Docket Nos. 07-0620/
07-0621/08-0067 (Cons.)
ICC Staff Exhibit 3.0

DIRECT TESTIMONY

of

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Finance Department

Financial Analysis Division

Illinois Commerce Commission

Aqua Illinois, Inc.

Proposed General Increase in Water and Sewer
Rates for the Hawthorn Woods and Willowbrook Divisions
and
Proposed General Increase for Water
Rates for the Vermilion Division

Docket Nos. 07-0620/07-0621/08-0067 (Cons.)

May 8, 2008

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WITNESS IDENTIFICATION

Q1. Please state your name and business address.

A1. My name is Michael McNally. My business address is 527 East Capitol Avenue, Springfield, IL 62701.

Q2. What is your current position with the Illinois Commerce Commission ("Commission")?

A2. I am a Senior Financial Analyst in the Finance Department of the Financial Analysis Division.

Q3. Please describe your qualifications and background.

A3. In May of 1993, I received a Bachelor of Arts degree in Economics from the University of Illinois at Urbana-Champaign. In May of 1999, I received a Master of Business Administration degree, with a concentration in Finance, from the University of Illinois at Urbana-Champaign. I have been employed by the Commission since June of 1999.

Q4. Please state the purpose of your testimony in this proceeding.

A4. The purpose of my testimony is to present my analysis of the cost of capital of, and recommend an overall rate of return for, Aqua Illinois, Inc. ("Aqua" or the "Company"). In addition, I will respond to the direct testimony of Company witness Harold Walker (Aqua Ex. 3.0).

COST OF CAPITAL

Q5. How is your cost of capital analysis organized?

A5. The Company uses an average 2008 capital structure measurement period for the Hawthorn Woods Water Division, the Hawthorn Woods Sewer Division, the Willowbrook Water Division, and the Willowbrook Sewer Division (collectively, "Hawthorn Woods & Willowbrook"). In contrast, the Company uses an average 2009 capital structure measurement period for the Vermilion Division ("Vermilion"). Since each of those divisions receives its capital from Aqua, my overall cost of capital estimate for each represents that of Aqua. For each division, I used the same cost of short-term debt and common equity estimates, which represent the most recent estimates, since those items are not fixed cost items. In addition, the cost of preferred stock is assumed to remain unchanged from 2006-2009[1] and, thus, I used the same preferred stock cost estimate for all divisions. However, since the measurement period for Vermilion (2009) differs from that of the other divisions (2008), my capital structure and cost of long-term debt estimate for Vermilion differ from that for the other divisions. Accordingly, my testimony regarding the cost of long-term debt and capital structure component balances addresses Vermilion separately from Hawthorn Woods & Willowbrook, whereas my estimates of the costs of short-term debt, preferred stock, and common equity apply to all divisions. Thus, my analysis contains two overall cost of capital estimates: one for Hawthorn Woods & Willowbrook and one for Vermilion.

[1] Schedule D-4.

Q6. Please summarize your cost of capital findings for Hawthorn Woods & Willowbrook.

A6. I recommend an 8.45% overall rate of return for Hawthorn Woods & Willowbrook, as shown on Schedule 3.01 HW, HS, WW, WS. The Company's proposed 9.388% overall rate of return for Hawthorn Woods & Willowbrook is also presented on Schedule 3.01 HW, HS, WW, WS.

Q7. Please summarize your cost of capital findings for Vermilion.

A7. I recommend an 8.67% overall rate of return for Vermilion, as shown on Schedule 3.01 VW. The Company's proposed 9.343% overall rate of return for Vermilion is also presented on Schedule 3.01 VW.

Q8. Please define the overall cost of capital for a public utility.

A8. The overall cost of capital equals the sum of the costs of the capital structure components (i.e., debt, preferred stock, and common equity) after weighting each by its proportion to total capital. It represents the rate of return the utility needs to earn on its assets to satisfy contractual obligations to, or the market requirements of, its investors.

Q9. Why must one determine an overall cost of capital for a public utility?

A9. 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.

Under the traditional regulatory model, ratepayer and shareholder interests are balanced when the Commission authorizes a rate of return on rate base equal to the public utility's overall cost of capital, as long as that overall cost of capital is not unnecessarily expensive. 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.

Capital Structure

Q10. What capital structure did the Company propose for Hawthorn Woods & Willowbrook?

A10. The Company proposes using a forecasted average 2008 capital structure that contains 4.19% short-term debt, 43.18% long-term debt, 0.25% preferred stock, and 52.39% common equity, as shown on Schedule 3.01 HW, HS, WW, WS.

Q11. What capital structure do you propose for Hawthorn Woods & Willowbrook?

A11. I propose using a forecasted average 2008 capital structure that contains 6.23% short-term debt, 46.01% long-term debt, 0.24% preferred stock, and 47.52% common equity, as shown on Schedule 3.01 HW, HS, WW, WS.

Q12. What capital structure did the Company propose for Vermilion?

A12. The Company proposes using a forecasted average 2009 capital structure that contains 0.61% short-term debt, 47.01% long-term debt, 0.24% preferred stock, and 52.14% common equity, as shown on Schedule 3.01 VW.

Q13. What capital structure do you propose for Vermilion?

A13. I propose using a forecasted average 2009 capital structure that contains 2.02% short-term debt, 47.96% long-term debt, 0.25% preferred stock, and 49.77% common equity, as shown on Schedule 3.01 VW.

Q14. How did you adjust the Company's proposed short-term debt balances for Hawthorn Woods & Willowbrook and Vermilion?

A14. My balance of short-term debt for Hawthorn Woods & Willowbrook and Vermilion differ from the Company's proposals for three reasons. First, I used the forecasted short-term debt balances from the Vermilion filing in my capital structures for both Hawthorn Woods & Willowbrook and Vermilion because they are likely to be more accurate, as they represent more recent forecasts. Doing so increased the short-term debt balance for Hawthorn Woods & Willowbrook.

Second, I added $4,200,000 to every projected month-end short-term debt balance to reflect the difference between the Company's projected and actual March 2008 short-term debt balances.[2]

Third, I adjusted the monthly balance of short-term debt to remove the portion assumed to be supporting construction work in progress ("CWIP") accruing an allowance for funds used during construction ("AFUDC"). To calculate the short-term debt balance, I first calculated the monthly ending net balance of short-term debt outstanding during each month. The net balance of short-term debt is the greater of: a) the monthly ending gross short-term debt balance minus the corresponding monthly ending balance of CWIP accruing AFUDC or b) the monthly ending gross short-term debt balance minus 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 raised in a previous Order[3] about double-counting short-term debt balances. Next, I calculated twelve monthly averages from the monthly ending net short-term debt balances. Finally, I averaged the twelve monthly average net balances of short-term debt in 2008 for Hawthorn Woods & Willowbrook and in 2009 for Vermilion. Schedule 3.02 HW, HS, WW, WS presents the calculation of the average adjusted short-term debt balance for Hawthorn Woods & Willowbrook. Schedule 3.02 VW presents the calculation of the average adjusted short-term debt balance for Vermilion.

[2] Company response to Staff data request MGM 3.05.
[3] *Order* at 51, Illinois-American Water Company: Proposed general increase in water rates, ICC Docket No. 95-0076, 1995 Ill. PUC Lexis 884 (December 20, 1995).

Q15. Please describe the adjustments you made to the Company's balances of long-term debt.

A15. I made the following adjustments to Aqua's balances of long-term debt: (1) the issuance and maturity dates for several issues were corrected to reflect information in Company data request responses and Aqua's annual report to the Commission;[4] (2) the Face Amount Outstanding for Series U was changed to reflect the amount presented on page 14F of Aqua's 2007 Form 21; (3) the Principal Amount, the Face Amount Outstanding, and the Unamortized Debt Expense for Series X was updated to reflect the balances presented on pages 14F and 15F of Aqua's 2007 Form 21; and (4) the annual amortization of debt discount, premium, and expense was adjusted to reflect straight-line amortization of each issue's December 31, 2007 unamortized balances over its remaining life. Those modifications produced long-tem debt balances of $73,075,620 for Hawthorn Woods & Willowbrook, as shown on Schedule 3.03 HW, HS, WW, WS, and $73,310,095 for Vermilion, as shown on Schedule 3.03 VW.

Q16. Did you make any changes to the Company's proposed preferred stock balance?

A16. No, I did not.

Q17. Did you make any changes to the Company's proposed common equity balance?

A17. Yes. I reduced each forecasted 2008 and 2009 month-end balance of common equity by $5,294,145 to reflect the difference between the Company's projected March 2008 balance presented on page one of WP-D1 and the Company's

[4]Company responses to Staff data requests MGM 2.3, 2.4, 2.7, and 2.8 and Aqua's 2007 ILCC Form 21, page 14F.

actual March 2008 month-end balance.[5] That adjustment produced an average forecasted 2008 common equity balance of $75,476,849 for Hawthorn Woods & Willowbrook, as presented on Schedule 3.05 HW, HS, WW, WS, and an average forecasted 2009 common equity balance of $76,079,198 for Vermilion, as presented on Schedule 3.05 VW.

Q18. Does capital structure affect the overall cost of capital?

A18. Yes. Financial theory suggests capital structure affects the value of a firm and, therefore, its cost of capital, to the extent it affects the expected level of cash flows that accrue to outside parties (i.e., other than debt and stock holders). Employing debt as a source of capital reduces a company's income taxes,[6] thereby reducing the cost of capital. However, as reliance on debt as a source of capital increases, so does the probability of default. As default becomes more probable, expected payments to attorneys, trustees, accountants, and other outside parties increase. Simultaneously, the expected value of the income tax shield provided by debt financing declines. Beyond a certain point, a growing dependence on debt as a source of funds increases the overall cost of capital. Therefore, the Commission should not determine the overall rate of return from a utility's actual capital structure if the Commission concludes that such a capital structure adversely affects the overall cost of capital.

[5] March 2008 is the latest month for which actual data was available. Company response to Staff data request MGM 3.05.

[6] The tax advantage debt has over equity at the corporate level is partially offset at the individual investor level. Debt investors receive returns largely in the form of current income (i.e., interest). In contrast, equity investors receive returns in the form of both current income (i.e., dividends) and capital appreciation (i.e., capital gains). Taxes on common dividends and capital gains are lower than taxes on interest income because common dividends and capital gains tax rates are lower and taxes on capital gains are deferred until realized.

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

Toward that end, I compared the Company's average 2008 and average 2009 capital structures to those of other utility companies. Standard & Poor's ("S&P") categorizes debt securities on the basis of the risk that a company will default on its interest or principal payment obligations. The resulting credit rating reflects both the operating and financial risks of a utility.[7] S&P states that "an obligor rated 'BBB' has adequate capacity to meet its financial commitments," while "an obligor rated 'A' has strong capacity to meet its financial commitments."[8] Based on data from the S&P *Utility Compustat* database, the average common equity ratio for utilities in the water industry with an S&P credit rating in the A range was 51.42%. In addition, the utility company and water company samples from which I derived my cost of equity estimate, which have average credit ratings of BBB

[7] Standard & Poor's Utilities Rating Service, "Industry Commentary: Utilities Rating Criteria," May 20, 1996, p. 1.
[8] Standard & Poor's, "Standard & Poor's Ratings Definitions," December 12, 2002, p. 5.

and A,[9] respectively, had a four quarter average common equity ratios of 43.22% and 49.89%, respectively, as of the 3rd quarter of 2007. My proposed capital structures for Aqua indicate similar risk than the averages for those groups, with 47.52% common equity for the average 2008 measurement period and 49.77% common equity for the average 2009 measurement period. Thus, I conclude that my proposed capital structures for Aqua are reasonable for rate-making purposes.

Cost of Short-term Debt

Q19. What is Aqua's cost of short-term debt?

A19. Aqua issues short-term debt in the form of bank loans. The interest rate on those loans equals the 30- to 360-day London Interbank Offered Rate ("LIBOR") plus 65 basis points.[10] For the cost of short-term debt, I added 65 basis points to the current one-month LIBOR rate, 2.72%, for a total cost of 3.37%.[11]

Cost of Long-term Debt

Q20. What is the average 2008 embedded cost of long-term debt for Hawthorn Woods & Willowbrook?

A20. Aqua's average embedded cost of long-term debt for the 2008 measurement period equals 6.77%, as shown on Schedule 3.03 HW, HS, WW, WS. That cost

[9] The A rating average for the water company sample represents the average of the six of the eight companies in the sample for which S&P credit ratings are available, with Aqua Pennsylvania's credit rating substituted for that of Aqua America, Inc.
[10] Schedule D-2.
[11] *The Wall Street Journal*, http://online.wsj.com, May 1, 2008.

reflects the adjustments to the Company's proposed debt schedule described previously.

Q21. What is the average 2009 embedded cost of long-term debt for Vermilion?

A21. Aqua's average embedded cost of long-term debt for the 2009 measurement period equals 6.75%, as shown on Schedule 3.03 VW. That cost reflects the adjustments to the Company's proposed debt schedule described previously.

Cost of Preferred Stock

Q22. What is Aqua's cost of preferred stock?

A22. Aqua's average cost of preferred stock equals 5.47%, as shown on Schedule 3.04.

Cost of Common Equity

Q23. What is your estimate of the Company's cost of common equity?

A23. My analysis indicates that Aqua's cost of common equity equals 10.75%.

Q24. How did you measure the investor required rate of return on common equity for Aqua?

A24. I measured the investor required rate of return on common equity for Aqua with discounted cash flow ("DCF") and risk premium models. Since Aqua does not have market-traded common stock,[12] DCF and risk premium models cannot be applied directly to Aqua; for this reason, and to reduce measurement error, I

[12] Aqua Ex. 3.0, p. 8.

applied both models to a sample of water utility companies ("Water Sample") and a sample of comparable public utility companies ("Utility Sample").

Sample Selection

Q25. How did you select your Water Sample?

A25. 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*. Second, I removed any company that did not have Zacks Investment Research ("Zacks") long-term growth rates. The remaining companies, American States Water Company, Aqua America, Inc., Artesian Resources, California Water Service Group, Middlesex Water Company, SJW Corp., Southwest Water Company, and York Water Company, compose my Water Sample.

Q26. How did you select your Utility Sample?

A26. According to financial theory, the market-required rate of return on common equity is a function of operating and financial risk. Thus, the method used to select a sample should reflect both the operating and financial characteristics of a firm. I selected a sample using twelve financial and operating ratios: 1) common equity to capitalization; (2) funds from operations to capitalization; (3) funds from operations to long-term debt; (4) fixed assets to revenues; (5) free cash flow to capitalization; (6) funds from operations interest coverage; (7) net cash flow to capital expenditures; (8) net plant to capital expenditures; (9) operating profit margin; (10) operating revenue stability; (11) earnings before interest and taxes stability; and (12) earnings stability. For the first nine ratios,

data from the period 2005-2007 were averaged to normalize the ratios. The last three ratios were measured over the period 2003-2007 with the coefficient of determination of a least-squares regression of the natural logarithm of the respective quarterly data against time.[13] Using those ratios, I compared Aqua to the utility industry.

I began with all market-traded companies on S&P's *Utility Compustat* tape. Among those utilities, 82 had sufficient data to calculate the financial and operating ratios. Next, I conducted a principal components analysis of the financial and operating ratios. Principal components constitute linear combinations of optimally-weighted variables which are uncorrelated with one another.[14, 15] For each utility in the data base, the principal components analysis calculates a value for each component, known as a principal component score, which has a mean of zero and a standard deviation of one.[16] From the principal components analysis, I retained four components for risk analysis. After calculating the scores for each principal component, I rank-ordered the utilities in the database in terms of least relative distance from Aqua's target ratios. Distance was measured by calculating the difference between each principal component score for each firm and Aqua, summing the squared differences, and

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

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

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

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

[15] The variables are optimally weighted when the resulting principal components explain the maximum amount of variance in the data base.

[16] The standard deviation is a statistical measure that explains how tightly the observations are clustered around the mean in a set of data.

taking the square root of the summation. I then eliminated water utilities that were included in my water sample to avoid doubling the weight given to those water utilities. Finally, I excluded any companies that lacked Zacks growth rates. Of the remaining utilities, my Utility Sample comprises the nine utilities the least distance from, and therefore the most comparable to, Aqua: Westar Energy, Inc., Southern Company, Pinnacle West Capital Corp., DPL, Inc., PPL Corp., Ameren Corp., Idacorp, Inc., Wisconsin Energy Corp., and Xcel Energy, Inc. Schedule 3.06 presents the four principal component scores and the cumulative distance for each company in the Utility Sample and Aqua. Schedule 3.06 also presents the four principal component scores for the companies in my Water Sample.[17]

DCF Analysis

Q27. Please describe DCF analysis.

A27. 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 risks becomes unnecessary to implement a 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 flow investors expect it to generate. Specifically, the market value of common

[17] 2007 data is unavailable for several of the companies in my Water Sample. Thus, for that sample, I compared the twelve financial and operating ratios noted above to industry averages through 2006. Because of this, the factor scores for Aqua relative to the industry are slightly different than those used for the Utility Sample, which reflect data through 2007.

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

Q28. Please describe the DCF model with which you measured the investor required rate of return on common equity.

A28. As it applies to common stocks, DCF analysis is generally employed to determine appropriate stock prices given a specified discount rate. Since a DCF model incorporates time-sensitive valuation factors, it must correctly reflect the timing of the dividend payments that stock prices embody. As such, incorporating stock prices that the financial market sets on the basis of quarterly dividend payments into a model that ignores the time value of quarterly cash flows constitutes a misapplication of DCF analysis. The companies in my samples pay dividends quarterly; therefore, I applied a multi-stage, non-constant growth quarterly DCF model to measure the annual required rate of return on common equity.

Q29. In past proceedings Staff has typically employed a constant growth, or single-stage, DCF model. Why did you apply a non-constant growth DCF model in this proceeding?

A29. Staff has not typically used a non-constant growth DCF model because it is a more elaborate model with additional unobservable growth rate variables that could be subject to greater measurement error than the analyst growth rate estimates Staff uses in constant-growth DCF analyses. Specifically, no observable estimates of investor "transitional" and "steady-state" growth rate expectations for individual companies exist.[18] Nevertheless, under certain

[18] The "steady-state" is defined as a period of long, indefinite length during which a company's expected rate of return on new investment does not vary. (A constant growth DCF model assumes a

circumstances, measurement error associated with a constant-growth DCF analysis exceeds that associated with a non-constant growth DCF model, making the latter model preferable.

A single-stage, constant growth DCF model employs a single growth rate estimate, which is assumed to be sustainable ad infinitum. Thus, the cost of common equity calculation derived from a constant growth estimate is correct if the near-term growth rate forecast for each company in the sample is expected to equal its average long-term dividend growth. However, the level of growth indicated by the 3-5 year growth rate averages for my Utility Sample and Water Sample are not sustainable over the long-term. Therefore, I implemented a multi-stage, non-constant growth DCF model.

Q30. Why did you conclude that 3-5 year growth rates for the companies in your samples appear to be unsustainable over the long-term?

A30. The average Zacks growth rate for my Utility Sample and Water Sample was 6.91% and 8.79%, respectively. As I discuss later, the current expectations of growth for the economy, as measured by GDP, is only approximately 5%. In theory, no company could sustain into infinity a growth rate any greater than that of the overall economy, or it would eventually grow to become the entire economy. Moreover, since utilities in particular are generally below-average growth companies, the sustainability of an above average growth rate is particularly dubious. At 6.91%, the average growth rate for the companies in my Utility Sample is approximately 38% greater than that expected for the overall

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company is already in the "steady-state;" that is, the growth rate is the "steady-state" growth rate,) The "transitional" phase is a bridge between the current, near-term period and the "steady-state" level during which the company's rate of return on new investment adjusts from the current level to the "steady-state" level.

economy; the Water Sample's 8.79% average growth rate is approximately 75% greater. Thus, given the large difference between the average growth rate estimates for my samples and the expected overall growth of the economy, the continuous sustainability of the Zacks growth rates for my samples is highly unlikely. Thus, I used a non-constant growth DCF model that employs distinct growth rate estimates for each of three discrete time periods.

Q31. Please describe how you modeled your non-constant growth DCF analysis.

A31. I modeled three stages of dividend growth. The first, a near-term growth stage, is assumed to last five years. The second stage is a transitional growth period lasting from the beginning of the sixth year through the end of the tenth year. Finally, the third, or "steady-state," growth stage begins at the end of the tenth year and is assumed to last into perpetuity. An expected stream of dividends is estimated by applying these stages of growth to the current dividend. The discount rate that equates the present value of this expected stream of cash flows to the company's current stock price equals the market-required return on common equity. Schedule 3.07 mathematically presents the relationship between the cash flow stream, stock price, and market required rate of return on common equity.

Q32. How did you estimate the growth rate parameter?

A32. Determining the market-required rate of return with the DCF methodology requires a growth rate that reflects the expectations of investors. Although the current market price reflects aggregate investor expectations, market-consensus expected growth rates cannot be measured directly. Therefore, I measured the first stage growth with growth rates forecasted by securities analysts that are

disseminated to investors. Specifically, for the first stage, which is assumed to last five years, I used Zacks growth rate estimates as of May 1, 2008. Zacks summarizes and publishes the earnings growth expectations of financial analysts employed by the research departments of investment brokerage firms. Zacks provides 3-5 year forward-looking, expectational estimates of earnings growth.

To estimate the long-term growth expectations for the third, steady-state stage, I utilized the implied 20-year forward U.S. Treasury rate in ten years, which reflects current expectations of the long-term overall economic growth during the steady-state growth stage of my non-constant DCF model.[19] An implied 20-year forward U.S. Treasury rate in ten years of 4.90% was derived from the 3.78% 10- and 4.49% 30-year U.S. Treasury rates as of May 1, 2008 using the following formula:

$$ {}_{20}f_{10} = [(1+{}_{30}r_0)^{30} / (1+{}_{10}r_0)^{10}]^{1/20} - 1 $$

Where ${}_{20}f_{10}$ = the implied 20-year forward U.S. Treasury rate in ten years;
${}_{30}r_0$ = the current 30-year U.S. Treasury rate; and
${}_{10}r_0$ = the current 10-year U.S. Treasury rate

The growth rate employed in the intervening, five-year transitional stage equals the average of the Zacks growth rate and the steady-state stage growth rate. Schedule 3.08 presents the growth rate estimates for the companies in the Utility Sample and Water Sample.

[19] Excepting a small premium for interest rate risk, the implied 20-year forward U.S. Treasury rate in ten years represents the risk-free rate of return during the 20-year period beginning in 10 years and ending 30 years from today, as implied by current 10- and 30-year U.S. Treasury rates. As I explain later, the overall economic growth rate and the risk-free rate of return should be similar since both are a function of production opportunities and consumption preferences.

Q33. Is an estimate of the long-term overall economic growth rate a reasonable estimate for the steady-state stage growth for your non-constant DCF analysis?

A33. Ideally, one would prefer to use growth rate estimates for the very long term forecasted for individual companies. Unfortunately, company specific long-term growth rate forecasts are not available. Further, for the reasons presented above, it is clear that investors cannot reasonably expect utilities to sustain growth over the very long term equal to analysts' current 3-5 growth rate estimates. Thus, while the overall economic growth rate may be biased upward for generally low-growth companies such as utilities, it is much closer to the growth rate that investors could reasonably expect utilities to sustain over the long term, based on expectations for the overall economy.

Q34. How did you measure the stock price?

A34. A current stock price reflects all information that is available and relevant to the market; thus, it represents the market's assessment of the common stock's current value. I measured each company's current stock price with its closing market price from May 1, 2008. Those stock prices appear on Schedule 3.09.

Since current stock prices reflect the market's current expectation of both the cash flows the securities will produce and the rate at which those cash flows are discounted, an observed change in the market price does not necessarily indicate a change in the required rate of return on common equity. Rather, a price change may reflect investors' re-evaluation of the expected dividend growth rate. In addition, stock prices change with the approach of dividend payment dates. Consequently, when estimating the required return on common equity

with the DCF model, one should measure the expected dividend yield and the corresponding expected growth rate concurrently. Using a historical stock price along with current growth expectations or combining an updated stock price with past growth expectations will likely produce an inaccurate estimate of the market-required rate of return on common equity.

Q35. Please explain the significance of the column titled "Next Dividend Payment Date" shown on Schedule 3.09.

A35. 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.

Q36. How did you estimate the expected future quarterly dividends?

A36. Most utilities declare and pay the same dividend per share for four consecutive quarters before adjusting the rate. Consequently, I assumed the current declared dividend rate will remain in effect for a minimum of four quarters and then adjust during the same quarter it changed during the preceding year; if the utility did not change its dividend during the last year, I assumed the rate would change during the next quarter. The average expected growth rate was applied to the current declared dividend rate to estimate the expected dividend rate. Schedule 3.09 presents the current quarterly dividends for the prior year. Schedule 3.10 presents the expected quarterly dividends for the coming year. This technique was applied to produce dividend projections for the next 11 years

hence, substituting the appropriate growth rate estimate for each of the three stages of my non-constant growth DCF analysis.

Q37. Based on your DCF analysis, what is the estimated required rate of return on common equity for the Utility Sample?

A37. My DCF analysis estimated that the required rate of return on common equity for the Utility Sample averages 9.88%, as shown on Schedule 3.11. That result was derived from the growth rates presented on Schedule 3.08, the stock prices and dividend payment dates presented on Schedule 3.09, and the expected quarterly dividends presented on Schedule 3.10.

Q38. Based on your DCF analysis, what is the estimated required rate of return on common equity for the Water Sample?

A38. My DCF analysis estimated that the required rate of return on common equity for the Water Sample averages 8.85%, as shown on Schedule 3.11. That result was derived from the growth rates presented on Schedule 3.08, the stock prices and dividend payment dates presented on Schedule 3.09, and the expected quarterly dividends presented on Schedule 3.10.

Risk Premium Analysis

Q39. Please describe the risk premium model.

A39. The risk premium model is based on the theory that the market-required rate of return for a given risk-bearing security equals the risk-free rate of return[20] plus a

[20] The risk-free rate of return is the theoretical rate of return on an investment with zero risk. This represents the absolute minimum return an investor demands as compensation for deferring consumption.

risk premium that investors expect in exchange for assuming the risk associated with that security. Mathematically, a risk premium equals the difference between the expected rate of return on a risk factor and the risk-free rate. If the risk of a security is measured relative to a portfolio, then multiplying that relative measure of risk and the portfolio's risk premium produces a security-specific risk premium for that risk factor.

The risk premium methodology is consistent with the theory that investors are risk-averse. That is, investors require higher returns to accept greater exposure to risk. Thus, if investors had an opportunity to purchase one of two securities with equal expected returns, they would purchase the security with less risk. Similarly, if investors had an opportunity to purchase one of two securities with equal risk, they would purchase the security with the higher expected return. In equilibrium, two securities with equal quantities of risk have equal required rates of return.

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

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

where R_j ≡ the required rate of return for security j;

R_f ≡ the risk-free rate;

R_m ≡ the expected rate of return for the market portfolio; and

β_j ≡ the measure of market risk for security j.

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

Q40. How did you estimate the risk-free rate of return?

A40. I examined the suitability of the yields on four-week U.S. Treasury bills and thirty-year U.S. Treasury bonds as estimates of the risk-free rate of return.

Q41. Why did you examine the yields on U.S. Treasury bills and bonds as measures of the risk-free rate?

A41. The proxy for the nominal risk-free rate should contain no risk premium and reflect similar inflation and real risk-free rate expectations to the security being analyzed through the risk premium methodology.[21] The yields of fixed income securities include premiums for default and interest rate risk. Default risk pertains to the possibility of default on principal or interest payments. The federal government's fiscal and monetary authority makes securities of the United States Treasury virtually free of default risk. Interest rate risk pertains to the effect of unexpected interest rate fluctuations on the value of securities.

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

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

terms to maturity ranging from four weeks to six months. Therefore, U.S. Treasury bonds are more likely to incorporate within their yields the inflation and real risk-free rate expectations that drive, in part, the prices of common stocks than either U.S. Treasury notes or Treasury bills.

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.

Q42. 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 the inflation and real risk-free rate expectations that are reflected in the yields on U.S. Treasury bills and the prices of common stocks are dissimilar?

A42. No. To the contrary, short and long-term inflation and real risk-free rate expectations, including those that are reflected in the yields on U.S. Treasury bills, U.S. Treasury bonds, and the prices of common stocks, should equal over time. Any other assumption implausibly implies that the real risk-free rate and inflation 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, in finite time periods short and long-term expectations may differ. Short-term interest rates tend to be more volatile than long-term

interest rates.[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.

Q43. What are the current yields on four-week U.S. Treasury bills and thirty-year U.S. Treasury bonds?

A43. Four-week U.S. Treasury bills are currently yielding 1.22%. Thirty-year U.S. Treasury bonds are currently yielding 4.54%. Both estimates are derived from quotes for May 1, 2008.[23] Schedule 3.12 presents the published quotes and effective yields.

Q44. Of the U.S. Treasury bill and bond yields, which is currently a better proxy for the long-term risk-free rate?

A44. In terms of the gross domestic product ("GDP") price index, the Energy Information Administration ("EIA") forecasts the inflation rate will average 2.0% annually during the 2006-2030 period.[24] Similarly, Global Insight forecasts the

[22] Fabozzi, ed., The Handbook of Fixed Income Securities, Fifth Edition, Irwin, p. 827.
[23] The Federal Reserve Board, *Federal Reserve Statistical Release: H.15, Selected Interest Rates, Daily Update*, www.federalreserve.gov/releases/H15/update/, May 2, 2008.
[24] Energy Information Administration, *Annual Energy Outlook 2008*, Table A19, Macroeconomic Indicators, www.eia.doe.gov/oiaf/aeo/, February 2008.

GDP price index will average 1.8% annually during the 2008-2038 period.[25] In terms of the consumer price index ("CPI"), the *Survey of Professional Forecasters* ("*Survey*") forecasts the inflation rate will average 2.4% during the next ten years.[26] EIA forecasts of real GDP growth imply the real risk-free rate will average 2.4% during the 2006-2030 period.[27] Global Insight forecasts of real GDP growth imply the real risk-free rate will average 2.5% during the 2008-2038 period.[28] The *Survey* forecasts real GDP growth will average 2.7% during the next ten years.[29] Those forecasts imply a long-term, nominal risk-free rate between 4.4% and 5.3%.[30] Therefore, EIA, Global Insight, and *Survey* forecasts of inflation and real GDP growth expectations suggest that, currently, the U.S. Treasury bond yield more closely approximates the long-term risk-free rate. It should be noted, however, the U.S. Treasury bond yield is an upwardly biased estimator of the long-term risk-free rate due to the inclusion of an interest rate risk premium associated with its relatively long term to maturity.

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[25] Global Insight, *The U.S. Economy: The 30-Year Focus, First Quarter 2008*, Table 1: Summary of the U.S. Economy.

[26] Federal Reserve Bank of Philadelphia, *Survey of Professional Forecasters*, www.philadelphiafed.org/files/spf/survq108.html, February 12, 2008. The *Survey* aggregates the forecasts of approximately thirty forecasters.

[27] Energy Information Administration, *Annual Energy Outlook 2008*, Table A19, Macroeconomic Indicators, www.eia.doe.gov/oiaf/aeo/, February 2008.

[28] Global Insight, *The U.S. Economy: The 30-Year Focus, First Quarter 2008*, Table 1: Summary of the U.S. Economy.

[29] Federal Reserve Bank of Philadelphia, *Survey of Professional Forecasters*, www.philadelphiafed.org/files/spf/survq108.html, February 12, 2008.

[30] Nominal interest rates are calculated as follows:

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

where r ≡ nominal interest rate;
R ≡ real interest rate; and
i ≡ inflation rate.

Q45. Please explain why the real risk-free rate and the GDP growth rate should be similar.

A45. 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.[31] The real risk-free rate excludes the premium for inflation. 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.

Q46. How was the expected rate of return on the market portfolio estimated?

A46. The expected rate of return on the market was estimated by conducting a DCF analysis on the firms composing the S&P 500 Index ("S&P 500") as of April 1, 2008. That analysis used dividend information reported in the April 2008 edition of S&P's *Security Owner's Stock Guide* and April 1, 2008 closing stock market prices reported by Zacks. April 2, 2008 growth rate estimates were also obtained from Zacks. Firms not paying a dividend as of April 1, 2008, or for which Zacks growth rates were not available were eliminated from the analysis. The resulting company-specific estimates of the expected rate of return on common equity were then weighted using market value data from Zacks on April 1, 2008. The estimated weighted average expected rate of return for the remaining 381 firms, composing 84.22% of the market capitalization of the S&P 500, equals 13.63%.

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

Q47. How did you measure market risk on a security-specific basis?

A47. 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 used Value Line's betas[32] and a regression analysis to estimate the beta of my Utility Sample and Water Sample.

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

$$R_{j,t} = \alpha_j + \beta_j \times R_{m,t} + \varepsilon_{j,t}$$

where $R_{j,t}$ ≡ the return on security j in period t;

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

α_j ≡ the intercept term for security j;

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

$\varepsilon_{j,t}$ ≡ 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 Value Line regression employs 259 weekly observations of stock return data. Then, an adjusted beta is estimated through the following equation:

[32] When available, I used published Value Line estimates for each company in each sample; for those companies that did not have published Value Line beta estimates, I calculated beta estimates using the Value Line beta methodology. The Value Line service to which the Commission subscribes does not provide beta estimates for Artesian Resources, Middlesex Water, SJW, and York Water.

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

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

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

$$R_{j,t} - R_{f,t} = \alpha + \beta (R_{m,t} - R_{f,t}) + \varepsilon_t$$

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*;

α ≡ the intercept term for security *j*;

β ≡ beta, the measure of market risk for security *j*; and

ε_t ≡ the residual term in period *t* for security *j*.

The regression analysis beta estimate for my samples was calculated in three steps. First, the U.S. Treasury bill return was subtracted from the average percentage change in the sample's stock prices and the percentage change in the NYSE Index to estimate the portfolio's return in excess of the risk-free rate. Second, the excess returns of each sample were 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:

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

Q48. Why do you use an adjusted beta estimate?

A48. Some empirical tests of the CAPM suggest that the linear relationship between risk, as measured by raw beta, and return is flatter than the CAPM predicts. That is, securities with raw betas less than one tend to realize higher returns that the CAPM predicts. Conversely, securities with raw betas greater than one tend to realize lower returns than the CAPM predicts. Adjusting the raw beta estimate towards the market mean of 1.0 results in a linear relationship between the beta estimate and realized return that more closely conforms to the CAPM prediction.[34] 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.

Q49. What is the beta estimate for your Utility Sample?

A49. The average Value Line beta for the Utility Sample is 0.81, as shown in Table 1 below.[35]

[34] 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.
[35] The Value Line Investment Survey, "Summary and Index," April 25, 2008, pp. 2-23.

Table 1

Company	Value Line Estimate
Westar Energy, Inc.	0.85
Southern Co.	0.70
Pinnacle West Capital Corp.	0.80
DPL, Inc.	0.75
PPL Corp.	0.90
Ameren Corp.	0.80
Idacorp, Inc.	0.90
Wisconsin Energy Corp.	0.80
Xcel Energy, Inc.	0.75
Average	0.81

The regression beta estimate for the Utility Sample is 0.79. I used the average of those two estimates, or 0.80.

Q50. What is the beta estimate for your Water Sample?

A50. The average Value Line beta for the Water Sample is 0.87, as shown in Table 2 below.[36]

Table 2

Company	Value Line Estimate
American States Water Co.	1.00
Aqua America, Inc.	0.95
Artesian Resources Corp.	0.40
California Water Services Gp.	1.10
Middlesex Water Co.	0.90
SJW Corp.	1.15
Southwest Water Co.	1.00
York Water Co.	0.45
Average	0.87

[36] The Value Line Investment Survey, "Summary and Index," April 25, 2008, pp. 2-23.

The regression beta estimate for the Water Sample is also 0.87. Thus, I used a beta of 0.87 for my Water Sample.

Q51. Is a beta of 0.87 typical for a water utility?

A51. No. Based on my experience, the 0.87 average beta for the companies in my Water Sample is higher than usual for water utilities.

Q52. Why do you still rely on the betas for your Water Sample, if they are atypically high?

A52. True betas are forward-looking measures of investors' expectations of market risk. As such, true betas are not observable. Betas that Staff calculates and betas that Value Line and other financial information services publish are proxies for true betas. Therefore, like all proxies, beta estimates are subject to measurement error. Thus, there is no single, definitively "correct" beta for a given company. Beta measurements can overstate a company's risk, and consequently its cost of capital, at times, and understate it at other times. Indeed, this is true of any cost of equity estimation methodology. The inevitable presence of measurement error is why Staff recommends against reliance on any single model to estimate the cost of equity. In fact, my analysis relies on multiple models involving multiple samples composed of multiple companies. These steps mitigate the effect on my cost of equity estimate of measurement error in my Water Sample's beta estimate.

Q53. What required rate of return on common equity does the risk premium model estimate for your Utility Sample?

A53. The risk premium model estimates a required rate of return on common equity of 11.81% for the Utility Sample. The computation of that estimate appears on Schedule 3.12.

Q54. What required rate of return on common equity does the risk premium model estimate for the Water Sample?

A54. The risk premium model estimates a required rate of return on common equity of 12.45% for the Water Sample. The computation of that estimate appears on Schedule 3.12.

Cost of Equity Recommendation

Q55. Based on your entire analysis, what is your estimate of Aqua's cost of common equity?

A55. A thorough analysis of the required rate of return on common equity requires both the application of financial models and the analyst's informed judgment. An estimate of the required rate of return on common equity based solely on judgment is inappropriate. Nevertheless, because techniques to measure the required rate of return on common equity necessarily employ proxies for investor expectations, judgment remains necessary to evaluate the results of such analyses. Along with DCF and risk premium cost of equity analyses, I have considered the observable 6.40% rate of return the market currently requires on less risky BBB-rated long-term utility debt.[37] Based on my analysis, in my

[37] The Value Line Investment Survey, "Selection & Opinion," April 25, 2008.

judgment Aqua's investor-required rate of return on common equity equals 10.75%.

Q56. Please summarize how you formed your estimate of the investor-required rate of return on common equity for Aqua.

A56. First, I estimated the investor-required rate of return on common equity for the two samples from the results of the DCF and risk premium analyses for the samples. The models from which the individual company estimates were derived are correctly specified and, thus, contain no source of bias. Moreover, except for the use of U.S. Treasury bond yields as a proxy for the long-term risk-free rate and overall economic growth, I am unaware of bias in my proxy for investor expectations. In addition, measurement error has been minimized through the use of a sample, since estimates for a sample as a whole are subject to less measurement error than individual company estimates. The average investor-required rate of return common equity for my Water Sample, 10.65%, is based on the average of the DCF-derived results (8.85%) and the risk premium-derived results (12.45%). The average investor-required rate of return on common equity for my Utility Sample, 10.85%, is based on the average DCF-derived results (9.88%) and the risk premium-derived results (11.81%). Next, I compared the risk of the two samples to Aqua to determine the relative weighting that should be applied to each.

Q57. How does Aqua compare to your Utility Sample in terms of risk?

A57. To assess the similarity of my Utility Sample to Aqua in terms of risk, I compared the average principal component factor scores for the Utility Sample with those of Aqua. Each utility's factor score represents the number of standard deviations

(σ) that utility falls from the industry average in terms of that specific factor. The standard deviation is a statistic that explains how tightly the observations are clustered around the mean in a set of data. Under a normal distribution, approximately 68% of all observations will fall within one standard deviation of the average; approximately 95% will fall within two standard deviations.

Factor 1 measures financial risk, with a higher score indicating less risk. Aqua's score on factor 1 is -0.636σ, while my Utility Sample's factor 1 score is -0.224σ. Thus, Aqua is riskier than my Utility Sample in terms of financial risk. Factor 2 measures construction risk. Aqua's score on factor 2 is -0.526σ, which is lower than my Utility Sample's -0.191σ, which indicates that Aqua's level of construction risk is higher than that of my Utility Sample. Factor 3 measures revenue and earnings stability, indicators of sales and cost variability. Aqua's factor 3 score of 1.236σ is significantly higher than my Utility Sample's factor score of 0.576σ, which indicates that Aqua has more stable revenues and earnings, and, consequently, less sales risk, than my Utility Sample. Factor 4 measures capital intensity. Capital intensity can insulate a company from competition and, thus, reduce risk. However, capital intensity can also indicate higher operating leverage (i.e., fixed costs), which can increase risk through lower earnings stability. Aqua's factor 4 score of 3.028σ is markedly higher than my Utility Sample's factor score of 0.820σ, which indicates that Aqua has more operating leverage, but is exposed to less competitive risk. Since Aqua's earnings stability is greater than that of my Utility Sample, Aqua's operating leverage has not led to greater relative operating risk. Thus, I conclude that Aqua's capital intensity lowers its operating risk relative to my Utility Sample. Overall, my analysis indicates that Aqua has slightly higher financial and

construction risk than my Utility Sample, but more stable earnings and less competitive risk. Thus, in my judgment, the overall risk of Aqua is similar to that of my Utility Sample.

Q58. How does Aqua compare to your Water Sample in terms of risk?

A58. To assess the similarity of my Water Sample to Aqua in terms of risk, I performed a principal components analysis similar to the one I performed on my Utility Sample. However, since 2007 data is unavailable for several of the companies in my Water Sample, my principal components analysis for my Water Sample was performed on the twelve financial and operating ratios discussed earlier calculated through 2006, rather than 2007. That comparison revealed the following:

Aqua's score on factor 1 is -0.307σ, while my Water Sample's factor 1 score is -0.211σ. Thus, Aqua is slightly riskier than my Water Sample in terms of financial risk. Aqua's score on factor 2 is -0.478σ, which is higher than my Water Sample's -1.077σ, which indicates that Aqua's level of construction risk is lower than that of my Water Sample. Aqua's factor 3 score of 0.925σ is slightly higher than my Water Sample's score of 0.746σ, which indicates that Aqua has slightly more stable revenues and earnings, and, consequently, slightly less risk, than my Water Sample. Aqua's factor 4 score of 2.672σ is significantly higher than my Water Sample's factor score of 1.116σ, which indicates that Aqua has more operating leverage, but is exposed to less competitive risk. Since Aqua's earnings stability is greater than that of my Water Sample, Aqua's operating leverage has not led to greater relative operating risk. Thus, I conclude that Aqua's capital intensity lowers its operating risk relative to my Water Sample.

Overall, my analysis indicates that Aqua has higher financial risk than my Water Sample, but more stable earnings and less construction and competitive risk. Thus, in my judgment, the overall risk of Aqua is equal to or less than that of my Water Sample.

Q59. What do you conclude from your comparison of the riskiness of your Utility Sample and Water Sample relative to Aqua?

A59. My principal components analysis indicates that both my Utility Sample and my Water Sample reasonably approximate the overall risk level of Aqua. Specifically, while Aqua has higher financial risk than either of my samples, its operating risk is lower. That is, Aqua's lower operating risk enables it to incur higher financial risk and still maintain stable earnings. Because my Utility Sample and my Water Sample are both similar in risk to Aqua, my recommended cost of equity for Aqua is the simple average of the cost of equity results for my Utility Sample and my Water Sample, or 10.75%.

Overall Cost of Capital Recommendation

Q60. What is the average 2008 overall cost of capital for Aqua?

A60. As shown on Schedule 3.01 HW, HS, WW, WS, Aqua's average 2008 overall cost of capital for Hawthorn Woods & Willowbrook equals 8.45%. That estimate incorporates my recommended cost of common equity of 10.75%.

Q61. What is the average 2009 overall cost of capital for Aqua?

A61. As shown on Schedule 3.01 VW, Aqua's overall cost of capital for Vermilion equals 8.67%. That estimate also incorporates my recommended cost of common equity of 10.75%.

RESPONSE TO MR. WALKER

Q62. Please summarize Mr. Walker's analysis of Aqua's cost of common equity.

A62. Mr. Walker's cost of equity estimate is based on DCF, CAPM, and risk premium ("RP") analyses. He performed his DCF, CAPM, and RP analyses on both a sample consisting of 7 water utilities ("Water Group") and a sample consisting of 10 natural gas utilities ("Gas Group"). The results for his Water Group provide the primary basis for his cost of equity recommendation while his Gas Group was used as a check on the results of the Water Group.[38] He concluded that: 1) his DCF analysis indicates a cost of equity of 11.75%; 2) his CAPM analysis indicates a cost of equity of 12.25%; and 3) his RP analysis indicates a cost of equity of 11.35%. Each of those estimates includes both a market to book value "leverage" adjustment of 60 basis points and a risk adjustment of 25 basis points. Based on those results, he recommended a cost of equity estimate of 11.75%.[39]

Q63. Please evaluate Mr. Walker's cost of equity recommendation?

A63. Mr. Walker's analysis contain several flaws that cause him to overstates Aqua's cost of equity estimate, including:

[38] Aqua Ex. 3.0, p. 12.
[39] Aqua Ex. 3.0, pp. 54-55.

1. The growth rates he applied in his DCF analysis are unsustainably high, based on current expectations of overall economic growth.

2. The size premium he added to his CAPM is inappropriate.

3. The leverage adjustment he adds to the results of each of his models is inappropriate.

4. The risk premium he adds to the results of each of his models is inappropriate.

Growth Rates

Q64. Please summarize your concerns with the growth rates Mr. Walker employs.

A64. Mr. Walker's near-term growth rates, like those for both of my samples, are not sustainable over the long term, based on current expectations of long-term economic growth. As I discussed previously, forecasts from the EIA, Global Insight, and the Survey, as well as current U.S. Treasury bond yields, indicate expectations of long-term growth in the overall economy of approximately 5%. In fact, Mr. Walker also recommends a risk-free rate of 5.0% in his CAPM analysis.[40] In contrast, the average near-term growth rate for Mr. Walker's Water Group is 66% greater, at 8.3%, and that of his Gas Group is 36% greater, at 6.8%. Since utilities are generally below average growth companies, it is unlikely

[40] Aqua Ex. 3.0, p. 46.

investors expect the companies in Mr. Walker's samples to be able to sustain above average growth.

Size Premium

Q65. Please describe the size premium Mr. Walker added to his CAPM.

A65. Mr. Walker claims that the beta, which is used to measure systematic risk in the CAPM, does not reflect the risk associated with the relatively small size of the companies in his Water Group and Gas Group.[41] Thus, he adds 120 basis points to his CAPM results. Unfortunately, Mr. Walker does not explain how he derived his size premium. Rather, he provides a page of data with a vague citation to "Stocks, Bonds, Bills, and Inflation, 2007 Yearbook and Value Line."[42] Despite this ambiguity, I believe I have identified the sources of that data and discerned how he developed his size premium adjustment.

It is my understanding that the sources of Mr. Walker's data are the same Value Line Investment Survey issues cited on Schedule 15 of his direct testimony and Ibbotson Associates' Stocks Bonds, Bills, and Inflation, 2007 Yearbook. Specifically, I believe he used data from page 140-142 of the Ibbotson text.[43] That text sorts companies into deciles based on their market capitalizations, with decile 10 containing the smallest companies and decile 1 containing the largest, using data from the Center for Research in Security Prices (CRISP) from the University of Chicago. It also provides average historical beta estimates from 1926-2006 for each decile. If further categorizes companies in deciles 3-5 as

[41] Aqua Ex. 3.0, p. 48.
[42] Aqua Ex. 3.0, Schedule 19, p. 4.
[43] I have attached those pages to my direct testimony, as Staff Schedule 3.13.

Mid-Cap, those in deciles 6-8 as Low-Cap, and those in deciles 9-10 as Micro-Cap and provides average historical betas and indicated size premia for each of those categories.[44] Mr. Walker claims that the companies in his Water Group fall into the Low-Cap category. Thus, he compared the 0.90 average Value Line beta for the four companies in his Water Group for which Value Line provides a beta estimate to the 1.28 historical beta Ibbotson reports for the Low-Cap category. The ratio of that Water Group beta to the Low-Cap beta was 70% (0.90 / 1.28 = 70%). He then multiplied that 70% beta ratio by the 1.76% historical indicated size premium for the Low-Cap category, to derive the 120 basis point size premium for his Water Group (1.76% X 70% = 1.2%). He used the same approach with his Gas Group, which he also claims to fall into the Low-Cap category. That sample also produced a size premium of 120 basis points.

Q66. Is the 120 basis point size premium Mr. Walker applied to his CAPM results appropriate?

A66. No.

Q67. Why is Mr. Walker's size premium adjustment inappropriate?

A67. There are two fundamental flaws that render it unsuitable from a conceptual standpoint. First, Mr. Walker's size premium has no theoretical basis. Second, the empirical study of beta on which his adjustment is based is not applicable to Aqua.

[44] Presumably, companies in deciles 1-2 would compose a fourth category, Large-Cap. Mr. Walker incorrectly labels those four categories as "quartiles" when, in fact, they are loose groupings of 2 or 3 deciles rather than evenly divided quartiles.

Q68. Please explain the significance of the absence of a theoretical basis for a size premium.

A68. Since a size 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,[45] rather than size, *per se*.

In fact, evidence of the existence of a size 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.[46] Fernholz states that as random price changes affect the size of stocks, some stocks cross over from one size portfolio to another. When a stock that starts in the large stock portfolio experiences a 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.[47] The combination of portfolio construction and random (i.e., non-systematic) price movements creates a biased source of measurement

[45] 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.

[46] Fernholz, "Crossovers, Dividends and the Size Effect," *Financial Analysts Journal,* May/June 1998, pp. 73-75.

[47] Fernholz, "Crossovers, Dividends and the Small Firm Effect," *Financial Analysts Journal,* May/June 1998, p. 73.

error. Thus, the size premium may be less a market return phenomenon than a modeling problem. That is, the size premium 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 size premiums appear to be related to monetary policy. Specifically, changes in monetary policy play a prominent role in determining the magnitude of size 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 <u>not</u> significantly greater than large stock returns.[48] 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 – a phenomenon known in financial circles as the "flight to quality." It is counter-intuitive to claim that investors would consider the smaller firms in the *regulated utility sector* to be speculative investments; and Mr. Walker has not supported that premise. Moreover, the Jensen study did not control its measurement of the size premium for risk as

[48] Jensen, Johnson and Mercer, "The Inconsistency of Small-Firm and Value Stock Premiums," *Journal of Portfolio Management,* p. 35.

measured by beta or other means.[49] Therefore, the study does not support Mr. Walker's size premium adjustment.

Q69. Why do you believe Mr. Walker's risk premium is not applicable to Aqua?

A69. Even if one misguidedly accepts the existence of a size premium for small companies generally, Mr. Walker has provided no evidence to demonstrate a size premium is warranted for utilities specifically. The study reported in Ibbotson Associates, which forms the basis for Mr. Walker's size 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").[50] Utilities, unlike most stocks listed on the NYSE, AMEX, or NASDAQ, are subject to uniform reporting requirements. Furthermore, their rates and conditions of service are publicly reported. Therefore, the cost of obtaining information regarding smaller utilities in general, and Aqua in particular, is unlikely to be as high as that of unregulated companies that are similar in size; hence, the application of a size premium to a utility is highly questionable. In fact, contrary to Mr. Walker's claims, a study by Annie Wong, reported in the Journal of the Midwest Finance Association, specifically found that there is no justification for a size premium for utilities.[51] Thus, the entire basis of Mr. Walker's size premium is questionable at best.

[49] Jensen, Johnson and Mercer, "The Inconsistency of Small-Firm and Value Stock Premiums," *Journal of Portfolio Management,* pp. 30 and 34.
[50] See Schedule 3.13.
[51] Wong, "Utility Stock and the Size Effect: an Empirical Analysis," *Journal of the Midwest Finance Association,* 1993.

Q70. The foregoing arguments notwithstanding, did Mr. Walker calculate his size premium correctly?

A70. No. Mr. Walker understated the size of his sample companies and, thus, overstated the indicated size premium. Page 140 of the Ibbotson text provides recent market capitalizations for the deciles it reports. Likewise, page 4 of Schedule 19 to Mr. Walker's direct testimony provides recent market capitalizations for the companies in his proxy samples. Based on that data, the average market capitalization of the companies in Mr. Walker's Water Group would fall into the Mid-Cap category. Similarly, the average market capitalization of the companies in his Gas Group would fall into the Mid-Cap to Large-Cap categories. However, Mr. Walker incorrectly concluded that both of his proxy samples fall into the Low-Cap category. Thus, even if one accepts Mr. Walker's flawed size premium argument, the risk premium adjustment he ultimately applied is overstated. For example, the proper classification of the Water Group in the Mid-Cap category would indicate a size premium of only 78 basis points (0.90 sample beta ÷ 1.12 Mid-Cap category beta = 80%, 80% X 0.97% Mid-Cap category risk premium = 0.78% sample premium), rather than the 120 basis point adjustment Mr. Walker calculated.

Q71. Has the Commission ruled on a size premium before?

A71. Yes. A size premium was presented in a prior Consumers Illinois rate case, and was rejected by the Commission on the basis that the company witness failed to demonstrate that there is a direct relationship between the size of a utility and its risk.[52]

[52] Amended Order at 39, Consumers Illinois Water Company: Proposed general increase in water and sewer rates, ICC Docket No. 97-0351, 1998 Ill. PUC Lexis 479 (June 17, 1998)

Leverage Adjustment

Q72. Please describe Mr. Walker's leverage adjustment.

A72. Mr. Walker adjusted his DCF, CAPM, and RP results upward by 60 basis points each because, he claims, there is a large difference in leverage as a result of the difference between the average market value of common equity for his samples and their average book values (i.e., market value > book value).[53] To derive his leverage adjustment, he averaged the results of two approaches. In the first approach, he used the "Hamada Formula" to "unlever" the Value Line sample beta using market value capital structure ratios, and then "re-levered" the unlevered beta using book value capital structure ratios. He then multiplied the difference between the unlevered and levered betas by the samples' risk premium to obtain a leverage adjustment estimate. In the second approach, Mr. Walker estimated that, based on market value debt ratios, the companies in his sample would command a AAA rating, in contrast to their current book-value based A rating. Thus, he used the spread between AAA-rated debt and A-rated debt to estimate the implied leverage adjustment. The average leverage adjustment estimate for those two approaches was 0.70% for the Water Group and 0.50% for the Gas Group. He averaged those two to get the 0.60% leverage adjustment he added to the results of his models.

Q73. Is Mr. Walker's leverage adjustment appropriate?

A73. No. Both of Mr. Walker's "leverage" adjustment approaches are based on the incorrect notion that utilities should be authorized rates of return on common equity in excess of the investor-required return whenever their market values of

[53] Aqua Ex. 3.0, pp. 38-45.

common equity exceed book values. However, to address this issue, one must first explore why the market value of utility common equity exceeds book value, which Mr. Walker has failed to do.

Q74. Please explain why the market value of a utility's equity might be higher than its book value of equity.

A74. There are two possible explanations for how utility stock prices have come to exceed their respective book values: (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 <u>lower</u> rate of return, not a higher one.

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 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 (e.g., higher than projected sales) 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 (R_{Other}), the product of rate base and rate of return. Earnings from these sources could allow a utility to earn returns beyond the level needed to meet investors' required rate of return on rate base investment.

R_{Other} can come from a number of sources. First, many utilities have unregulated sources of income that would contribute to earnings beyond the level needed to meet the required rate of return. Second, the normalization of deferred income taxes and income tax credits might also contribute to the divergence between utility market and book equity values since that practice compensates utilities for taxes they do not yet owe. Finally, investors do not value utilities on the basis of accounting earnings, as Mr. Walker suggests, but on economic earnings and cash flow. In utility revenue requirements, part of cash flow comes from operating income (i.e., rate base × rate of return). The larger share of the remainder comes from operating expenses in the form of depreciation and deferred taxes. Clearly, the Commission should not increase a utility's rate of return due to expectations of additional earnings from these other sources.

Q75. Mr. Walker argues that "the market value derived cost rate reflects the financial risk or leverage associated with capitalization ratios based on market value, not book value."[54] Do you agree?

A75. No. The intrinsic financial risk level of a given company does not change simply because the manner in which it is measured has changed. Such an assertion is akin to claiming that the ambient temperature changes when the measurement scale is switched from Fahrenheit to Celsius. To be clear, capital structure ratios are merely indicators of financial risk; they are not sources of financial risk. Financial risk arises from contractually required debt service payments. Changing the measure of capital structure ratios from a market to book value basis does not affect a company's debt service requirements.

[54] Aqua Ex. 3.0, p. 42.

Q76. What is the fundamental error with "leverage" adjustments such as Mr. Walker proposes?

A76. Leverage adjustments such as Mr. Walker's are based on the flawed argument that a market-derived required rate of return does not a produce a "fair" return when applied to a book value rate base if the market to book value ratio differs from one. The crucial flaw in that argument is that it equates secondary investing (i.e., the purchase of existing shares of stock from other investors) with primary investing (i.e., the purchase of new shares of stock directly from the company or the retention of earnings for reinvestment). The former does not affect the amount of money available to the company to buy assets because the proceeds from the sale go to the previous stockholder, not to the company. Thus, a rise in the price of existing common stock traded in secondary markets does not increase the amount of capital actually serving customers. It only reveals that investors' expectations for the future cash flows of the company have risen or that their required rate of return has fallen. In contrast, primary investment directly contributes capital to the company that is available to buy assets to serve customers. Under original cost ratemaking, ratepayers provide a return only on the amount of capital that is invested in assets that serve ratepayers. Inflating that return to compensate investors for capital not invested in plant and equipment is neither fair nor appropriate; moreover, such an adjustment would render the establishment of original cost rate base a pointless exercise.

A fair rate of return is determined exogenously from the ratemaking process. That is, the investor required rate of return is determined entirely by the market price investors are willing to pay based on the perceived riskiness of cash flows. Thus, investors, not the Commission, determine the required rate of return. As

1009 the Commission stated in Docket No. 92-0448/93-0239 Consol., "The
1010 Commission, in authorizing a rate of return, makes an estimate of what the
1011 investor is demanding. It is the Commission that reacts to the investor, not vice-
1012 versa."[55] The Commission does not control what investors pay for a share of
1013 stock, nor does it control investors' expectations for dividends and growth; the
1014 Commission simply evaluates investors' behavior to ascertain investors' rate of
1015 return requirements. The Commission then applies that market-determined rate
1016 of return to the amount of equity capital determined to be serving customers.

1017 If a utility's services were entirely subject to original cost-based, rate of return
1018 regulation[56] and its rates perfectly and instantaneously reflected changes in its
1019 costs, then the market value of the firm would equal the book value whenever the
1020 expected rate of return matches the investor required rate of return. However, if
1021 the expected rate of return exceeds the investor required rate of return, then
1022 demand for the company's stock will increase as investors seek a share in those
1023 abnormally high returns. This increased demand for the company's stock will
1024 cause the stock's market value to rise until the expected rate of return on market
1025 value equals the required rate of return. Such a scenario would explain why
1026 market values of utilities have grown to exceed their book values. Utilities
1027 frequently have other sources of cash flows in addition to the operating income
1028 component of the revenue requirement set by the Commission. For example,
1029 many utility companies own non-regulated assets that generate cash flows for
1030 investors. Also, investment tax credits, deferred taxes, and positive working
1031 capital balances contribute to utilities' cash flows. The revenue requirement

[55] Order, Docket No. 92-0448/93-0239 Consol., October 11, 1994, p. 172.
[56] For the purpose of this discussion, the phrase "entirely subject to original cost-based, rate of return regulation" means that a utility's revenues perfectly match its costs including taxes and cost of capital.

calculation does not recognize these "other" cash flows and, thus, is not adjusted downward to offset them. Therefore, some utilities may be able to earn more than their ratemaking operating income, which, as explained above, would drive the market values of utilities above their book values. Clearly, the Commission should not further increase allowed rates of return when the benefits that utilities receive from other aspects of the rate setting process, such as tax normalization rules, and other sources of earnings not recognized by the rate setting process increase stock prices above book value. To do so would compensate utilities twice for the same sources of cash flow.

Finally, allowing upward adjustments to the allowed rate of return based on a market to book value ratio greater than one, when taken to its logical conclusion, would require the Commission to continually make upward adjustments to the allowed rate of return, since such an upward adjustment would tend to again increase the market to book value ratio, thereby warranting another increase, resulting in a never ending upward movement in the allowed rate of return. To establish utility rates, regulators generally apply a market-based rate of return to a book value rate base. If that process provided a return that did not meet investor requirements, market prices would fall towards book value. Yet, the market prices of utility stocks continue to exceed book value.

Q77. Has the Commission addressed such "leverage" adjustments before?

A77. The market to book adjustment argument was presented in Consumers Illinois Water rate case Docket No. 97-0351. The Amended Order from Docket No. 97-0351 states that:

> [the Commission does] not agree that, as stock prices have risen, the problems associated with reliance on the traditional DCF theory in rate cases also have increased," and that "[the Commission continues] to rely upon the traditional DCF approach.[57]

In Docket No. 99-0121, Ameren Company witness Robert C. Porter based his cost of equity recommendation entirely on his Comparable Earnings model analysis, arguing that it would be inappropriate to apply an unadjusted DCF-derived estimate based on the market value of common equity to the book value of common equity to determine the revenue requirements.[58] However, the Commission Order from Docket No. 99-0121 rejected his argument and stated that "the Commission has consistently used and adopted estimates based on DCF and CAPM models and has not been presented with any reason to depart from this practice."[59] More recently, in Docket No. 03-0403, the Commission's Order stated:

> The Commission also rejects the Company's suggestion that the DCF model produces a downward-biased cost of common equity due to a variation between the book and market values of common equity. The argument for a market-to-book ratio adjustment has been made, and has been rejected by this Commission, numerous times in previous cases. The Company's arguments here are not significantly different, and the Commission continues to find such arguments to be without merit.[60]

[57] Amended Order, Docket No. 97-0351, June 17, 1998, p. 42.
[58] Docket No. 99-0121, Exhibit Ameren 6.0, pp. 6 and 13.
[59] Order, Docket No. 99-0121, August 25, 1999, p. 68.
[60] Order, Docket No. 03-0403, April 13, 2004, p. 42.

Risk Premium Adjustment

Q78. What is the purpose of Mr. Walker's risk premium adjustment?

A78. Mr. Walker claims that a risk premium adjustment must be added to the results of each of his cost of equity models to reflect Aqua's greater level of risk relative to that of his samples.

Q79. Why did Mr. Walker conclude that Aqua is riskier than his samples?

A79. Mr. Walker notes three bases for his risk premium adjustment. First, Mr. Walker claims that Aqua's small size, in comparison to the companies composing his Water Group and Gas Group, is a source of additional business risk for the Company.[61] Second, Mr. Walker claims that a financial analysis and risk analysis he performed indicate that Aqua is exposed to greater investment risk than either of his samples.[62] Third, Mr. Walker notes that Aqua has been assigned an NAIC 2 designation by the National Association of Insurance Commissioners ("NAIC"), which Mr. Walker alleges reflects a higher degree of credit risk for Aqua than exists for either of his proxy groups.[63] According to Mr. Walker, Aqua's size, lower cash generation and interest coverage, and its NAIC 2 debt designation warrant an investment risk premium for the cost of common equity of 25 basis points, or 0.25%.[64]

[61] Aqua Ex. 3.0, pp. 20-24 and 54.
[62] Aqua Ex. 3.0, p. 54.
[63] Aqua Ex. 3.0, p. 25.
[64] Aqua Ex. 3.0, p. 54.

Q80. Do you agree that a risk adjustment is warranted on the basis of Aqua's small size, relative to the companies composing proxy samples?

A80. No. For the reasons stated previously, I do not believe a size premium is warranted for Aqua. Nevertheless, should the Commission accept, in principle, the arguments in favor of a size premium, despite my previous arguments, such a premium should be based on the size of Aqua's parent company, Aqua America, Inc. ("Aqua America"). Aqua America is the second largest company in either of Mr. Walker's samples and nearly four times the size of the next largest company in the Water Group from which he derives his cost of equity estimate. Thus, even if one disregards my earlier arguments with respect to the size premium issue, a size premium is still not warranted in this case.

Q81. Why should the parent company be the basis for a size adjustment?

A81. Although Aqua raises its own debt, it obtains common equity financing from Aqua America,[65] whose market capitalization is approximately $2.9 billion.[66] Being part of a much larger organization should enhance Aqua's ability to access the equity market on reasonable terms. When utilities combine, reductions in costs resulting from efficiencies should be passed on to customers in the form of lower rates. Such economies of scale are often advanced to justify utility acquisitions and reorganizations. Financial capital costs are also subject to economies of scale. If the risk inherent in a utility common stock is a function of that utility's size, then the larger size of Aqua America should translate into a decreased cost of common equity, in comparison to that of a company the size of Aqua. If a risk premium were based on the size of Aqua, ratepayers would be

[65] Company responses to Staff data requests MGM 3.06 and 3.07.
[66] Aqua Ex. 3.0, Schedule 19, p. 4.

denied a portion of the benefits associated with the combined entity's stronger financial profile.

In fact, in support of Consumers Illinois Water Company's ("Consumers Illinois," now known as Aqua Illinois) request to merge with Philadelphia Suburban Corporation ("PSC," now known as Aqua America), the President of Consumers Illinois testified that the merger "should enhance the ability of PSC and Consumers Illinois to access the capital markets on reasonable terms."[67] Similarly, another Company witness testified, "the combined entity will have a stronger financial profile," which "should enhance the ability of PSC and Consumers Illinois to access the capital markets on reasonable terms."[68]

Importantly, in a prior rate case for Aqua's Kankakee Water Division, the Commission Order stated:

> The Commission does not conclude that the size of [Aqua] warrants a risk premium. [Aqua] is a wholly-owned subsidiary within a much larger organization, and in that sense is distinguishable from an independent utility of the same size as [Aqua].[69]

Q82. Do you agree that a risk adjustment is warranted on the basis of Mr. Walker's financial ratio analysis?

A82. No, I do not. The ratios he presents for Aqua are very similar to those of his Water Group, upon which his cost of equity estimates are based. For example, Aqua's 5-year average pre-tax interest coverage ratio was 3.0x, while the Water

[67] Order, ICC Docket No. 98-0602, p. 3, January 21, 1999.
[68] Order, ICC Docket No. 98-0602, p. 3, January 21, 1999.
[69] Order at 43, Consumers Illinois Water Company: Tariffs seeking general increase in water Rates for the Kankakee Water Division (Tariffs filed on May 21, 2003), ICC Docket 03-0403 (April 13, 2004).

Group's was 3.2x; Aqua's 5-year average total debt ratio was 50.5%, while the Water Group's was 52.5%; and Aqua's 5-year average gross cash flow interest coverage ratio was 4.0x, while the Water Group's was 3.9x. With respect to the indicated risk, the pre-tax interest coverage ratio indicates that Aqua is slightly riskier than the Water Group; however, the total debt ratio and the gross cash flow interest coverage ratio both indicate that Aqua is slightly less risky than the Water Group. Thus, not only do Mr. Walker's ratios provide mixed results with respect to the indicated relative risk levels, but the differences are so small, they would not likely make a significant difference in credit ratings, if any. Clearly, those ratios do not suggest a rating differential of three full notches, as Mr. Walker concludes.

Q83. Is Mr. Walker's adjustment for a risk premium appropriate, based on Aqua's NAIC rating?

A83. No. Aqua has certain debt issues that have been assigned an NAIC-2 designation by the National Association of Insurance Commissioners ("NAIC"), which Mr. Walker alleges reflects a higher degree of credit risk for Aqua than exists for his proxy samples. However, Mr. Walker did not demonstrate whether the companies comprising his samples have been assigned NAIC debt designations. Aqua's NAIC designations do not suggest that Aqua is any riskier than Mr. Walker's samples, since it is possible that companies comprising his sample groups have been or would have been assigned NAIC-2 debt designations as well.

In addition, Mr. Walker's allegation that Aqua's NAIC-2 debt designation denotes Aqua is riskier than his samples is based on the premise that NAIC debt

designations are equivalent to credit ratings issued by Nationally Recognized Statistical Rating Organizations ("NRSROs"), namely, S&P, Moody's, Fitch Ratings and Dominion Ratings. However, that premise is unfounded. He has not provided any documentation by NRSROs that states those credit ratings are equivalent to certain NAIC debt designations.

Q84. Are NAIC debt designations equivalent to NRSRO ratings?

A84. No. First, NAIC does not rate companies such as Aqua; NAIC only rates specific security issues. Specifically, the NAIC "is responsible for the day-to-day credit quality assessment and valuation of securities owned by state regulated insurance companies."[70] Second, while NRSRO-issued credit ratings are often a starting point for the NAIC debt analysis, NRSRO-issued credit ratings are not necessarily the ending point of an NAIC debt analysis as the NAIC explicitly reserves the right to assign lower (but not higher) designations than the NRSRO-issued credit ratings would otherwise indicate.[71] That is, Aqua's debt securities that have been designated NAIC-2 might include terms that merit a lower NAIC designation than the general level of investment risk for Aqua because the NAIC considers security-specific factors when assigning its designation to certain debt issues. Finally, while both NAIC and NRSROs assess credit risk in their risk assessment, NAIC debt designations are distinguishable from NRSRO-issued credit ratings because the NAIC considers a security's potential price volatility in addition to default risk.[72]

[70] www.naic.org/about/background/svo.htm.
[71] Purposes and Procedures of the Securities Valuation Office of the National Association of Insurance Commissioners, July 2003.
[72] Moody's Investors Service, "Moody's Comments on the SVO's Recent Hybrid Security Ruling," April 2006, p. 3.

Q85. Are NAIC debt designations intended for use by investors?

A85. No. The NAIC website clearly states, "These designations and unit prices are produced solely for the benefit of NAIC members…[and] [u]nlike the ratings of nationally recognized statistical rating organizations, NAIC designations are not suitable for use by anyone other than NAIC members."[73]

Q86. Do you recommend adding an investment risk premium to Aqua's cost of common equity because it has debt that has been assigned the equivalent of an NAIC 2 designation?

A86. No. To evaluate Aqua's risk vis-à-vis my proxy groups, independent of credit ratings or NAIC debt designations, I performed a quantitative risk analysis of Aqua and concluded Aqua is close in risk to both of my samples. Since Aqua and my water sample are similar in risk, and investors require similar returns from investments with similar risk, adding an investment risk premium to Aqua's cost of equity is unnecessary.

Q87. Does this conclude your direct testimony?

A87. Yes, it does.

[73] www.naic.org/about/background/svo.htm.

Aqua Illinois, Inc.

Weighted Average Cost of Capital

Company Proposal
Average 2008

	Amount	Percent of Total Capital	Cost	Weighted Cost
Short-term Debt	$6,450,000	4.19%	5.97%	0.250%
Long-term Debt	$66,457,942	43.18%	6.88%	2.969%
Preferred Stock	$379,057	0.25%	5.47%	0.013%
Common Equity	$80,637,719	52.39%	11.75%	6.156%
Total Capital	$153,924,718	100.00%		
Weighted Average Cost of Capital				**9.388%**

Source: Aqua Illinois, Inc.'s Schedule D-1, p. 1.

Staff Proposal
Average 2008

	Amount	Percent of Total Capital	Cost	Weighted Cost
Short-term Debt	$9,887,500	6.23%	3.37%	0.21%
Long-term Debt	$73,075,620	46.01%	6.77%	3.12%
Preferred Stock	$379,057	0.24%	5.47%	0.01%
Common Equity	$75,476,849	47.52%	10.75%	5.11%
Total Capital	$158,819,026	100.00%		
Weighted Average Cost of Capital				**8.45%**

Aqua Illinois, Inc.

Weighted Average Cost of Capital

Company Proposal
Average 2009

	Amount	Percent of Total Capital	Cost	Weighted Cost
Short-term Debt	$950,000	0.61%	5.97%	0.036%
Long-term Debt	$73,365,318	47.01%	6.74%	3.167%
Preferred Stock	$379,057	0.24%	5.47%	0.013%
Common Equity	$81,373,343	52.14%	11.75%	6.126%
Total Capital	$156,067,718	100.00%		
Weighted Average Cost of Capital				**9.343%**

Source: Aqua Illinois, Inc.'s Schedule D-1, p. 1.

Staff Proposal
Average 2009

	Amount	Percent of Total Capital	Cost	Weighted Cost
Short-term Debt	$3,087,500	2.02%	3.37%	0.07%
Long-term Debt	$73,310,095	47.96%	6.75%	3.24%
Preferred Stock	$379,057	0.25%	5.47%	0.01%
Common Equity	$76,079,198	49.77%	10.75%	5.35%
Total Capital	$152,855,850	100.00%		
Weighted Average Cost of Capital				**8.67%**

Aqua Illinois, Inc.

Balance of Short-term Debt
Average 2008

End of Month Balance

Date (A)	Gross Short-term Debt Outstanding (B)	CWIP (C)	CWIP Accruing AFUDC (D)	Net Short-term Debt Outstanding (E)	Monthly Average (F)	Remaining CWIP Accruing AFUDC (G)	Monthly Average (H)
Dec-07	$ 17,600,000	$ 3,200,000	$ -	$ 17,600,000		$ -	
Jan-08	17,600,000	4,000,000	-	17,600,000	$ 17,600,000	-	$ -
Feb-08	18,800,000	4,700,000	100,000	18,700,000	18,150,000	-	-
Mar-08	14,400,000	2,800,000	300,000	14,100,000	16,400,000	-	-
Apr-08	4,500,000	4,300,000	500,000	4,000,000	9,050,000	-	-
May-08	9,500,000	5,900,000	700,000	8,800,000	6,400,000	-	-
Jun-08	10,000,000	5,200,000	1,000,000	9,000,000	8,900,000	-	-
Jul-08	9,300,000	6,500,000	1,100,000	8,200,000	8,600,000	-	-
Aug-08	9,700,000	7,800,000	1,400,000	8,300,000	8,250,000	-	-
Sep-08	9,000,000	4,400,000	1,700,000	7,300,000	7,800,000	-	-
Oct-08	8,500,000	5,700,000	2,000,000	6,500,000	6,900,000	-	-
Nov-08	6,500,000	6,400,000	2,200,000	4,300,000	5,400,000	-	-
Dec-08	6,100,000	1,500,000	-	6,100,000	5,200,000	-	-
Average					**$ 9,887,500**		**$ -**

Notes: Column (E) = the greater of [Column (B) - Column (C)] or [Column (B) - Column (B) / Column (C) * Column (D)]
Column (G) = Column (D) - [Column (B) - Column (E)]

Sources: Aqua Vermillion D-2, pp. 2-4 and Company response to Staff data request MGM 3.05.

Aqua Illinois, Inc.

Balance of Short-term Debt
Average 2009

End of Month Balance

Date (A)	Gross Short-term Debt Outstanding (B)	CWIP (C)	CWIP Accruing AFUDC (D)	Net Short-term Debt Outstanding (E)	Monthly Average (F)	Remaining CWIP Accruing AFUDC (G)	Monthly Average (H)
Dec-08	$ 6,100,000	$ 1,500,000	$ -	$ 6,100,000		$ -	
Jan-09	4,900,000	200,000	200,000	4,700,000	$ 5,400,000	-	$ -
Feb-09	5,100,000	400,000	400,000	4,700,000	4,700,000	-	-
Mar-09	4,200,000	400,000	400,000	3,800,000	4,250,000	-	-
Apr-09	4,200,000	600,000	600,000	3,600,000	3,700,000	-	-
May-09	4,600,000	1,000,000	1,000,000	3,600,000	3,600,000	-	-
Jun-09	4,200,000	800,000	800,000	3,400,000	3,500,000	-	-
Jul-09	4,200,000	1,900,000	1,900,000	2,300,000	2,850,000	-	-
Aug-09	4,800,000	2,700,000	2,700,000	2,100,000	2,200,000	-	-
Sep-09	4,500,000	3,200,000	3,200,000	1,300,000	1,700,000	-	-
Oct-09	4,200,000	4,000,000	4,000,000	200,000	750,000	-	-
Nov-09	4,800,000	2,600,000	2,600,000	2,200,000	1,200,000	-	-
Dec-09	4,200,000	-	-	4,200,000	3,200,000	-	-
Average					**$ 3,087,500**		**$ -**

Notes: Column (E) = the greater of [Column (B) - Column (C)] or [Column (B) - Column (B) / Column (C) * Column (D)]
Column (G) = Column (D) - [Column (B) - Column (E)]

Sources: Aqua Vermillion D-2, pp. 2-4 and Company response to Staff data request MGM 3.05.

Aqua Illinois, Inc.

Embedded Cost of Long-term Debt
Average 2008

	Coupon Rate, Debt Issue Type, (A)		Date Issued (B)	Maturity Date (C)	Original Principal Amount (D)	Face Amount Outstanding (E)	Unamortized Debt Discount or (Premium) (F)	Unamortized Debt Expense (G)	Carrying Value (H)	Coupon Interest Expense (I)	Amortization of Debt Discount or (Premium) (J)	Amortization of Debt Expense (K)	Total Expense (L)
	First Mortgage Bonds												
1	Series M	10.40%	12/6/1988	12/1/2018	$ 6,000,000	$ 6,000,000	$ -	$ 62,497	$ 5,937,503	$ 624,000	$ -	$ 5,995	$ 629,995
2	Series N	9.69%	3/15/1991	3/1/2021	4,500,000	4,500,000	-	53,738	4,446,262	436,050	-	4,240	440,290
3	Series O	7.63%	9/21/1995	9/1/2025	8,000,000	8,000,000	-	48,449	7,951,551	610,400	-	2,820	613,220
4	Series U	5.00%	11/1/2002	11/1/2032	9,965,000	9,890,000	-	665,457	9,224,543	494,500	-	27,325	521,825
5	Series T	4.90%	11/1/2002	11/1/2032	2,785,000	2,785,000	-	187,693	2,597,307	136,465	-	7,707	144,172
6	Series S	5.40%	9/1/2000	9/1/2030	4,500,000	4,500,000	-	243,169	4,256,831	243,000	-	10,962	253,962
7	Series V (A)	5.20%	12/15/2003	2/1/2014	6,500,000	6,500,000	-	56,779	6,443,221	338,000	-	10,154	348,154
8	Series V (B)	5.40%	12/15/2003	2/1/2016	6,500,000	6,500,000	-	63,112	6,436,888	351,000	-	8,313	359,313
9	Series W	5.32%	12/21/2004	12/1/2019	10,500,000	10,500,000	-	108,262	10,391,738	558,600	-	9,476	568,076
10	Series X	4.95%	12/1/2007	12/1/2037	17,000,000	17,000,000	-	1,107,672	15,892,328	841,500	-	37,627	879,127
					$ 76,250,000	$ 76,175,000	$ -	$ 2,596,829	$ 73,578,171	$ 4,633,515	$ -	$ 124,620	$ 4,758,135
	Other												
11	Aroma Park	8.00%	5/23/2001	5/23/2021	$ 1,000,000	$ 1,000,000	$ -	$ -	$ 1,000,000	$ 80,000	$ -	$ -	$ 80,000
					$ 1,000,000	$ 1,000,000	$ -	$ -	$ 1,000,000	$ 80,000	$ -	$ -	$ 80,000
	Retired Issues												
12	Series I	9.19%	7/24/1992	7/15/2022	$ 6,000,000	$ -	$ -	$ 72,530	$ (72,530)	$ -	$ -	$ 5,164	$ 5,164
13	Tax Exempt	7.50%	2/1/1990	1/1/2020	10,000,000	-	145,269	321,203	(466,472)	-	12,622	27,908	40,529
14	Series P	9.19%	7/24/1995	12/1/2019	6,000,000	-	252,946	22,561	(275,507)	-	22,140	1,975	24,115
15	Series Q	6.10%	9/21/1995	9/1/2025	10,000,000	-	160,946	375,727	(536,673)	-	9,368	21,869	31,237
16	Series R	6.00%	9/21/1995	9/1/2025	2,800,000	-	45,395	105,975	(151,370)	-	2,642	6,168	8,810
					$ 34,800,000	$ -	$ 604,556	$ 897,996	$ (1,502,551)		$ 46,772	$ 63,083	$ 109,855
					$ 112,050,000	$ 77,175,000	$ 604,556	$ 3,494,825	$ 73,075,620	$ 4,713,515	$ 46,772	$ 187,703	$ 4,947,990
													6.77%

Aqua Illinois, Inc.

Embedded Cost of Long-term Debt
Average 2009

	Coupon Rate, Debt Issue Type, (A)		Date Issued (B)	Maturity Date (C)	Original Principal Amount (D)	Face Amount Outstanding (E)	Unamortized Debt Discount or (Premium) (F)	Unamortized Debt Expense (G)	Carrying Value (H)	Coupon Interest Expense (I)	Amortization of Debt Discount or (Premium) (J)	Amortization of Debt Expense (K)	Total Expense (L)
	First Mortgage Bonds												
1	Series M	10.40%	12/6/1988	12/1/2018	$ 6,000,000	$ 6,000,000	$ -	$ 56,502	$ 5,943,498	$ 624,000	$ -	$ 5,996	$ 629,996
2	Series N	9.69%	3/15/1991	3/1/2021	4,500,000	4,500,000	-	49,498	4,450,502	436,050	-	4,241	440,291
3	Series O	7.63%	9/21/1995	9/1/2025	8,000,000	8,000,000	-	45,629	7,954,371	610,400	-	2,820	613,220
4	Series U	5.00%	11/1/2002	11/1/2032	9,970,000	9,890,000	-	638,132	9,251,868	494,500	-	27,327	521,827
5	Series T	4.90%	11/1/2002	11/1/2032	2,785,000	2,785,000	-	179,986	2,605,014	136,465	-	7,707	144,172
6	Series S	5.40%	9/1/2000	9/1/2030	4,500,000	4,500,000	-	232,208	4,267,792	243,000	-	10,962	253,962
7	Series V (A)	5.20%	12/15/2003	2/1/2014	6,500,000	6,500,000	-	46,625	6,453,375	338,000	-	10,157	348,157
8	Series V (B)	5.40%	12/15/2003	2/1/2016	6,500,000	6,500,000	-	54,799	6,445,201	351,000	-	8,315	359,315
9	Series W	5.32%	12/21/2004	12/1/2019	10,500,000	10,500,000	-	98,785	10,401,215	558,600	-	9,477	568,077
10	Series X	4.95%	12/1/2007	12/1/2037	17,000,000	17,000,000	-	1,070,046	15,929,954	841,500	-	37,629	879,129
					$ 76,255,000	$ 76,175,000	$ -	$ 2,472,209	$ 73,702,791	$ 4,633,515	$ -	$ 124,631	$ 4,758,146
	Other												
11	Aroma Park	8.00%	5/23/2001	5/23/2021	$ 1,000,000	$ 1,000,000	$ -	$ -	$ 1,000,000	$ 80,000	$ -	$ -	$ 80,000
					$ 1,000,000	$ 1,000,000	$ -	$ -	$ 1,000,000	$ 80,000	$ -	$ -	$ 80,000
	Retired Issues												
12	Series I	9.19%	7/24/1992	7/15/2022	$ 6,000,000	$ -	$ -	$ 67,366	$ (67,366)	$ -	$ -	$ 5,164	$ 5,164
13	Tax Exempt	7.50%	2/1/1990	1/1/2020	10,000,000	-	132,647	293,295	(425,943)	-	12,623	27,911	40,534
14	Series P	9.19%	7/24/1995	12/1/2019	6,000,000	-	230,806	20,586	(251,392)	-	22,143	1,975	24,118
15	Series Q	6.10%	9/21/1995	9/1/2025	10,000,000	-	151,578	353,858	(505,436)	-	9,369	21,871	31,239
16	Series R	6.00%	9/21/1995	9/1/2025	2,800,000	-	42,753	99,807	(142,560)	-	2,642	6,169	8,811
					$ 34,800,000	$ -	$ 557,784	$ 834,913	$ (1,392,696)		$ 46,777	$ 63,090	$ 109,867
					$ 112,055,000	$ 77,175,000	$ 557,784	$ 3,307,122	$ 73,310,095	$ 4,713,515	$ 46,777	$ 187,721	$ 4,948,013
													6.75%

Aqua Illinois, Inc.

Preferred Stock

Series (A)	Date of Issuance (B)	Dividend Rate (C)	Shares Outstanding (D)	Amount Outstanding (E)	Discount or (Premium) (F)	Issuance Expense (G)	Net Proceeds (H)	Annual Dividends (I)	Embedded Cost of Preferred Stock (J)
5.5% Cumulative	July-67	5.50%	3,768	$376,800	($3,970)	$1,713	$379,057	$20,724	5.47%

Notes: Column(H) = Column(E) + Column(F) - Column(G)
Column(I) = Column(E) * Column(C)
Column(J) = Column(I) / Column(H)

Sources: Aqua Illinois, Inc.'s 2007 ILCC Form 21 and Company's response to ICC Staff data request MGM 2.10.

Aqua Illinois, Inc.

Balance of Common Equity
2008

Month (A)	Month-Ending Balance (B)	Monthly Average (C)
Dec-07	$ 72,023,298	
Jan-08	72,470,885	$ 72,247,092
Feb-08	71,413,612	71,942,249
Mar-08	74,553,204	72,983,408
Apr-08	79,340,987	76,947,096
May-08	75,456,146	77,398,567
Jun-08	76,035,525	75,745,836
Jul-08	76,768,747	76,402,136
Aug-08	76,070,220	76,419,484
Sep-08	76,547,004	76,308,612
Oct-08	77,025,842	76,786,423
Nov-08	75,906,777	76,466,310
Dec-08	76,243,191	76,074,984
Average		**$ 75,476,849**

Sources: Aqua Vermillion WP-D1 and Company response to Staff data request MGM 3.05.

Aqua Illinois, Inc.

Balance of Common Equity
2009

Month (A)	Month-Ending Balance (B)	Monthly Average (C)
Dec-08	$ 76,243,191	
Jan-09	$ 76,678,755	$ 76,460,973
Feb-09	$ 75,603,668	76,141,212
Mar-09	$ 76,082,951	75,843,310
Apr-09	$ 76,366,467	76,224,709
May-09	$ 75,411,198	75,888,833
Jun-09	$ 75,928,200	75,669,699
Jul-09	$ 76,604,309	76,266,255
Aug-09	$ 75,851,614	76,227,962
Sep-09	$ 76,265,185	76,058,400
Oct-09	$ 76,675,468	76,470,327
Nov-09	$ 75,485,751	76,080,610
Dec-09	$ 75,750,433	75,618,092
Average		**$ 76,079,198**

Sources: Aqua Vermillion WP-D1 and Company response to Staff data request MGM 3.05.

AQUA ILLINOIS, INC.

Principal Components Scores and Distance

Utility Sample

Company	Factor 1	Factor 2	Factor 3	Factor 4	Cumulative Distance
Westar Energy, Inc.	-0.403	0.018	0.949	1.255	1.891
Southern Co.	-0.003	0.130	1.352	1.077	2.157
Pinnacle West Capital Corp.	-0.159	-0.562	0.993	0.758	2.333
DPL, Inc.	-0.346	0.294	-0.120	1.287	2.372
PPL , Corp.	-0.084	0.691	-0.202	1.438	2.527
Ameren Corp.	-0.180	0.150	1.005	0.511	2.656
Idacorp, Inc.	-0.846	-1.215	-0.369	0.931	2.737
Wisconsin Energy Corp.	0.121	-0.851	0.803	0.099	3.074
Xcel Energy, Inc.	-0.112	-0.374	0.776	0.025	3.087
Average	-0.229	-0.234	0.523	0.859	

Aqua Illinois, Inc.

Company	Factor 1	Factor 2	Factor 3	Factor 4
Aqua Illinois, Inc.	-0.636	-0.526	1.236	3.028

Source: Standard & Poor's Utility Compustat.

AQUA ILLINOIS, INC.

Principal Components Scores

Water Sample

Company	Factor 1	Factor 2	Factor 3	Factor 4
American States Water Co.	0.1828	-1.0195	-0.1954	0.6989
Aqua America, Inc.	-0.0712	-0.6526	1.3154	2.3404
Artesian Resources Corp.	-0.8703	-1.4752	0.8714	1.9196
California Water Services Gp.	-0.2626	-0.5135	1.0952	0.3100
Middlesex Water Co.	-0.9524	-1.1616	1.1220	1.0344
SJW Corp.	0.8628	-0.5276	0.7171	0.6985
Southwest Water Co.	-0.4006	-1.3178	0.3937	-0.9374
York Water Co.	-0.1778	-1.9519	0.6497	3.2649
Average	-0.211	-1.077	0.746	1.166

Aqua Illinois, Inc.

Company	Factor 1	Factor 2	Factor 3	Factor 4
Aqua Illinois, Inc.	-0.307	-0.478	0.925	2.672

Source: Standard & Poor's Utility Compustat.

AQUA ILLINOIS, INC.

The Non-Constant Growth Discounted Cash Flow Model

The formula for measuring the cost of common equity, *k*, when growth, *g*, does not become constant until period φ, is as follows:

$$k = \left[\frac{D_{1,1}(1+k)^{\varphi-0.25} + D_{1,2}(1+k)^{\varphi-0.50} + D_{1,3}(1+k)^{\varphi-0.75} + \ldots + D_{\varphi,4} + P_{\varphi,4}}{P} \right]^{\left(\frac{1}{x+\varphi-0.25} \right)} - 1$$

where: P $\equiv$ the current market value;

$D_{\varphi,q}$ $\equiv$ the expected dividend at the end of quarter *q* in year φ, where *q* = 1 to 4 and φ = the number of periods until the steady-state growth period;

k $\equiv$ the cost of common equity;

x $\equiv$ the elapsed time between the stock observation and first dividend payment dates, in years; and

$P_{\varphi,4}$, the market value at the beginning of the steady-state growth stage, is calculated from the following equation:

$$P_{\varphi,4} = \frac{\sum_{q=1}^{4} D_{\varphi,q}(1+g_l)(1+k)^{1-[x+0.25(q-1)]}}{k-g_l}$$

where: $D_{\varphi,q}$ $\equiv$ the dividend paid in quarter q during the last year of the transitional growth stage; and

g_l $\equiv$ the steady-state growth rate.

AQUA ILLINOIS, INC.

Growth Rate Estimates

Utility Sample

Company	Growth Rates Stage 1[1]	Stage 2[2]	Stage 3[3]
Westar Energy, Inc.	5.00%	4.95%	4.90%
Southern Co.	4.71	4.81	4.90
Pinnacle West Capital Corp.	6.67	5.79	4.90
DPL, Inc.	8.00	6.45	4.90
PPL , Corp.	12.25	8.58	4.90
Ameren Corp.	5.00	4.95	4.90
Idacorp, Inc.	6.00	5.45	4.90
Wisconsin Energy Corp.	9.40	7.15	4.90
Xcel Energy, Inc.	5.20	5.05	4.90
Average	6.91%	5.91%	4.90%

Water Sample

Company	Growth Rates Stage 1[1]	Stage 2[2]	Stage 3[3]
American States Water Co.	10.00%	7.45%	4.90%
Aqua America, Inc.	9.80	7.35	4.90
Artesian Resources Corp.	5.00	4.95	4.90
California Water Services Gp.	8.00	6.45	4.90
Middlesex Water Co.	8.00	6.45	4.90
SJW Corp.	10.00	7.45	4.90
Southwest Water Co.	8.50	6.70	4.90
York Water Co.	11.00	7.95	4.90
Average	8.79%	6.84%	4.90%

1 Zacks 3-5 year earnings per share growth rate estimate. (Zacks Investment Research, Inc.)
2 Equals the average of Stage 1 and Stage 3 growth rates.
3 The implied 20-year forward U.S. Treasury rate in ten years ($_{20}f_{10}$), based on the 10- and 30-year U.S. Treasury rates as of May 1, 2008. (The Federal Reserve Board, Federal Reserve Statistical Release: H.15, Selected Interest Rates, Daily Update, www.federalreserve.gov/releases/H15/update/, May 2, 2008.)

AQUA ILLINOIS, INC.

Quarterly Dividends and Stock Prices
as of May 1, 2008

Utility Sample

Company	Current Quarterly Dividends $D_{0,1}$	$D_{0,2}$	$D_{0,3}$	$D_{0,4}$	Next Dividend Payment Date	Stock Price
Westar Energy, Inc.	$0.270	$0.270	$0.270	$0.290	7/1/2008	$23.73
Southern Co.	0.403	0.403	0.403	0.420	9/6/2008	36.92
Pinnacle West Capital Corp.	0.525	0.525	0.525	0.525	9/2/2008	34.78
DPL, Inc.	0.260	0.260	0.260	0.275	6/1/2008	28.10
PPL , Corp.	0.305	0.305	0.305	0.335	7/1/2008	48.26
Ameren Corp.	0.635	0.635	0.635	0.635	6/30/2008	46.32
Idacorp, Inc.	0.300	0.300	0.300	0.300	8/29/2008	32.80
Wisconsin Energy Corp.	0.250	0.250	0.250	0.270	6/1/2008	47.65
Xcel Energy, Inc.	0.230	0.230	0.230	0.230	7/20/2008	21.24

Water Sample

Company	Current Quarterly Dividends $D_{0,1}$	$D_{0,2}$	$D_{0,3}$	$D_{0,4}$	Next Dividend Payment Date	Stock Price
American States Water Co.	$0.235	$0.235	$0.250	$0.250	6/1/2008	$35.34
Aqua America, Inc.	0.115	0.125	0.125	0.125	6/1/2008	18.60
Artesian Resources Corp.	0.166	0.166	0.172	0.172	5/23/2008	18.61
California Water Services Gp.	0.290	0.290	0.293	0.293	7/23/2008	37.16
Middlesex Water Co.	0.173	0.173	0.175	0.175	6/2/2008	18.43
SJW Corp.	0.151	0.151	0.151	0.161	6/1/2008	31.77
Southwest Water Co.	0.058	0.058	0.060	0.060	7/18/2008	11.14
York Water Co.	0.118	0.118	0.121	0.121	7/15/2008	15.71

Sources: *The Wall Street Journal*, http://online.wsj.com, May 2, 2008; http://finance.yahoo.com; http://www.marketwatch.com; Standard & Poor's Utility Compustat; http://www.westar energy.com; http://www.southerncompany.com; http://www.pinnaclewest.com; http://www.dplinc.com; http://www.pplweb.com; http://www.ameren.com; http://www.idacorpinc.com http://www.wisconsinenergy.com; http://www.xcelenergy.com; http://www.gswater.com; http://www.aquaamerica.com; http://www.artesianwater.com; http://www.calwatergroup.com; http://www.middlesexwater.com; http://www.sjwater.com; http://www.southwestwater.com; http://www.yorkwater.com.

AQUA ILLINOIS, INC.

Expected Quarterly Dividends

Utility Sample

Company	$D_{1,1}$	$D_{1,2}$	$D_{1,3}$	$D_{1,4}$
Westar Energy, Inc.	$0.290	$0.290	$0.290	$0.305
Southern Co.	0.420	0.420	0.420	0.440
Pinnacle West Capital Corp.	0.560	0.560	0.560	0.560
DPL, Inc.	0.275	0.275	0.275	0.297
PPL , Corp.	0.335	0.335	0.335	0.376
Ameren Corp.	0.635	0.667	0.667	0.667
Idacorp, Inc.	0.318	0.318	0.318	0.318
Wisconsin Energy Corp.	0.270	0.270	0.270	0.295
Xcel Energy, Inc.	0.242	0.242	0.242	0.242

Water Sample

Company	$D_{1,1}$	$D_{1,2}$	$D_{1,3}$	$D_{1,4}$
American States Water Co.	$0.250	$0.250	$0.275	$0.275
Aqua America, Inc.	0.125	0.137	0.137	0.137
Artesian Resources Corp.	0.178	0.178	0.181	0.181
California Water Services Gp.	0.293	0.293	0.316	0.316
Middlesex Water Co.	0.175	0.175	0.189	0.189
SJW Corp.	0.161	0.161	0.161	0.177
Southwest Water Co.	0.060	0.060	0.065	0.065
York Water Co.	0.121	0.121	0.134	0.134

Sources: Staff Schedules 3.08 and 3.09.

AQUA ILLINOIS, INC.

DCF Cost of Common Equity Estimates

Utility Sample

Company	Estimate
Westar Energy, Inc.	10.10%
Southern Co.	9.57
Pinnacle West Capital Corp.	12.14
DPL, Inc.	9.90
PPL , Corp.	9.43
Ameren Corp.	10.90
Idacorp, Inc.	9.12
Wisconsin Energy Corp.	8.07
Xcel Energy, Inc.	9.71
Average	9.88%

Water Sample

Company	Estimate
American States Water Co.	9.04%
Aqua America, Inc.	8.85
Artesian Resources Corp.	8.90
California Water Services Gp.	8.93
Middlesex Water Co.	9.82
SJW Corp.	7.85
Southwest Water Co.	7.76
York Water Co.	9.62
Average	8.85%

AQUA ILLINOIS, INC.

Risk Premium Analysis

Interest Rates as of May 1, 2008

U.S. Treasury Bills[1]		U.S. Treasury Bonds[2]	
Discount Rate	Effective Yield	Bond Equivalent Yield	Effective Yield
1.20%	1.22%	4.49%	4.54%

Risk Premium Cost of Equity Estimates

Proxy Group	Risk-Free Rate		Beta		Risk Premium		Cost of Common Equity
Utility Sample	4.54%	+	0.80	×	(13.63% – 4.54%)	=	11.81%
Water Sample	4.54%	+	0.87	×	(13.63% – 4.54%)	=	12.45%

[1] U.S. Treasury bill yields are quoted on a 360-day discount basis. The effective yield is determined as follows:

$$Effective\ yield = \left(1 + \frac{discount\ rate \times \left(\frac{days\ to\ maturity}{360} \right)}{1 - discount\ rate \times \left(\frac{days\ to\ maturity}{360} \right)} \right)^{\left(\frac{365}{days\ to\ maturity} \right)} - 1$$

where *days to maturity* equals twenty-eight days.

[2] The bond equivalent yield on U.S. Treasury bonds represents a nominal rather than an effective yield. The effective yield is calculated as follows:

Effective yield = [1 + (*bond equivalent yield* ÷ 2)]^2 – 1.

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Table 7-5

Size-Decile Portfolios of the NYSE/AMEX/NASDAQ:
Bounds, Size, and Composition
from 1926 to 2006

Decile	Historical Average Percentage of Total Capitalization	Recent Number of Companies	Recent Decile Market Capitalization (in thousands)	Recent Percentage of Total Capitalization
1-Largest	63.26%	168	$9,586,846,750	61.64%
2	13.97%	179	2,148,609,950	13.81%
3	7.57%	198	1,126,434,240	7.24%
4	4.73%	184	624,621,080	4.02%
5	3.24%	209	492,840,110	3.17%
6	2.38%	264	428,711,640	2.76%
7	1.74%	291	333,661,890	2.15%
8	1.29%	355	284,415,720	1.83%
9	1.00%	660	298,400,730	1.92%
10-Smallest	0.82%	1,744	229,218,310	1.47%
Mid-Cap 3–5	15.54%	591	2,243,894,380	15.41%
Low-Cap 6–8	5.41%	910	1,046,789,110	7.19%
Micro-Cap 9–10	1.83%	2,404	527,619,100	3.62%

Source: Center for Research in Security Prices, University of Chicago.

Historical average percentage of total capitalization shows the average, over the last 81 years, of the decile market values as a percentage of the total NYSE/AMEX/NASDAQ calculated each month. Number of companies in deciles, recent market capitalization of deciles and recent percentage of total capitalization are as of September 30, 2006.

Decile	Recent Market Capitalization (in thousands)	Company Name
1-Largest	$371,187,368	Exxon Mobil Corp
2	16,820,566	EOG Resources Inc.
3	7,777,183	Xcel Energy Inc.
4	4,085,184	First American Corp./CA
5	2,848,771	Scotts Miracle Gro Co.
6	1,946,588	DRS Technologies Inc.
7	1,378,476	ESCO Technologies Inc.
8	976,624	Knoll Inc.
9	626,955	Bandag Inc.
10-Smallest	314,433	M & F Worldwide Corp.

Source: Center for Research in Security Prices, University of Chicago.

Market capitalization and name of largest company in each decile as of September 30, 2006.

Long-Term Returns in Excess of Risk

The Capital Asset Pricing Model (CAPM) does not fully account for the higher returns of small company stocks. Table 7-6 shows the returns in excess of risk over the past 81 years for each decile of the NYSE/AMEX/NASDAQ.

The CAPM can be expressed as follows:

$$k_s = r_f + (\beta_s \times ERP) \qquad (28)$$

where,

k_s = the expected return for company s;
r_f = the expected return of the riskless asset;
β_s = the beta of the stock of company s; and,
ERP = the expected equity risk premium, or the amount by which investors expect the future return on equities to exceed that on the riskless asset.

The amount of an asset's systematic risk is measured by its beta. A beta greater than 1 indicates that the security is riskier than the market, and according to the CAPM equation, investors are compensated for taking on this additional risk. However, based on historical return data on the NYSE/AMEX/NASDAQ decile portfolios, the smaller deciles have had returns that are not fully explainable by the CAPM. This return in excess of CAPM grows larger as one moves from the largest companies in decile 1 to the smallest in decile 10. The excess return is especially pronounced for micro-cap stocks (deciles 9–10). This size related phenomenon has prompted a revision to the CAPM that includes the addition of a size premium.

The CAPM is used here to calculate the CAPM return in excess of the riskless rate and to compare this estimate to historical performance. According to the CAPM, the return on a security should consist of the riskless rate plus an additional return to compensate for the systematic risk of the security. Table 7-6 uses the 81-year arithmetic mean income return component of 20-year government bonds as the historical riskless rate. (However, it is appropriate to match the maturity, or duration, of the riskless asset with the investment horizon.) This CAPM return in excess of the riskless rate is β (beta) multiplied by the realized equity risk premium. The realized equity risk premium is the return that compensates investors for taking on risk equal to the risk of the market as a whole (estimated by the 81-year arithmetic mean return on large company stocks, 12.34 percent, less the historical riskless rate, 5.21 percent). The difference between the excess return predicted by the CAPM and the realized excess return is the size premium, or return in excess of CAPM.

This phenomenon can also be viewed graphically, as depicted in the Graph 7-2. The security market line is based on the pure CAPM without adjusting for the size premium. Based on the risk (or beta) of a security, the expected return should fluctuate along the security market line. However, the expected returns for the smaller deciles of the NYSE/AMEX/NASDAQ lie above the line, indicating that these deciles have had returns in excess of their risk.

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Table 7-6
Size-Decile Portfolios of the NYSE/AMEX/NASDAQ:
Long-Term Returns in Excess of CAPM
from 1926 to 2006

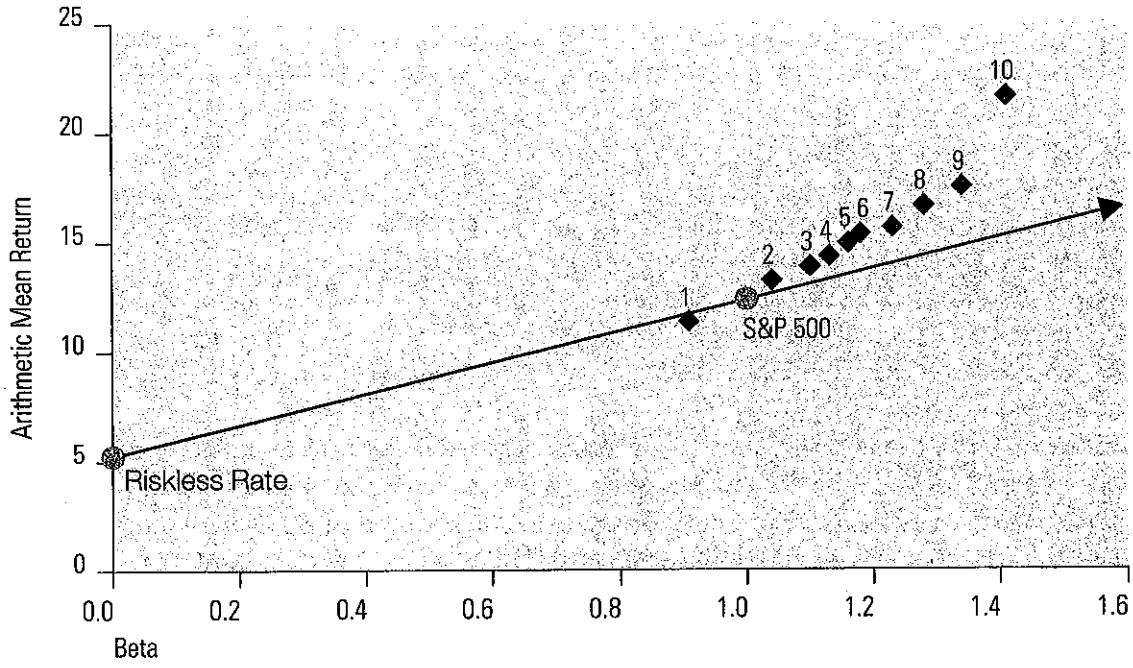
Decile	Beta*	Arithmetic Mean Return	Actual Return in Excess of Riskless Rate**	CAPM Return in Excess of Riskless Rate†	Size Premium (Return in Excess of CAPM)
1-Largest	0.91	11.35%	6.13%	6.49%	−0.36%
2	1.04	13.25%	8.04%	7.39%	0.65%
3	1.10	13.85%	8.64%	7.82%	0.81%
4	1.13	14.28%	9.07%	8.04%	1.03%
5	1.16	14.92%	9.71%	8.26%	1.45%
6	1.18	15.33%	10.11%	8.45%	1.67%
7	1.23	15.63%	10.42%	8.80%	1.62%
8	1.28	16.61%	11.39%	9.12%	2.28%
9	1.34	17.48%	12.27%	9.57%	2.70%
10-Smallest	1.41	21.57%	16.36%	10.09%	6.27%
Mid-Cap, 3-5	1.12	14.15%	8.94%	7.97%	0.97%
Low-Cap, 6-8	1.22	15.67%	10.46%	8.70%	1.76%
Micro-Cap, 9-10	1.36	18.77%	13.56%	9.68%	3.88%

*Betas are estimated from monthly returns in excess of the 30-day U.S. Treasury bill total return, January 1926–December 2006.

**Historical riskless rate measured by the 81-year arithmetic mean income return component of 20-year government bonds (5.21).

†Calculated in the context of the CAPM by multiplying the equity risk premium by beta. The equity risk premium is estimated by the arithmetic mean total return of the S&P 500 (12.34 percent) minus the arithmetic mean income return component of 20-year government bonds (5.21 percent) from 1926–2006.

Graph 7-2
Security Market Line Versus Size-Decile Portfolios of the NYSE/AMEX/NASDAQ:
from 1926 to 2006



Source: Center for Research in Security Prices, University of Chicago (decile data).