DIRECT TESTIMONY

of

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Finance Department
Financial Analysis Division
Public Utilities Bureau
Illinois Commerce Commission

Aqua Illinois, Inc.

Docket No. 04-0442

September 15, 2004

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SCHEDULES

WITNESS IDENTIFICATION

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

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

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

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

3. Q. Please describe your qualifications and background.

A. In May 1998, I received a Bachelor of Arts degree in Finance from Illinois College, Jacksonville, Illinois. In May 2000, I received a Master of Business Administration degree from the University of Illinois at Springfield. I have been employed by the Commission since June 2000.

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

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

COST OF CAPITAL

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

A. I recommend an 8.76% overall rate of return for the Company, as shown on Schedule 3.1. The Company's proposed 9.18% overall rate of return for Aqua IL is also presented on Schedule 3.1.

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

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

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

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

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

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

CAPITAL STRUCTURE

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

A. The Company proposes determining the rate of return on rate base on the basis of a forecasted average 2005 capital structure comprising 47.90% long-term debt, 51.39% common equity, 0.32% preferred stock and 0.38% short-term debt.[1] The Company's proposed capital structure appears on Schedule 3.1.

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

[1] Co. Sch. D-1, p. 1.

A. My proposed capital structure is shown on Schedule 3.1. I also used a forecasted average 2005 capital structure comprising 47.97% long-term debt, 51.46% common equity, 0.32% preferred stock and 0.25% short-term debt. I may modify in rebuttal testimony my recommendation to use an average 2005 capital structure because I still have questions regarding the Company's financial statements, the Company's financial projections for 2005 and certain discrepancies between the Company's actual 2004 financial data and its financial projections for 2004 that need to be resolved.

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

A. Yes. I made two adjustments to the Company's proposed average 2005 short-term debt balance. First, I added $1,096,946 to every projected 2005 month-end short-term debt balance, which is the difference between the Company's projected July 2004 short-term debt balance presented in Schedule D-2 and the Company's actual July 2004 month-end short-term debt balance.[2]

Second, I adjusted the monthly balance of short-term debt to the portion supporting construction work in progress ("CWIP"). To calculate the short-term debt balance, I first calculated the monthly ending net balance of short-term debt outstanding each month. The net balance of short-term debt is the greater of a) the monthly ending gross balance of short-term debt outstanding minus the corresponding monthly ending balance of CWIP accruing an allowance for funds used during construction

[2] Co. response to Staff data request FD-26.

("AFUDC") or b) CWIP accruing AFUDC times the ratio of short-term debt to total CWIP. That adjustment recognizes that the Commission's formula for calculating AFUDC assumes short-term debt is the first source of funds financing CWIP and addresses the concern the Commission has raised about double-counting short-term debt balances in a previous Order.[3] Next, I calculated twelve monthly averages from the monthly ending net short-term debt balances. Finally, I averaged the twelve monthly average net balances of short-term debt for January 2005 through December 2005, which is consistent with the other components of the Company's proposed capital structure. Schedule 3.2 presents the calculation of the average adjusted balances of short-term debt.

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

A. Yes. The Company incorrectly calculated the average 2005 long-term debt balance by averaging the face amounts outstanding on December 31, 2004 and December 31, 2005. In contrast, I calculated the Company's average 2005 long-term debt balance by averaging the carrying value on December 31, 2004, and December 31, 2005. The average 2005 long-term debt balance is presented on Schedule 3.3.

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

A. No. The average preferred stock balance is presented on Schedule 3.4.

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

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

A. No. The average common equity balance is presented on Schedule 3.1.

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

A. Yes. Financial theory suggests capital structure will affect the value of a firm and, therefore, its cost of capital, to the extent capital structure affects the expected level of cash flows that accrue to third parties (i.e., other than debt and stock holders). Employing debt as a source of capital reduces a company's income taxes,[4] thereby reducing the cost of capital. However, as reliance on debt as a source of capital increases, so does the probability of bankruptcy. As bankruptcy becomes more probable, expected payments to attorneys, trustees, accountants and other third parties increase; simultaneously, the expected value of the income tax shield provided by debt financing declines. Beyond a certain point, a growing dependence on debt as a source of funds increases the overall cost of capital. Therefore, the Commission should not determine the overall rate of return from a utility's actual capital structure if the Commission concludes that capital structure adversely affects the overall cost of capital.

An optimal capital structure would minimize the cost of capital and maintain a utility's financial integrity. Unfortunately, determining whether a capital structure is optimal remains problematic because (1) the cost of capital is a continuous function of the capital structure, rendering precise

[4] 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 capital gains and dividend income are lower than taxes on interest income because capital gains and dividend tax rates are lower and taxes on capital gains are deferred until

measurement along each point of the range of possible capital structures problematic; (2) the optimal capital structure is a function of operating risk, which is dynamic; and (3) the relative costs of the different types of capital vary with dynamic market conditions. Consequently, one should determine whether the capital structure is consistent with the financial strength necessary to access the capital markets under most conditions, and if so, whether the cost of that financial strength is reasonable.

Towards that end, I compared the Company's average 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.[5] The mean total debt ratio of water utilities that have an S&P 'A' credit rating equals 52.80%. The mean common equity ratio for S&P A-rated water utilities equals 46.64%.[6] The above ratios are shown in Table 1 for comparative purposes.

realized.
[5] Standard & Poor's, *Utility Financial Statistics*, June 1999, p. 3.
[6] *S&P Utility Compustat*

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 IL Average 2005
	Mean	Standard Deviation			
Debt Ratio	52.80%	3.97%	52% - 58%	50% - 55%	47.97%
Equity Ratio	46.64%	4.33%			51.46%

Aqua IL'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 benchmark for A-rated utilities with business profile scores of 2. Nevertheless, Aqua IL'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. Aqua IL's average 2005 total debt ratio is also reasonably close to the 54.9% median debt ratio for all S&P-rated water utilities.[7] According to S&P, an obligor rated 'A' has a strong capacity to meet its financial commitments.[8] The above suggests that the Company's average 2005 capital structure as presented by Staff on Schedule 3.1 is commensurate with a strong degree of financial strength.

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

[7] That median debt ratio does not reflect the debt ratios for New York Water Service Corporation, which S&P rates BB. Standard & Poor's, "Research: Water Transmission & Distribution Utilities – Regulated," August 20, 2004.
[8] Standard & Poor's, *Utility Financial Statistics,* June 1999, p. 3.

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.[9] The S&P published targets for utilities with business profile scores of 2 indicate that Aqua IL's financial strength is consistent with a strong A credit rating. Table 2 presents Aqua IL'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 IL 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%

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

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

[9] Standard & Poor's, "Research: New Business Profile Scores Assigned for U.S. Utility and Power Companies; Financial Guidelines Revised," June 2, 2004.

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.[10] I imputed an S&P business profile score for the Company since it does not have one. I began with 11 water companies with business profile scores listed in S&P *Utilities & Perspectives*. Of these 11 water utilities, 1 is assigned a business profile score of "1"; 6 are assigned a business profile score of "2"; 3 are assigned a business profile score of "3"; and 1 is assigned a business profile score of "4".[11] The average business profile score of the 11 water utilities is 2.4. Additionally, Aqua IL's A+-rated affiliate, Aqua Pennsylvania has also been assigned an S&P business profile score of 2.[12] Based on the average business profile score of 2.4 for S&P-rated water utilities and the S&P business profile score of 2 for Aqua Pennsylvania, I concluded that a business profile score of 2 would be a reasonable estimate for Aqua IL.

COST OF SHORT-TERM DEBT

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

A. Aqua IL issues short-term debt in the form of bank loans. The interest rate on those loans equals the 30 to 360-day London Interbank Offered Rate ("LIBOR") plus sixty-five basis points.[13] For the cost of short-term debt, I

[10] Standard & Poor's, "Research: New Business Profile Scores Assigned for U.S. Utility and Power Companies; Financial Guidelines Revised," June 2, 2004.
[11] Standard & Poor's, *Utilities & Perspectives,* August 23, 2004, pp. 21-24.
[12] Standard & Poor's, *Utilities & Perspectives,* August 30, 2004, p. 17.
[13] Co. Sch. D-2.

added 65 basis points to the September 9, 2004, three-month LIBOR rate, 1.87%, for a total cost of 2.52%.[14]

COST OF LONG-TERM DEBT

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

A. As shown on Schedule 3.3, Aqua IL's average embedded cost of long-term debt for 2005 is 7.48%.

19. Q. Describe the adjustments you made to the Company's long-term debt schedule.

A. I made the following adjustments to the Company's long-term debt schedule. First, I used straight-line amortization to estimate the annual amortization and unamortized balances of debt expense for the Series V and Series W debt issues since the Company's 2003 Form 21 annual report does not reflect an annual amortization amount for those debt issues. Second, I adjusted the Company's forecasted interest rate for the Series W debt issue to reflect current market conditions and Aqua IL's implied 'A' credit rating.

20. Q. Why did you adjust the Company's forecasted interest rate for the Series W debt issue?

A. The Company assumes that its December 2004 debt issuance, which is expected to mature in 2016, will have a 6.50% interest rate.[15] To estimate

[14] http://online.wsj.com/documents/rates.htm.

the Series W interest cost, the Company assumed a 5.0% U.S. Treasury bond yield, plus a spread of 150 – 200 basis points for the Company's alleged NAIC-2 designation.[16] However, recent experience indicates that the Company's estimated interest cost is too high. On December 15, 2003, the Company issued its Series V(A) and V(B) bonds, which mature in 2014 and 2016 with interest rates of 5.2% and 5.4%, respectively.[17] On December 15, 2003, the 10-year U.S. Treasury bond yield was 4.28%,[18] which results in a spread of 92 basis points for Series V(A) and 112 basis points for Series V(B) (i.e., 5.20% - 4.28%; 5.40% - 4.28%). Thus, I added 112 basis points to the current 4.30% yield for 10-year U.S. Treasury bonds to estimate a 5.42% interest rate for the Series W debt issuance that is expected occur in December 2004.

COST OF PREFERRED STOCK

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

A. As shown on Schedule 3.4, the average embedded cost of preferred stock is 5.48%.

COST OF COMMON EQUITY

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

A. My analysis indicates that Aqua IL's cost of common equity is 10.0%, as presented on Schedule 3.1.

[15] Co. Sch. D-3, p. 1.

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

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

Sample Selection

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

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

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

[16] Co. response to Staff data request FD-21.
[17] Co. Sch. D-3, p. 1.
[18] www.federalreserve.gov/releases/h15/data/b/tcm10y.txt

A. To form the utility sample, I began with a list of all domestic publicly traded corporations assigned an industry number of 4911, 4922, 4923, 4924, 4931 or 4932 in the S&P *Utility Compustat II* database that have been assigned an S&P business profile score of 1, 2 or 3. Second, I removed any company that had an S&P credit rating other than AA, AA-, A+, A or A-. Next, I removed any company that lacked Zacks growth rates. Finally, I eliminated any company that was in the process of being acquired by another company. The remaining companies, Consolidated Edison, Inc., Laclede Group, Inc., Nicor, Inc., Northwest Natural Gas Company, NSTAR, Piedmont Natural Gas Company and WGL Holdings, Inc., compose my utility sample.

DCF Analysis

26. Q. Describe DCF analysis.

A. For a utility to attract common equity capital, it must provide a rate of return on common equity sufficient to meet investor requirements. DCF analysis establishes a rate of return directly from investor requirements. A comprehensive analysis of a utility's operating and financial risk is unnecessary to estimate a utility's cost of common equity with DCF analysis since the market price of a utility's stock already embodies the market consensus of those risks.

According to DCF theory, a security price equals the present value of the cash flows investors expect it to generate. Specifically, the market value of

a firm's common stock equals the aggregate value of its expected stream of future dividends, discounted at the investor-required rate of return.

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

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

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

$$k = \frac{\sum_{q=1}^{4} D_{0,q}(1+g)(1+k)^{1-[x+0.25(q-1)]}}{P} + g.$$

Where: P ≡ The current stock price;

$D_{0,q}$ ≡ The last dividend paid at the end of quarter q, where q=1 to 4;

k ≡ The cost of common equity;

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

g ≡ The expected dividend growth rate.

The expression $(1+k)^{1-[x+0.25(q-1)]}$ is a future value factor that measures the value of the expected dividend ($D_{0,q}(1+g)$) one year from the stock price measurement date. The DCF model above assumes dividends will grow at a constant rate and the market value of common stock (i.e., stock price) equals the sum of the discounted value of each dividend.

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

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

Zacks summarizes the forward-looking, earnings growth expectations of financial analysts employed by the research departments of investment brokerage firms. The Zacks growth rate estimates for each firm in my samples are presented on Schedule 3.5.

29. Q. How did you measure stock price?

A. A current stock price reflects all relevant information that is available and relevant to the market; thus, it represents the market's assessment of the common stock's current value. I measured each firm's current stock price with its closing stock price from August 26, 2004. Those stock prices appear on Schedule 3.6.

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

30. Q. Explain the significance of the column titled, "Next Dividend Payment Date" shown on Schedule 3.6.

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.

31. 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 be increased during the next quarter. For the quarter in which the dividend rate is expected to adjust, if the utility has already declared a new dividend rate then the expected dividend rate equals the sum of one plus the average expected growth rate ($1+g$) times the current dividend rate $D_{0,q}$. Schedule 3.6 presents the current quarterly dividends. Schedule 3.7 presents the expected quarterly dividends.

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

A. The DCF analysis estimates the required rate of return on common equity is 10.76% for the water sample and 8.92% for the utility sample, as shown on Schedule 3.8.[19] Those estimates are derived from the growth rates presented on Schedule 3.5, the stock price and dividend payments presented on Schedule 3.6 and the expected quarterly dividends presented on Schedule 3.7.

Risk Premium Analysis

33. Q. Describe the risk premium model.

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

The risk premium methodology is consistent with the theory that investors are risk-averse. That is, investors require higher returns to accept greater exposure to risk. Thus, if investors had an opportunity to purchase one of

[19] The cost of equity estimate for California Water Service Group was eliminated from the DCF analysis because it is 1.73 standard deviations above the 11.17% average cost of equity estimate for the water sample. The next farthest estimate is Middlesex Water Co. with a DCF-derived cost of equity estimate that is 0.91 standard deviations below the mean. Additionally, there is no low DCF-derived cost of equity estimate to balance out the high estimate for California Water Service Group.

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

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

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

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

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

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

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

35. 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.[20] The yields of fixed income securities include premiums for default and interest rate risk. Default risk pertains to the possibility of default on principal or interest payments. Securities of the United States Treasury are virtually free of default risk by virtue of the federal government's fiscal and monetary authority. Interest rate risk pertains to the effect of interest rate fluctuations on the value of securities.

Since common equity theoretically has an infinite life, its market-required rate of return reflects the inflation and real risk-free rates anticipated to prevail over the long run. U.S. Treasury bonds, the longest term U.S. Treasury securities, were issued with terms to maturity of thirty years;[21] 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 ninety-one days to six months. Therefore, U.S. Treasury bond yields are more likely to incorporate the inflation and real risk-free rate

[20] Real risk-free rate and inflation expectations comprise the non-risk related portion of a security's rate of return.
[21] In October 2001, the U.S. Treasury suspended the issuance of 30-year U.S. Treasury bonds.

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

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

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

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

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

more volatile than long-term interest rates.[22] Consequently, over time U.S. Treasury bill yields are less biased (i.e., more accurate) but less reliable (i.e., more volatile) estimators of the long-term risk-free rate than U.S. Treasury bond yields. 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.

37. Q. Provide the current yield on three-month U.S. Treasury bills and the current estimated yield on thirty-year U.S. Treasury bonds.

A. Three-month U.S. Treasury bills are currently yielding 1.56%. The estimated yield for U.S. Treasury bonds equals 5.17%.[23] Both estimates are derived from quotes for August 26, 2004.[24] Schedule 3.9 presents the published quotes and effective yields.

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

[22] Fabozzi and Pollack, ed., *The Handbook of Fixed Income Securities,* 4th edition, Irwin, p. 789.
[23] To estimate a 30-year rate, I began with the 20-year U.S. Treasury bond yield and then added to it the daily extrapolation factor, as published by the U.S. Treasury. www.treas.gov/offices/domestic-finance/debt-management/interest-rate/ltcompositeindex.html.
[24] The Federal Reserve Board, *Federal Reserve Statistical Release: Selected Interest Rates, H.15 Daily Update*, www.federalreserve.gov/releases/H15/update, August 27, 2004.

A. In terms of the gross domestic product ("GDP") price index, the Energy Information Administration ("EIA") forecasts the inflation rate will average 3.0% annually during the 2004-2025 period. In terms of the consumer price index ("CPI"), the EIA forecasts the inflation rate will average 3.0% annually during the 2004-2025 period.[25] In comparison, Global Insight forecasts that the GDP price inflation will average 3.0% annually during the 2004-2029 period.[26] In terms of CPI, the *Survey of Professional Forecasters* ("*Survey*") forecasts the inflation rate will average 2.5% during the next ten years.[27] In terms of real GDP growth, EIA forecasts the real risk-free rate will average 3.0% during the 2004-2025 period;[28] Global Insight forecasts the real risk-free rate will average 3.7% during the 2004-2029 period;[29] and the *Survey* forecasts real GDP growth will average 3.4% during the next ten years.[30] Those forecasts imply a long-term, nominal risk-free rate between 6.0% and 6.8%.[31] 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, currently. It should be noted, however, that the U.S. Treasury bond yield is an upwardly biased

[25] Energy Information Administration, *EIA 2004 Long-Term Forecast*, Table 20, Macroeconomic Indicators.
[26] Global Insight, "The U.S. Economy: The 25 Year Focus," Table 1, Winter 2004.
[27] *Survey of Professional Forecasters,* Federal Reserve Bank of Philadelphia, www.phil.frb.org, August 20, 2004. The *Survey* aggregates the forecasts of approximately 30 forecasters.
[28] Energy Information Administration, *EIA 2004 Long-Term Forecast*, Table 20, Macroeconomic Indicators.
[29] Global Insight, "The U.S. Economy: The 25 Year Focus," Table 1, Winter 2004.
[30] *Survey of Professional Forecasters,* Federal Reserve Bank of Philadelphia, www.phil.frb.org, February 23, 2004.
[31] 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.

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

39. Q. 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. The real risk-free rate excludes the premium for inflation.[32] The real GDP growth rate measures output of goods and services without reflecting inflation expectations and, as such, also reflects both production and consumers' consumption preferences. Therefore, both the real GDP growth rate and the real risk-free rate of return should be similar since both are a function of production opportunities and consumption preferences without the effects of either a risk premium or an inflation premium.

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

A. The expected rate of return on the market was estimated by conducting a DCF analysis on the firms comprising the S&P 500 Index ("S&P 500") as of July 1, 2004. That analysis used dividend information and closing market prices reported by Zacks Research Wizard and the July 2004 edition of *Standard & Poor's Security Owner's Stock Guide*. Firms not paying a dividend as of June 30, 2004, or for which Zacks growth rates

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

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 July 1, 2004, as provided by Zacks Research Wizard. The estimated weighted average expected rate of return for the remaining 371 firms, composing 84.7% of the market capitalization of the S&P 500, equals 13.54%.

41. 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").[33]

When available, I used published Value Line estimates for each company in each sample. For those companies that did not have published Value Line beta estimates, I calculated beta estimates using the Value Line beta methodology.[34] Value Line estimates beta for a security with the following model using an ordinary least-squares technique:[35]

[33] The Regression beta methodology is the same as the Merrill Lynch methodology except Regression beta methodology substitutes (1) total excess return data for the total price change data that the Merrill Lynch methodology uses and (2) the NYSE Composite Index for the S&P500 Index as a proxy for the market return. The former substitution does not significantly affect the beta estimate; however, using the NYSE Composite Index as a proxy for the market return produced higher utility betas than using the S&P500 Index.
[34] 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.
[35] Statman, "Betas Compared: Merrill Lynch vs. Value Line", *The Journal of Portfolio Management,* Winter 1981.

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

Where:
$R_{j,t}$ ≡ The return on security j in period t;
$R_{m,t}$ ≡ The return on the market portfolio in period t;
a_j ≡ The intercept for security j;
β_j ≡ Beta, the measure of market risk for security j; and
$e_{j,t}$ ≡ The residual term in period t for security j.

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

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

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

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

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

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

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

42. 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 of 1.0 over time; therefore, the adjustment represents an attempt to estimate a forward-looking beta. Second, empirical tests of the CAPM suggest that the linear relationship

between risk, as measured by raw beta, and return is flatter than the CAPM predicts. That is, securities with raw betas less than one tend to realize higher returns that the CAPM predicts. Conversely, securities with raw betas greater than one tend to realize lower returns than the CAPM predicts. Adjusting the raw beta estimate towards the market mean of 1.0 compensates for the observed flatness in the linear relationship between risk and return.[36] Securities with betas less than one are adjusted upwards thereby increasing the predicted required rate of return towards observed realized rates of return. Conversely, securities with betas greater than one are adjusted downwards thereby decreasing the predicted rate of return towards observed realized rates of return.

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

A. The Value Line beta estimates average 0.63 for the water sample and 0.74 for the utility sample. The regression beta estimates are 0.44 and 0.57, respectively. The average of the Value Line and regression beta estimates equals 0.54 for the water sample and 0.65 for the utility sample.

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

A. The risk premium model estimates a required rate of return on common equity of 9.69% for the water sample and 10.61% for the utility sample. The computation of those estimates appears on Schedule 3.9.

Cost of Equity Recommendation

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

A. A thorough cost of common equity analysis requires both the proper application of financial models and appropriate use of the analyst's informed judgment. A cost of common equity recommendation based solely on judgment is inappropriate. Nevertheless, because cost of common equity measurement techniques necessarily employ proxies for investor expectations, judgment remains necessary to evaluate the results of such analyses. Along with DCF and risk premium analyses, I have considered the observable 5.81% rate of return the market currently requires on less risky A-rated long-term debt for utilities.[37] Based on my analysis, in my judgment, the investor-required rate of return on common equity for Aqua IL is 10.0%. My 10.0% cost of equity recommendation in conjunction with my proposed average 2005 capital structure, as presented on Schedule 3.1, results in a pre-tax interest coverage ratio of 3.39X for Aqua IL, which compares favorably to the 2.9X average pre-tax interest ratio for all A-rated utilities.[38]

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

[36] 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.
[37] *Value Line Selection & Opinion*, August 27, 2004, p. 2155.
[38] Standard & Poor's, *Utilities & Perspectives,* August 30, 2004, pp. 9-10.

A. The models from which the individual company estimates were derived are correctly specified and, thus, contain no source of bias. Moreover, I am unaware of bias in any of my proxies for investor expectations.[39] Consequently, estimates for a sample as a whole are subject to less measurement error than individual company estimates. I estimated the investor-required rate of return on common equity by: 1) averaging the DCF-derived estimates of the required rate of return on common equity, or 9.84%, 2) averaging the risk premium-derived estimates of the required rate of return on common equity, or 10.15%; and 3) taking the midpoint of the DCF- and risk premium-derived estimates, or 10.0%.

OVERALL COST OF CAPITAL RECOMMENDATION

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

A. As shown on Schedule 3.1, the overall cost of capital estimate for Aqua IL is 8.76%, which incorporates a 10.0% cost of common equity.

RESPONSE TO MS. PAULINE AHERN

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

A. Ms. Ahern estimates an 11.35% cost of common equity for Aqua IL.[40] Ms. Ahern's analysis contains several errors that lead her to over-estimate Aqua IL's cost of common equity. Critical errors occur in, or are the result

[39] Except as discussed above in regard to U.S. Treasury bond yields as proxies for the long-term risk-free rate.

of, her Discounted Cash Flow ("DCF"), Capital Asset Pricing Model ("CAPM"), Risk Premium ("RPM") and Comparable Earnings ("CEM") analyses. The most significant flaws in Ms. Ahern's analysis of Aqua IL's cost of common equity are the following:

1. Ms. Ahern's inclusion of an investment risk premium due to Aqua IL's size and alleged NAIC 2 designation 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 are her flawed derivation of the overall market return ("R_m") and 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] Co. Ex. 3., pp. 3-6.

Investment Risk Premium for Aqua IL

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

A. Ms. Ahern alleges that Aqua IL'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 IL has certain debt issues that the Company alleges to 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 IL than exists for either of her proxy groups. According to Ms. Ahern, Aqua IL's size and alleged NAIC 2 designation warrant an investment risk premium for the cost of common equity of 30 – 40 basis points (hereafter, basis points are referred to as "BPS").[42]

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

A. Yes. Ms. Ahern asserts that Aqua IL's size, relative to the size of the companies comprising her water sample, warrants a risk premium adjustment of 277 BPS to Aqua IL's cost of common equity and 370 BPS for her utility sample. Ms. Ahern's estimates of size-based risk premiums are based upon historical size premiums for market-traded companies during the 1926 – 2002 measurement period, as reported by Ibbotson

[41] Co. Ex. 3, pp. 10-12.

Associates.[43] Ms. Ahern asserts further that the alleged NAIC 2 designation warrants adding 27 BPS to the estimated cost of equity for her water sample and adding 26 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 A1/A2 and A2 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 304 BPS for the water sample (i.e., 277 BPS + 27 BPS) and 396 BPS for the utility sample (i.e., 370 BPS + 26 BPS). Ms. Ahern makes a "conservatively reasonable" investment risk adjustment of 30 BPS and 40 BPS to her water sample and utility sample cost of equity rates, respectively.[45]

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

A. No.

Size-based Risk Premium

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

A. First, Ms. Ahern's size-based risk premium has no theoretical basis. Rather, it is based on an empirical study of beta, the measure of risk in the

[42] Co. Ex. 3, pp. 5-6.
[43] Co. Ex. 3, pp. 62-63.
[44] Co. Ex. 3, pp. 63-64.

CAPM, that is not applicable to Aqua IL. Second, Ms. Ahern inappropriately applied her size-based risk premium to her overall analysis rather than limiting it to those that use beta (i.e., the CAPM and RPM analyses). Regardless, should a size-based risk premium adopted, and it should not, it should be based on the size of Aqua IL's parent company, Aqua America, Inc. ("Aqua America").

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

A. Although Aqua IL raises its own debt, it obtains common equity financing from its parent company,[46] Aqua America, whose market capitalization is approximately $2.1 billion.[47] Being part of a much larger organization should enhance Aqua IL's ability to access the equity market on reasonable terms. When utilities combine, reductions in costs resulting from efficiencies should be passed on to customers in the form of lower rates. Such economies of scale are often advanced to justify utility acquisitions and reorganizations. Financial capital costs are also subject to economies of scale. If the risk inherent in a utility common stock is a function of that utility's size, then the larger size of Aqua America should translate into a decreased cost of common equity, in comparison to that of a company the size of Aqua IL. If a risk premium were based on the size of Aqua IL, ratepayers would be denied a portion of the benefits associated with the combined entity's stronger financial profile.

[45] Co. Ex. 3, pp. 62-64.
[46] Co. responses to Staff data requests FD-31 and FD-32.
[47] Co. Ex. 3, Sch. 12, p. 12.

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

A. Since a size-based risk premium has no theoretical basis, to the extent that a correlation between firm size and return exists, that relationship is likely the result of some other factor or factors that are related to both size and return, such as liquidity or information costs. Relatively illiquid securities impose costs on investors since they may be unable to sell illiquid securities at a fair price on a timely basis. The securities of smaller companies tend to be less liquid than those of larger companies since the potential breadth of the market for the former tends to be more limited. Additionally, gathering information regarding the expected cash flows and risks of a security imposes costs an investor must recover through the returns that security generates. If fewer sources of information regarding smaller companies exist, then obtaining information might be more expensive.

If Aqua America securities are less liquid or the availability of information regarding Aqua America is more restricted than the average security, then adding a size-based premium to a CAPM analysis of Aqua IL's cost of common equity might be proper. However, Ms. Ahern has not provided any evidence to demonstrate a size premium is warranted for utilities. The study reported in Ibbotson Associates, which forms the basis for Ms. Ahern's size-based risk premium adjustment, is not restricted to utilities. Rather, it is based on the stocks listed on the New York Stock Exchange ("NYSE"), American Stock Exchange ("AMEX") and National Association

of Security Dealers Automated Quotation System ("NASDAQ").[48] In addition, the Brigham text that Ms. Ahern also cites in support of her size-based risk premium does not specifically refer to utility stocks either. Further, the Brigham text defines a small firm as one with a market capitalization of less than $20 million, which is far below Aqua IL's $113 million book capitalization.[49] Thus, the entire basis of Ms. Ahern's size-based risk premium is questionable at best.

Utilities, unlike most stocks listed on the NYSE, AMEX, or NASDAQ, are subject to uniform reporting requirements. Furthermore, their rates and conditions of service are publicly reported. Therefore, the cost of obtaining information regarding smaller utilities in general, and Aqua IL in particular, is unlikely to be as high as that of unregulated companies that are similar in size; hence, the application of a size-based premium to a utility is highly questionable. In fact, in direct contrast with Ms. Ahern's claims, a study by Annie Wong, reported in the Journal of the Midwest Finance Association, specifically found no justification for a size premium for utilities.[50]

Even for non-utilities, evidence of the existence of a size-based risk premium is not very strong. Fernholz found that a statistical property he termed the "crossover effect" was the primary cause of the difference between large and small company stock returns. The "crossover effect" measures the effect on rate of return of those stocks that switch from one size portfolio to another.[51] Fernholz states that as random price changes

[48] Co. Ex. 3, pp. 62-63.
[49] Aqua Illinois, Inc.'s 2003 Form 22 ILCC Annual Report, p. 5F.
[50] Wong, "Utility Stock and the Size Effect: an Empirical Analysis," *Journal of the Midwest Finance Association,* 1993.
[51] Fernholz, "Crossovers, Dividends and the Size Effect," *Financial Analysts Journal,* May/June 1998, pp.

affect the size of stocks, some stocks cross over from one size portfolio to another. When a stock that starts in the large stock portfolio experiences a random negative price change that moves it into the small stock portfolio, its resulting negative return is assigned to, and therefore reduces, the return on the large stock portfolio. Conversely, when that same stock experiences a random positive price change that moves it back into the large stock portfolio, its resulting positive return is assigned to, and therefore increases, the return on the small stock portfolio.[52] The combination of portfolio construction and random (i.e., non-systematic) price movements creates a biased source of measurement error. Thus, the "small stock effect" may be less a market return phenomenon than a modeling problem. That is, the "small stock effect" may be nothing more than a statistical anomaly.

In another study of domestic stocks listed on the NYSE and AMEX, Jensen, Johnson and Mercer, (hereafter "Jensen") found that small stock premiums appear to be related to monetary policy. Specifically, changes in monetary policy play a prominent role in determining the magnitude of small stock premiums. During expansive monetary periods, defined as months following a reduction in the Federal Reserve discount rate, Jensen found that small stock returns were significantly greater than large stock returns. Conversely, during restrictive monetary periods, defined as months following an increase in the discount rate, Jensen found that small stock returns were not significantly greater than large stock returns.[53]

73-75.
[52] Fernholz, "Crossovers, Dividends and the Small Firm Effect," *Financial Analysts Journal,* May/June 1998, p. 73.
[53] Jensen, Johnson and Mercer, "The Inconsistency of Small-Firm and Value Stock Premiums," *Journal of Portfolio Management,* p. 35.

Nevertheless, the applicability of the Jensen results to small utility stocks is doubtful. First, since the Jensen study was based on largely non-utility companies, its findings that small stocks outperformed large stocks during "expansionary" monetary periods is not surprising. During monetary expansions, as the supply of loanable funds increases, investors are more likely to invest in speculative, small company stocks. However, during monetary contractions, as the supply of loanable funds decreases, investors are more likely to switch from speculative investments to safer ones – the well-known "flight to quality." It is counter-intuitive to claim that investors would consider the smaller firms in the regulated utility sector to be speculative investments; and Ms. Ahern has not supported that premise. Moreover, the Jensen study did not control its measurement of the small stock premium for risk as measured by beta or other means.[54] Therefore, the study does not support Ms. Ahern's size-based risk premium adjustment.

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

Second, Ms. Ahern's application of a size-based risk premium, on the basis of Ibbotson Associates' historical size-based risk premiums, is probably inconsistent with the manner in which Ibbotson Associates measured the historical size-based risk premiums. While Ms. Ahern adds

[54] Jensen, Johnson and Mercer, "The Inconsistency of Small-Firm and Value Stock Premiums," *Journal of*

a size-based premium to her CAPM-based risk premium analysis, which is based on adjusted Value Line betas, the studies I have reviewed on the effect of size on returns employs raw betas.[55] Since the Ibbotson Associates size-based risk premiums are a function of raw beta, Ms. Ahern should have used the same type of betas as Ibbotson Associates.

55. 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.[56] Importantly, in Aqua IL's most recent rate case, Docket No. 03-0403, the Commission Order stated:

> The Commission does not conclude that the size of [Aqua IL] warrants a risk premium. [Aqua IL] 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 IL].[57]

56. Q. In the current docket, does Ms. Ahern provide evidence beyond that she presented in Docket No. 03-0403 to demonstrate Aqua IL's size merits a risk premium?

Portfolio Management, pp. 30 and 34.
[55] Wong, "Utility Stocks and the Size Effect: an Empirical Analysis," *Journal of the Midwest Finance Association,* 1993, p. 96; Ibbotson, Kaplan and Peterson, "Estimates of Small-Stock Betas Are Much Too Low," *Journal of Portfolio Management,* Summer 1997, p. 106.
[56] Amended Order, Docket No. 97-0351, June 17, 1998, p. 39.
[57] Order, Docket No. 03-0403, April 13, 2004, p. 43.

A. Yes. In the current case, Ms. Ahern states, "Teepak, LLC uses 33 MG of water per month, representing approximately 4% of Aqua IL's annual operating revenues."[58] In response to a Staff data request, Ms. Ahern states further, "If the revenues associated with 33 MG of water per month were lost to a company of Aqua IL's size, the impact of the loss would be greater than it would be to the average company in either of Ms. Ahern's two proxy groups."[59]

57. Q. Does Ms. Ahern's statement establish that a size-based risk premium for Aqua IL is warranted in the current case?

A. No. Aqua IL is smaller than the companies comprising Ms. Ahern's proxy groups. Accordingly, losing a customer that generates revenues similar in amount to Teepak LLC might not impact the proxy groups companies as much as it would impact Aqua IL. Nonetheless, any of the companies comprising Ms. Ahern's proxy groups might face the same risks as Aqua IL if any of those companies have a single customer that accounts for the same relative proportion of revenues. Ms. Ahern's argument that losing 4% of Aqua IL's revenues would more impact Aqua IL than it would a company larger than Aqua IL fails to support Ms. Ahern's proposal to allow Aqua IL a size-based risk premium.

Furthermore, S&P's rating criteria for the water industry includes assessing a water utility's customer base. As shown on Company Exhibit 3, Schedule 2, page 3, S&P states, "Credit concerns arise when individual customers represent more than 5% of revenues…Customer concentration

[58] Co. Ex. 3, p. 10.

is less significant for water…utilities."[60] In another S&P document provided in response to a Staff data request, S&P states, "Care is taken to assess any one customer responsible for more than 5% of revenues to determine that customer's stability, commitment to the service area and contribution to the bottom line."[61] Thus, the average S&P credit ratings for Ms. Ahern's proxy groups already reflect any incremental credit risk related to customer concentration. Moreover, Ms. Ahern did not address any of the factors related to customer concentration that S&P assesses regarding specific customers that are responsible for more than 5% of a water utility's revenues. Thus, Ms. Ahern's vague statement regarding Aqua IL's Teepak LLC-derived revenues fails to support her proposal to add a size-based risk premium to Aqua IL's cost of equity.

Alleged NAIC 2 Designation

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

A. No. First, NAIC does not rate companies such as Aqua IL; NAIC only rates specific security issues. Specifically, the NAIC "is responsible for the day-to-day credit quality assessment and valuation of securities owned by state regulated insurance companies."[62] Second, the NAIC rating is not intended for use by investors. The NAIC website clearly states, "These designations and unit prices are produced solely for the benefit of NAIC members…Unlike the ratings of nationally recognized statistical rating

[59] Co response to Staff data request FD-6.
[60] Standard & Poor's, *Corporate Ratings Criteria*, 1996, p. 29, provided in Co. Ex. 3, Sch. 2, p. 3.
[61] Standard & Poor's, *Criteria: Infrastructure Finance,* "Water and Wastewater Utilities, Projects and Concessions," September 1998, p. 48 (Emphasis added), provided in response to Staff data request FD-8.

organizations, NAIC designations are not suitable for use by anyone other than NAIC members."[63] Since no party to this case is an insurance regulator and therefore an NAIC member, and, thus, is not familiar with the analysis that is performed when assessing risk for NAIC designations, the frequency of NAIC reviews, which entities or securities have been assigned NAIC designations, or the purpose of NAIC designations, the NAIC designations should not be used in this proceeding. Third, Ms. Ahern does not know whether the companies composing her water and utility samples have been assigned NAIC designations.[64] It is possible that the companies composing Ms. Ahern's proxy groups have been or would have been assigned NAIC 2 designations. Therefore, there is no evidence that suggests Ms. Ahern's samples are less risky than Aqua IL. Fourth, Ms. Ahern's testimony states, "Aqua IL's debt has been assigned the bond/issue credit rating equivalent of an NAIC…Rating of 2 by NatCity Investments, Inc., the investment banker which privately places Aqua IL's debt with insurance companies."[65] Ms. Ahern's statement suggests that Aqua IL does not have an NAIC designation, but a designation that was assigned by the Company's investment banker. Finally, Ms. Ahern's own risk premium analysis is based on a credit rating of A.[66] For all of these reasons, adding an investment risk adjustment to Aqua IL's rate of return on common equity is not warranted.

[62] www.naic.org/about/background/svo.htm
[63] www.naic.org/about/background/svo.htm
[64] Co. response to Staff data request FD-10.
[65] Co. Ex. 3, p. 14.
[66] Co. Ex. 3, Sch. 13, p. 1.

59. Q. Did Ms. Ahern provide documentation by either Standard and Poor's or Moody's Investors Service that states those credit ratings are equivalent to certain NAIC designations?

A. No.[67]

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

A. No. Given the information I have reviewed thus far regarding this issue, I do not recommend adding an investment risk premium to Aqua IL's cost of common equity.

Historical Data

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

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 two groups of non-price regulated proxy companies in her CEM analysis.

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

[67] Co. response to Staff data request FD-9.

A. The use of historical data is problematic. First, historical data improperly favors outdated information that the market no longer considers relevant over the most recently available information. Second, historical data reflects conditions that may not continue in the future. In other words, use of average historical data wrongly implies that securities data will revert to a mean. To the contrary, security return movements approximate a random walk, which suggests no tendency of mean reversion.[68] That is, in a random walk, the "future steps or directions cannot be predicted on the basis of past actions."[69] Finally, even if securities data were mean reverting, which they are not, no method exists for determining the true value of that mean. Consequently, sample means, which depend upon the measurement period used, are substituted. Thus, any measurement period chosen is arbitrary, rendering the results uninformative.

63. 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."[70]

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

[68] Malkiel, *A Random Walk Down Wall Street*, 4th Edition, Norton, 1985, pp. 132 and 146.
[69] *Id.*, at 16, *emphasis added*.
[70] Order, Docket No. 92-0357, July 21, 1993, p. 66.

> 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."[71]

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).[72] Most recently, the Commission objected to Ms. Ahern's use of historical dividend yields in the Docket No. 03-0403 Order (Aqua IL's most recent 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.[73]

Discounted Cash Flow Analysis

64. Q. Respond to Ms. Ahern's assertion that the DCF model has a tendency to mis-specify investors' required return rate when the

[71] Order, Docket No. 95-0076, December 20, 1995, p. 69.
[72] 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.
[73] Order, Docket No. 03-0403, April 13, 2004, p. 42.

market value of common stock differs significantly from its book value.[74]

A. To address this issue, one must first explore why the market value of utility common equity exceeds book value, which Ms. Ahern failed to do. Two possible explanations for how utility stock prices have come to exceed their respective book values exist: (1) the investor-required rate of return has fallen or (2) expectations of future earnings have risen. The investor-required rate of return on an investment in a utility would fall if either the price of risk (i.e., the risk premium) has fallen or if investors' perceived level of risk in that utility has fallen. Either way, if a utility's stock price grows to exceed its book value due to a decline in investors' required rate of return for that utility, then it obviously follows that the Commission should authorize a lower rate of return. In contrast, Ms. Ahern would illogically conclude that the Commission should authorize a higher rate of return whenever that utility's investor-required rate of return declines.

An increase in investors' expectations of future returns could also cause a rise in market values over book values. Such an increase in expectations may be due to positive deviations (e.g., higher than expected sales) from the test year amounts upon which the company's rates are set. Clearly, the Commission should not approve higher rates today based on such deviations from past rate case estimates. Increased expectations of future returns may also be a function of earned returns from sources other than the revenue requirements formula component, the product of rate base and rate of return ("R_{Other}"). Earnings from these sources could allow a

[74] Co. Ex. 3, p. 23.

utility to earn returns beyond the level needed to meet investors' required rate of return. The danger in allowing a utility to earn a rate of return on equity rate base in excess of the market required rate of return on common equity becomes apparent when those other sources (R_{Other}) of value are recognized. The result is a never ending upward spiral as each successive increase in market value would lead to another increase in the allowed rate of return, which in turn, would lead to a further increase in market value.

65. Q. 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 demonstrates the both [companies] currently possess strong credit ratings and are financial sound utilities.[75]

In Docket No. 03-0403, Aqua IL's most recent rate proceeding, the Commission's Order stated:

[75] Order, Docket Nos. 02-0798/03-0008/03-0009 Consol., October 22, 2003, p. 87.

> 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.[76]

66. Q. Explain why Ms. Ahern's growth rate estimate is improper.

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.[77] 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 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.[78]

67. Q. Explain why Ms. Ahern's growth rate estimation procedure is questionable.

[76] Order, Docket No. 03-0403, April 13, 2004, p. 42.
[77] Co. Ex. 3, Sch. 12, p. 1, Columns (1) through (8).
[78] Co. Ex. 3, Sch. 12, Column (7).

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.

Ms. Ahern's averages of all growth rate types for each proxy group are uninformative because both the Value Line Projected 2000-2002 to 2006-2008 growth rates for EPS and DPS are missing data. Consequently, the DCF analysis of the water sample overweights three companies.

The second problem with Ms. Ahern's growth rate estimates is the inclusion of the "BR+SV" growth rates (Schedule 12, columns 3 and 8) among her seven growth rate types. The BR+SV growth estimate introduces circularity into the return on common equity estimate (i.e., "R"). Ms. Ahern must first estimate "R" in order to estimate a growth rate using the BR+SV methodology. The resulting growth estimate is then used in a calculation to estimate the return on common equity "R".

Ms. Ahern's BR+SV method of estimating growth also suffers from 1) the same missing data problem discussed previously; 2) a requirement to estimate four variables, which increases the sources of estimation error four-fold compared to the single source of estimation error when growth is estimated directly; and 3) Ms. Ahern's incorrect substitution of the average return on all equity investment for "R", which should be defined as the return on incremental investment only. The latter is appropriate since

"BR+SV" is supposed to measure sustainable growth, which is derived from new investment. Obviously, the average return on all equity investment includes existing assets, which cannot sustain growth beyond their capacity.

68. Q. Ms. Ahern testified that she eliminated DCF-derived cost of equity estimates for her proxy companies that "are no more than 200 basis points above the current prospective average yield on A rated public utility bonds of 6.6%."[79] 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 [360] basis points.[80] In accordance with the EMH, investors are aware of these implicit equity risk premiums and, in my opinion, would not consider returns providing an equity risk premium of only 200 basis points either reasonable or credible.[81]

The basis for her elimination criterion is a document titled "Major Rate Case Decisions – January 1990 – December 2003" that is published by Regulatory Research Associates.[82]

[79] Co. Ex. 3, pp. 34-35.
[80] Co. response to Staff data request FD-12 states, "Page 34 [of Co. Ex. 3] should read 'between 300 and 360 basis points."
[81] Co. Ex. 3, p. 34.
[82] Co. response to Staff data request FD-12.

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

A. No. Ms. Ahern asserts that she did not eliminate any "high-end" DCF-derived cost of equity estimates because there were none.[83] To the contrary, Ms. Ahern's "prospective" A-rated utility bond yield (i.e., 6.6%), plus 360 basis points (i.e., the high end of the Ms. Ahern's estimate of the risk premium implicit in Commission-authorized returns on common equity) equals 10.3%. Two out of six estimates for Ms. Ahern's water sample and two out of fifteen estimates for Ms. Ahern's utility sample exceed the high-end of the risk premium implicit in Commission authorized rates of return.[84] Moreover, Ms. Ahern's 11.35% cost of equity recommendation for Aqua IL is 475 basis points above her "prospective" A-rated bond yield of 6.6% and 554 basis points above the current 5.81% A-rated bond yield.

Including the "low" estimates in Ms. Ahern's DCF analysis results in DCF-derived cost of equity estimates of 9.7% for her water sample and 9.1% 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.

Capital Asset Pricing Model

70. Q. How did Ms. Ahern derive the overall market return (i.e., R_m) she used in her CAPM analyses?

A. Ms. Ahern averaged two estimates of R_m to derive her estimate of the rate of return on the market. One estimate is the long-term historical total equity earned rate of return of 12.2%, as reported by Ibbotson Associates.[85] The other estimate is based on projections reported in *The Value Line Investment Survey.*[86]

For the Value Line estimate, Ms. Ahern added together dividend yield and price appreciation projections in order to estimate R_m. As a proxy for the market portfolio's dividend yield, Ms. Ahern adopted the median of estimated dividend yields (for the next 12 months) of all dividend-paying stocks under review in *The Value Line Investment Survey* (1.62%).

For the proxy of expected growth in the market portfolio, Ms. Ahern adopted the geometric average of the Value Line 3-month and spot 3-5 year estimated median price appreciation potential of all 1700 stocks in the hypothesized economic environment three to five years hence (8.58%). Those two rates were added together for an R_m of 10.2%.

71. Q. Explain the errors in those two approaches.

A. Ms. Ahern's Ibbotson-based estimate is based entirely on historical data, the use of which has several shortcomings, as discussed previously.

Ms. Ahern's Value Line-based estimate of the required rate of return on the market contains several errors. First, the median is a biased measure

[83] Co. response to Staff data request FD-13.
[84] Co. Ex. 3, Sch. 7 Revised.
[85] Co. Ex. 3, p. 50.

of the aggregate market dividend yield and growth rate. The median of a sample is its middle value; that is, the sample contains as many values above the median as it contains below it. The magnitude of the difference between those other values and the median is not considered. For example, the median of a set of comprising 1, 3 and 5 equals 3. The median of a set comprising 1, 3 and 10 also equals 3; although, the highest value in the latter set is double the highest value in the former set.

In particular, the median fails to properly weight the relative value of the securities composing the market portfolio. The common stocks of larger companies have a greater effect on market returns because they constitute a greater proportion of the market than those of smaller companies. Nevertheless, the median growth estimate does not apply higher weights to larger companies, and thus over-weights the contributions of smaller companies, which tend to have greater growth potential.

Ms. Ahern's Value Line-based estimate compounds that problem by improperly drawing the median dividend yield and growth rates from two different samples. The median of estimated dividend yields is derived from dividend paying stocks only. That is, common stocks that do not pay dividends were excluded from sample from which the median dividend yield was derived. Conversely, the median appreciation projection is an estimate of <u>all</u> stocks in the hypothesized economic environment, dividend paying or not. Obviously, the dividend yield of non-dividend paying stocks is 0%. Therefore, the median dividend yield for <u>all</u> common stocks

[86] Co. Ex. 3, Sch. 14, p. 4, note (1).

included in *The Value Line Investment Survey* would be lower than that for the subset of common stocks paying dividends. Thus, by adding the higher dividend yield of dividend paying stocks alone to the estimated price appreciation of all stocks, Ms. Ahern over-estimates the overall return on the market.

72. 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 Aaa-rated corporate bonds would average 6.6% during the 2nd quarter of 2004.[87] The actual yield averaged 5.9%. Absent convincing evidence that Ms. Ahern's forecasted interest rates are accurate, the Commission should continue to rely on current, observable, market interest rates.

73. 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

[87] Docket No. 03-0403, CIWC Ex. 3, Schedule 13, p. 7.

> using a single day's U.S. Treasury bond yield, it is impossible to accurately predict future interest rates.[88]

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.[89]

74. 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.[90] 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.[91] 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

[88] Order, Docket No. 02-0837, October 17, 2003, p. 37.
[89] Order, Docket Nos. 02-0798/03-0008/03-0009 Consol., October 22, 2003, p. 85.
[90] Co. Ex. 3, pp. 47-48.
[91] 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.

models Value Line adjusted betas,[92] rather than the raw betas used in accordance with Litzenberger et al. Importantly, Litzenberger et al. suggests that globally adjusted betas,[93] 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.[94] 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.

75. Q. Demonstrate how Ms. Ahern's use of Value Line betas in her ECAPM inflates her estimate of her samples' cost of common equity.

A. Ms. Ahern's ECAPM can be depicted mathematically as follows:[95]

$$R_j = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta_j \times (R_m - R_f).$$

That formula can be restated as follows:

$$R_j = R_f + (0.25 + 0.75 \times \beta_j) \times (R_m - R_f). \qquad (1)$$

Consequently, the ECAPM effectively substitutes a weighted-average beta for security *j*'s raw beta. In Ms. Ahern's ECAPM, the weighted-average beta effectively equals the sum of 0.25 times the market beta of 1.0, and

[92] Co. Ex. 3, Sch. 14, pp. 2-3.
[93] Litzenberger et al. refers to betas adjusted in the manner of Merrill Lynch and Value Line as "globally adjusted."
[94] 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.

0.75 times security *j*'s raw beta. Yet, Value Line betas are already adjusted using the following formula:

$$\beta_{Value\ Line} = 0.35 + 0.67 \times \beta_{raw}.$$[96]

Substituting the Value Line adjustment formula into the CAPM produces an ECAPM with slightly different parameters:

$$R_j = R_f + (0.35 + 0.67 \times \beta_j) \times (R_m - R_f).$$

Substituting Value Line betas into Ms. Ahern's ECAPM in place of raw betas increases the weight (compare equations (1) and (2)) of the market beta (where β =1, i.e., the intercept) and reduces the weight of the raw beta:

$$R_j = R_f + (0.51 + 0.50 \times \beta_j) \times (R_m - R_f). \qquad (2)$$

Therefore, including Value Line adjusted betas in Ms. Ahern's ECAPM leads to an overstated estimate of the cost of common equity whenever the raw beta is less than one, since the weight of raw beta is being further reduced in favor of the market beta of 1.0.

76. Q. Do you agree with Ms. Ahern's assertion that an adjustment to beta and an adjustment to the CAPM are discrete, unrelated adjustments?[97]

[95] Co. Ex. 3, Sch. 14, p. 4, Note (4).
[96] Statman, "Betas Compared: Merrill Lynch vs. Value Line," *Journal of Portfolio Management*, Winter 1981, pp. 41-44.

A. No. Ms. Ahern contends that the difference between an adjustment to beta and an adjustment to the CAPM is that the beta adjustment is a risk (X-axis) adjustment while the ECAPM represents a required return (Y-axis) adjustment.[98] However, since the slope of the Security Market Line ("SML"), is a ratio of required return to risk, the mathematical effect of either increasing the required return or decreasing the risk is identical. As such, an adjustment to beta along the X-axis results in a corresponding change to the return along the Y-axis. Thus, the beta adjustment does correct for the observed flatness in the linear relationship between risk and return.

77. 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 IL's most recent 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.[99]

78. 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?

[97] Co. Ex. 3, pp. 52-53.
[98] Co. Ex. 3, pp. 52-53.
[99] Order, Docket No. 03-0403, April 13, 2004, pp. 41-42.

A. No.[100] 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* Ms. Ahern's Direct Testimony, p. 52.) 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.[101]

79. Q. Does Ms. Ahern provide documentation that suggests Dr. Morin's e-mail message should be given more evidentiary weight in the current proceeding than it received in Docket No. 03-0403?

A. No. Ms. Ahern notes that the quotation on page 52 of her direct testimony (Co. Ex. 3.0) is consistent with Dr. Morin's response to Data Request MGM 3.03 filed as MidAmerican Exhibit No. 8.2 in Docket No. 01-0444 regarding MidAmerican Energy Company.[102] Ms. Ahern's statement is accurate; however, in Docket No. 01-0444, the Commission also explicitly rejected Dr. Morin's ECAPM, stating:

[100] Co. response to Staff data request FD-5.
[101] Order, Docket No. 03-0403, April 13, 2004, pp. 41-42.
[102] Co. response to Staff data request FD-4.

> Lastly, we [the Commission] agree with Staff's criticism of MEC's ECAPM analysis. It seems that Dr. Morin [the company witness] mixes apples and oranges. Dr. Morin applies adjusted Value Line betas to his empirical CAPM model when unadjusted betas are appropriate. We agree that this departure from the methodology required by the model results in an overstated cost of equity.[103]

That is, even when Dr. Morin had the opportunity to defend his views directly before the Commission, he was unsuccessful.

Risk Premium Model

80. Q. Describe Ms. Ahern's RPM analysis.

A. Ms. Ahern's RPM is essentially an average of two distinct RPMs for each proxy group.[104] The following formula, derived on Schedule 3.10, depicts Ms. Ahern's RPM as:

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

Both models begin with the same "Adjusted Prospective Bond Yield," R_A (6.6%), which, ostensibly, represents the "prospective" yield on bonds rated 'A' by Moody's, the average credit rating of a proxy subgroup of three water companies. To R_A, the first model adds the product of a Value Line adjusted beta for yet another proxy subgroup of three water companies, β_j (i.e., 0.68) and the average of the historical and forecasted

[103] Order, Docket No. 01-0444, March 27, 2002, pp. 16-17.
[104] For presentation purposes, I will only address the proxy group of six water companies; however, the proxy group of fifteen public utility companies is conceptually the same.

risk premium estimates, RP_1 (i.e., 5.1%).[105] The second model[106] adds to R_A an historical risk premium estimate, RP_2 (i.e., 3.9%). Inputting Ms. Ahern's estimates[107] produces a cost of equity estimate of 10.3% as shown below:

Ahern Beta RPM = (6.6% + 0.68 × 5.1%) = 10.1%

Ahern Utility Historical RPM = (6.6% + 3.9%) = 10.5%

$$R_j = \frac{10.1\% + 10.5\%}{2} = 10.3\%$$

81. 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 also 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.

[105] Hereafter referred to as the "Ahern Beta RPM".
[106] Hereafter referred to as the "Ahern Utility Historical RPM".
[107] Co. Ex. 3, Sch. 13.

82. Q. Explain why it is improper to apply a market risk premium-based beta to a non-market risk premium.

A. Beta measures a particular type of risk[108] and cannot be assumed to accurately measure any other type of risk. To illustrate, an RPM that is derived from the CAPM but substitutes a corporate bond yield for the risk-free rate ("Beta RPM") can be depicted mathematically as follows:

$$R_{\beta RPMj} = R_{A\text{-}bond} + \beta_j \times (R_m - R_{A\text{-}bond}) \qquad (3)$$

Where $R_{\beta RPM} \equiv$ The calculated rate of return for security *j*;

$R_{A\text{-}Bond} \equiv$ The A-rated utility bond rate;

$R_m \equiv$ The expected rate of return for the market portfolio; and

$\beta_j \equiv$ The measure of risk for security *j*.

The above model is identical to the CAPM except that it substitutes a risky debt rate, $R_{A\text{-}bond}$, for the risk-free rate, R_f, a substitution that has no basis in financial theory. The CAPM can be expressed as:

$$R_j = (1 - \beta_j) \times R_f + (\beta_j \times R_m)$$

Likewise, the Beta RPM can be rewritten as:

$$R_{\beta RPMj} = (1 - \beta_j) \times R_{A\text{-}bond} + (\beta_j \times R_m)$$

[108] Beta risk is variously labeled "market", "nondiversifiable", or "systematic" risk.

Since the cost of risky debt, $R_{A\text{-}bond}$, exceeds the risk-free rate, R_f, a comparison of the CAPM and the Beta RPM above makes evident that the latter systematically underestimates the cost of common equity for all companies with betas less than one. Ms. Ahern's water and utility proxy subgroups have betas below one.[109] Thus, the Beta RPM systematically overestimates the cost of common equity for those proxy subgroups.

83. Q. Explain the consequences of incorporating two different long-term corporate bond yields as substitutes for the risk-free rate in a risk premium model.

A. The first of the two models averaged in Ms. Ahern's risk premium analysis differs slightly from the basic Beta RPM depicted in Equation (3) above in that the Ahern Beta RPM substitutes <u>two</u> different long-term corporate bond yields for the risk-free rate rather than one. Ms. Ahern's implication of the Beta RPM is shown below:

$$R_{\beta RPMj} = R_{Utility\ A} + \beta_j \times (R_m - R_{Corporate\ Aaa})$$

Where $R_{Utility\ A} \equiv$ Rate of return on A-rated utility bonds; and

$R_{Corporate\ Aaa} \equiv$ Rate of return on Aaa-rated corporate bonds.

A fundamental tenet of financial theory states that investors require identical returns from two securities with identical risk. Whenever $R_{Corpoprate\ Aaa}$ is not equal to $R_{Utility\ A}$, then a Beta RPM violates that principle. To

[109] Only three of the seven companies in the water proxy group and thirteen of the fifteen companies in the utility proxy group have published Value Line betas. Thus, all of Ms. Ahern's analyses that involve Value Line betas (i.e., CAPM, ECAPM, Beta RPM and CEM) are based on subgroups of her proxy

illustrate, consider a company *j*, whose risk is equal to that of the market ($\beta_m = \beta_j = 1$). Financial theory posits that the expected return on company j stock should equal that of the market. Setting a beta equal to one in the above formula produces:

$$R_{\beta RPMj} = R_{Utility\ A} + (R_m - R_{Corporate\ Aaa})$$

Whenever $R_{Utility\ A} = R_{Corporate\ Aaa}$, the above formula will reduce to $R_j = R_m$, which conforms to the aforementioned tenet of financial theory. However, when $R_{Utility\ A} \neq R_{Corporate\ Aaa}$, then $R_{\beta RPMj} \neq R_m$. That is, the estimated return for security *j* does not equal the estimated return on the market although they both have the same risk level ($\beta_m = \beta_j = 1$). Ms. Ahern used a $R_{Utility\ A}$ of 6.6% and an average $R_{Corporate\ Aaa}$ of 6.0% with an average R_m of 11.2% in the Ahern Beta RPM. This would result in an estimated return ($R_{\beta RPMj}$) of 11.8% for a company with a beta of one (i.e., the same beta as the market), although the estimated market return (R_m) equals 11.2%. Clearly, the Ahern Beta RPM is theoretically untenable. In fact, for companies and proxy groups with a beta less than one, the Ahern Beta RPM will overestimate the cost of equity as long as $R_{Utility\ A}$ exceeds $R_{Corporate\ Aaa}$.

84. Q. Explain how the equity risk premium in the Ahern Utility Historical RPM ($R_A + RP_2$) was improperly derived.

A. To estimate the risk premium for the Ahern Utility Historical RPM (RP_2), Ms. Ahern selected the historical measurement period of 1928-2002.[110] First, Ms. Ahern calculated a market equity risk premium by subtracting

groups.

the Salomon Brothers Long-Term High Grade Corporate Bond Index yield from the S&P Public Utility Index (10.6% − 6.2% = 4.4%). Next, Ms. Ahern estimated the spread between the Salomon Brothers Long-Term High Grade Corporate Bond Index yield and A-rated public utility bonds, to reflect the average rating of the proxy group of six water companies. To do so, Ms. Ahern subtracted the arithmetic mean yields on Aaa and Aa-rated bonds (used as a proxy for the Salomon Brothers Long-Term High Grade Corporate Bond Index yield) from the yield on A-rated public utility bonds (6.63% − 6.16% = 0.47%, which she rounded to 0.5%). Finally, she calculated a 3.9% adjusted equity risk premium by subtracting the spread between the Salomon Brothers Long-Term High Grade Corporate Bond Index yield and A-rated public utility bonds (0.5%) from the equity risk premium (4.4%).

The adjusted equity risk premium in the Ahern Utility Historical RPM analysis is inappropriate for two reasons. First, it uses historical data, which, as discussed previously, is inappropriate. Second, it is based upon S&P's Public Utility Index, which Ms. Ahern has not demonstrated is comparable in risk to Aqua IL.[111]

[110] Co. Ex. 3, Sch. 13, p. 8.
[111] Ms. Ahern asserts that it is not her testimony that S&P's Public Utility Index is similar in risk to Aqua IL (Co. response to Staff data request FD-17). However, in Docket Nos. 99-0122/0130, an electric delivery services rate proceeding for MidAmerican Energy Company ("MidAmerican"), the Commission rejected MidAmerican's RPM because the company witness failed to show that MidAmerican is similar in risk to the S&P Public Utility Index, which formed, in part, the basis for his risk premium. (*See* Order, Docket Nos. 99-122/0130, August 25, 1999, p. 10.)

85. Q. Ms. Ahern's asserts that the RPM fully captures unsystematic risk through the use of the "prospective" long-term bond yield.[112] Explain why Ms. Ahern's assertion is incorrect.

A. Ms. Ahern's assertion contradicts financial theory. Since bond ratings reflect the risk that a company will default on its interest or principal payment obligations, and diversifiable risks would affect a company's ability to make those debt service payments, then bond ratings should reflect diversifiable risks. However, it does not follow that bond yields reflect diversifiable risks since investors can diversify the risk of default by holding a portfolio of bonds. The probability that all of the bonds composing the portfolio would experience an increase in default risk let alone default is remote. Similar to stockholders, bondholders are able to reduce the level of risk inherent in their investments through diversification (e.g., holding a portfolio of bonds); thus, bond yields should not reflect diversifiable risks.

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

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's Order states, "[t]he Commission has consistently

[112] Co. Ex. 3, pp. 37-38.

rejected the RPM and [the company] has not adequately explained why this practice should be modified."[113]

Comparable Earnings Model

87. 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 water sample has a higher average Value Line beta (i.e., 0.74), and is thus riskier, than the sample it is supposed to represent, which has an average beta equal to 0.68. [114] Fifth, the validity of the information from which Ms. Ahern forms her sample is questionable, the reasons for which are discussed below. Thus, Ms. Ahern's CEM is inappropriate for estimating Aqua IL's rate of return on common equity.

88. Q. How can accounting practices distort the CEM-derived rate of return estimate?

[113] Order, Docket No. 02-0837, October 17, 2003, p. 38.
[114] Co. Ex. 3, Sch. 15, p. 2 presents an average Value Line beta of 0.72 for Ms. Ahern's water sample CEM proxy group; however, as is discussed later in this section of my direct testimony, Schedule 15 contains numerous typographical errors. In reality, the average Value Line beta for Ms. Ahern's water sample CEM proxy group is 0.74.

A. Accounting returns between two companies may not be directly comparable, particularly if those companies are from different industries. Differences in accounting practices can have a significant impact on accounting rate of return. Because of the sheer numbers involved (i.e., Ms. Ahern's comparison proxy groups consists of 103 and 40 non-utility companies for the water and utility subgroups, respectively),[115] the comparability of the realized and expected returns on book value ("accounting earnings") of the CEM non-utility samples to Ms. Ahern's water and utility proxy subgroups is highly questionable.

89. Q. Why are accounting earnings inappropriate estimators of investor-required returns?

A. The cost of common equity is the market-required rate of return demanded by investors. In contrast, Ms. Ahern's CEM is not a market-based methodology. Ms. Ahern uses rates of return that are based on the returns of net worth (i.e., book value of common equity) reported in Value Line.[116] The CEM incorrectly implies that the rate of return on book equity is equivalent to current investor-required rates of return. There is simply no basis for that implication since the accounting return that the CEM measures may be more or less than the return investors require from an investment. For example, if the expected return is 20% while the investor-required return is only 10%, then investors will bid up the price in the marketplace until the expected returns on market equity equal the required 10% return. The market price of a common stock does not achieve equilibrium until the expected rate of return on the common stock

[115] Co. Ex. 3, p. 56 and Schedule 15.

equals the investor-required rate of return. In contrast, the return on book value has no such adjustment mechanism since the denominator, book value, is largely unresponsive to market forces. Ms. Ahern claims that her CEM analysis is market-based because she used market-based measures of risk to select the CEM samples.[117] If the required return from Ms. Ahern's CEM analysis is market-based, then the measures of risk should be positively related with the measures of return. However, analysis of Ms. Ahern's data shows that the statistical relationship of her measures of risk with her measures of return is either negative or insignificantly different from zero.

90. Q. Ms. Ahern eliminated from her CEM proxy groups, all rates of return that exceed 20% or fall below her estimated 6.6% yield on Moody's A-rated public utility bonds.[118] Why is this problematical?

A. Ms. Ahern eliminated those rates of return that are greater than 20% and less than 6.6% in order to be conservative.[119] Ms. Ahern does not justify those "limits" for her CEM results nor does she explain why the criterion she applied to her CEM analysis is different than the criterion she used with respect to her DCF-derived cost of equity estimates (i.e., she eliminated DCF estimates that did not exceed 6.6%, plus 200 basis points). Thus, Ms. Ahern's attempt to provide a "conservative" CEM-derived cost of equity estimate is based on an arbitrary criterion. Moreover, despite Ms. Ahern's attempt to provide a "conservative" cost of equity estimate for Aqua IL, her CEM-derived cost of equity estimates are

[116] Co. Ex. 3, p. 56.
[117] Co. Ex. 3, pp. 55-56.
[118] Co. Ex. 3, p. 59.

the highest cost of equity estimates she presents in this case (i.e., 13.5% for her water sample and 13.1% for her utility sample).[120]

91. Q. Why is the validity of the information Ms. Ahern used to develop her sample for her CEM analysis questionable?

A. Reviewing Ms. Ahern's source documents revealed that the majority of Value Line adjusted betas presented on Company Exhibit 3, Schedule 15 are incorrect. Of the 103 companies comprising Ms. Ahern's first CEM sample (which serves as a proxy for her water sample), approximately two-thirds of the Value Line adjusted betas presented on Schedule 15 are incorrect. Of the 40 companies comprising Ms. Ahern's second CEM sample (which serves as a proxy for her utility sample), more than half of the Value Line adjusted betas presented on Schedule 15 are incorrect.[121]

92. 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

[119] Co. response to Staff data request FD-15.
[120] Co. Ex. 3, Sch. 1, p. 2.
[121] Co. response to Staff data request FD-20.

> investor-required rate of return on the market value of a firm's common equity.[122]

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.[123]

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.[124]

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."[125] 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:

[122] Order, Docket No. 91-0147, February 11, 1992, p. 149.
[123] Order, Docket Nos. 92-0448/93-0239 Consol., October 11, 1994, pp. 88-89.
[124] 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.
[125] Order, Docket No. 99-0121, August 25, 1999, p. 67.

> 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.[126]

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 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.[127]

Most significantly, the Commission rejected Ms. Ahern's CEM in Aqua IL's most recent rate proceeding, Docket No. 03-0403. 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.[128]

[126] Order, Docket Nos. 01-0528/0628/0629 Consol., March 28, 2002, p. 13.
[127] Order, Docket Nos. 02-0798/03-0008/03-0009 Consol., October 22, 2003, p. 88.
[128] Order, Docket No. 03-0403, April 13, 2004, p. 41.

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

A. No.[129]

94. Q. Does this conclude your direct testimony?

A. Yes, it does.

[129] Co. response to Staff data request FD-3.

AQUA ILLINOIS, INC.

Company's Proposed Average 2005 Weighted-Average Cost of Capital

Class of Capital	Average 2005 Balance	Percent of Total Capitalization	Cost	Weighted Cost
Short-Term Debt	**$458,333**	0.38%	3.07%	0.012%
Long-Term Debt	**57,135, 490**	47.90%	7.57%	3.625%
Preferred Equity	**382,372**	0.32%	5.48%	0.018%
Common Equity	**61,298,813**	51.39%	10.75%	5.525%
Total	**$119,275,008**	100.00%		**9.180%**

Staff's Proposed Average 2005 Weighted-Average Cost of Capital

Class of Capital	Average 2005 Balance	Percent of Total Capitalization	Cost	Weighted Cost
Short-Term Debt	**$301,839**	0.25%	2.52%	0.006%
Long-Term Debt	**57,135,310**	47.97%	7.48%	3.589%
Preferred Equity	**382,372**	0.32%	5.48%	0.018%
Common Equity	**61,298,813**	51.46%	10.00%	5.146%
Total	**$119,118,334**	100.00%		**8.759%**

Source: Company Schedule D-1.

Docket No. 04-0442
ICC Staff Exhibit 3.0
Schedule 3.2

AQUA ILLINOIS, INC.

Short-Term Debt Balance
Average 2005

	End of Month Balance				
Date	Gross Short-Term Debt Outstanding	CWIP	CWIP Accruing AFUDC	Net Short-Term Debt Outstanding	Month-End Average
(A)	(B)	(C)	(D)	(E)	(F)
Dec – 2004	$2,896,946	$1,294,623	$1,294,623	$1,602,323	
Jan – 2005	2,296,946	1,294,623	1,294,623	1,002,323	$1,302,323
Feb – 2005	1,896,946	1,294,623	1,294,623	602,323	802,323
Mar – 2005	1,496,946	1,294,623	1,294,623	202,323	402,323
Apr – 2005	1,296,946	1,294,623	1,294,623	2,323	102,323
May – 2005	1,096,946	1,294,623	1,294,623	0	1,162
Jun – 2005	1,496,946	1,294,623	1,294,623	202,323	101,162
Jul – 2005	1,296,946	1,294,623	1,294,623	2,323	102,323
Aug – 2005	1,696,946	1,294,623	1,294,623	402,323	202,323
Sep – 2005	1,596,946	1,294,623	1,294,623	302,323	352,323
Oct – 2005	1,396,946	1,294,623	1,294,623	102,323	202,323
Nov – 2005	1,096,946	1,294,623	1,294,623	0	51,162
Dec – 2005	1,096,946	1,294,623	1,294,623	0	0

Average Month-End Short-Term Debt Balance = $301,839

Docket No. 04-0442
ICC Staff Exhibit 3.0
Schedule 3.3

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	Unamort. Debt Exp.	2005 Carrying Value	2004 Carrying Value	Average Carrying Value	Annual Coupon Interest	Annual Amort. Of Disc/Prem	Annual. Amort. Of Debt Exp.	Annual Interest Expense
10.40%	Series M	12/6/88	12/1/18	$ 6,000,000	$ 6,000,000	$ -	$ 77,493	$ 5,922,507	$ 5,916,508	$ 5,919,508	$ 624,000	$ -	5,999	$ 629,999
9.69%	Series N	3/15/91	3/1/21	4,500,000	4,500,000	0	64,316	4,435,684	4,431,455	4,433,570	436,050	0	4,229	440,279
7.63%	Series O	9/21/95	9/1/25	8,000,000	8,000,000	0	55,503	7,944,497	7,941,687	7,943,092	610,400	0	2,810	613,210
9.19%	Series P	7/24/95	7/15/22	6,000,000	6,000,000	0	26,777	5,973,223	5,971,608	5,972,416	551,400	0	1,615	553,015
5.00%	Series U	11/1/02	11/1/32	9,970,000	9,970,000	0	744,788	9,225,212	9,197,456	9,211,334	498,500	0	27,756	526,256
4.90%	Series T	11/1/02	11/1/32	2,785,000	2,785,000	0	210,068	2,574,932	2,567,103	2,571,018	136,465	0	7,829	144,294
5.40%	Series S	9/1/00	9/30/30	4,500,000	4,500,000	0	270,589	4,229,411	4,218,441	4,223,926	243,000	0	10,970	253,970
5.20%	Series V (A)	12/15/03	2/1/14	6,500,000	6,500,000	0	63,299	6,436,701	6,428,880	6,432,791	338,000	0	7,821	345,821
5.40%	Series V (B)	12/15/03	2/1/16	6,500,000	6,500,000	0	65,885	6,434,115	6,427,587	6,430,851	351,000	0	6,528	357,528
5.42%	Series W	12/15/04	12/15/16	4,500,000	4,500,000	0	54,985	4,445,015	4,440,000	4,442,507	243,900	0	5,015	248,915
					$ 59,255,000	$ -	$ 1,633,703	$ 57,621,297	$ 57,540,725	$ 57,581,011	$4,032,715	$ -	$ 80,572	$ 4,113,287
0.00%	Non-Int. Note	6/17/75	Until Paid	$ 294,924	$ 28,334	$ -	$ -	$ 28,334	$ 28,334	$ 28,334	$ -	$ -	$ -	$ -
8.00%	Aroma Park			$ 1,000,000	$ 1,000,000	$ -	$ -	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ 80,000	$ -	$ -	$ 80,000
9.19%	Series I	7/24/92	7/15/22	$ 6,000,000	$ -	$ -	$ 85,472	(85,472)	$ (90,652)	$ (88,062)	$ -	$ -	5,180	$ 5,180
7.50%	Tax Exempt	2/1/90	2/1/20	10,000,000	0	176,841	389,874	(566,715)	(606,707)	(586,711)	0	12,632	27,360	39,992
6.10%	Series Q	9/21/95	9/1/25	9,970,000	0	178,968	430,228	(609,196)	(637,650)	(623,423)	0	6,670	21,784	28,454
6.00%	Series R	9/21/95	9/1/25	2,785,000	0	50,479	121,347	(171,826)	(179,851)	(175,839)	0	1,881	6,144	8,025
					$ -	$ 406,288	$ 1,026,921	$ (1,433,209)	$ (1,514,860)	$ (1,474,035)	$ -	$ 21,183	$ 60,468	$ 81,651
					$ 60,283,334	$ 406,288	$ 2,660,624	$ 57,216,422	$ 57,054,199	$ 57,135,310	$4,112,715	$ 21,183	$ 141,040	$ 4,274,938

Embedded Cost of Long-Term Debt = 7.48%

Docket No. 04-0442
ICC Staff Exhibit 3.0
Schedule 3.4

AQUA ILLINOIS, INC.

Embedded Cost of Preferred Stock

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

Embedded Cost of Preferred Stock = 5.48%

AQUA ILLINOIS, INC.

Growth Rate Estimates

	Company	Zacks Earnings
1	Aqua America	8.33%
2	Artesian Resources	8.50%
3	California Water Service	8.70%
4	Middlesex Water	6.00%
5	Southwest Water	8.33%
6	York Water	7.00%

	Company	Zacks Earnings
1	Consolidated Edison	2.78%
2	Laclede Group	4.00%
3	Nicor, Inc.	3.70%
4	Northwest Natural Gas	4.13%
5	NSTAR	4.25%
6	Piedmont Natural Gas	4.42%
7	WGL Holdings	3.90%

Source: Zacks Research Wizard, August 26, 2004.

Docket No. 04-0442
ICC Staff Exhibit 3.0
Schedule 3.6

AQUA ILLINOIS, INC.

Quarterly Dividends and Stock Prices

WATER SAMPLE	Current Dividend					
Company	$D_{0,1}$	$D_{0,2}$	$D_{0,3}$	$D_{0,4}$	Next Dividend Payment Date	Stock Price
Aqua America	$0.120	$0.120	$0.120	$0.120	12/1/2004	$20.95
Artesian Resources	0.203	0.203	0.208	0.208	11/19/2004	26.96
California Water Service	0.281	0.283	0.283	0.283	11/19/2004	27.85
Middlesex Water	0.165	0.165	0.165	0.165	12/1/2004	17.75
Southwest Water	0.044	0.048	0.048	0.048	10/21/2004	11.91
York Water	0.135	0.145	0.145	0.145	10/15/2004	17.06

UTILITY SAMPLE	Current Dividend					
Company	$D_{0,1}$	$D_{0,2}$	$D_{0,3}$	$D_{0,4}$	Next Dividend Payment Date	Stock Price
Consolidated Edison	$0.565	$0.565	$0.565	$0.565	12/15/2004	$41.18
Laclede Group	0.335	0.335	0.340	0.340	10/1/2004	28.20
Nicor, Inc.	0.465	0.465	0.465	0.465	11/1/2004	35.52
Northwest Natural Gas	0.325	0.325	0.325	0.325	11/12/2004	30.45
NSTAR	0.540	0.555	0.555	0.555	11/1/2004	47.90
Piedmont Natural Gas	0.415	0.415	0.430	0.430	10/15/2004	42.43
WGL Holdings	0.320	0.320	0.325	0.325	11/1/2004	28.35

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

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	$0.130	$0.130
Artesian Resources	0.208	0.208	0.225	0.225
California Water Service	0.283	0.307	0.307	0.307
Middlesex Water	0.175	0.175	0.175	0.175
Southwest Water	0.053	0.053	0.053	0.053
York Water	0.145	0.155	0.155	0.155

Utility Sample

Company	$D_{1,1}$	$D_{1,2}$	$D_{1,3}$	$D_{1,4}$
Consolidated Edison	$0.565	$0.581	$0.581	$0.581
Laclede Group	0.340	0.340	0.354	0.354
Nicor, Inc.	0.465	0.482	0.482	0.482
Northwest Natural Gas	0.338	0.338	0.338	0.338
NSTAR	0.555	0.579	0.579	0.579
Piedmont Natural Gas	0.430	0.430	0.449	0.449
WGL Holdings	0.325	0.325	0.338	0.338

Docket No. 04-0442
ICC Staff Exhibit 3.0
Schedule 3.8

AQUA ILLINOIS, INC.

DCF Analysis Cost of Equity Estimates

Water Sample

Company		Cost of Equity Estimate
Aqua America		10.91%
Artesian Resources		11.85
California Water Service		13.24
Middlesex Water		10.08
Southwest Water		10.18
York Water		10.76
	Average	**10.76%**[130]

Utility Sample

Company		Cost of Equity Estimate
Consolidated Edison		8.53%
Laclede Group		9.15
Nicor, Inc.		9.30
Northwest Natural Gas		8.73
NSTAR		9.22
Piedmont Natural Gas		8.74
WGL Holdings		8.75
	Average	**8.92%**

[130] The cost of equity estimate for California Water Service Group was eliminated from the DCF analysis because it is 1.73 standard deviations above the 11.17% average cost of equity estimate for the water sample. The next farthest estimate is Middlesex Water Co. with a DCF-derived cost of equity estimate that is 0.91 standard deviations below the mean. Additionally, there is no low DCF-derived cost of equity estimate to balance out the high estimate for California Water Service Group.

Docket No. 04-0442
ICC Staff Exhibit 3.0
Schedule 3.9

AQUA ILLINOIS, INC.

Risk Premium Analysis Cost of Equity Estimates

Interest Rates on August 26, 2004

U.S. Treasury Bills		U.S. Treasury Bonds	
Discount Rate	Effective Yield	Bond Equivalent Yield	Effective Yield
1.52%	1.56%	5.10%	5.17%

Risk Premium Cost of Equity Estimates*

Water Sample

Risk-Free Rate		Beta		Risk Premium		Cost of Common Equity
5.17%	+	0.54	×	(13.54% - 5.17%)	=	**9.69%**

Utility Sample

Risk-Free Rate		Beta		Risk Premium		Cost of Common Equity
5.17%	+	0.65	×	(13.54% - 5.17%)	=	**10.61%**

*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

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