendation

44. Q. Based on your entire analysis, what is your estimate of Aqua's cost of common equity?

A. A thorough cost of common equity analysis requires both the proper application of financial models and appropriate use of the analyst's informed judgment. A cost of common equity recommendation based solely on judgment is inappropriate. Nevertheless, because cost of common equity measurement techniques necessarily employ proxies for investor expectations, judgment remains necessary to evaluate the results of such analyses. Along with DCF and risk premium analyses, I have considered the observable 6.15% rate of return the market currently requires on less risky A-rated long-term debt for utilities.[36] Based on my analysis, in my judgment, the investor-required rate of return on common equity for Aqua is 10.45%. My 10.45% cost of equity recommendation in conjunction with my proposed average 2007 capital structure, as presented on Schedule 3.01, results in a pre-tax interest coverage ratio of 3.79X for Aqua,[37] which compares favorably to the 3.88X average pre-tax interest ratio for all A-rated utilities.[38]

45. Q. Please explain why you did not exclude any cost of equity estimates because the earnings growth rate estimate exceeds the 5.8% implied nominal GDP growth rate that you used in your risk premium analysis.

[36] *Value Line Selection & Opinion*, June 12, 2006.

A. The 5.8% implied nominal GDP growth rate is a proxy for expected long-term economic growth. Individual growth rate estimates for six of the eight companies comprising my water sample exceed the 5.8% implied nominal GDP growth rate. Four of the nine companies comprising my utility sample also have high growth rate estimates. Utilities are closely regulated and typically have higher dividend payout ratios than other industries; thus, reason suggests that utilities would grow more slowly than the economy as a whole. However, as shown by recent stock market "bubbles", capital markets and investors are not always rational. Nevertheless, capital markets are efficient as long as security prices reflect investors' expectations. Nothing suggests that the analysts' growth rate estimates provided by Zacks are biased or inaccurate measures of investors' expectations. Accordingly, those growth rate estimates reflect investors' expectations and should not be rejected despite the fact that several individual growth rate estimates exceed the forecasted economic growth rate.

46. Q. Summarize how you determined the investor-required rate of return on common equity for Aqua equals 10.45%.

A. First, I estimated the investor-required rate of return on common equity for the two samples from the results of the DCF and risk premium analyses for the samples. The models from which the individual company estimates were derived are correctly specified and, thus, contain no source of bias. Moreover, I am unaware of bias in any of my proxies for investor

[37] Aqua Pennsylvania, Inc.'s average pre-tax interest coverage ratio for the years 2002-2004 is 3.70X. S&P CreditStats: Water Transmission & Distribution Utilities – Regulated, August 11, 2005.
[38] *S&P Utility Compustat.*

expectations.[39] In addition, measurement error has been minimized through the use of samples, since estimates for a sample as a whole are subject to less measurement error than individual company estimates. The average investor-required rate of return common equity for the water sample, 10.25%, is based on the average of the DCF-derived results (10.43%) and the risk premium-derived results (10.06%). The average investor-required rate of return on common equity for the utility sample, 10.86%, is based on the average DCF-derived results (10.57%) and the risk premium-derived results (11.15%).[40]

Next, I compared the risk of the two samples to Aqua to determine the relative weighting that should be applied to each.

47. Q. How did you compare the risk of the samples to Aqua?

A. To assess the similarity of the water and utility samples to Aqua in terms of risk, I compared the average factor scores for the water and utility samples with those of Aqua. Schedule 3.06 presents the factor scores for the samples and Aqua. Factor 1 measures financial risk, with a higher score indicating less risk. Since Aqua's score on factor 1 is higher than those of the water sample and the utility sample, Aqua is closer to the utility sample in terms of financial risk, but less risky than both the water and utility samples. Factors 2, 3 and 4 measure operating risk. Factor 2 measures construction risk. Aqua's score on factor 2 is very similar to

[39] Except as discussed above in regard to U.S. Treasury bond yields as proxies for the long-term risk-free rate.
[40] I did not exclude any cost of equity estimates from my sample results because there were no high or low outliers. Specifically, my water sample contained a high DCF-derived estimate (Artesian with a 13.65% cost of equity) and a low estimate (

water sample's factor 2 score, although Aqua's score is slightly lower than that of the water sample, which indicates Aqua has slightly more construction risk than the water sample. Aqua's factor 2 score is also lower than that of the utility sample, which indicates Aqua has more construction risk than the utility sample. Factor 3 measures earnings and revenue stability, indicators of sales and cost variability. Aqua's score on factor 3 is similar to that of the water sample but higher than that of the utility sample, which indicates that Aqua's level of product risk is similar to the water sample but Aqua has less product risk than the utility sample. Factor 4 measures capital intensity. Aqua's factor 4 score exceeds that of the water sample, which indicates that it has more operating leverage. Capital intensity can insulate a company from competition and, thus, reduce risk. However, capital intensity can also indicate higher operating leverage (*i.e.*, fixed costs), which can increase risk through lower earnings stability. Aqua's factor 4 score exceeds that of the water and utility samples; therefore, Aqua is exposed to less competitive risk. Further, Aqua's factor 3 score is higher than that of the utility sample and very close to that of the water sample, which indicates that Aqua's capital intensity has not led to greater relative risk from operating leverage. Therefore, I conclude that Aqua's capital intensity lowers its operating risk relative to the water and utility samples. Thus, in my judgment, the risks of Aqua are more similar to the water sample, while Aqua is less risky than the utility sample.

48. Q. Based on your comparison of the riskiness of the water and utility samples relative to Aqua, how did you weight the costs of common equity for the water sample and the utility sample?

A. Both the water and utility samples reasonably approximate the financial and operating risk level of Aqua. Based on the factor scores described above, Aqua has slightly less financial risk than either sample; Aqua has slightly more product risk than the water sample but less than the utility sample; Aqua has less construction risk than the water sample but more construction risk than the utility sample; and Aqua faces less competitive risk than both the water and utility samples. Although Aqua's Factor 1 score is slightly closer to the utility sample, the Company's scores for factors 2, 3 and 4 are much closer to the water sample. Hence, based on my quantitative risk analysis, Aqua is closer in risk to the water sample than the utility sample. Therefore, I applied two-thirds weight to the water sample average investor-required rate of return on common equity, and one-third weight to the utility sample average investor-required rate of return on common equity. My recommended cost of equity for Aqua, 10.45%, is the result of that calculation.

OVERALL COST OF CAPITAL RECOMMENDATION

49. Q. What is the overall cost of capital for Aqua in this proceeding?

A. As shown on Schedule 3.01, the overall cost of capital estimate for Aqua is 8.78%, which incorporates a 10.45% cost of common equity.

RESPONSE TO MS. PAULINE AHERN

50. Q. Summarize your evaluation of Ms. Ahern's cost of common equity analysis.

A. Ms. Ahern estimates an 11.00% cost of common equity for Aqua.[41] Ms. Ahern's analysis contains several errors that lead her to over-estimate Aqua's cost of common equity. First, Ms. Ahern's inclusion of an investment risk premium due to Aqua's size and alleged NAIC 2 designation is unwarranted. Additionally, Aqua's claim that the Company faces a higher degree of operating risk than the companies used to estimate its cost of equity is incorrect, as shown by my quantitative analysis of Aqua's risk vis-à-vis Ms. Ahern's proxy groups. Thus, adding an investment risk premium to Aqua's cost of equity is unwarranted. Second, Ms. Ahern's utility sample should not include Constellation New Energy ("Constellation"), in light of the fact that it announced a $28 billion merger during December 2005 and ,thus, its' stock price may include a merger premium. Third, Ms. Ahern applied an arbitrary elimination criterion to her DCF-derived cost of equity estimates for the companies comprising her water sample that was inflated due to Ms. Ahern's use of a forecasted bond yield as the threshold for the elimination criterion. Finally, Ms. Ahern incorrectly used a forecasted long-term bond yield as her proxy for the risk-free rate of return in her CAPM analysis.

Investment Risk Premium

51. Q. What is Ms. Ahern's rationale for requesting an investment risk premium for Aqua's cost of common equity?

A. Ms. Ahern alleges that Aqua's size, in comparison to the companies comprising her water and utility samples, is a source of additional

[41] Co. Ex. 3., pp. 3-6.

business risk for the Company.[42] Ms. Ahern also alleges that Aqua's need to replace aging infrastructure vis-à-vis her proxy groups is a source of additional business risk for the Company.[43] Additionally, Aqua has certain debt issues that have been assigned an NAIC 2 designation by the National Association of Insurance Commissioners ("NAIC"), which Ms. Ahern alleges reflects a higher degree of credit risk for Aqua than exists for either of her proxy groups.[44] According to Ms. Ahern, Aqua's size, its NAIC 2 debt designation and the need to replace aging infrastructure warrant an investment risk premium for the cost of common equity of 32 basis points or 0.32%.[45]

52. Q. Does Ms. Ahern quantify the portion of her recommended investment risk premium that is due to Aqua's size in comparison to the proportion that she relates to the NAIC 2 debt designation?

A. Yes. Ms. Ahern asserts that Aqua's size, relative to the size of the companies comprising her water sample, warrants a risk premium adjustment of 480 basis points (or 4.80%) to Aqua's cost of common equity and 573 basis points (or 5.73%) for her utility sample. Ms. Ahern's estimates of size-based risk premiums are based upon historical size premiums for market-traded companies during the 1926 – 2004 measurement period, as reported by Ibbotson Associates.[46] Ms. Ahern asserts further that the NAIC 2 debt designation warrants adding 32 basis points to Aqua's estimated cost of equity. That risk premium is based on

[42] Co. Ex. 3, pp. 11-12.
[43] Co. Ex. 3.0, p. 6.
[44] Co. Ex. 3, pp. 16-17.
[45] Co. Ex. 3, p. 6.
[46] Co. Ex. 3, p. 35.

the average yield spread between Moody's Baa rated public utility bonds and Moody's A2 public utility bonds (*i.e.*, the average Moody's bond rating for Ms. Ahern's water and utility samples, respectively).[47] Together, those risk premiums total 512 basis points (or 5.12%) for the water sample (*i.e.*, 480 + 32) and 605 basis points (or 6.05%) for the utility sample (*i.e.*, 573 + 32). Ms. Ahern makes what she characterizes as a "conservatively reasonable" investment risk adjustment of 32 basis points to her cost of equity estimate for Aqua.[48]

53. Q. Do you agree with Ms. Ahern's recommended investment risk premium for her water and utility samples?

A. No, I do not.

54. Q. Did the Commission include an investment risk premium in Aqua's allowed cost of equity in Aqua's last rate case?[49]?

A. Yes, while it did, the Commission's Order also stated the following:

> [T]he Commission finds it significant that Staff testifies that such an investment risk premium is unnecessary and may not be recommended by Staff in future Aqua rate proceedings. Thus, in Aqua's next rate proceeding, the Commission expects to consider

[47] Ms. Ahern's utility sample actually has an average credit rating of A- and business profile score of 4. Ms. Ahern incorrectly used the credit ratings for operating companies rather than those issued for the companies comprising her samples.
[48] Co. Ex. 3, pp. 35-36.
[49] Order, Aqua Illinois, Inc.: Proposed general increase in water and sewer rates for the Woodhaven Water Division (Tariffs filed on December 22, 2004) / Proposed general increase in water rates for the Oak Run Water Division (Tariffs filed on December 29, 2004), ICC Docket Nos. 05-0071 / 0072 (consol.) (November 8, 2005) (hereafter "Woodhaven / Oak Run Order")

the propriety of an incremental investment risk premium on the cost of common equity.[50]

Size-based Risk Premium

55. Q. Explain why Ms. Ahern's adjustment for a size-based risk premium is inappropriate.

A. First, Ms. Ahern's size-based risk premium has no theoretical basis. Rather, it is based on an empirical study of beta, the measure of risk in the CAPM, which is not applicable to Aqua. Second, Ms. Ahern inappropriately applied her size-based risk premium to her overall analysis rather than limiting it to those that use beta (*i.e.*, the CAPM analysis). Regardless, should a size-based risk premium adopted, and it should not, it should be based on the size of Aqua's parent company, Aqua America, Inc. ("Aqua America").

56. Q. Why should the parent company be the basis for a size adjustment?

A. Although Aqua raises its own debt, it obtains common equity financing from its parent company,[51] Aqua America, whose market capitalization is approximately $3.0 billion.[52] Being part of a much larger organization should enhance Aqua's ability to access the equity market on reasonable terms. When utilities combine, reductions in costs resulting from efficiencies should be passed on to customers in the form of lower rates. Such economies of scale are often advanced to justify utility acquisitions

[50] Id. at 53-54.
[51] Co. responses to Staff data requests FD 1.10 and FD 1.11.
[52] Co. Ex. 3.8, p. 7.

and reorganizations. Financial capital costs are also subject to economies of scale. If the risk inherent in a utility common stock is a function of that utility's size, then the larger size of Aqua America should translate into a decreased cost of common equity, in comparison to that of a company the size of Aqua. If a risk premium were based on the size of Aqua, ratepayers would be denied a portion of the benefits associated with the combined entity's stronger financial profile.

In fact, in support of the Company's request to merge with Philadelphia Suburban Corporation ("PSC", now known as Aqua America), the President of Consumers Illinois Water Company ("Consumers Illinois", now known as Aqua Illinois) testified that the merger "should enhance the ability of PSC and Consumers Illinois to access the capital markets on reasonable terms".[53] Similarly, another Company witness testified, "the combined entity will have a stronger financial profile," which "should enhance the ability of PSC and Consumers Illinois to access the capital markets on reasonable terms."[54]

57. Q. Explain the significance of the absence of a theoretical basis for a size-based risk premium.

A. Since a size-based risk premium has no theoretical basis, to the extent that a correlation between firm size and return exists, that relationship is likely the result of some other factor or factors that are related to both size

[53] Order at 3, Consumers Illinois Water Company and Philadelphia Suburban Corporation Joint Application for approval of the Reorganization of Consumers Illinois Water Company through the merger of Consumers Water Company and Philadelphia Suburban Corporation and for assignment of Service Agreement, ICC Docket No. 98-0602, 1999 Ill. PUC Lexis 109 (January 21, 1999)
[54] *Id.*

and return, such as liquidity or information costs. Relatively illiquid securities impose costs on investors since they may be unable to sell illiquid securities at a fair price on a timely basis. The securities of smaller companies tend to be less liquid than those of larger companies since the potential breadth of the market for the former tends to be more limited. Additionally, gathering information regarding the expected cash flows and risks of a security imposes costs an investor must recover through the returns that security generates. If fewer sources of information regarding smaller companies exist, then obtaining information might be more expensive.

If Aqua America securities are less liquid or the availability of information regarding Aqua America is more restricted than the average security, then adding a size-based premium to a CAPM analysis of Aqua's cost of common equity might be proper. However, Ms. Ahern has not provided any evidence to demonstrate a size premium is warranted for utilities. The study reported in Ibbotson Associates, which forms the basis for Ms. Ahern's size-based risk premium adjustment, is not restricted to utilities. Rather, it is based on the stocks listed on the New York Stock Exchange ("NYSE"), American Stock Exchange ("AMEX") and National Association of Security Dealers Automated Quotation System ("NASDAQ").[55] In addition, the Brigham text that Ms. Ahern also cites in support of her size-based risk premium does not specifically refer to utility stocks either. Further, the Brigham text defines a small firm as one with a market capitalization of less than $20 million, which is far below Aqua's $129

[55] Co. Ex. 3, p. 35.

million book capitalization.[56] Thus, the entire basis of Ms. Ahern's size-based risk premium is questionable at best.

Utilities, unlike most stocks listed on the NYSE, AMEX, or NASDAQ, are subject to uniform reporting requirements. Furthermore, their rates and conditions of service are publicly reported. Therefore, the cost of obtaining information regarding smaller utilities in general, and Aqua in particular, is unlikely to be as high as that of unregulated companies that are similar in size; hence, the application of a size-based premium to a utility is highly questionable. In fact, contrary to Ms. Ahern's claims, a study by Annie Wong, reported in the Journal of the Midwest Finance Association, specifically found that there is no justification for a size premium for utilities.[57]

Even for non-utilities, evidence of the existence of a size-based risk premium is not very strong. Fernholz found that a statistical property he termed the "crossover effect" was the primary cause of the difference between large and small company stock returns. The "crossover effect" measures the effect on rate of return of those stocks that switch from one size portfolio to another.[58] Fernholz states that as random price changes affect the size of stocks, some stocks cross over from one size portfolio to another. When a stock that starts in the large stock portfolio experiences a <u>random</u> negative price change that moves it into the small stock portfolio, its resulting negative return is assigned to, and therefore reduces, the

[56] Aqua Illinois, Inc.'s 2005 Form 22 ILCC Annual Report, p. 5F.
[57] Wong, "Utility Stock and the Size Effect: an Empirical Analysis," *Journal of the Midwest Finance Association,* 1993.
[58] Fernholz, "Crossovers, Dividends and the Size Effect," *Financial Analysts Journal,* May/June 1998, pp. 73-75.

return on the large stock portfolio. Conversely, when that same stock experiences a random positive price change that moves it back into the large stock portfolio, its resulting positive return is assigned to, and therefore increases, the return on the small stock portfolio.[59] The combination of portfolio construction and random (i.e., non-systematic) price movements creates a biased source of measurement error. Thus, the "small stock effect" may be less a market return phenomenon than a modeling problem. That is, the "small stock effect" may be nothing more than a statistical anomaly.

In another study of domestic stocks listed on the NYSE and AMEX, Jensen, Johnson and Mercer, (hereafter "Jensen") found that small stock premiums appear to be related to monetary policy. Specifically, changes in monetary policy play a prominent role in determining the magnitude of small stock premiums. During expansive monetary periods, defined as months following a reduction in the Federal Reserve discount rate, Jensen found that small stock returns were significantly greater than large stock returns. Conversely, during restrictive monetary periods, defined as months following an increase in the discount rate, Jensen found that small stock returns were not significantly greater than large stock returns.[60] Nevertheless, the applicability of the Jensen results to small utility stocks is doubtful. First, since the Jensen study was based on largely non-utility companies, its findings that small stocks outperformed large stocks during "expansionary" monetary periods is not surprising. During monetary expansions, as the supply of loanable funds increases, investors are more

[59] Fernholz, "Crossovers, Dividends and the Small Firm Effect," *Financial Analysts Journal,* May/June 1998, p. 73.
[60] Jensen, Johnson and Mercer, "The Inconsistency of Small-Firm and Value Stock Premiums," *Journal of*

likely to invest in speculative, small company stocks. However, during monetary contractions, as the supply of loanable funds decreases, investors are more likely to switch from speculative investments to safer ones – a phenomenon known in financial circles as the "flight to quality." It is counter-intuitive to claim that investors would consider the smaller firms in the regulated utility sector to be speculative investments; and Ms. Ahern has not supported that premise. Moreover, the Jensen study did not control its measurement of the small stock premium for risk as measured by beta or other means.[61] Therefore, the study does not support Ms. Ahern's size-based risk premium adjustment.

Even if a size-based risk premium exists for utilities, which it does not, Ms. Ahern's estimates of the size of the premium are questionable since Ms. Ahern's size-based risk premiums are based on historical returns whose shortcomings as proxies for expected returns will be addressed in the next section of this testimony.

58. Q. Has the Commission ruled on a size-based risk premium before?

A. Yes. A size-based risk premium was presented in a prior Consumers Illinois rate case, and was rejected by the Commission on the basis that the company witness failed to demonstrate that there is a direct relationship between the size of a utility and its risk.[62] Importantly, in

Portfolio Management, p. 35.
[61] Jensen, Johnson and Mercer, "The Inconsistency of Small-Firm and Value Stock Premiums," *Journal of Portfolio Management,* pp. 30 and 34.
[62] Amended Order at 39, Consumers Illinois Water Company: Proposed general increase in water and sewer rates, ICC Docket No. 97-0351, 1998 Ill. PUC Lexis 479 (June 17, 1998)

Aqua's last rate case for the Kankakee Water Division, the Commission Order stated:

> The Commission does not conclude that the size of [Aqua] warrants a risk premium. [Aqua] is a wholly-owned subsidiary within a much larger organization, and in that sense is distinguishable from an independent utility of the same size as [Aqua].[63]

59. Q. In the current docket, does Ms. Ahern provide evidence beyond that she presented in prior Aqua rate cases to demonstrate Aqua's size merits a risk premium?

A. No.

NAIC-2 Debt Designation

60. Q. Is Ms. Ahern's adjustment for a credit risk premium appropriate?

A. No. Aqua has certain debt issues that have been assigned an NAIC-2 designation by the National Association of Insurance Commissioners ("NAIC"), which Ms. Ahern alleges reflects a higher degree of credit risk for Aqua than exists for her proxy groups. However, Ms. Ahern does not know whether the companies comprising her samples have been assigned NAIC debt designations.[64] There is no evidence that suggests Ms. Ahern's samples are less risky than Aqua because it is possible that companies comprising her sample groups have been or would have been assigned NAIC-2 debt designations.

In addition, Ms. Ahern's allegation that Aqua's NAIC-2 debt designation denotes Aqua is riskier than her samples is based on a false premise, i.e., that NAIC debt designations are equivalent to credit ratings issued by Nationally Recognized Statistical Rating Organizations ("NRSROs"), namely, S&P, Moody's, Fitch Ratings and Dominion Ratings. However, Ms. Ahern's claim is unfounded. She has not provided any documentation by NRSROs that states those credit ratings are equivalent to certain NAIC debt designations.[65]

61. Q. Are NAIC debt designations equivalent to NRSRO ratings?

A. No. First, NAIC does not rate companies such as Aqua; NAIC only rates specific security issues. Specifically, the NAIC "is responsible for the day-to-day credit quality assessment and valuation of securities owned by state regulated insurance companies."[66] Second, while NRSRO-issued credit ratings are often a starting point for the NAIC debt analysis, NRSRO-issued credit ratings are not necessarily the ending point of an NAIC debt analysis as the NAIC explicitly reserves the right to assign lower (but not higher) designations than the NRSRO-issued credit ratings would otherwise indicate.[67] That is, Aqua's debt securities that have been designated NAIC-2 might include terms that merit a lower NAIC designation than the general level of investment risk for Aqua because the NAIC considers security-specific factors when assigning its designation to certain debt issues. Second, while both NAIC and NRSROs assess credit

[63] Order at 43, Consumers Illinois Water Company: Tariffs seeking general increase in water Rates for the Kankakee Water Division (Tariffs filed on May 21, 2003), ICC Docket 03-0403 (April 13, 2004).
[64] Co. response to Staff data request FD 1.22.
[65] Co. response to Staff data request FD 1.21.
[66] www.naic.org/about/background/svo.htm

risk in their risk assessment, NAIC debt designations are distinguishable from NRSRO-issued credit ratings because the NAIC considers a security's potential price volatility in addition to default risk.[68]

62. Q. Are NAIC debt designations intended for use by investors?

A. No. The NAIC website clearly states, "These designations and unit prices are produced solely for the benefit of NAIC members…[and] [u]nlike the ratings of nationally recognized statistical rating organizations, NAIC designations are not suitable for use by anyone other than NAIC members."[69]

63. Q. Do you recommend adding an investment risk premium to Aqua's cost of common equity because it has debt that has been assigned the equivalent of an NAIC 2 designation?

A. No. To evaluate Aqua's risk vis-à-vis my proxy groups independent of credit ratings or NAIC debt designations, I performed a quantitative risk analysis of Aqua and concluded Aqua is close in risk to both of my samples, but closer in risk to my water sample than the utility sample. Since Aqua and the water sample are equivalent in risk, and investors require the same return from investments with equal risk, adding an investment risk premium to Aqua's cost of equity is unnecessary. Adding

[67] Purposes and Procedures of the Securities Valuation Office of the National Association of Insurance Commissioners, July 2003, provided in response to Staff data request FD 1.06.
[68] Moody's Investors Service, "Moody's Comments on the SVO's Recent Hybrid Security Ruling," April 2006, p. 3.
[69] www.naic.org/about/background/svo.htm

an investment risk premium to Aqua's cost of equity would only be warranted if Aqua were riskier than both of my samples.

Aqua's Business Risk

64. Q. Is adding an investment risk premium to your cost of equity estimate for Aqua necessary given Aqua's need to replace aging infrastructure?

A. No. All of the publications Ms. Ahern uses to support her claim that Aqua's cost of equity must be adjusted upward due to its need to replace aging infrastructure describe this risk as one facing the entire water industry. Value Line specifically excludes Aqua's parent company, Aqua America, Inc., from the same disadvantage facing other companies, stating:

> Infrastructure repair costs are expected to climb in the hundreds of millions of dollars over the next two decades putting many smaller water companies at a distinct disadvantage. With a dearth of resources to fund these improvements, many such companies are being forced to sell. But, given the current landscape, larger companies with the flexibility and capital to deal with the higher costs are utilizing the weakness to add additional legs of growth to their businesses. **Aqua America, the largest water utility in our survey, for example, has made more than 90 acquisitions in the past five years, doubling its revenue base during that time. The company does not seem to be slowing its aggressive spending ways and has the highest return on equity of any of the stock that we cover here.**[70]

Ms. Ahern also references a Best Practices resolution by NARUC, many of which are in place in Illinois. Namely, Aqua is allowed to recover certain costs relating to replacing portions of its distribution system between rate cases in accordance with Ill. Adm. Code Part 656 (Qualifying

Infrastructure Plant Surcharge). This improves Aqua's ability to synchronize its capital investment with the timing of rate relief, which Company witness Thomas Bunosky claims is a significant source of business risk.[71]

65. Q. Did your quantitative risk analysis of Aqua indicate that Aqua has a higher degree of operating risk than your water sample?

A. No. Factors 2, 3 and 4 of my quantitative risk analysis measure the following three operating risk factors: construction risk, earnings stability risk and capital intensity, respectively. As shown on Schedule 3.06, Aqua's scores for Factors 2 and 3 are very similar to the water sample, which means Aqua and the water sample are equivalent in terms of construction risk and earnings stability. On the other hand, Aqua's Factor 4 score suggests Aqua has a higher degree of capital intensity than the water sample and the utility sample. Thus, Aqua faces a lower degree of competitive risk than both of my samples but that greater capital intensity has not led to lower earnings stability relative to the two samples. Thus, my quantitative risk analysis of Aqua' vis-à-vis my water sample indicates that the water sample faces similar, if not more, operating risk than Aqua. That is, the operating risks Aqua faces are not unique. Rather, they affect the water industry. Thus, adding an investment risk premium to Aqua's cost of equity is unwarranted.

[70] Value Line Investment Survey, "Water Utility Industry," October 28, 2005, p. 1419.
[71] Co. Ex. 1.0, p. 12.

Company Utility Sample

66. Q. Should Constellation New Energy ("Constellation") be excluded from Ms. Ahern's utility sample?

A. Yes. In December 2005, Constellation and FPL Group, Inc. announced that they had entered an agreement to merge in a $28 billion transaction.[72] Due to the inclusion of a merger premium in Constellation's stock price data, the company should be excluded from Ms. Ahern's utility sample. Removing Constellation reduces Ms. Ahern's DCF-derived cost of equity estimate for her utility sample to 10.43% (from 10.80%) and her CAPM-derived estimate for her utility sample to 11.00% (from 11.17%).[73]

Discounted Cash Flow Analysis

67. Q. Ms. Ahern testified that she eliminated DCF-derived cost of equity estimates for her proxy companies that "are no more than 200 basis points above the current prospective average yield on A rated public utility bonds of 6.41%."[74] What is the basis for Ms. Ahern's elimination criterion?

A. Ms. Ahern's Direct Testimony states the following:

[72] "FPL Group and Constellation Energy to Merge, Creating Nation's Largest Competitive Energy Supplier and its Second Largest Utility, $28 Billion Transaction Expected to be Immediately Accretive to Earnings, Will Create a FORTUNE 500 Copmmany," December 19, 2005.
[73] The CAPM estimate including Constellation (i.e., 11.17%) is lower than Ms. Ahern's proposed 11.35% because it also reflects the current U.S. Treasury bond yield as a proxy for the risk-free rate of return rather than the forecasted bond yield used by Ms. Ahern, which is improper for reasons discussed later in my direct testimony.
[74] Co. Ex. 3, pp. 26-27.

> Based upon a review of recent authorized returns on common equity (ROE) throughout the United States vis-à-vis concurrent estimates of the forecasted average yield on A rated public utility bonds, I determined that the equity risk premium implicit in authorized ROEs for the year 2005 is between [310] and 551 basis points, averaging [404] basis points. In addition, the equity risk premium implicit in all regulatory awarded returns on common equity for 2004 and 2005 ranged from 280 to 551 basis points, averaging [397] basis points. In accordance with the EMH, investors are aware of these implicit equity risk premia and, in my opinion, would not consider returns providing an equity risk premium of only 200 basis points or less either reasonable or credible.[75]

The basis for her elimination criterion is a document titled "Electric & Gas Company ROEs vs A Rated Public Utility Bond Yield Forecast for January 2002-March 2006".[76]

68. Q. Did Ms. Ahern eliminate any "high-end" DCF-derived cost of equity estimates?

A. No.[77] To the contrary, Ms. Ahern's "prospective" A-rated utility bond yield (i.e., 6.41%), plus 400 basis points equals 10.41% (*i.e.*, 400 basis points is the average equity risk premium implicit in authorized ROEs for the years 2004 and 2005 based upon Ms. Ahern's review of recent authorized returns on common equity throughout the United States vis-à-vis concurrent estimates of forecasted A-rated utility bond yields). Three out of the seven estimates for Ms. Ahern's water sample and four out of nine estimates for Ms. Ahern's utility sample exceed the high-end of the risk premium implicit in authorized rates of return.[78] Moreover, Ms. Ahern's 11.00% cost of equity recommendation for Aqua is 459 basis points above

[75] Co. Ex. 3, pp. 26-27.
[76] Co. response to Staff data request FD 1.18.
[77] Co. response to Staff data request FD 1.18.

her prospective A-rated bond yield of 6.41% and 485 basis points above the current 6.15% A-rated bond yield.

Including the "low" estimates in Ms. Ahern's DCF analysis[79] results in an average DCF-derived cost of equity estimate of 9.96% for her water sample, which, when averaged with the utility sample's DCF-derived cost of equity estimate, results in a 10.19% DCF-derived cost of equity estimate for Aqua. When compared to the 6.15% current yield on less-risky, A-rated public utility bonds, Ms. Ahern's 10.19% cost of equity results in a risk premium exceeding 400 basis points.

Capital Asset Pricing Model

69. Q. Do you agree with Ms. Ahern's use of a forecasted U.S. Treasury bond yield as a proxy for the risk-free rate of return in her CAPM and empirical CAPM analyses?

A. No. Accurately forecasting interest rates is problematic, as shown in the following table, which compares actual U.S. Treasury bond yields with the December 1, 2004, *Blue Chip Financial Forecast*.

[78] Co. Ex. 3.6, pp. 1 and 2.
[79] Ms. Ahern's quarterly compounded growth DCF model estimates a 6.97% cost of equity for Southwest Water Co. (Aqua Ex. 3.6, p. 2) and her quarterly DCF model estimates a 7.00% cost of equity for Southwest Water Co. (Aqua Ex. 3.6, p. 3). Those two estimates are the only "low" estimates Ms. Ahern excluded.

Quarter	**Forecasted** 20-Year U.S. Treasury Bond Yield as published by Blue Chip Financial Forecast	**Actual** 20-Year U.S. Treasury Bond Yield as published by the Federal Reserve
Q4-2004	4.90%	4.87%
Q1-2005	5.20%	4.76%
Q2-2005	5.40%	4.55%
Q3-2005	5.50%	4.51%
Q4-2005	5.70%	4.77%
Q1-2006	5.80%	5.29%

Absent convincing evidence that Ms. Ahern's forecasted interest rates are accurate, the Commission should continue to rely on current, observable, market interest rates.

70. Q. Has the Commission previously rejected using forecasted yields in CAPM analyses?

A. Yes. In a rate proceeding for Central Illinois Light Company, the Commission's Order stated:

> Although [the company] takes issue with Ms. Phipps' use of a single day's current Treasury bond yield as her risk-free rate… the Commission does not agree. Contrasted with

> using a single day's U.S. Treasury bond yield, it is impossible to accurately predict future interest rates.[80]

The Commission also endorsed using a current U.S. Treasury bond yield over a forecasted U.S. Treasury bond yield in Docket Nos. 02-0798/03-0008/03-0009 Consolidated, a rate proceeding for Central Illinois Public Service Company and Union Electric Company.[81]

71. Q. Does this conclude your direct testimony?

A. Yes, it does.

[80] Order,at 37, . Central Illinois Light Company: Proposed general increase in natural gas rates, ICC Docket No. 02-0837, 2003 Ill. PUC Lexis 860; 230 P.U.R.4th 17 (October 17, 2003)

[81] Order at 85, Central Illinois Public Service Company (AmerenCIPS) and Union Electric Company (AmerenUE): Application for entry of protective order to protect confidentiality of materials submitted in support of revised gas service tariffs / Central Illinois Public Service Company: Proposed general increase in natural gas rates. (Tariffs filed November 27, 2002) / Union Electric Company: Proposed general increase in natural gas rates. (Tariffs filed November 27, 2002), ICC Docket Nos. 02-0798; 03-0008; 03-0009 (cons.) 2003 Ill. PUC Lexis 824 (October 22, 2003).

AQUA ILLINOIS, INC.

Company's Proposed Average 2007 Weighted-Average Cost of Capital

Class of Capital	Average 2007 Balance	Percent of Total Capitalization	Cost	Weighted Cost
Short-Term Debt	**$9,802,519**	7.00%	5.50%	0.385%
Long-Term Debt	**57,059,714**	40.73%	7.13%	2.902%
Preferred Equity	**382,372**	0.27%	5.48%	0.015%
Common Equity	**72,854,088**	52.00%	11.00%	5.720%
Total	**$140,098,693**	100.00%		**9.022%**

Source: Company Schedule D-1.

Staff's Proposed Average 2007 Weighted-Average Cost of Capital

Class of Capital	Average 2007 Balance	Percent of Total Capitalization	Cost	Weighted Cost
Short-Term Debt	**$8,804,430**	6.33%	5.86%	0.371%
Long-Term Debt	**57,071,348**	41.04%	7.12%	2.923%
Preferred Equity	**382,372**	0.27%	5.48%	0.015%
Common Equity	**72,804,117**	52.35%	10.45%	5.471%
Total	**$139,062,268**	100.00%		**8.780%**

AQUA ILLINOIS, INC.

Short-Term Debt Balance
Average 2007

	End of Month Balance				
Date	Gross Short-Term Debt Outstanding	CWIP	CWIP Accruing AFUDC	Net Short-Term Debt Outstanding	Month-End Average
(A)	(B)	(C)	(D)	(E)	(F)
Dec – 2006	$11,450,000	$2,244,528	$2,244,528	$9,205,472	
Jan – 2007	10,950,000	2,244,528	2,244,528	8,705,472	$8,955,472
Feb – 2007	10,350,000	2,244,528	2,244,528	8,105,472	8,405,472
Mar – 2007	9,950,000	2,244,528	2,244,528	7,705,472	7,905,472
Apr – 2007	9,650,000	2,244,528	2,244,528	7,405,472	7,555,472
May – 2007	9,800,000	2,244,528	2,244,528	7,555,472	7,480,472
Jun – 2007	10,500,000	2,244,528	2,244,528	8,255,472	7,905,472
Jul – 2007	11,100,000	2,244,528	2,244,528	8,855,472	8,555,472
Aug – 2007	11,550,000	2,244,528	2,244,528	9,305,472	9,080,472
Sep – 2007	11,950,000	2,244,528	2,244,528	9,705,472	9,505,472
Oct – 2007	12,250,000	2,244,528	2,244,528	10,005,472	9,855,472
Nov – 2007	12,375,000	2,244,528	2,244,528	10,130,472	10,067,972
Dec – 2007	12,875,000	2,244,528	2,244,528	10,630,472	10,380,472

Average Month-End Short-Term Debt Balance = $8,804,430

Aqua Illinois, Inc.
Embedded Cost of Long-Term Debt
Forecasted Average 2007

Coupon Rate	Debt Issue Type	Date Issued	Maturity Date	Principal Amount	Face Amt Outstanding	Unamort. Disc/(Prem)	Unamort. Debt Expense	2006 Carrying Value	2007 Carrying Value	Average Carrying Value	Annual Coupon Int	Annual Amort. Of Disc/Prem	Annual. Amort. Of Debt Exp.	Annual Int. Exp.
10.40%	Series M	12/6/88	12/1/18	$ 6,000,000	$ 6,000,000	$ -	$ 65,494	$ 5,928,507	$ 5,934,506	$ 5,931,507	$ 624,000	$ -	$ 5,999	$ 629,999
9.69%	Series N	3/15/91	3/1/21	$ 4,500,000	$ 4,500,000	$ -	$ 55,858	$ 4,439,913	$ 4,444,142	$ 4,442,028	$ 436,050	$ -	$ 4,229	$ 440,279
7.63%	Series O	9/21/95	9/1/25	$ 8,000,000	$ 8,000,000	$ -	$ 49,883	$ 7,947,307	$ 7,950,117	$ 7,948,712	$ 610,400	$ -	$ 2,810	$ 613,210
5.00%	Series U	11/1/02	11/1/32	$ 9,960,000	$ 9,960,000	$ -	$ 679,119	$ 9,253,534	$ 9,280,881	$ 9,267,208	$ 498,000	$ -	$ 27,347	$ 525,347
4.90%	Series T	11/1/02	11/1/32	$ 2,785,000	$ 2,785,000	$ -	$ 191,547	$ 2,585,740	$ 2,593,453	$ 2,589,597	$ 136,465	$ -	$ 7,713	$ 144,178
5.40%	Series S	9/1/00	9/1/30	$ 4,500,000	$ 4,500,000	$ -	$ 248,649	$ 4,240,381	$ 4,251,351	$ 4,245,866	$ 243,000	$ -	$ 10,970	$ 253,970
5.20%	Series V (A	12/15/03	2/1/14	$ 6,500,000	$ 6,500,000	$ -	$ 61,856	$ 6,429,308	$ 6,438,144	$ 6,433,726	$ 338,000	$ -	$ 8,836	$ 346,836
5.40%	Series V (B	12/15/03	2/1/16	$ 6,500,000	$ 6,500,000	$ -	$ 67,268	$ 6,425,258	$ 6,432,732	$ 6,428,995	$ 351,000	$ -	$ 7,474	$ 358,474
5.32%	Series W	12/21/04	12/21/19	$ 10,500,000	$ 10,500,000	$ -	$ 98,779	$ 10,392,976	$ 10,401,221	$ 10,397,099	$ 558,600	$ -	$ 8,245	$ 566,845
					$ 59,245,000	$ -	$ 1,518,453	$ 57,642,924	$ 57,726,547	$ 57,684,736	$ 3,795,515	$ -	$ 83,623	$ 3,879,138
8.00%	Aroma Parl	5/23/01	5/23/21	$ 1,000,000	$ 1,000,000	$ -	$ -	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ 80,000	$ -	$ -	$ 80,000
9.19%	Series P	7/24/95	7/15/22	$ 6,000,000	$ -	$ 273,554	$ 23,548	$ (317,521)	$ (297,102)	$ (307,311)	$ -	$ 18,804	$ 1,615	$ 20,419
9.19%	Series I	7/24/92	7/15/22	$ 6,000,000	$ -	$ -	$ 75,112	$ (80,292)	$ (75,112)	$ (77,702)	$ -	$ -	$ 5,180	$ 5,180
7.50%	Tax Exemp	2/1/90	2/1/20	$ 10,000,000	$ -	$ 151,580	$ 335,155	$ (526,726)	$ (486,735)	$ (506,731)	$ -	$ 12,631	$ 27,360	$ 39,991
6.10%	Series Q	9/21/95	9/1/25	$ 10,000,000	$ -	$ 160,783	$ 386,660	$ (578,320)	$ (547,443)	$ (562,882)	$ -	$ 9,093	$ 21,784	$ 30,877
6.00%	Series R	9/21/95	9/1/25	$ 2,800,000	$ -	$ 45,349	$ 109,059	$ (163,116)	$ (154,408)	$ (158,762)	$ -	$ 2,565	$ 6,144	$ 8,709
					$ -	$ 631,266	$ 929,534	$ (1,665,975)	$ (1,560,800)	$ (1,613,387)	$ -	$ 43,092	$ 62,083	$ 105,175
					$ 60,245,000	$ 631,266	$ 2,447,987	$ 56,976,949	$ 57,165,747	**$ 57,071,348**	$ 3,875,515	$ 43,092	$ 145,706	**$ 4,064,313**

Average 2007 Embedded Cost of Long-Term Debt= 7.12%

AQUA ILLINOIS, INC.

Embedded Cost of Preferred Stock

Dividend Rate, Type, Par Value	Issuance Date	Number of Shares Outstanding	Average Par Value Outstanding	Premium	Issue Expense	Net Proceeds	Annual Dividends
5.50% Preferred Stock ($100 Par)	July 1967	3,807	$380,700	$3,970	$2,298	$382,372	$20,939

Embedded Cost of Preferred Stock = 5.48%

AQUA ILLINOIS, INC.

Average 2007 Common Equity Balance

Month	Aqua's Forecasted Month-End Common Equity Balance	Aqua's Forecasted Month-End Common Equity Balance Adjusted to Deduct Capital Stock Expense	Adjusted Average Common Equity Balance
December 2006	$70,255,619	$70,175,648	
January 2007	70,628,795	70,578,824	$70,377,236
February 2007	71,030,462	70,980,491	70,779,658
March 2007	71,375,596	71,325,625	71,153,058
April 2007	71,796,877	71,746,906	71,536,266
May 2007	72,216,649	72,166,678	71,956,792
June 2007	72,750,377	72,700,406	72,433,542
July 2007	73,363,269	73,313,298	73,006,852
August 2007	73,925,868	73,875,897	73,594,598
September 2007	74,451,047	74,401,076	74,138,487
October 2007	74,805,440	74,755,469	74,578,273
November 2007	75,121,611	75,071,640	74,913,555
December 2007	75,340,514	75,290,543	75,181,092
		Average 2007 Balance =	**$72,804,117**

Aqua Illinois, Inc.

Principal Components Analysis Scores for Staff & Company Samples

	Factor 1	Factor 2	Factor 3	Factor 4
	Financial Risk	*Construction Expenditures*	*Earnings Stability*	*Capital Intensity*
Aqua	**-0.171**	**-1.321**	**0.486**	**1.938**

Water Sample				
American States Water	-0.086	-1.439	0.403	0.810
Artesian Resources	-0.818	-2.035	1.083	1.593
Aqua America	-0.044	-0.706	1.552	2.085
York Water	-0.063	-2.457	0.478	2.474
Middlesex Water	-0.966	-1.282	1.339	1.008
Pennichuck	-0.126	-1.806	-1.145	1.062
California Water	-0.314	-0.371	1.321	0.477
Southwest Water	-0.026	-1.392	0.399	-0.900
Average Score for Staff Water Sample	**-0.305**	**-1.436**	**0.679**	**1.076**
Average Score for Company Water Sample (excludes Pennichuck)	**-0.331**	**-1.383**	**0.939**	**1.078**

Staff Utility Sample				
Dominion Resources	-0.115	-0.932	-0.754	0.497
Pinnacle West Capital	0.284	-0.507	-0.701	0.663
Puget Energy	-0.532	-0.531	-0.113	0.240
Northwest Natural Gas	-0.130	-0.462	1.504	0.183
Southwest Gas	-0.577	-0.865	1.059	-0.154
Consolidated Edison	-0.350	-0.551	0.860	-0.218
Hawaiian Electric Ind.	-1.022	-0.206	-0.457	0.216
Progress Energy	-0.347	0.188	-0.645	0.437
Vectren Corp.	0.545	-0.606	-0.040	-0.260
Average	**-0.249**	**-0.497**	**0.079**	**0.178**

Company Utility Sample				
Dominion Resources	-0.115	-0.932	-0.754	0.497
Pinnacle West Capital	0.284	-0.507	-0.701	0.663
Northwest Natural Gas	-0.130	-0.462	1.504	0.183
Consolidated Edison	-0.350	-0.551	0.860	-0.218
Vectren Corp.	0.545	-0.606	-0.040	-0.260
NSTAR	-0.631	-0.419	-0.077	-0.368
Wisconsin Energy Corp.	0.175	-0.939	-1.381	0.226
PNM Resources Inc.	0.493	0.289	-1.638	-0.436
Average	**0.034**	**-0.516**	**-0.278**	**0.036**

AQUA ILLINOIS, INC.

Growth Rate Estimates

	Company	Zacks Earnings
1	American States Water	6.00%
2	Aqua America	9.00%
3	Artesian Resources	11.50%
4	California Water	9.00%
5	Middlesex Water	3.50%
6	Pennichuck Water	8.00%
7	Southwest Water	5.50%
8	York Water	7.00%

	Company	Zacks Earnings
1	Dominion Resources	9.50%
2	Pinnacle West Capital	6.75%
3	Puget Energy	7.00%
4	Northwest Natural Gas	5.30%
5	Southwest Gas	6.00%
6	Consolidated Edison	3.86%
7	Hawaiian Electric Ind.	5.17%
8	Progress Energy	3.93%
9	Vectren Corp.	5.00%

Source: Zacks Research Wizard, June 8, 2006.

AQUA ILLINOIS, INC.

Quarterly Dividends and Stock Prices

WATER SAMPLE

Company	Current Dividend $D_{0,1}$	$D_{0,2}$	$D_{0,3}$	$D_{0,4}$	Next Dividend Payment Date	Stock Price
American States Water	$0.225	$0.225	$0.225	$0.225	9/1/2006	$36.65
Aqua America	0.098	0.107	0.107	0.107	9/1/2006	22.00
Artesian Resources	0.218	0.223	0.223	0.229	8/25/2006	31.08
California Water Service	0.285	0.285	0.288	0.288	8/18/206	37.00
Middlesex Water	0.168	0.170	0.170	0.170	9/1/2006	17.39
Pennichuck	0.165	0.165	0.165	0.165	9/1/2006	20.00
Southwest Water	0.050	0.050	0.052	0.052	7/20/2006	13.30
York Water	0.156	0.156	0.168	0.168	9/1/2006	25.92

UTILITY SAMPLE

Company	Current Dividend $D_{0,1}$	$D_{0,2}$	$D_{0,3}$	$D_{0,4}$	Next Dividend Payment Date	Stock Price
Dominion Resources	$0.670	$0.670	$0.690	$0.690	9/20/2006	$72.65
Pinnacle West Capital	0.475	0.500	0.500	0.500	9/1/2006	40.20
Puget Energy	0.250	0.250	0.250	0.250	8/15/2006	21.52
Northwest Natural Gas	0.325	0.345	0.345	0.345	8/15/2006	35.40
Southwest Gas	0.205	0.205	0.205	0.205	9/1/2006	29.57
Consolidated Edison	0.570	0.570	0.575	0.575	10/15/2006	44.44
Hawaiian Electric Ind.	0.310	0.310	0.310	0.310	9/14/2006	27.18
Progress Energy	0.590	0.590	0.605	0.605	8/1/2006	42.36
Vectren Corp.	0.295	0.305	0.305	0.305	9/1/2006	26.66

Sources: Company Press Releases, **www.yahoo.com**, www.wsj.com and S&P Compustat.

AQUA ILLINOIS, INC.

Expected Quarterly Dividends

Water Sample

Company	$D_{1,1}$	$D_{1,2}$	$D_{1,3}$	$D_{1,4}$
American States Water	$0.239	$0.239	$0.239	$0.239
Aqua America	0.107	0.117	0.117	0.117
Artesian Resources	0.229	0.249	0.249	0.255
California Water	0.288	0.288	0.314	0.314
Middlesex Water	0.170	0.176	0.176	0.176
Pennichuck	0.178	0.178	0.178	0.178
Southwest Water	0.052	0.052	0.055	0.055
York Water	0.168	0.168	0.180	0.180

Utility Sample

Company	$D_{1,1}$	$D_{1,2}$	$D_{1,3}$	$D_{1,4}$
Dominion Resources	$0.690	$0.690	$0.756	$0.756
Pinnacle West Capital	0.500	0.534	0.534	0.534
Puget Energy	0.268	0.268	0.268	0.268
Northwest Natural Gas	0.345	0.363	0.363	0.363
Southwest Gas	0.205	0.205	0.205	0.205
Consolidated Edison	0.430	0.430	0.597	0.597
Hawaiian Electric Ind.	0.326	0.326	0.326	0.326
Progress Energy	0.605	0.605	0.629	0.629
Vectren Corp.	0.305	0.320	0.320	0.320

AQUA ILLINOIS, INC.

DCF Analysis Cost of Equity Estimates

Water Sample

Company		Cost of Equity Estimate
American States Water		8.69%
Aqua America		11.16
Artesian Resources		14.84
California Water		12.42
Middlesex Water		7.63
Pennichuck		11.72
Southwest Water		7.18
York Water		9.78
	Average	**10.43%**

Utility Sample

Company		Cost of Equity Estimate
Dominion Resources		13.65%
Pinnacle West Capital		12.22
Puget Energy		12.23
Northwest Natural Gas		9.52
Southwest Gas		8.87
Consolidated Edison		8.57
Hawaiian Electric Ind.		10.14
Progress Energy		10.03
Vectren Corp.		9.93
	Average	**10.57%**

AQUA ILLINOIS, INC.

Risk Premium Analysis Cost of Equity Estimates

Interest Rates on June 8, 2006

U.S. Treasury Bills		U.S. Treasury Bonds	
Discount Rate	Effective Yield	Bond Equivalent Yield	Effective Yield
4.70%	4.89%	5.06%	5.12%

Risk Premium Cost of Equity Estimates*

Water Sample

Risk-Free Rate		Beta		Risk Premium		Cost of Common Equity
5.01%	+	0.60	×	(13.42% - 5.01%)	=	**10.06%**

Utility Sample

Risk-Free Rate		Beta		Risk Premium		Cost of Common Equity
5.01%	+	0.73	×	(13.42% - 5.01%)	=	**11.15%**

*Risk-free rate proxy is average of the U.S. Treasury bond and U.S. Treasury bill yields.