Docket Nos. 05-0071/05-0072
(Consolidated)
ICC Staff Exhibit 3.0

DIRECT TESTIMONY

OF

JANIS FREETLY

Finance Department

Financial Analysis Division

Illinois Commerce Commission

Aqua Illinois, Inc.

Proposed General Increase for Water and Sewer
Rates for the Woodhaven Division
and
Proposed General Increase for Water
Rates for the Oak Run Division

Docket Nos. 05-0071/05-0072 (Consolidated)

May 5, 2005

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Witness Identification

Q. Please state your name and business address.

A. My name is Janis Freetly. My business address is 527 East Capitol Avenue, Springfield, Illinois 62701.

Q. What is your current position with the Illinois Commerce Commission ("Commission")?

A. I am currently employed as a Senior Financial Analyst in the Finance Department of the Financial Analysis Division.

Q. Please describe your qualifications and background.

A. In May of 1995, I earned a Bachelor of Business degree in Marketing from Western Illinois University. I received a Master of Business Administration degree, with a concentration in Finance, from Western Illinois University in May of 1998. I have been employed by the Commission since September of 1998. I was promoted to Senior Financial Analyst in August of 2001.

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

A. The purpose of my testimony and accompanying schedules is to present my analysis of the rate of return on rate base for the Oak Run Water Division and the

Woodhaven Water and Sewer Divisions of Aqua Illinois, Inc. ("Aqua" or the "Company").

Rate of Return on Rate Base

Q. Please summarize your conclusions.

A. The rate of return on rate base for the Oak Run Water Division and the Woodhaven Water and Sewer Divisions of Aqua is 8.79% as shown on Schedule 3.01.

Q. Why is it important to determine a reasonable cost of capital for a public utility?

A. A primary objective of regulation is to minimize the cost of reliable service to ratepayers while allowing public utilities to earn a fair and reasonable rate of return. When a public utility is authorized a rate of return equal to a reasonable cost of capital, the interests of ratepayers and investors are properly balanced. If the authorized rate of return is greater than a reasonable cost of capital, ratepayers are burdened with excessive rates. Conversely, if the authorized rate of return is less than a reasonable cost of capital, the utility may be unable to raise capital at a reasonable cost and ultimately may be unable to raise sufficient capital to meet demands for service. Therefore, the interests of ratepayers and

investors are best served when a utility's allowed rate of return is set equal to a reasonable overall cost of capital.

Q. What is the overall cost of capital for a public utility?

A. The overall cost of capital is the sum of the component costs of the capital structure (i.e., debt, preferred stock, and common equity) after each is weighted by its proportion to total capital. It represents the rate of return the public utility needs to earn on its assets to satisfy contractual obligations to, or the market requirements of, its investors.

Capital Structure

Q. What capital structure did Aqua propose for setting rates?

A. Aqua proposed using a forecasted average 2005 capital structure, comprised of 0.38% short-term debt, 47.90% long-term debt, 0.32% preferred stock, and 51.39% common equity.[1]

Q. What capital structure do you recommend?

A. I recommend adopting Aqua's updated forecasted average 2005 capital structure comprised of 47.87% long-term debt, 0.32% preferred stock, and 51.81% common equity, as shown on Schedule 3.01.

[1] Schedule D-1, p. 1 of 4.

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

A. In response to Staff Data Request JF-1.03, the Company provided actual 2004 month-end balances of short-term debt, construction work in progress ("CWIP") and CWIP accruing allowance for funds used during construction ("AFUDC"). According to that response, the balance of short-term debt was zero in December 2004. I then adjusted the month-end balances for January through December 2005 to reflect the reduction in the December 31, 2004 balance of short-term debt from the original forecast of $1,800,000 to the actual balance of $0. Specifically, I updated the January through May 2005 balances of short-term debt to reflect the actual December 31, 2004 zero balance. I used the company's original forecasted balances for June through December 2005.[2] The original forecasted and updated 2005 end of month balances of short-term debt are shown on Schedule 3.02. Then, I calculated the monthly ending net balance of short-term debt outstanding from December 2004 through December 2005. The net balance of short-term debt equals the monthly ending gross balance of short-term debt outstanding minus the lesser of a) the corresponding monthly ending balance of CWIP accruing AFUDC or b) the monthly ending balance of CWIP accruing AFUDC times the ratio of short-term debt to total CWIP for the corresponding month. That adjustment recognizes that the Commission's formula for calculating AFUDC assumes short-term debt is the first source of

[2] Schedule D-2, p. 2.

funds financing CWIP[3] and addresses the double-counting concern the Commission raised in a previous Order.[4] When using the actual 2004 balances and the adjusted 2005 balances, the net balance of short-term debt is zero in the 24-month period of 2004 and 2005. Hence, the capital structure should not include short-term debt.

Q. Please describe the adjustments you made to Aqua's long-term debt balance.

A. I changed the face amount outstanding for the non-interest bearing note with the City of Danville dated 6/17/75 to reflect the contract balance provided by the Company in response to Staff Data Request JF-3.01. I also modified the face amount outstanding of the Series P and Series W First Mortgage Bonds to reflect the issuance of $10,500,000 of the Series W bonds on 12/21/04 and use of a portion of the proceeds to refund the $6,000,000 face amount outstanding of Series P bonds. In addition, I adjusted the balances of unamortized discount/premium and unamortized debt expense for December 31, 2004 and December 31, 2005 to reflect straight line amortization from December 31, 2003, as shown in the Form 22 Annual Report to the ICC. The average 2005 balance of long-term debt is presented on Schedule 3.03.

[3] *Uniform System of Accounts for Water Utilities Operating in Illinois*, Accounting Instruction 19 - Utility Plant – Components of Construction Cost (17). Long-term debt, preferred stock, and common equity are assumed to finance CWIP balances in excess of the short-term balance according to their relative proportions to long-term capital.

[4] Order, Docket No. 95-0076, December 20, 1995, p. 51.

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

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

Q. Please describe the adjustments you made to Aqua's common equity balance.

A. In response to Staff Data Request JF-1.02, the Company provided the actual month-end common equity balances from January 2004 through December 2004. The Company then updated the projected 2005 monthly balances of common equity to reflect the actual 2004 monthly balances of common equity.[5] I used the updated 2005 projections to calculate the average monthly balances and the average 2005 balance of common equity, as shown on Schedule 3.05.

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

A. Yes. However that effect is complex and difficult to measure. As a utility increases the proportion of common equity in its capital structure, the resulting decline in financial risk reduces the cost of each capital component. However, since common equity is the most costly capital structure component, an increasing proportion of common equity could increase the overall cost of capital. Conversely, debt is less costly than equity. Thus, increasing the proportion of debt in the capital structure could reduce the overall cost of capital. However, raising the proportion of debt in the capital structure increases financial risk,

thereby causing the cost of all capital components to rise. Hence, an increasing proportion of debt could increase the overall cost of capital.

In a world without income taxes and distress costs, capital structure would not affect the overall cost of capital. Since capital structure does not affect the riskiness of assets (i.e., operating risk), capital structure only partitions that total level of riskiness between investor classes. If a company was 100% common equity financed, the riskiness of the company's assets and its common equity would be identical. Conversely, if a company was 100% debt financed, its debt holders would bear all the riskiness of the company's assets; therefore, the riskiness of its debt and assets would be equal. Since the overall risk of the firm is independent of capital structure, then the overall cost of capital must be independent of capital structure. Thus, increasing the amount of debt in the capital structure would not lower the overall cost of capital as rising debt and common equity costs exactly offset any cost reduction resulting from the higher proportion of lower cost debt.

However, capital structure does affect the overall cost of capital when income taxes and distress costs are considered. Capital structure affects the value of a firm and, therefore, its cost of capital, to the extent it affects the expected level of cash flows generated for investors. Employing debt as a source of capital

[5] Company Response to Staff Data Request JF-4.04.

reduces a company's income taxes,[6] 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, a company's investment opportunities are constrained and 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 capital structure if it determines that capital structure adversely affects the overall cost of capital.

An optimal capital structure would minimize the cost associated with the capital a utility raises and maintain its 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 its precise measurement along each segment 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

[6] 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., capital gains). Taxes on common dividends and capital gains are lower than taxes on

capital markets under most conditions, and if so, whether the cost of that financial strength is reasonable.

Towards that end, I compared Aqua's average 2005, 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.[7] Water utilities that have an S&P 'A' credit rating have a mean total debt ratio of 52.80%. The mean common equity ratio for S&P 'A' rated water utilities equals 46.64%.[8] The above numbers are shown in Table 1 below.

Table 1: Capital Structure Ratios

	A-Rated Water Utilities		Range for A-Rated Utility with Business Profile Score of 2	Range for A-Rated Utility with Business Profile Score of 3	Aqua Average 2005
	Mean	Standard Deviation			
Debt Ratio	52.80%	3.97%	52% - 58%	50% - 55%	47.87%
Equity Ratio	46.64%	4.33%			51.81%

Aqua's average 2005 capital structure comprises a lower proportion of debt and a higher proportion of equity than A-rated water utilities or the debt ratio

interest income because common dividends and capital gains tax rates are lower, and taxes on capital gains are deferred until realized.

[7] Standard & Poor's *Utility Financial Statistics*, June 1999, p. 3; Standard & Poor's *Utilities Rating Service: Industry Commentary*, May 20, 1996, p.1.

benchmarks for A-rated utilities with business profile scores of 2 or 3. Nevertheless, Aqua's average 2005 total debt and equity ratios are reasonably close to the mean total debt and equity ratios for S&P A-rated water utilities. The four-quarter average equity ratio for water utilities in S&P's Utility Compustat database for the four quarters ended September 30, 2004 was 49.02% with a standard deviation of 4.17. Aqua's average 2005 equity ratio is reasonable when compared to that four-quarter average. 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 2005 capital structure as presented by Staff on Schedule 3.01 is commensurate with a strong degree of financial strength.

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

[8] S&P *Utility Compustat*, for the year 2003.
[9] Standard & Poor's, *Utility Financial Statistics,* June 1999, p. 3.
[10] Standard & Poor's, "Research: New Business Profile Scores Assigned for U.S. Utility and Power Companies; Financial Guidelines Revised," June 2, 2004.

consistent with a strong A credit rating. Table 2 presents Aqua's financial ratios for the 2001-2003 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	3.9X	3X - 4X	3.5X – 4.5X	2X – 3X	2.5X – 3.5X
FFO to Total Debt	20%	20% - 25%	25% - 30%	12% - 20%	15% - 25%
Total Debt to Total Capital	52%	45% - 52%	42% - 50%	52% - 58%	50% - 55%

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] The Company does not have an S&P business profile score. However, of the 14 water companies with business profile scores listed in S&P *U.S. Utility and Power Ranking List*, one is assigned a business profile score of "1"; seven are assigned a business profile score of "2"; four are assigned a business profile score of "3"; and two are assigned a business profile score of "4".[12] The average business profile score of the 14 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 comparing Aqua's Benchmark Ratio values to the targets S&P publishes for the business profile scores of 2 and 3 is appropriate.

Cost of Long-Term Debt

Q. What is the embedded cost of long-term debt for Aqua?

A. Aqua's average embedded cost of long-term debt for 2005 is 7.06%, as shown on Schedule 3.03.

Q. Please describe the adjustments you made to Aqua's debt schedule.

[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," March 31, 2005.
[13] Standard & Poor's, "Research: U.S. Utility and Power Ranking List," March 31, 2005.

A. I adjusted the annual amortization of debt discount, premium and expenses to reflect straight-line amortization of the respective unamortized balances over the remaining life of each issue. I did not include the unamortized debt expense of the Series W bonds and the call premium associated with refunding the Series P bonds since the Company failed to file the report described in 83 Ill. Adm. Code 240 as the Commission ordered in Docket No. 04-0626.[14] A company should not be authorized to recover costs through rates that it failed to report to the Commission in the manner ordered. Further, the Company's failure to file the required reports prevented me from verifying the amount and timing of the costs associated with issuing the Series W bonds and refunding the Series P bonds.

Cost of Preferred Stock

Q. What is the embedded cost of preferred stock for Aqua?

A. Aqua's embedded cost of preferred stock is 5.48%, as presented by the Company on Schedule D-4 and shown on Schedule 3.04.

Cost of Common Equity

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

[14] The Commission authorized the issuance of the Series W bonds in Docket No. 04-0626 and ordered Aqua to comply with the reporting requirements of 83 Ill. Adm. Code 240, which requires quarterly reporting regarding the issuance of the bonds that were authorized, the application of the proceeds, and all expenses incurred.

A. My analysis indicates that the cost of common equity for Aqua's Oak Run Water Division and Woodhaven Water and Sewer Divisions is 10.10%.

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 the discounted cash flow ("DCF") and risk premium models. Since Aqua does not have market-traded common stock, DCF and risk premium models cannot be applied directly to Aqua; for this reason, and to minimize measurement error, I applied both models to water utility and public utility samples (hereafter, referred to as "water sample" and "utility sample", respectively).

Sample Selection

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, which are needed for DCF analysis. The remaining companies, Aqua America, Inc., Artesian Resources, California Water Service Group, Middlesex Water Company, Southwest Water Company and York Water Company, compose my sample.

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: (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) funds 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. To normalize the data, the first nine ratios were measured over the period 2001-2003. The last three ratios were measured over the period 1999-2003 with the coefficient of determination of a least-squares regression of the natural logarithm of the respective quarterly data against time.[15] Using those ratios, I compared Aqua to the utility industry.

The utility group comprises the 102 market-traded electric, natural gas, and water companies in 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

[15] Dummy variables were added to the regression model to incorporate seasonality.

variables that are uncorrelated with one another.[16,17] For each utility in the data base, the principal components analysis calculates values for each component, known as principal components 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 the 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 growth rates for water utilities and their securities 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. Finally, I eliminated Ameren Corp. and AGL Resources due to significant acquisition activity. The remaining nine utilities, Empire District Electric, Southern Company, Progress Energy, Dominion Resources, Pinnacle West Capital, Southwest Gas Corp., Northwest Natural

[16] A principal component can be described mathematically as follows:

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

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

Gas, Consolidated Edison, and SCANA Corp., compose my sample. Schedule 3.06 presents the four principal components 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 components scores and the cumulative distance for the companies in my water sample.

DCF Analysis

Q. Please describe DCF analysis.

A. For a utility to attract common equity capital, its investors must expect it to provide a rate of return on common equity sufficient to meet their requirements. DCF analysis establishes a rate of return directly from investor requirements. Implementation of a DCF analysis does not require a comprehensive analysis of a utility's operating and financial risks since the market price of a utility's stock already embodies the market consensus of those risks. However, when using a proxy group of companies to determine the cost of equity for a target company, one must first ascertain that the operating and financial risks of the sample companies are similar to those of the target company, as discussed above. According to DCF theory, a security price equals the present value of the cash flow investors expect it to generate. Specifically, the market value of common

[17] The variables are optimally weighted when the resulting principal components explain the

stock equals the cumulative value of the expected stream of future dividends after each is discounted by the investor-required rate of return.

Q. Please 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 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 the 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:

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

where P ≡ the current stock price;

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

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maximum amount of variance in the database.

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

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 expectations, market-consensus expected growth rates cannot be measured directly. Therefore, I measured market-consensus expected growth indirectly with Zacks growth estimates, which summarize securities 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 estimates for the companies in my water and utility samples are shown on Schedule 3.07.

Q. How did you measure the stock price?

A. A current stock price reflects all 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 company's current stock price with its closing market price from April 7, 2005. Those stock prices for the companies in the water and utility samples appear on Schedule 3.08.

Since stock prices reflect the market's concurrent expectation 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. Rather, a price change 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 return on common equity with the DCF model, one should measure the expected dividend yield and the corresponding expected growth rate concurrently. Using an historical stock price along with current growth expectations or combining an updated stock price with past growth expectations would likely produce an inaccurate estimate of the market-required rate of return on common equity.

Q. Please 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.

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 would 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 increase during the next quarter. For those companies that had announced the next dividend payment by the date that I performed my analysis, I input the dividend payment amount announced by the company. Otherwise, the average expected growth rate was applied to the current dividend rate to estimate the expected dividend rate. Schedule 3.08 presents the current quarterly dividends for the companies in the water and utility samples. Schedule 3.09 presents the expected quarterly dividends for the companies in the water and utility samples.

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

A. The DCF analysis estimated a 10.66% required rate of return on common equity estimate for the water sample and 9.33% for the utility sample as shown on Schedule 3.10. Those results represent averages of the DCF estimates for the individual companies. The DCF estimates for the water and utility samples are derived from the growth rates presented on Schedule 3.07, the stock price and dividend payment dates presented on Schedule 3.08, and the expected quarterly dividends presented on Schedule 3.09.

Risk Premium Analysis

Q. Please 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 returns, they would purchase the security with less risk. Similarly, 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 portfolio 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.

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

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

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.[18] 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 unexpected 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 treasury securities, were issued with terms to maturity of thirty years;[19] 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 bonds are more likely to incorporate within their yields the inflation and real risk-free rate expectations that drive, in part, the prices of common stocks than either U.S. Treasury notes or Treasury bills.

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

[19] In October 2001, the U.S. Department of Treasury suspended the issuance of 30-year U.S. Treasury Bonds.

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.

Q. Given that the inflation and real risk-free rate expectations reflected in the yields on U.S. Treasury bonds and the prices of common stocks are similar, does it necessarily follow that the 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 implausibly implies that the real risk-free rate and inflation is 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, in finite time periods, short and long-term expectations may differ. Short-term interest rates tend to be more volatile than long-term interest rates.[20] Consequently, over time U.S. Treasury bill yields are less biased

[20] Fabozzi and Fabozzi, ed., *The Handbook of Fixed Income Securities*, Fourth Edition, Irwin, p. 789.

(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. In comparison, 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.

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

A. Four-week U.S. Treasury bills are currently yielding 2.65%. Twenty-year U.S. Treasury bonds are currently yielding 4.96%. Both estimates are derived from quotes for April 7, 2005.[21] Schedule 3.11 presents the published quotes and effective yields.

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 2.5%

annually during the 2005-2025 period.[22] Likewise, Global Insight forecasts the GDP price index growth will average 2.4% annually during the 2005-2029 period.[23] In terms of the consumer price index ("CPI"), the *Survey of Professional Forecasters* ("*Survey*") forecasts the inflation rate will average 2.5% during the next ten years.[24] EIA forecasts of real GDP growth imply the real risk-free rate will average 3.0% during the 2005-2025 period.[25] Global Insight forecasts that real GDP growth will average 3.0% during the 2005-2029 period.[26] The *Survey* forecasts real GDP growth will average 3.3% during the next ten years.[27] Those forecasts imply a long-term, nominal risk-free rate between 5.4% and 5.8%.[28] Therefore, EIA, Global Insight, and *Survey* forecasts of inflation and real GDP growth expectations suggest that, currently, the U.S. Treasury bond yield more closely approximates the long-term risk-free rate. It should be noted, however, the U.S. Treasury bond yield is an upwardly biased estimator of the

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[21] The Federal Reserve Board, *Federal Reserve Statistical Release: Selected Interest Rates, H.15 Daily Update*, http://www.federalreserve.gov/releases/H15/update/, April 8, 2005.

[22] Energy Information Administration, *EIA 2005 Annual Energy Outlook*, Table 19, Macroeconomic Indicators, February 2005.

[23] Global Insight, "The U.S. Economy: The 25 Year Focus," Table 1 – Summary of the U.S. Economy: First Quarter 2005.

[24] *Survey of Professional Forecasters*, Federal Reserve Bank of Philadelphia, www.phil.frb.org/files/spf/survq404.htm, February 14, 2005. The *Survey* aggregates the forecasts of approximately thirty forecasters.

[25] Energy Information Administration, *EIA Annual Energy Outlook*, Table 19, Macroeconomic Indicators, February 2005.

[26] Global Insight, "The U.S. Economy: The 25 Year Focus," Table 1 – Summary of the U.S. Economy: First Quarter 2005.

[27] *Survey of Professional Forecasters*, Federal Reserve Bank of Philadelphia, www.phil.frb.org/files/spf/survq104.html, February 14, 2005.

[28] Nominal interest rates are calculated as follows:

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

where $r \equiv$ nominal interest rate;
$R \equiv$ real interest rate; and
$i \equiv$ inflation rate.

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

Q. Please explain why the real risk-free rate and the GDP growth rate should be similar.

A. Risk-free securities 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.[29] The real risk-free rate does not include premiums for inflation; therefore, only production opportunities and consumption preferences affect it. The real GDP growth rate measures output of goods and services excluding inflation 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 a risk premium or an inflation premium.

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 composing the S&P 500 Index ("S&P 500") as of March 31, 2005. That analysis used dividend information and closing market prices reported by Zacks Research Wizard and in the April 2005 edition of *S&P Security*

Owner's Stock Guide. Firms not paying a dividend as of April 1, 2005, 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, 2005, as provided by Zacks Research Wizard. The estimated weighted average expected rate of return for the remaining 380 firms, composing 86.69% of the market capitalization of the S&P 500, equals 13.44%.

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").[30]

When available, I used published Value Line beta 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 methodology.[31]

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

[30] The Regression beta methodology is the same as the Merrill Lynch methodology except the 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 beta estimates than the S&P500 Index.

[31] The Value Line service to which the Commission subscribes does not provide beta estimates for Artesian Resources, Middlesex Water Company, Southwest Water Company, and York Water Company.

Value Line estimates beta for a security with the following model using an ordinary least-squares technique:[32]

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

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 term 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 259 weekly observations of stock return data. Then, an adjusted beta is estimated through the following equation:

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

The regression analysis estimate of beta for a security or portfolio of securities is estimated with the following model using an ordinary least-squares technique:

$$R_{j,t} - R_{f,t} = a_j + \beta_j \times (R_{m,t} - R_{f,t}) + e_{j,t}$$

[32] Statman, Meir, "Betas Compared: Merrill Lynch vs. Value Line", *The Journal of Portfolio Management*, Winter 1981.

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_j ≡ the intercept term 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*.

Next, a beta estimate for both samples was calculated in three steps using regression analysis. First, the U.S. Treasury bill return is subtracted from both 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 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, the beta is adjusted through the following equation:

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

Q. Why do you use an adjusted beta estimate?

A. I use an adjusted beta estimate for two reasons. First, betas tend to regress towards the market mean value of 1.0 over time; therefore, the adjustment

represents an attempt to estimate a forward-looking beta. Second, 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 than 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 value of 1.0 results in a linear relationship between the beta estimate and realized rate of return that more closely conforms to the CAPM prediction.[33] 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 required rate of return towards observed realized rates of return.[34]

Q. What are the beta estimates for the samples?

A. The Value Line beta estimates average 0.64 for the water sample and 0.73 for the utility sample. The Regression beta estimates are 0.50 for the water sample and 0.54 for the utility sample. The average of the Value Line and Regression beta estimates equals 0.57 for the water sample and 0.64 for the utility sample.

[33] 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, pp. 375-376.

[34] In other words, the linear relationship between risk, as measured by adjusted beta, and return is steeper than the linear relationship between risk, as measured by raw beta, and return.

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

A. The risk premium model estimates a required rate of return on common equity of 9.79% for the water sample and 10.39% for the utility sample. The computation of those estimates appears on Schedule 3.11.

Cost of Equity Recommendation

Q. Based on your entire analysis, what is your estimate of the required rate of return on the common equity for Aqua?

A. A thorough analysis of the required rate of return on common equity requires both the application of financial models and the analyst's informed judgment. An estimate of the required rate of return on common equity based solely on judgment is inappropriate. Nevertheless, because techniques to measure the required rate of return on common equity 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 5.56% rate of return the market currently requires on less risky A-rated utility long-term debt.[35] Based on my analysis, in my judgment the investor-required rate of return on common equity for Aqua's Oak Run Water Division and Woodhaven Water and Sewer Divisions equals 10.10%.

Q. Please summarize how you determined that the investor-required rate of return on common equity for Aqua's Oak Run Water Division and Woodhaven Water and Sewer Divisions equals 10.10%.

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 my proxy for investor expectations.[36] In addition, measurement error has been minimized through the use of a sample, 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 on common equity for the water sample, 10.22%, is based on the average of the DCF-derived results (10.66%) and the risk premium-derived results (9.79%). The average investor required rate of return on common equity for the utility sample, 9.86%, is based on the average of the DCF-derived results (9.33%) and the risk premium-derived results (10.39%).

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

[35] *Value Line Selection & Opinion,* April 15, 2005, p. 1769.
[36] Except as discussed above in regard to U.S. Treasury bond yields as proxies for the long-term risk-free rate.

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. Factor 2 measures earnings and revenue stability, indicators of sales and cost variability. Aqua's score on factor 2 is lower than that of the water sample but higher than that of the utility sample, which indicates that Aqua has more product risk than the water sample but less product risk than the utility sample. Factor 3 measures construction risk. Aqua's score on factor 3 is slightly higher than that of the water sample but lower than that of the utility sample, which indicates that Aqua has slightly less construction risk than the water sample but more construction risk than the utility sample. Factor 4 measures capital intensity, which is an industry-specific risk factor. Aqua's factor 4 score exceeds that of the water sample, which indicates that is has less operating leverage and therefore less operating risk in comparison to the water sample. Aqua's factor 4 score is also higher than the utility sample, which indicates that the Company is more insulated from competition through regulation, which means that Aqua is exposed to less competitive risk. Thus, in

my judgment, the risks of Aqua are more similar to the water sample, while Aqua is less risky than the utility sample.

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, has more product risk than the water sample but less product risk than the utility sample, less construction risk than the water sample but more construction risk than the utility sample, and has less risk on the capital intensity dimension than both the water and utility samples. Although Aqua's scores for factors 1 and 2 are slightly closer to the utility sample, the Company's scores for factors 3 and 4 are much closer to the water sample. Hence, based on my quantitative 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, 10.10%, is the result of that calculation.

Q. Have you reviewed the Commission Order from Aqua's most recent rate proceeding, Docket No. 04-0442?

A. Yes, I have reviewed the Commission's decision regarding the cost of capital for Aqua in the Docket No. 04-0442 Order. The Commission adopted Staff's analysis. However, the Commission also added 30 basis points to Staff's cost of equity recommendation.

Q. Do you agree with the additional 30 basis points allowed by the Commission in Docket No. 04-0442?

A. No. My analysis indicates that an additional investment risk premium to Aqua's cost of common equity is not necessary. Aqua's financial strength is consistent with an A credit rating, not the BBB-level rating implied in its NAIC-2 designation. Similarly, in Aqua's last two rate proceedings, Staff's analysis also indicated that Aqua's financial strength was consistent with an A credit rating and an investment risk premium was not warranted. However, despite Staff's recommendation, the Commission added an investment risk premium of 30 basis points to the authorized rate of return on common equity in Aqua's last two rate proceedings. The Commission Order in Docket No. 03-0403 states:

> Although the size of [Aqua] does not warrant a premium, other factors might warrant a business risk adjustment. In this context, it is appropriate to consider all available information of record, including the rating of NAIC-2 on certain of [Aqua's] securities issues. When compared to the credit rating of A discussed earlier, the rating of NAIC-2, or a comparable S&P rating of BBB, indicates

> the presence of some additional risk factor not already explained. The Company also asserts that, on average, [Aqua] faces risk from the need to renew and replace certain infrastructure at higher replacement cost per dollar of net plant. In this light, the Commission concludes that a business risk premium is warranted under the facts of this case as applied to [Aqua], and should be included in the cost of equity in the amount of the 30 basis points proposed by the Company.[37]

The Commission Order in Docket No. 04-0442 states:

> The Commission finds that Aqua's NAIC-2 rating, which is comparable to an S&P rating of BBB, demonstrates an additional risk factor not included in Staff's analysis. To remedy this, the Commission will allow the addition of 30 basis points to the cost of common equity.[38]

In my opinion, the NAIC-2 rating is biased downward. However, the Commission gave the NAIC-2 rating more weight than Staff's quantitative risk analysis in the last two rate proceedings. Since my water sample also has a higher average credit rating (i.e., A+) than the BBB-level rating implied in the NAIC-2 designation on some of Aqua's debt issues, [39] I am assuming that the Commission would be inclined to add an investment risk premium to the cost of equity estimate for Aqua. Hence, I am adding 30 basis points to my cost of equity estimate for Aqua to acknowledge the significance the Commission afforded to the NAIC-2 rating in its previous two rate orders for Aqua.

[37] Order, Docket No. 03-0403, April 13, 2004, p. 43.
[38] Order, Docket No. 04-0442, April 20, 2005, p. 45.
[39] The average credit rating for the utility sample is BBB+. Unlike Moody's Investors Service and S&P credit ratings, NAIC designations do not distinguish between debt issues with above and below average default risk within a designation. Therefore, whether the NAIC-2 designation for Aqua's debt issues is closer to a BBB+, BBB, or BBB- S&P credit rating is unknown. My quantitative analysis of Aqua's financial strength indicates that Aqua's is commensurate with A-rated water utilities.

Q. What is your estimate of Aqua's cost of common equity incorporating the 30 basis point investment risk premium the Commission included in its last two rate decisions for Aqua?

A. Adding 30 basis points to my 10.10% cost of equity recommendation that my analysis supports results in a 10.40% estimate of Aqua's cost of common equity for use in determining the overall cost of capital for rate setting purposes in this proceeding.

Rate of Return on Rate Base Conclusion

Q. What rate of return on rate base will Staff be using for setting Aqua's revenue requirement?

A. As shown on Schedule 3.01, the rate of return on rate base for Aqua is 8.79%. The recommended estimate incorporates a rate of return on common equity of 10.40%.

Response to Ms. Ahern

Q. Please evaluate Ms. Ahern's analyses of Aqua's cost of common equity.

A. Ms. Ahern estimates an 11.30% cost of common equity for Aqua.[40] Ms. Ahern's analysis contains several errors that lead her to over-estimate Aqua's cost of common equity. Critical errors occur in, or are the result of, her DCF, CAPM, Risk Premium Model ("RPM") and Comparable Earnings Model ("CEM") analyses. The most significant flaws in Ms. Ahern's analysis of Aqua's cost of common equity are the following:

1. Ms. Ahern's inclusion of an investment risk premium due to Aqua's size is unwarranted.

2. Ms. Ahern's use of historical data in each of her models is problematic.

3. Ms. Ahern used questionable growth rates in her DCF model and applied an arbitrary elimination criterion to her DCF-derived cost of equity estimates for the companies comprising her water and utility samples.

4. Ms. Ahern's CAPM analysis suffers from a number of errors, the most critical of which is an improper use of adjusted betas in her "empirical" CAPM analysis.

5. Ms. Ahern's RPM is flawed on several levels.

6. Ms. Ahern's CEM is theoretically and empirically invalid.

[40] Aqua Exhibit No. 3.0, pp. 3-6.

Investment Risk Premium for Aqua

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 business risk for the Company.[41] 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 her proxy groups. According to Ms. Ahern, Aqua's size and NAIC-2 designation warrant an investment risk premium for the cost of common equity of 30 – 50 basis points (hereafter, basis points are referred to as "BPS").[42]

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

A. No. However, Ms. Ahern does quantify the risk premiums separately. Ms. Ahern asserts that Aqua's small relative size warrants a risk premium adjustment of 271 BPS to the indicated cost of equity for her sample of six C.A. Turner water companies, 303 BPS to the indicated cost of equity for her sample of three Value Line water companies, and 575 BPS to the indicated cost of equity for her utility

[41] Aqua Exhibit No. 3.0, pp. 10-12.

sample. Ms. Ahern's estimates of size-based risk premiums are based upon historical size premiums for market-traded companies during the 1926 – 2003 measurement period, as reported by Ibbotson Associates.[43] Ms. Ahern asserts further that the alleged NAIC-2 designation warrants adding 28 BPS to the estimated cost of equity for both of her water samples and adding 19 BPS to the estimated cost of equity for her utility sample. That risk premium is based on the average yield spread between Moody's Baa rated public utility bonds and Moody's A2 and A3 public utility bonds (i.e., the average Moody's bond rating for Ms. Ahern's water and utility samples, respectively).[44] Together, those risk premiums total 299 BPS for the six water companies (i.e., 271 BPS + 28 BPS), 331 BPS for the three Value Line water companies (i.e., 331 BPS + 28 BPS), and 594 BPS for the utility sample (i.e., 575 BPS + 19 BPS). Ms. Ahern makes a "conservatively reasonable" investment risk adjustment of 30 BPS to the estimated cost of equity for both of her water samples and 50 BPS to the estimated cost of equity for her utility sample.[45]

Size-Based Risk Premium

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

[42] Aqua Exhibit No. 3.0, pp. 5-6.
[43] Aqua Exhibit No. 3.0, pp. 66-67.
[44] Aqua Exhibit No. 3.0, pp. 67-68.
[45] Aqua Exhibit No. 3.0, pp. 68-69.

A. No. A size-based risk premium for a utility is contrary to financial theory and unsupported by empirical studies. 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.

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

A. Yes. A size-based risk premium was presented in Consumers Illinois Water rate case, Docket No. 97-0351, and was rejected 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.[46] Importantly, in Docket No. 03-0403, an Aqua rate proceeding in which Ms. Ahern was the Company cost of equity witness, 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].[47]

The Commission once again rejected the Company's position that a business risk premium was warranted based on the size of Aqua in Docket No. 04-0442, Aqua's most recent rate proceeding.[48] Once again, Ms. Ahern's inclusion of an investment risk premium based on the size of Aqua is unwarranted.

[46] Amended Order, Docket No. 97-0351, June 17, 1998, p. 39.
[47] Order, Docket No. 03-0403, April 13, 2004, p. 43.
[48] Order, Docket No. 04-0442, April 20, 2005, p. 43.

Historical Data

Q. What historical data did Ms. Ahern use in her cost of equity analysis?

A. Ms. Ahern used historical data, in part, to estimate the growth rates and dividend yields in her DCF analysis, the market risk premiums in her RPM and CAPM analyses and the return on book common equity for the three groups of non-price regulated proxy companies in her CEM analysis.

Q. Why is Ms. Ahern's use of historical data in her DCF, CAPM, RPM and CEM analyses improper?

A. Historical data improperly favors outdated information that the market no longer considers relevant over the most recently available information.

Q. Has the Commission previously ruled on the use of historical data in determining a company's cost of capital?

A. Yes. In Docket No. 92-0357, a rate proceeding for Iowa-Illinois Gas and Electric Company, the Commission's Order stated:

> The Commission notes that the investor-required return on common equity is a forward-looking concept. Mr. Benore [the company witness], in many instances, inappropriately utilized historical data to determine the Company's cost of equity.[49]

[49] Order, Docket No. 92-0357, July 21, 1993, p. 66.

Similarly, in Docket No. 95-0076, a rate proceeding for Illinois-American Water Company, the Commission's Order stated:

> The Commission also concludes that Staff's criticism of Dr. Phillips' [the company witness] use of two-month average historical stock prices and historical growth rates in his traditional DCF analysis, and historical risk premiums in his risk premium analysis are valid. Historical data is inappropriate in determining a forward-looking cost of equity because it contains information that may no longer be relevant to investors.[50]

The Commission has also rejected using historical data to estimate a utility's cost of equity in Docket Nos. 99-0122/99-0130 Consolidated (an electric delivery services rate proceeding for MidAmerican Energy Co.), Docket Nos. 01-0528/0628/0629 Consolidated (an electric delivery services rate proceeding for Interstate Power Co. and South Beloit Water, Gas & Electric Co.), and Docket No. 02-0837 (Central Illinois Light Co. rate proceeding).[51] The Commission rejected Ms. Ahern's use of historical dividend yields in the Docket No. 03-0403 Order (Aqua, then CIWC, rate proceeding), which states:

> The Commission is aware that historical data has a place in many cost of capital analyses. The instant objective, however, is to estimate the forward-looking cost of common equity. For this reason, the Commission has consistently rejected the use of average common stock prices, and has accepted the use of spot common stock prices when implementing the DCF model. The Commission continues to believe that the use of spot common stock prices in the DCF model is superior to the use of average prices.[52]

[50] Order, Docket No. 95-0076, December 20, 1995, p. 69.
[51] Order, Docket Nos. 99-0122/0130 Consol., August 25, 1999, p. 10; Order, Docket Nos. 01-0528/0628/0629 Consol., March 28, 2002, p. 12; Order, Docket No. 02-0837, October 17, 2003, p. 37.
[52] Order, Docket No. 03-0403, April 13, 2004, p. 42.

In addition, the Commission once again rejected Ms. Ahern's use of historical data in Docket No. 04-0442, Aqua's most recent rate proceeding.[53] Ms. Ahern's use of historical data in her cost of equity analysis should also be rejected in this proceeding.

Discounted Cash Flow Analysis

Q. Ms. Ahern asserts that the DCF model has a tendency to mis-specify investors' required return rate when the market value of common stock differs significantly from its book value.[54] Has the Commission previously ruled on market-to-book ratios in relation to determining a company's cost of capital?

A. Yes. In Docket No. 02-0798/03-008/03-0009 Consolidated, a rate proceeding for Central Illinois Public Service Company and Union Electric Company, the Commission's Order stated:

> The Commission has reviewed the arguments of the parties and rejects [the companies'] proposed market-to-book adjustment. As Staff points out, the Commission has a long history of applying its estimated market required rate of return on common equity to the book value, net original cost rate base for Illinois jurisdictional utilities, including [the companies]. There is no evidence that this practice has ever served as an impediment to a utility's ability to raise capital or maintain its financial integrity. In fact, the record

[53] Order, Docket No. 04-0442, April 20, 2005, p. 43.
[54] Aqua Exhibit No. 3.0, p. 24.

> demonstrates the both [companies] currently possess strong credit ratings and are financial sound utilities.[55]

In Docket No. 03-0403, an Aqua rate proceeding in which Ms. Ahern was the Company cost of equity witness, the Commission's Order stated:

> The Commission also rejects the Company's suggestion that the DCF model produces a downward-biased cost of common equity due to a variation between the book and market values of common equity. The argument for a market-to-book ratio adjustment has been made, and has been rejected by this Commission, numerous times in previous cases. The Company's arguments here are not significantly different, and the Commission continues to find such arguments to be without merit.[56]

Ms. Ahern also presented this same argument in Docket No. 04-0442, where the Commission once again rejected it.[57]

Q. How did Ms. Ahern derive the growth rates used in her DCF model?

A. Ms. Ahern begins with seven types of growth rate estimates from three different sources. Some are based on dividends per share ("DPS"), other on earnings per share ("EPS"); some are historical, others projected; some are from Value Line, others from Thomson FN/First Call, and still others she derived herself.[58] She used different combinations of those growth rates to derive two average growth rate estimates ("Composite Growth Rate Estimates"). Ms. Ahern's final DCF-derived cost of equity estimate was the average of the DCF results obtained

[55] Order, Docket Nos. 02-0798/03-0008/03-0009 Consol., October 22, 2003, p. 87.
[56] Order, Docket No. 03-0403, April 13, 2004, p. 42.
[57] Order, Docket No. 04-0442, April 20, 2005, p. 43.
[58] Aqua Exhibit No. 3.0, Schedule 3.13, p. 1, Columns (1) through (8).

from using the Composite Growth Rate Estimates. Ms. Ahern's first Composite Growth Rate Estimate is the average of a) the midpoint of all seven growth rate estimates and b) the mean of all seven growth estimates. The second Composite Growth Rate Estimate comprises the average of the Value Line and Thomson FN/First Call forecasts of EPS growth for each company in her two samples.[59]

Q. Please explain why Ms. Ahern's growth rate estimation procedure is questionable.

A. In addition to the shortcomings of using historical data discussed previously, Ms. Ahern's growth rate estimates reflect two major problems. First, missing data undermines the integrity of Ms. Ahern's growth rate. Second, Ms. Ahern introduces circularity into the estimate of return on common equity by the inclusion of the "BR+SV" growth estimate.

Q. Has the Commission previously rejected Ms. Ahern's method of developing the growth rates used in her DCF analysis?

A. Yes, the Commission rejected Ms. Ahern's growth rates, which were developed in the same manner, in Docket No. 03-0403. The Order from that proceeding states:

[59] Aqua Exhibit No. 3.0, Schedule 3.13, p. 1, Column (7).

> In addition, the Commission has concerns regarding the growth rates used by the Company in implementing the DCF model. While the application of informed judgment is necessary in estimating the cost of common equity, the Commission requires a full explanation of why and how such judgment is used. Setting aside the questionable use of historical information used in developing its growth rates, the Company has failed to adequately explain how and why it combined various data to develop the growth rates it used in implementing the DCF model.[60]

Q. Ms. Ahern testified that she eliminated DCF-derived cost of equity estimates for her proxy companies that were less than 200 basis points above the prospective yield on Moody's A rated public utility bonds of 6.6%. What is the basis for Ms. Ahern's elimination criterion?

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

> Based upon a review of recent authorized returns on common equity (ROE) in Illinois 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 recent ICC authorized ROEs is between 300 and 450 basis points. In addition, the ICC's authorized common equity cost rate for Aqua in Docket No. 03-0403 of 10.16% entered April 16, 2004 was 356 basis points above the then prospective yield on A rated public utility bonds of 6.6%. 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 either reasonable or credible.[61]

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

[60] Order, Docket No. 03-0403, April 13, 2004, p. 42.
[61] Aqua Exhibit No. 3.0, p. 36.

A. No. Ms. Ahern's prospective A-rated utility bond yield (i.e., 6.6%) plus 450 basis points (i.e., the high end of Ms. Ahern's estimate of the risk premium implicit in Commission authorized returns on common equity) equals 11.1%. Eight out of twenty-four DCF estimates for Ms. Ahern's sample of six water companies, six out of twelve DCF estimates for Ms. Ahern's sample of three water companies, and eleven out of sixty DCF estimates for Ms. Ahern's utility sample exceed the high-end of the risk premium of Commission authorized rates of return.[62] Moreover, Ms. Ahern's 11.30% cost of equity recommendation for Aqua is 470 basis points above her "prospective" A-rated bond yield and 574 basis points above the current 5.56% A-rated bond yield.

Ms. Ahern's elimination criterion caused her to exaggerate the DCF derived cost of equity estimates. Including the "low" estimated in Ms. Ahern's DCF analysis results in DCF-derived cost of equity estimates of 9.9% for her sample of six water companies, 10.6% for her Value Line water sample, and 9.4% for her utility sample, which is more in line with the recently authorized returns on equity that Ms. Ahern relied upon to justify her elimination criterion.

[62] Aqua Exhibit No. 3.0, Schedule 3.9.

Capital Asset Pricing Model

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. For example, Ms. Ahern's source for interest rate forecasts projected that the yield on 20-year Treasury Bonds would be 5.2% during the 1st quarter of 2005.[63] The actual yield averaged 4.76%.[64] Absent convincing evidence that Ms. Ahern's forecasted interest rates are accurate, the Commission should continue to rely on current, observable, market interest rates.

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

A. Yes. In Docket No. 02-0837, 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.[65]

[63] Aqua Exhibit No. 3.0, Schedule 3.15, p.4.
[64] The Federal Reserve Board, *Historical Data – 20 Year Treasury Bonds*, http://www.federalreserve.gov/releases/H15/data/m/tcm20y.txt, April 29, 2005.
[65] Order, Docket No. 02-0837, October 17, 2003, p. 37.

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.[66]

Q. Describe the errors in Ms. Ahern's empirical CAPM ("ECAPM") analysis.

A. Some quantitative research suggests the relationship between risk and return is flatter than the CAPM predicts. The ECAPM attempts to reproduce the observed relationship between risk and realized returns.[67] Since the adjustments to the CAPM that result in the ECAPM are based on empirical testing rather than financial theory, the ECAPM should be applied in a manner that is consistent with the conditions under which it was developed. Specifically, the measure of risk used within the ECAPM must be consistent with that used in the empirical studies from which the model was developed. Ms. Ahern failed in that regard. The basis of Ms. Ahern's ECAPM is a book entitled *Regulatory Finance: Utilities' Cost of Capital* by Roger A. Morin. That text, in turn, cites another study by Litzenberger, et. al.[68] Litzenberger et. al. adopts raw beta as the measure of risk in its tests of the relationship between risk and realized returns. In contrast, Ms. Ahern applies to both her Traditional and Empirical CAPM models Value Line

[66] Order, Docket Nos. 02-0798/03-0008/03-0009 Consol., October 22, 2003, p. 85.
[67] Aqua Exhibit No. 3.0, pp. 54-57.
[68] 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, pp. 369-383.

adjusted betas,[69] rather than the raw betas used in accordance with Litzenberger et al. Importantly, Litzenberger et al. suggests that globally adjusted betas,[70] such as those which Value Line publishes, are a solution to the discrepancy between the theoretically predicted and empirically observed relationship between risk and return.[71] In other words, by using adjusted betas, Ms. Ahern has already effectively transformed her Traditional CAPM into an ECAPM. Therefore, including an additional beta adjustment in the ECAPM model results in inflated estimates of her samples' cost of common equity.

Q. Has the Commission previously rejected the use of the ECAPM to measure a utility's cost of equity?

A. Yes. The Commission rejected Ms. Ahern's ECAPM analysis in Aqua's rate proceeding, Docket No. 03-0403. The Docket No. 03-0403 Order states:

> The Commission also rejects the empirical CAPM model as implemented by the Company. …Furthermore, the Commission continues to be of the opinion that the use of adjusted betas in the ECAPM is improper and leads to unreliable results.[72]

In addition, the Commission rejected Ms. Ahern's ECAPM analysis in Aqua's most recent rate proceeding, Docket No. 04-0442.[73]

[69] Aqua Exhibit No. 3.0, Schedule 3.15, pp. 2-3.
[70] Litzenberger et al. refers to betas adjusted in the manner of Merrill Lynch and Value Line as "globally adjusted."
[71] 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, pp. 375-376.
[72] Order, Docket No. 03-0403, April 13, 2004, pp. 41-42.
[73] Order, Docket No. 04-0442, April 20, 2005, p. 43.

Q. Did Ms. Ahern modify her ECAPM in the current docket to address the Commission's concerns identified in the Docket No. 03-0403 Commission Order?

A. No.[74] In fact, Ms. Ahern's direct testimony in the current docket quotes an e-mail message from Dr. Roger Morin to Ms. Ahern's colleague, Frank Hanley, dated August 31, 2000. (*See* Aqua Exhibit No. 3.0, p. 54.) Ms. Ahern also submitted the same e-mail message in Docket No. 03-0403 and the Commission's Order in that docket made the following statement regarding the e-mail message:

> The Commission is reluctant to rely upon an unauthenticated document that attempts to persuade by means of a statement made years before the instant proceeding, yet offered for the truth of matter asserted therein. Furthermore, there is no showing that the theory of the Morin ECAPM is widely accepted by practitioners using risk premium models, notwithstanding the discussion in Dr. Morin's textbook. In fact, the comment begins with a concession to the contrary, stating that '[s]ome have argued that the Morin ECAPM constitutes a double beta adjustment.' Nor is there any reason to accept that the document is of the type reasonably relied upon by experts in the field of finance. The Commission accordingly finds the Morin comment and the discussion of it to be of little evidentiary weight.[75]

Further, the Commission's Order in Docket No. 04-0442 states:

> The Commission additionally notes that, as in 03-0403, the Morin ECAPM material is hearsay…the presentation is inherently unreliable, offers no opportunity for cross-examination, is unauthenticated, and suffers from other problems outlined in 03-

[74] Co. response to Staff data request FD-5.
[75] Order, Docket No. 03-0403, April 13, 2004, pp. 41-42.

0403. Ms. Ahern's discussions in each phase of testimony of the Morin ECAPM therefore are given no weight.[76]

Risk Premium Model

Q. Describe Ms. Ahern's RPM analysis.

A. Ms. Ahern's RPM is essentially an average of two distinct RPMs for each proxy group.[77] The following formula, derived on Schedule 3.12, depicts Ms. Ahern's RPM as:

$$R_j = \tfrac{1}{2}(R_A + \beta_j \times RP_1) + \tfrac{1}{2}(R_A + RP_2)$$

Both models begin with the same "Adjusted Prospective Bond Yield," R_A (6.6%), which, ostensibly, represents the "prospective" yield on bonds rated 'A2' by Moody's, the average credit rating of a proxy subgroup of six water companies. To R_A, the first model (i.e., $R_A + \beta_j \times RP_1$) adds the product of a Value Line adjusted beta for the proxy subgroup β_j (i.e., 0.66) and the average of the historical and forecasted risk premium estimates, RP_1 (i.e., 5.7%).[78] The second model[79] adds to R_A an historical risk premium estimate, RP_2 (i.e., 4.2%).

[76] Order, Docket No. 04-0442, April 20, 2004, footnote 4, p. 43.
[77] For presentation purposes, I will only address the proxy group of six water companies; however, the proxy groups of three Value Line water companies and fifteen public utility companies is conceptually the same.
[78] Hereafter referred to as the "Ahern Beta RPM".
[79] Hereafter referred to as the "Ahern Utility Historical RPM".

Inputting Ms. Ahern's estimates[80] produces a cost of equity estimate of 10.6% as shown below:

Ahern Beta RPM = (6.6% + 0.66 × 5.7%) = 10.4%

Ahern Utility Historical RPM = (6.6% + 4.2%) = 10.8%

$$R_j = \frac{10.4\% + 10.8\%}{2} = 10.6\%$$

Q. Describe the shortcomings of Ms. Ahern's RPM.

A. In addition to the improper use of historical input data, as discussed previously, both of the models incorporated into Ms. Ahern's RPM analysis are flawed in other respects. The Ahern Beta RPM ($R_A + \beta_j \times RP_1$) is a CAPM derivation that uses biased proxies for the risk-free rate. There are two fundamental flaws to this approach. First, Ms. Ahern improperly applied a market risk premium-based beta to a non-market risk premium. Second, she inappropriately substituted two different long-term corporate bond yields for the risk-free rate within the same RPM. The Ahern Utility Historical RPM ($R_A + RP_2$) is also flawed due to the improper derivation of the equity risk premium.

Q. Has the Commission rejected the use of the RPM to measure a utility's cost of equity?

[80] Aqua Exhibit No.3.0, Schedule 3.14.

A. Yes. The Commission rejected the Beta RPM in Docket No. 02-0837, a rate proceeding for Central Illinois Light Company. The Docket No. 02-0837 Commission Order states, "[t]he Commission has consistently rejected the RPM and [the company] has not adequately explained why this practice should be modified."[81] More recently, the Commission rejected Ms. Ahern's RPM in Aqua's last two rate cases, Docket Nos. 03-0403 and 04-0442.[82]

Comparable Earnings Model

Q. Describe the shortcomings of Ms. Ahern's CEM analysis.

A. In addition to using historical data, Ms. Ahern's CEM suffers several other shortcomings. First, accounting practices can distort the CEM-derived rate of return estimate. Second, Ms. Ahern's CEM relies on the erroneous notion that a combination of realized and expected returns on book value is an appropriate estimate for investor-required returns. Third, Ms. Ahern applies an arbitrary criterion for eliminating certain returns for the CEM proxy groups. Fourth, the CEM sample group that serves as a proxy for Ms. Ahern's six company water sample has a higher average Value Line beta (i.e., 0.73), and is thus riskier, than the sample it is supposed to represent, which has an average beta equal to

[81] Order, Docket No. 02-0837, October 17, 2003, p. 38.
[82] Order, Docket No. 03-0403, April 13, 2004, pp. 41-43; Order Docket No. 04-0442, April 20, 2005, p. 43.

0.66.[83] Thus, Ms. Ahern's CEM is inappropriate for estimating Aqua's rate of return on common equity.

Q. Has the Commission rejected the use of the CEM to measure a utility's cost of equity?

A. Yes. The Commission has rejected the use of the CEM in many rate proceedings. In Docket No. 91-0147, a rate proceeding for Illinois Power Company, the Commission's Order stated:

> The Commission concludes that little weight should be given to Mr. Parcell's [the company witness] comparable earnings analysis. That analysis wrongly assumes that the earned rate of return on book equity equals the current investor-required rate of return on the market value of a firm's common equity.[84]

Similarly, in Docket Nos. 92-0448/93-0239 Consolidated, a rate proceeding for Illinois Bell Telephone Company ("IBT"), the Commission's Order stated:

> The Commission rejects Dr. Phillips [the company witness] comparable earnings analysis as differing from the conventional thinking of the sophisticated investor. Dr. Phillips' comparable analysis is flawed because it attempts to establish rates based on book equity instead of using a market-based approach. The Commission has previously rejected Dr. Phillips' use of the comparable earnings analysis for this reason and IBT has not established a basis for the Commission to find differently in this case.[85]

[83] Aqua Exhibit No. 3.0, Schedule 3.16, p. 2.
[84] Order, Docket No. 91-0147, February 11, 1992, p. 149.
[85] Order, Docket Nos. 92-0448/93-0239 Consol., October 11, 1994, pp. 88-89.

That quotation from the Commission Order in the IBT rate proceeding refers to a prior IBT rate proceeding, i.e., Docket No. 89-0033, in which the Commission also rejected Dr. Phillips' CEM.[86]

In Docket No. 99-0121, an electric delivery services rate proceeding for Central Illinois Public Service Company and Union Electric Company, the Commission's Order stated, "The Commission is of the opinion that the comparable earnings method advanced by [the companies] does not produce a reliable return for ratemaking purposes."[87] Similarly, in Docket Nos. 01-0528/0628/0629 Consolidated, an electric delivery services rate proceeding for Interstate Power Company and South Beloit Water, Gas and Electric Company, the Commission's Order stated:

> The Companies' analysis also relies, in part, on the comparable earnings approach that we have consistently rejected in other dockets. We do so again in this case. The cost of common equity is the market required rate of return demanded by investors. The comparable earnings approach relies on book equity, rather than a market required rate.[88]

In Docket Nos. 02-0798/03-0008/03-0009 Consolidated, a rate proceeding for Central Illinois Public Service Company and Union Electric Company, the Commission's Order stated:

> As Staff notes, the Commission has consistently and repeatedly rejected the comparable earnings methodology. In the Commission's view, [the company] has provided no new argument in favor of this flawed

[86] Order, Docket Nos. 92-0448/93-0239 Consol., October 11, 1994, p. 86, citing Order on Remand, Docket No. 89-0033, November 4, 1991, p. 15.
[87] Order, Docket No. 99-0121, August 25, 1999, p. 67.
[88] Order, Docket Nos. 01-0528/0628/0629 Consol., March 28, 2002, p. 13.

> methodology. Stated simply, the Commission does not believe it is appropriate to estimate [the companies'] forward looking cost of common equity by looking to historical earned returns on common equity earned by competitive industrial firms of similar risk. The constantly changing economic environment alone, which is well documented in the record, prevents the Commission from relying upon historical earned returns to establish a forward-looking return on common equity.[89]

The Commission also rejected the comparable earnings methodology in Docket Nos. 03-0676/03-0677 Consolidated. The Order in Docket Nos. 03-0676/03-0677 Consolidated stated:

> The Commission finds, as it has in prior dockets, that the comparable earning approach has little value because it constitutes an accounting-return based approach rather than a market-based methodology, and fails to reflect the investor-required rate of return.[90]

Most significantly, the Commission rejected Ms. Ahern's CEM in Aqua's two most recent rate proceedings, Docket Nos. 03-0403 and 04-0442. The Docket No. 03-0403 Order states:

> First, the Commission rejects the use of the comparable earnings analysis. The Commission has repeatedly found that the comparable earnings approach is an unsound basis for estimating a utility's cost of common equity. In the view of the Commission, there is no economic basis for concluding that the comparable earnings approach provides a valid estimate of the forward-looking, investor-required rate of return for the Company. The Commission is not convinced that looking to the return on book equity of non-price regulated firms provides meaningful information when estimating the Company's cost of common equity.[91]

[89] Order, Docket Nos. 02-0798/03-0008/03-0009 Consol., October 22, 2003, p. 88.
[90] Order, Docket Nos. 03-0676/03-0677 Consolidated, October 6, 2004, p. 40.
[91] Order, Docket No. 03-0403, April 13, 2004, p. 41.

Rate Case Expense

Q. Please comment on Staff witness Pearce's proposal to disallow the rate case expense associated with Ms. Ahern's testimony in this proceeding.[92]

A. Ms. Pearce proposes to disallow Ms. Ahern's fees because the Company submitted the same analysis for three consecutive filings instead of filing one consolidated proceeding. Ms. Ahern utilized the same methodology to estimate the cost of common equity for Aqua in Docket Nos. 03-0403, 04-0442 and this current proceeding. If the Company had filed all of the divisions in one consolidated rate case, the fees would have been much less and the ratepayers would not have to bear as high a burden.

In addition, Ms. Ahern's methodology is flawed on many levels and was rejected in Docket Nos. 03-0403 and 04-0442. Where the Commission has rejected a financial model or technique as fundamentally unsound, expenses incurred to present that same financial model or technique in a subsequent case are not just, reasonable, or prudent absent a good-faith argument for the modification or reversal of the Commission's analysis or decision. The Commission Order in Docket No. 04-0442 states:

> Several of the issues presented in this proceeding were already decided in Docket 03-0403 (Order entered April 13, 2004). That case involved a different operating division of Aqua. The parties have already noted with respect to other issues in this case that such determinations are not *res judicata*. Nonetheless, the

[92] ICC Staff Exhibit 1.0, pp. 11-12.

> Commission finds that the precedential value of 03-0403 toward the instant case is quite strong; the Commission therefore will not depart from its determinations in 03-0403 as applied to these issues unless a convincing argument is presented as to why the decision in 03-0403 should not be followed. No such argument was offered by Aqua with respect to any of the following issues: the CEM model, the RPM model, the alleged exclusive reliance on the DCF model, the use of historical data, the calculation of betas, the sample selection methods, the size of Aqua for a size-based business risk premium, the empirical CAPM (or "Morin ECAPM"),[fn] and the discussions of the *Bluefield* and *Hope* cases.[fn] Instead, the same Company witness offered substantially the same opinions without attempting to reconcile them with 03-0403 Order. The Commission once again rejects the Company's position as to these issues, and, subject to the remainder of this discussion, generally affirms the cost of equity models and methodology utilized by Staff.[93]

In the instant proceeding, Ms. Ahern once again failed to provide a good faith argument for the modification or reversal of the Commission's prior analysis and decisions. She offered substantially the same analysis and opinions without attempting to reconcile them with the Order from Docket No. 03-0403. Hence, I concur with the testimony of Staff witness Pearce that the rate case expenses associated with Ms. Ahern's contribution to this case should not be allowed.

Q. Does this conclude your direct testimony?

A. Yes, it does.

[93] Order, Docket No. 04-0442, April 20, 2005, pp. 43-44.

Docket Nos. 05-0071/05-0072
(Consolidated)
ICC Staff Exhibit 3.0
Schedule 3.01

Aqua Illinois, Inc.

Weighted Average Cost of Capital
Average 2005

Staff Proposal

	Amount	Percent of Total Capital	Cost	Weighted Cost
Long-term Debt	$57,184,210	47.87%	7.06%	3.38%
Preferred Stock	$382,372	0.32%	5.48%	0.02%
Common Equity	$61,900,673	51.81%	10.40%	5.39%
Total Capital	$119,467,255	100.00%		
Weighted Average Cost of Capital				**8.79%**

Docket Nos. 05-0071/05-0072
(Consolidated)
ICC Staff Exhibit 3.0
Schedule 3.02

Aqua Illinois, Inc.

Balance of Short-term Debt
Average 2005

Forecasted 2005 End of Month Balances

	Original Forecasted Gross Short Term Debt	CWIP	CWIP Accruing AFUDC	Per 285.4020(b) (4)(A)	Per 285.4020(b) (4)(B)	Average Net Short-Term Debt Outstanding
Dec-04	$1,800,000	$1,294,623	$1,294,623	$0	$505,377	
Jan-05	$1,200,000	$1,294,623	$1,294,623	$0	($94,623)	$0
Feb-05	$800,000	$1,294,623	$1,294,623	$0	($494,623)	$0
Mar-05	$400,000	$1,294,623	$1,294,623	$0	($894,623)	$0
Apr-05	$200,000	$1,294,623	$1,294,623	$0	($1,094,623)	$0
May-05	$0	$1,294,623	$1,294,623	$0	$0	$0
Jun-05	$400,000	$1,294,623	$1,294,623	$0	($894,623)	$0
Jul-05	$200,000	$1,294,623	$1,294,623	$0	($1,094,623)	$0
Aug-05	$600,000	$1,294,623	$1,294,623	$0	($694,623)	$0
Sep-05	$500,000	$1,294,623	$1,294,623	$0	($794,623)	$0
Oct-05	$300,000	$1,294,623	$1,294,623	$0	($994,623)	$0
Nov-05	$0	$1,294,623	$1,294,623	$0	$0	$0
Dec-05	$0	$1,294,623	$1,294,623	$0	$0	$0
						$0

Updated 2005 End of Month Balances

	Updated Forecasted Gross Short Term Debt	CWIP	CWIP Accruing AFUDC	Per 285.4020(b) (4)(A)	Per 285.4020(b) (4)(B)	Average Net Short-Term Debt Outstanding
Dec-04	$0	$1,294,623	$1,294,623	$0	($1,294,623)	
Jan-05	$0	$1,294,623	$1,294,623	$0	($1,294,623)	$0
Feb-05	$0	$1,294,623	$1,294,623	$0	($1,294,623)	$0
Mar-05	$0	$1,294,623	$1,294,623	$0	($1,294,623)	$0
Apr-05	$0	$1,294,623	$1,294,623	$0	($1,294,623)	$0
May-05	$0	$1,294,623	$1,294,623	$0	$0	$0
Jun-05	$400,000	$1,294,623	$1,294,623	$0	($894,623)	$0
Jul-05	$200,000	$1,294,623	$1,294,623	$0	($1,094,623)	$0
Aug-05	$600,000	$1,294,623	$1,294,623	$0	($694,623)	$0
Sep-05	$500,000	$1,294,623	$1,294,623	$0	($794,623)	$0
Oct-05	$300,000	$1,294,623	$1,294,623	$0	($994,623)	$0
Nov-05	$0	$1,294,623	$1,294,623	$0	$0	$0
Dec-05	$0	$1,294,623	$1,294,623	$0	$0	$0
						$0

Docket Nos. 05-0071/05-0072
(Consolidated)
ICC Staff Exhibit 3.0
Schedule 3.03

Aqua Illinois, Inc.

Embedded Cost of Long-Term Debt
Average 2005

Coupon Rate	Debt Issue Type	Issue Date	Maturity Date	Principal Amount	Face Amt Outstanding	Unamort. Disc/Prem	Average Unamort. Debt Exp.	December 31, 2005 Carrying Value	December 31, 2004 Carrying Value	Average Carrying Value	Annual Coupon Interest	Annual Amort. Of Disc/Prem	Annual. Amort. Of Debt Exp.	Annual Interest Expense
First Mortgage Bonds														
10.40%	Series M	12/6/88	12/1/18	$ 6,000,000	$ 6,000,000	$ -	$ 80,499	$ 5,922,499	$ 5,916,504	$ 5,919,501	$ 624,000	$ -	$ 5,996	$ 629,996
9.69%	Series N	3/15/91	3/1/21	4,500,000	4,500,000	-	66,419	4,435,700	4,431,462	4,433,581	436,050	-	4,237	440,287
7.63%	Series O	9/21/95	9/1/25	8,000,000	8,000,000	-	56,895	7,944,515	7,941,696	7,943,105	610,400	-	2,819	613,219
5.00%	Series U	11/1/02	11/1/32	9,970,000	9,970,000	-	758,699	9,225,168	9,197,433	9,211,301	498,500	-	27,736	526,236
4.90%	Series T	11/1/02	11/1/32	2,785,000	2,785,000	-	213,992	2,574,919	2,567,096	2,571,008	136,465	-	7,823	144,288
5.40%	Series S	9/1/00	9/30/30	4,500,000	4,500,000	-	276,135	4,229,329	4,218,400	4,223,865	243,000	-	10,930	253,930
5.20%	Series V (A)	12/15/03	2/1/14	6,500,000	6,500,000	-	67,209	6,436,701	6,428,880	6,432,791	338,000	-	7,821	345,821
5.40%	Series V (B)	12/15/03	2/1/16	6,500,000	6,500,000	-	69,149	6,434,115	6,427,587	6,430,851	351,000	-	6,528	357,528
5.32%	Series W	12/21/04	12/1/19	10,500,000	10,500,000	-	-	10,500,000	10,500,000	10,500,000	558,600	-	-	558,600
	Subtotal				$ 59,255,000	$ -	$ 1,588,998	$ 57,702,946	$ 57,629,057	$ 57,666,002	$ 3,796,015	$ -	$ 73,889	$ 3,869,904
Other Long-Term Debt														
0.00%	Non-Int. Note	6/17/75	Until Paid	$ 294,924	$ 15,216	$ -	$ -	$ 15,216	$ 15,216	$ 15,216	$ -	$ -	$ -	$ -
8.00%	Aroma Park			1,000,000	1,000,000	-	-	1,000,000	1,000,000	1,000,000	80,000	-	-	80,000
Premature Redemptions														
9.19%	Series P	12/15/04	7/15/22	$ -	$ -	$ -	$ 27,581	$ (26,772)	$ (28,389)	$ (27,581)	$ -	$ -	$ 1,618	$ 1,618
9.19%	Series I	7/24/92	7/15/22	6,000,000	-	-	88,083	(85,499)	(90,666)	(88,083)	-	-	5,167	5,167
7.50%	Tax Exempt	2/1/90	2/1/20	10,000,000	-	183,273	403,166	(566,350)	(606,528)	(586,439)	-	12,556	27,622	40,178
6.10%	Series Q	9/21/95	9/1/25	9,970,000	-	179,005	441,021	(604,665)	(635,387)	(620,026)	-	8,869	21,852	30,721
6.00%	Series R	9/21/95	9/1/25	2,785,000	-	50,489	124,391	(170,547)	(179,212)	(174,880)	-	2,502	6,163	8,665
	Subtotal				$ -	$ 412,766	$ 1,084,241	$ (1,453,833)	$ (1,540,182)	$ (1,497,007)	$ -	$ 23,928	$ 62,422	$ 86,349
	TOTAL				$ 60,270,216	$ 412,766	$ 2,673,239	$ 57,264,330	$ 57,104,091	**$ 57,184,210**	$ 3,876,015	$ 23,928	$ 136,311	$ 4,036,254

Embedded Cost of Long-Term Debt = 7.06%

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(Consolidated)
ICC Staff Exhibit 3.0
Schedule 3.04

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%

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ICC Staff Exhibit 3.0
Schedule 3.05

Aqua Illinois, Inc.

Common Equity Balance
Average 2005

Updated 2005	Actual Dec-04	Jan-05	Feb-05	Mar-05	Apr-05	May-05	Jun-05	Jul-05	Aug-05	Sep-05	Oct-05	Nov-05	Dec-05
Common Stock	$3,750,000	$3,750,000	$3,750,000	$3,750,000	$3,750,000	$3,750,000	$3,750,000	$3,750,000	$3,750,000	$3,750,000	$3,750,000	$3,750,000	$3,750,000
Premium on Capital Stock	$8,966,400	$8,966,400	$8,966,400	$8,966,400	$8,966,400	$8,966,400	$8,966,400	$8,966,400	$8,966,400	$8,966,400	$8,966,400	$8,966,400	$8,966,400
Other Paid-in Capital	$24,922,077	$24,930,967	$24,939,857	$24,948,747	$24,957,637	$24,966,527	$24,975,417	$24,984,307	$24,993,197	$25,002,087	$25,010,977	$25,019,867	$25,135,437
Retained Earnings:													
Appropriated	$411,929	$411,929	$411,929	$411,929	$411,929	$411,929	$411,929	$411,929	$411,929	$411,929	$411,929	$411,929	$411,929
Unappropriated	$21,850,188	$22,129,768	$22,376,878	$22,726,020	$23,013,220	$23,333,488	$23,649,681	$24,100,745	$24,558,499	$24,965,531	$25,241,881	$25,562,301	$25,853,345
Total Common Equity	$59,900,594	$60,189,064	$60,445,064	$60,803,096	$61,099,186	$61,428,344	$61,753,427	$62,213,381	$62,680,025	$63,095,947	$63,381,187	$63,710,497	$64,117,111
Average Monthly Balances		$60,044,829	$60,317,064	$60,624,080	$60,951,141	$61,263,765	$61,590,886	$61,983,404	$62,446,703	$62,887,986	$63,238,567	$63,545,842	$63,913,804
													$61,900,673

Source: Company Response to Staff Data Request JF-4.04.

Aqua Illinois, Inc.

Water Sample

	Factor 1	Factor 2	Factor 3	Factor 4	Cumulative Distance
Aqua America	-0.228	1.091	-0.543	2.078	0.605
York Water	-0.243	1.326	-0.576	2.161	0.789
Middlesex Water	-0.818	0.958	-0.754	1.079	1.232
Artesian Resources	-0.589	0.866	-2.125	1.541	1.451
California Water Service	-0.675	1.178	-1.103	0.423	1.731
Southwest Water	0.59	0.94	-0.959	-0.577	2.497
Average	-0.32717	1.059833	-1.01	1.1175	

Utility Sample

	Factor 1	Factor 2	Factor 3	Factor 4	Cumulative Distance
Empire District Electric	-0.7	0.986	-0.602	1.04	1.213
Southern Company	0.135	1.356	-0.117	0.882	1.438
Progress Energy	-0.412	-0.209	0.127	0.74	1.857
Dominion Resources	0.008	-0.792	-0.363	0.933	1.867
Pinnacle West Capital	0.833	-0.465	-0.733	0.422	2.057
Southwest Gas Corp.	-0.593	0.98	-1.048	-0.055	2.09
Northwest Natural Gas	-0.053	1.704	-0.04	0.273	2.094
Consolidated Edison	-0.294	1.075	-0.415	-0.156	2.176
SCANA Corp.	-0.586	-0.632	-1.106	0.316	2.189
Average	-0.18467	0.444778	-0.47744	0.488333	

Aqua Illinois	0.049	0.711	-0.885	1.909	

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Schedule 3.07

Aqua Illinois, Inc.

Growth Rates

Water Sample

Company	Zacks Earnings
Aqua America	9.25%
Artesian Resources	8.50%
California Water Service	7.67%
Middlesex Water	6.00%
Southwest Water	6.50%
York Water	7.00%

Utility Sample

Company	Zacks Earnings
Consolidated Edison	3.00%
Dominion Resources	5.93%
Empire District Electric	5.00%
Northwest Natural Gas	5.13%
Pinnacle West Capital	5.20%
Progress Energy	3.68%
SCANA Corp.	4.50%
Southern Company	4.46%
Southwest Gas Corp.	4.57%

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ICC Staff Exhibit 3.0
Schedule 3.08

Aqua Illinois, Inc.

Water Sample

Company	Current Dividend $D_{0.1}$	$D_{0.2}$	$D_{0.3}$	$D_{0.4}$	Next Dividend Payment Date	4/7/2005 Stock Price
Aqua America	$ 0.120	$ 0.120	$ 0.130	$ 0.130	6/1/2005	$ 25.17
Artesian Resources	0.208	0.208	0.213	0.213	5/25/2005	26.17
California Water Service	0.283	0.283	0.283	0.285	5/18/2005	33.91
Middlesex Water	0.165	0.165	0.168	0.168	6/1/2005	18.25
Southwest Water	0.048	0.048	0.053	0.050	4/21/2005	10.68
York Water	0.145	0.145	0.156	0.156	7/15/2005	18.78

Utility Sample

Company	Current Dividend $D_{0.1}$	$D_{0.2}$	$D_{0.3}$	$D_{0.4}$	Next Dividend Payment Date	4/7/2005 Stock Price
Consolidated Edison	$ 0.565	$ 0.565	$ 0.565	$ 0.570	6/15/2005	$ 42.48
Dominion Resources	0.645	0.645	0.665	0.670	6/20/2005	76.50
Empire District Electric	0.320	0.320	0.320	0.320	6/15/2005	23.58
Northwest Natural Gas	0.325	0.325	0.325	0.325	5/13/2005	36.07
Pinnacle West Capital	0.450	0.450	0.475	0.475	6/1/2005	43.28
Progress Energy	0.575	0.575	0.575	0.590	5/2/2005	41.76
SCANA Corp.	0.365	0.365	0.365	0.390	7/1/2005	38.16
Southern Company	0.350	0.358	0.358	0.358	6/5/2005	32.14
Southwest Gas Corp.	0.205	0.205	0.205	0.205	6/1/2005	24.88

Aqua Illinois, Inc.

Expected Quarterly Dividends

Water Sample

Company	$D_{1,1}$	$D_{1,2}$	$D_{1,3}$	$D_{1,4}$
Aqua America	$ 0.130	$ 0.130	$ 0.142	$ 0.142
Artesian Resources	0.213	0.213	0.231	0.231
California Water Service	0.285	0.285	0.285	0.307
Middlesex Water	0.168	0.168	0.178	0.178
Southwest Water	0.050	0.050	0.053	0.053
York Water	0.156	0.156	0.167	0.167

Utility Sample

Company	$D_{1,1}$	$D_{1,2}$	$D_{1,3}$	$D_{1,4}$
Consolidated Edison	0.570	0.570	0.570	0.587
Dominion Resources	0.670	0.670	0.670	0.710
Empire District Electric	0.336	0.336	0.336	0.336
Northwest Natural Gas	0.325	0.342	0.342	0.342
Pinnacle West Capital	0.475	0.475	0.500	0.500
Progress Energy	0.590	0.590	0.590	0.612
SCANA Corp.	0.390	0.390	0.390	0.408
Southern Company	0.358	0.373	0.373	0.373
Southwest Gas Corp.	0.205	0.214	0.214	0.214

Aqua Illinois, Inc.

DCF Cost of Equity Estimates

Water Sample

Company	Cost of Equity Estimate
Aqua America	11.52%
Artesian Resources	12.08%
California Water Service	11.29%
Middlesex Water	9.95%
Southwest Water	8.53%
York Water	10.56%
Average	10.66%

Utility Sample

Company	Cost of Equity Estimate
Consolidated Edison	8.61%
Dominion Resources	9.63%
Empire District Electric	10.97%
Northwest Natural Gas	9.05%
Pinnacle West Capital	9.91%
Progress Energy	9.68%
SCANA Corp.	8.77%
Southern Company	9.25%
Southwest Gas Corp.	8.11%
Average	9.33%

Aqua Illinois, Inc.

Risk Premium Analysis

Interest Rates as of April 7, 2005

U.S. Treasury Bills		U.S. Treasury Bonds	
Discount Rate	Effective Yield	Equivalent Yield	Effective Yield
2.57%	2.65%	4.90%	4.96%

Risk Premium Cost of Equity Estimates*

Water Sample

Risk-Free Rate		Beta		Risk Premium		Cost of Common Equity
4.96%	+	0.570	*	(13.44% - 4.96%)	=	9.79%

Utility Sample

Risk-Free Rate		Beta		Risk Premium		Cost of Common Equity
4.96%	+	0.640	*	(13.44% - 4.96%)	=	10.39%

*Risk-Free Rate Proxy is the U.S. Treasury Bond

Ahern Risk Premium Model

Ms. Ahern averages the results from two distinct risk premium models ("RPMs") to develop her cost of equity estimate. The formulas for the two RPMs Ms. Ahern uses are:

Ahern Beta RPM = ($R_A + \beta_j \times RP_1$) and;

Ahern Utility Historical RPM = ($R_A + RP_2$).

Ms. Ahern's RPM for (for the proxy group of six water companies) can be depicted mathematically as follows:

$$R_j = R_A + \left(\frac{\beta_j \times (R_{m1} - R_{Aa\,/\,Aaa}) + (R_{m2} - R_{A-bond})}{2} \right)$$

Where R_j ≡ Required rate of return for security *j*;

R_A ≡ Derived estimate of the yield on a long-term bond rated 'A' by Moody's;

R_{m1} ≡ Average of historical and projected estimates of the overall market return;

R_{m2} ≡ S&P's Public Utility Index return (1928-2002);

$R_{Aa/Aaa}$ ≡ Average of historical return on long-term high-grade corporate bonds and a "prospective" yield on Aaa-rated corporate bonds;

$R_{A\text{-}bond}$ ≡ Derived historical estimate yield on an A-rated bond; and

β_j ≡ The measure of risk for security *j*.

That formula can be restated as follows:

$$2R_j = 2R_A + [\beta_j \times (R_{m1} - R_{Aa/Aaa})] + [(R_{m2} - R_{A\text{-}bond})]$$

$$2R_j = [R_A + \beta_j \times (R_{m1} - R_{Aa/Aaa})] + [R_A + (R_{m2} - R_{A\text{-}bond})]$$

$$R_j = \{[R_A + \beta_j \times (R_{m1} - R_{Aa/Aaa})] + [R_A + (R_{m2} - R_{A\text{-}bond})]\} / 2$$

$$R_j = [(R_A + \beta_j \times RP_1) + (R_A + RP_2)] / 2$$

Where $RP_1 = R_{m1} - R_{Aa/Aaa}$; and

$RP_2 = R_{m2} - R_{A\text{-}bond}$.