REBUTTAL TESTIMONY

of

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Finance Department
Financial Analysis Division
Public Utilities Bureau
Illinois Commerce Commission

Aqua Illinois, Inc.

Docket No. 04-0442

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WITNESS IDENTIFICATION

1. Q. State your name, employer and business address.

A. My name is Rochelle Phipps. I am employed by the Illinois Commerce Commission ("Commission"), 527 East Capitol Avenue, Springfield, Illinois 62701.

2. Q. Are you the same Rochelle Phipps who previously testified in this proceeding?

A. Yes, I am.

3. Q. State the purpose of your rebuttal testimony in this proceeding.

A. I will respond to the rebuttal testimony of Aqua Illinois, Inc. ("Aqua IL" or the "Company") witness Ms. Pauline M. Ahern (Aqua Ex. R-3.0).

RECOMMENDATION

4. Q. Have you revised your recommended rate of return on rate base?

A. Yes. In her rebuttal testimony, Ms. Ahern argued that I should have performed a quantitative analysis of Aqua IL's risks similar to that which Staff performed in Docket Nos. 00-0337/0338/0339 Consolidated.[1] I have performed such an analysis for my rebuttal testimony on Aqua IL and my water and public utility samples. That quantitative risk analysis revealed Aqua IL is closer in risk to my water sample than my utility sample; thus, I assigned more weight to my cost of equity estimates for the water sample, which raised my cost of equity estimate for Aqua IL to 10.07%. I also updated my estimate of Aqua IL's cost of long-term debt to reflect the Company's proposed December 2004 financing activity, which reduces the Company's embedded cost of long-term debt to 7.18% as shown on Schedule 7.2. My revised costs of debt and equity for Aqua IL result in an 8.66% cost of capital for Aqua IL, as presented on Schedule 7.1.

AQUA IL'S DEBT COSTS

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

A. The Company's Schedule D-3 assumes that during December 2004, Aqua IL will issue $4,500,000 of indebtedness with an interest rate of 6.50% and twelve-year maturity.[2] On October 11, 2004, Aqua IL filed an Informational

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[1] Aqua Ex. R-3.0, p. 10.
[2] Co. Sch. D-3.

Statement pursuant to Section 6-102(d) of the Illinois Public Utilities Act ("Act") regarding the proposed issuance and sale of $10,500,000 of indebtedness for the purpose of refunding the Company's 9.19% Series P bonds and short-term indebtedness. To reflect the Company's revisions to its proposed financing activity, I removed the $6,000,000 principal amount outstanding for the 9.19% Series P bonds and added the premium due for early redemption on the Series P bonds to the unamortized debt expense balance. Second, I adjusted the principal outstanding and the unamortized debt expense associated with the Series W bonds to reflect the increase in the issuance amount from $4.5 million to $10.5 million. I did not adjust my 5.42% cost estimate for the Series W bonds. Those adjustments result in a 7.18% average 2005 embedded cost of long-term debt for Aqua IL.

6. Q. Why is the Company's estimated 6.50% interest rate for the anticipated December 2004 Series W debt issuance inappropriate?

A. In support of Aqua IL's estimated 6.50% interest rate for the Series W indebtedness, Ms. Ahern states:

> The most recent three-month average spread between Moody's Aaa corporate bond yields and Baa public utility bond yields is 0.82%. Adding this 0.82% spread to the 5.8% Blue Chip forecasted fourth quarter 2004 Moody's Aaa rated corporate bond yield results in a projected Moody's Baa public utility bond yield of 6.62%, thus confirming the

55 Company's estimated coupon rate on the Series W debt of
56 6.50%.[3]

57 Aqua IL's recently filed Informational Statement regarding the proposed
58 issuance and sale of $10,500,000 of indebtedness states, "[i]ndicated
59 rates based on recent market rates range from 5.13% to 5.33% for a 10
60 year maturity to 6.10% to 6.30% for a 30 year maturity."[4] That is, the
61 6.50% interest rate the Company proposed for the forecasted 12-year new
62 debt series in this proceeding exceeds the interest rate the Company
63 estimated for a thirty-year debt issue in the Informational Statement it filed
64 in Docket No. 04-0626. Indeed, the interest rate estimate the Company
65 provided in its Informational Statement for a 10-year debt issue supports
66 my 5.42% recommendation for the Series W indebtedness, given its
67 similar assumed maturity. Furthermore, the Company's Schedule D-3
68 does not reflect the Company's intent to refund higher cost debt (i.e., the
69 9.19% Series P bonds) with the Series W indebtedness. Failure to remove
70 that higher cost debt, would overstate the overall weighted cost of debt.
71 Moreover, Ms. Ahern's source document does not indicate the length to
72 maturity for the bond yields she cites. Bond yields generally increase as
73 the term to maturity increases. Thus, if the Moody's bond yields Ms. Ahern
74 references are for maturities that exceed twelve years, then her estimated
75 spread is further inflated. Thus, my recommended 5.42% interest rate for
76 the Series W indebtedness and 7.18% embedded cost of long-term debt

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[3] Aqua Ex. R-3.0, p. 3.
[4] Company's Informational Statement, Docket No. 04-0626, paragraph 8.

recommendation, as presented in Schedule 7.2, should be adopted by the Commission.

7. Q. Ms. Ahern asserts that your 2.52% estimate of Aqua IL's cost of short-term debt is inadequate because it does not reflect annual issuance expense totaling $3,864.[5] Should Aqua IL's short-term debt cost reflect issuance expense?

A. No. The Company indicated that the loan agreements relating to the short-term debt issuance expense have been inadvertently misplaced.[6] Thus, I am not able to verify the amount of short-term debt issuance expense the Company has incurred, and, consequently, recommend that the Company's cost of short-term debt exclude issuance expense.

8. Q. Ms. Ahern recommends using forecasted interest rates to estimate Aqua IL's costs of short-term and long-term debt.[7] Are forecasted interest rates appropriate proxies for Aqua IL's cost of debt?

A. No. As I demonstrated in my direct testimony, interest rate forecasts are very inaccurate.[8] Thus, the Commission should adopt my recommended

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[5] Aqua Ex. R-3.0, p. 2.
[6] Company responses to Staff data requests FD-48 and FD-49.
[7] Aqua Ex. R-3.0, pp. 2-3.
[8] ICC Staff Ex. 3.0, p. 55.

2.52% cost of short-term debt for Aqua IL, which is based on the current LIBOR rate, plus 65 basis points.[9] Furthermore, since Aqua IL recently filed its request for authority to issue the December 2004 indebtedness and provided the Commission with an estimate of its cost, Ms. Ahern's long-term interest rate forecasts are unnecessary.

STAFF'S COST OF EQUITY ANALYSIS

General Misconceptions by Aqua IL

9. Q. Is Ms. Ahern correct when she repeatedly asserts that analysts such as you and she should attempt to emulate investor behavior?[10]

A. No. Ms. Ahern is incorrect on two levels. First, even if Ms. Ahern's assertion was valid, and it is not, it implies that investor behavior is homogenous, unvarying, and knowable. If true, Ms Ahern should have demonstrated that her conception of investor behavior is valid. She did not. Obviously, investor behavior has none of those traits, making attempts to emulate it unproductive. Second, while investors determine appropriate prices to pay for securities given their required rates of return, the task at hand is to estimate the investor-required rate of return given

[9] ICC Staff Ex. 3.0, pp. 10-11.
[10] Aqua Ex. R-3.0, pp. 13, 23, 25, 27, 29, 31, 38 and 39.

observable market prices. Different investors surely use different valuation methodologies. For example, an investor may buy a security simply because he believes its price will appreciate rapidly, without performing any fundamental analysis. Whether or not an investor applies a formal valuation methodology, one can still estimate that investor's required rate of return from the price he is willing to pay through the application of valid financial market models.

10. Q. Do you agree with Ms. Ahern's argument that "absent evidence to the contrary"[11] the Commission should accept her assumptions?

A. No. The Commission should require Ms. Ahern to demonstrate convincingly that her deviations from *financial theory* are supported with observable fact rather than the conjecture and supposition on which she relies.

11. Q. Ms. Ahern criticizes your selection of the utility sample because of your use of S&P credit ratings and business profiles instead of computing "several operating and financial ratios" as Staff did in Aqua IL's prior rate case.[12] Please comment.

A. In past rate cases Staff has utilized a general utility sample selected on the basis of a quantitative comparison in risk to the petitioner.[13] However,

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[11] Aqua Ex. R-3.0, pp. 23, 26 and 27.
[12] Aqua Ex. R-3.0, p. 10.
[13] The Staff comparable sample methodology is described in Staff Ex. 7, pp. 8-10 filed in Docket Nos.

recent industry restructuring has rendered questionable the measurement of financial and operating risk with historical data for many utilities. Nonetheless, to further evaluate the risk inherent in my water and utility samples relative to Aqua IL and to determine whether an investment risk premium for Aqua IL's cost of equity is necessary, I have performed a quantitative analysis using various operating and financial ratios.

12. Q. Describe the quantitative analysis you performed for Aqua IL.

A. According to financial theory, the market-required rate of return on common equity is a function of operating and financial risk. Thus, I examined the following twelve financial and operating ratios for Aqua IL for the measurement period 2001-2003: (1) common equity to capitalization; (2) cash flow to capitalization; (3) cash flow to debt; (4) fixed asset turnover; (5) free cash flow to capitalization; (6) funds flow interest coverage; (7) gross utility additions to net plant; (8) net cash flow to gross utility additions; (9) operating profit margin; (10) revenue stability; (11) earnings before interest and taxes ("EBIT") stability; and (12) earnings stability. The last three ratios were measured with the coefficient of determination of a least-squares regression of the natural logarithm of their respective quarterly data against time.[14] The stability ratios were measured over the period 1999-2003. Data from the period 2001-2003 were averaged to normalize the remaining ratios. Using those ratios, I

00-0337/00-0338/00-0339 consolidated.

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

performed a principal component analysis comparison of Aqua IL to the utility industry.

I began with all market-traded electric, natural gas and water companies on Standard & Poor's *Utility Compustat* tape. Among those utilities, 105 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 that are uncorrelated with one another.[15,16] For each utility in the database, the principal components analysis calculates values for each component known as principal component scores, which have a mean of zero and a standard deviation of one. From the principal components analysis, I retained four components for risk analysis. Schedule 7.3 presents the four principal component scores for Aqua IL and my water and utility samples. The principal components are inversely related to risk because the principal components are strongly positively correlated with the ratios, each of which indicates less risk as its value increases.

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

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

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 variable *n*.

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

13. Q. Is Aqua IL exposed to greater risk than your water and utility samples?

A. My quantitative risk analysis reveals that Aqua IL is closer in risk to my water sample than my utility sample. Schedule 7.3 presents the factor scores for Aqua IL as well as my water and utility samples. The first factor measures financial risk; the second factor measures risks related to sales (e.g., customer mix and other service territory characteristics) and cost variability; the third factor score measures construction risk; and, the fourth factor measures capital intensity. All of the water sample factor scores are very close to Aqua IL's factor scores. The first three factor scores for the utility sample are higher than those of Aqua IL, which indicates the latter is exposed to higher financial risk, construction risk, and sales and cost risks. The factor four scores indicate the utility sample differs from Aqua IL on the capital intensity dimension, which is an industry-specific risk factor. Unlike the vertically integrated water industry, which is insulated from competition through regulation and high barriers to entry,[17] the gas industry is becoming increasingly competitive. Aqua IL is also slightly riskier than the water sample with respect to factor two, but that is offset by factor one, which suggests Aqua IL has less financial risk than the water sample. Thus, in my judgment, the risks of Aqua IL and the

[17] Standard & Poor's, "Research: A Few Ripples in the Water Industry, September 10, 1999.

water sample are equivalent while Aqua IL is riskier than the utility sample to a small degree.

14. Q. Does your quantitative analysis reveal that an investment risk premium should be added to Aqua IL's cost of equity?

A. No. An additional risk premium would be warranted if my quantitative analysis revealed that Aqua IL is riskier than both of my samples but that is not the case. Thus, adding an investment risk premium to Aqua IL's cost of equity is unwarranted. Nonetheless, my analysis does reveal that Aqua IL is closer in risk to my water sample than my utility sample. Consequently, I revised my estimate of Aqua IL's cost of equity to better reflect the risk inherent in the Company. Specifically, I gave the water sample double the weight I gave the utility sample. DCF analysis estimates a 10.76% cost of equity for the water sample and 8.92% for the utility sample.[18] CAPM analysis estimates a 9.69% cost of equity for the water sample and 10.61% for the utility sample.[19] Assigning two-thirds weight to the water sample and one-third weight to the utility sample estimates a 10.07% cost of equity for Aqua IL.

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[18] ICC Staff Ex. 3.0, Sch. 3.8.
[19] ICC Staff Ex. 3.0, Sch. 3.9.

15. Q. Why do you not recommend relying exclusively on your water sample to estimate Aqua IL's cost of common equity?

A. Water utilities are not as widely followed as other utilities; hence, estimates of their cost of common equity are prone to larger measurement error. For example, the Zacks growth rates for my water sample reflect, on average, the forecasts of 3 analysts. In contrast, the growth rates for my utility sample reflect, on average, the forecasts of 5 analysts. The fewer the number of analyst forecasts reflected in a growth rate estimate, the less confidence one should have in that estimate's accuracy as a proxy for the growth rate reflected in stock prices. Similarly, the less frequently a security trades, the less reliable its beta estimate becomes. Consequently, the Commission should be reluctant to rely solely on water utility samples to estimate the cost of common equity for utilities, including water utilities.

Alleged Inconsistencies with a Prior Commission Order

16. Q. Ms. Ahern argues that in the current proceeding, the Commission should authorize a 10.49% return on equity for Aqua IL because the current higher interest rate environment warrants a 33 basis point

adjustment to the 10.16% return on equity the Commission authorized in Docket No. 03-0403 during April 2004.[20] Do you agree?

A. No. Ms. Ahern's proposed cost of equity adjustment should be rejected because it is based on the incorrect assumption that cost of equity estimates are solely a function of interest rates. In contrast, costs of equity estimates are not only a function of interest rates, but also a function of the price of risk at a given point in time.

Even if one were to incorrectly assume that the difference between Aqua IL's cost of common equity and A-rated utility bond yields was fixed, Ms. Ahern's conclusion would be invalid because she bases it on the wrong data. In April 2004, the Commission issued its Order in Docket No. 03-0403, authorizing a 10.16% return on equity for Aqua IL. In March 2004, A-rated utility bond yields averaged 5.97%. By August 2004, A-rated utility bond yields averaged 6.14%.[21] Thus, Ms. Ahern argues that my recommended cost of equity should be adjusted to reflect relative difference in interest rates between the current higher interest rate environment and the interest rate environment that existed when the Commission issued its Order in Docket No. 03-0403. However, the Commission based that authorized rate of return on the September 2003 analysis of Staff witness Sheena Kight. In September 2003, the market required a 6.17% rate of return on A-rated utility long-term debt.[22] Under

[20] Aqua Ex. R-3.0, pp. 5-6.
[21] Aqua Ex. R-3.0, p. 5.
[22] Docket No. 03-0403, ICC Staff Ex. 3.0, pp. 29-30.

Ms. Ahern's logic, since the yields on A-rated utility bonds had fallen to 5.81% by August 2004 when I performed my analysis,[23] the Commission should reduce Aqua IL's authorized rate of return on equity 36 basis points to 9.80% in recognition of the 36 basis point decline in the yield on A-rated utility long-term debt since September 2003 when Staff witness Kight performed her cost of equity analysis of Aqua IL.[24]

17. Q. Respond to Ms. Ahern's allegation that your direct testimony is inconsistent with the Commission Order in Docket No. 03-0403 because you did not recommend adding an investment risk premium to Aqua IL's return on equity due to the Company's NAIC-2 designation.

A. Staff did not perform a quantitative analysis of Aqua IL's risks in Docket No. 03-0403; hence a direct assessment of the riskiness of Aqua IL against the riskiness of the samples did not exist. Without that quantitative analysis, the Commission was left with a comparison of the NAIC designation for some of Aqua IL's debt issues with the S&P and Moody's credit ratings of the sample companies. My direct quantitative analysis of the relative risks of Aqua IL and my sample companies renders

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[23] ICC Staff Ex. 3.0, p. 30.

[24] If the Commission had adhered to Ms. Ahern's fixed common equity return premium proposition in its Order in Docket No. 03-0403, its authorized rate of return on common equity would have been 9.96% rather than 10.16%. The latter included an additional 30 basis points for unspecified investment risk to Staff's recommended rate of return on common equity of 9.86%. To that investment risk adjustment, the former reflects the 20 basis point decline in A-rated public utility bond yields between September 2003, when Staff performed its analysis, and March 2004, when the Commission issued its Order.

reliance on the flawed "apples to oranges" comparison of NAIC designations with S&P and Moody's credit ratings unnecessary.

Alleged Exclusive Reliance on the DCF Model

18. Q. Respond to Ms. Ahern's allegation that your entire analysis relies exclusively on the DCF model, since the market return used in your Risk Premium model was derived through a DCF calculation.[25]

A. Ms. Ahern is mistaken. First, my risk premium model uses a DCF calculation only to derive the market return ("R_M"), one of its four inputs. Second, the R_M used in my risk premium model comprises 369 different companies not used in my DCF analysis. Third, her criticism is disingenuous since in addition to using an historical market return, Ms. Ahern's Risk Premium and Capital Asset Pricing models also use DCF-derived market returns.[26]

R_M is a measurement of investors' rate of return requirement. As such, R_M is necessarily forward-looking. Therefore, without resorting to untimely, obsolete historical data, R_M can only be estimated through a DCF calculation. Nevertheless, should the Commission conclude, contrary to its previous Orders, that the DCF-derived R_M should not be applied within the risk premium model, then I would have to substitute a R_M derived from

[25] Aqua Ex. R-3.0, p. 7.
[26] Aqua Ex. 3.0, pp. 44 and 50.

historical returns. In her direct testimony, Ms. Ahern relies on the Ibbotson historical R_M of 12.2%.[27] Applying the historical R_M that Ms. Ahern advocates to my risk premium analysis would produce cost of equity estimates of 8.97% for my Water sample and 9.74% for my Utility sample, both of which are below the 9.69% and 10.61% estimates I obtained with my methodology for estimating R_M.

19. Q. Ms. Ahern states that the Efficient Market Hypothesis ("EMH") "means that investors are aware of all publicly-available information, including…various cost of common equity methodologies." Thus, she concludes that the EMH mandates "that no single common equity cost rate model should be relied upon in determining a cost rate of common equity…" and that your "exclusive reliance upon the DCF model is at odds with the very foundation, *i.e.*, the EMH, upon which the DCF is predicated."[28] Is her conclusion correct?

A. No. The semi-strong form of the EMH states that security prices should reflect all relevant information that is publicly available at any point in time and that the expected returns implicit in the current price of the security should reflect its risk.[29,30] However, the EMH does not identify what information is relevant let alone which security pricing methodologies

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[27] Aqua Ex. R-3.0, p. 51.
[28] Aqua Ex. R-3.0, pp. 7-8.
[29] Copeland, Thomas E. and J. Fred Weston, Financial Theory and Corporate Policy, Second Edition, 1983, p. 287.
[30] Although evidence from tests of the semi-strong form of the EMH is mixed, I will assume, for the sake of argument that the semi-strong form holds.

investors use. Specifically, the EMH is concerned with whether investors can reap "excess" returns[31] from a given information set (e.g., historical price information, all publicly-available information, or all public and non-publicly available information). The EMH recognizes that not all information is relevant in determining asset prices. For example, the identity of the winner of the World Series, although widely known, has no measurable effect on asset prices. While analysts should use more than one valid common equity cost rate model in order to avoid the potential misestimates possible with any single model, the EMH does not dictate that they do so, particularly if those models do not explain the prices that investors pay for securities. Thus, even if my entire analysis relied exclusively on the DCF, which it does not, it would not be at odds with the EMH.

Capital Asset Pricing Model

20. Q. Ms. Ahern claims that the R_M used in your Risk Premium model is grossly understated because the market value of the S&P 500 was much higher than its book value and consequently the results of your risk premium analysis are understated.[32] Is she correct?

A. No. The fact that the market-to-book ratio of the S&P 500 Index was 298.0% at year-end 2003 does not indicate that the required rate of return

[31] For the purpose of this discussion, returns are "excess" when they exceed "normal" levels.
[32] Aqua Ex. R-3.0, p. 8.

has increased. I addressed this issue at length on pages 46-48 of my direct testimony, ICC Staff Exhibit 3.0. Ms. Ahern confuses required rates of return on market equity with expected rates of return on book equity. The market value of an investment is an estimate of future earnings discounted at the required rate of return. The required rate of return is based on investors' time value of money and the assessed risk of the investment. If the required rate of return rises, all else held constant, the price of an investment will fall. Similarly, if the price of an investment has risen, all else constant, the investor-required rate of return must have fallen. The market price of a common stock does not achieve equilibrium until the expected rate of return on the common stock equals the investor-required rate of return.

The falseness of Ms. Ahern's claim that the R_M I used in my Risk Premium analysis is grossly understated due to a DCF bias, is clear given that my forward-looking 13.54% R_M is higher than the 12.2% historical R_M that she espouses.[33] If Ms. Ahern's claim was valid, the investor-required rate of return derived from DCF analysis would be lower than the historical realized R_M, not higher. Therefore her claim of a downward DCF bias is unfounded.

[33] Aqua Ex. 3.0, p. 50.

21. Q. Ms. Ahern claims that investors need not compute their own betas since betas are readily available from Merrill Lynch.[34] Please comment.

A. As I explained earlier, the objective of rate of return analysts is not to emulate investors, but rather to discern investors' required rate of return based on observable market prices. Regardless, nothing in financial theory posits that it is inappropriate for an investor (or analyst) to calculate her own betas. Further, despite Ms. Ahern's assertion to the contrary, I do not have access to Merrill Lynch's published betas. However, Merrill Lynch's betas can be reproduced with Merrill Lynch's beta estimation methodology,[35] which results in adjusted beta estimates of 0.36 for my water sample and 0.42 for my utility sample. As a check, I also examined Yahoo, which publishes unadjusted beta estimates that are calculated using the same methodology as Merrill Lynch. Applying the Merrill Lynch adjustment formula to the unadjusted Yahoo betas produces beta estimates of 0.36 for the Water Sample and 0.42 for the Utility Sample. Table 1 below presents the Yahoo betas for the companies in my samples and adjusts each beta using the same methodology as Merrill Lynch.[36]

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[34] Aqua Ex. R-3.0, p. 13.
[35] ICC Staff Ex. 3.0, Footnote 33, pp. 27-28.
[36] ICC Staff Ex. 3.0, Footnote 33, p. 28.

TABLE 1

Water Sample			Utility Sample		
Company	Yahoo Beta	Adjusted Beta	Company	Yahoo Beta	Adjusted Beta
Aqua America	-0.22	0.19	Consolidated Edison	-0.11	0.27
Artesian Resources	0.19	0.47	Laclede Group	0.09	0.40
California Water Services	-0.12	0.26	Nicor Inc.	0.39	0.60
Middlesex Water	0.28	0.52	Northwest Natural Gas	-0.07	0.29
Southwest Water	-0.12	0.42	NSTAR	0.24	0.49
York Water	-0.09	0.28	Piedmont Natural Gas	0.12	0.41
			WGL Holdings	0.18	0.46
Average	0.03	0.36	Average	0.12	0.42

The Merrill Lynch and published Yahoo betas are lower than my regression betas; hence if I were to include the Yahoo/Merrill Lynch betas in my CAPM analysis, as Ms. Ahern's interpretation of EMH would require, either as additions to, or substitutes for, my regression betas, my CAPM-derived cost of common equity estimate would be lower rather than higher.

Ms. Ahern suggests that published Merrill Lynch betas are superior to my regression beta estimates because Merrill Lynch beta estimates are widely available and investor-influencing, unlike my regression betas, which are independently calculated, and substitute the NYSE Composite Index for the S&P 500.[37] First, as demonstrated above, had I not

[37] Aqua Ex. R-3.0, p. 13.

substituted the NYSE Composite Index for the S&P 500, my regression beta would have been lower rather than higher. Second, Ms. Ahern contradicted her own argument by using a proprietary Value Line database to obtain beta estimates for her proxy groups in her comparable sample analysis rather than relying on the individual Ratings and Reports that are publicly available to investors.[38]

Moreover, in Aqua IL's last rate case, Docket No. 03-0403, the Commission found Staff's CAPM analysis reasonable. Specifically, the Commission's Order in Docket No. 03-0403 stated, "[Aqua IL] failed to demonstrate a significant problem with either the betas or market returns calculated by Staff. The Company's arguments that Staff's calculations are unnecessary and do not model investor behavior are unavailing. Estimating the Company's cost of equity necessarily involves using proxies for unobservable information."[39]

22. Q. What would your CAPM-derived cost of equity estimates for your Water and Utility samples be if you were to use the historical market return and Merrill Lynch beta estimates, as Ms. Ahern recommends?

A. Substituting the Merrill Lynch betas presented above for my regression beta estimates and substituting the historical Ibbotson market return (i.e., 12.2%) for my estimated market return that is based on a DCF analysis of

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[38] Aqua Ex. R-3.0, p. 43.
[39] Order, Docket No. 03-0403, April 13, 2004, p. 42.

the S&P 500 (i.e., 13.54%) would result in CAPM-derived cost of equity estimates of 8.69% for my water sample and 9.25% for my utility sample (in comparison to the 9.69% and 10.61% estimates presented in my direct testimony). Combining those revised CAPM-derived cost of equity estimates with the results of my DCF analysis would produce a 9.40% cost of equity estimate for Aqua IL. Thus, the data do not support Ms. Ahern's suggestion that my CAPM analysis understates Aqua IL's cost of equity.

Cost of Common Equity Recommendation

23. Q. Ms. Ahern claims that your cost of common equity cost estimate provides an insufficient risk premium.[40] Is her claim correct?

A. No. The relevant data do not support Ms. Ahern's contention. As such, she rests her argument on irrelevant data. Specifically, Ms. Ahern compares my 10.0% cost of equity estimate for Aqua IL to my estimate of the Company's embedded cost of long-term debt and alleges that my cost of equity estimate implies a 2.52% risk premium for Aqua IL. Ms. Ahern incorrectly compares my cost of equity estimate to Aqua IL's embedded cost of debt, which reflects interests rates that Aqua IL locked into as long ago as 1988, rather than the interest rate Aqua IL would pay on new debt capital. Aqua IL's embedded cost of debt includes the 10.4% Series M issued in December 1988; 9.69% Series N issued in March 1991; 9.19%

[40] Aqua Ex. R-3.0, p. 15.

Series P issued in July 1992; and 8.0% Aroma Park Series. In comparison, in December 2003, Aqua IL issued Series V(A) and (B) debt at the much lower interest rates of 5.2% and 5.4%, respectively.[41] In contrast, at the time my equity analysis was performed, the yield on A-rated utility long-term debt was 5.81%.[42] Thus, contrary to Ms. Ahern's claim, my cost of equity reflects a risk premium of 4.19% (i.e., 10% - 5.81%) in comparison to concurrent A-rated utility long-term debt yields.

Ms. Ahern's reliance on a common equity risk premium calculated with Aqua IL's embedded cost of debt to criticize my recommended rate of return on common equity is inconsistent with her own risk premium analyses. After incorrectly estimating the risk premium implied by my analysis, Ms. Ahern inappropriately compared that risk premium to beta-adjusted risk premiums ($\beta_j \times (R_m - R_{Aaa})$) of 3.5% and 3.7%.[43] Ms. Ahern's criticism is invalid because she compares two different types of risk premiums. The first risk premium equals the difference between the cost of common equity and Aqua IL's embedded cost of debt, whereas the second risk premium equals the difference between the cost of common equity and Aaa-rated corporate bond yields.[44]

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[41] Co. Sch. D-3.
[42] ICC Staff Ex. 3.0, p. 30.
[43] Aqua Ex. R-3.0, p. 15.
[44] Aqua Ex. 3.0, Sch. 13, pp. 5, 6 and 8 and Company response to Staff data request FD-54. Ms. Ahern measures the equity risk premium incorrectly as the difference between the cost of equity and the yield on Aaa-rated corporate bonds. As described in ICC Staff Ex. 3.0, pp. 64-66, a CAPM analysis that estimates the equity risk premium in the same manner Ms. Ahern does overestimates the cost of equity for a company with a beta below 1.0.

COMPANY'S COST OF EQUITY ANALYSIS

Investment Risk Premium

24. Q. Respond to Ms. Ahern's argument that "In the context of the EMH, which requires that investors evaluate all information available to them, notwithstanding the NAIC's disclaimer that their designations are for the sole use of the NAIC membership, it is my opinion that investors are aware that Aqua Illinois' debt securities have been assigned an NAIC-2 designation as it is a matter of public record."[45]

A. Ms. Ahern's argument is flawed on several levels. First, NAIC designations are not publicly available. In fact, despite Ms. Ahern's opinion that investors are aware that Aqua IL's debt has been assigned an NAIC-2 designation because it is a matter of public record, Ms. Ahern testifies that she does not know whether the companies in her proxy groups have been assigned NAIC designations.[46] Moreover, Ms. Ahern's assertion that "[i]nvestors are also fully aware that a comprehensive credit analysis is undertaken by the SVO in assigning its designations"[47] is entirely without support. Indeed, due to a lack of publicly available information regarding the NAIC designations and the Company's refusal to provide Staff a complete copy of the NAIC's "Purposes and Procedures Manual," I cannot

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[45] Aqua Ex. R-3.0, p. 22.
[46] Aqua Ex. R-3.0, p. 23.
[47] Aqua Ex. R-3.0, p. 22.

446 rely on the Company's NAIC-2 designation for assessing the relative risk
447 of Aqua IL in comparison to my samples.

448 Second, Ms. Ahern's assumes that the companies comprising her
449 samples likely have debt rated NAIC-1 "as both proxy groups are in the A
450 bond ratings categories of Moody's and S&P."[48] However, unlike an issuer
451 credit rating, an NAIC designation is not a measure of general investment
452 risk. To the contrary, Aqua Schedule R-3.9, page 5 states, "[a]lpha
453 numeric methodologies are usually granted automatic translation into
454 NAIC designations by the SVO. However, the SVO even in these cases
455 reserves the right to *downgrade* any translation when deemed
456 necessary."[49] Further, Aqua Schedule R-3.9, page 6, indicates that the
457 NAIC considers the security-specific terms when assigning NAIC
458 designations, including covenants, structure, collateral, credit
459 enhancements and any other credit-related factor specific to the security
460 under review. Thus, it is possible the companies comprising Ms. Ahern's
461 samples have debt securities that merit a lower NAIC designation than the
462 company's credit rating would suggest due to security-specific factors.
463 Conversely, Aqua IL's NAIC-2 designated debt securities might include
464 terms that merit a lower NAIC designation than the general level of
465 investment risk for the Company would suggest due to security-specific
466 factors. That is, Aqua IL's NAIC-2 designation might not reflect a higher

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[48] Aqua Ex. R-3.0, p. 23.
[49] *Emphasis added.*

degree of investment risk but instead could reflect loan covenants or other security-specific factors that merit an NAIC-2 designation.

Finally, Ms. Ahern's suggestion that investors would agree that Aqua IL's NAIC-2 designation denotes a higher level of general investment risk (assuming investors would know about the NAIC-2 designation despite that it is not publicly disseminated), while ignoring the NAIC's disclaimer that their designations are for the sole use of the NAIC membership, is baseless. She presents no evidence that investors will ignore the NAIC's disclaimer let alone consider the NAIC-2 designation. Thus, Ms. Ahern's arguments regarding the NAIC designations should not be given any weight in this proceeding.

25. Q. What is your response to Ms. Ahern's claim that "a 'theoretical' basis [for a size-based risk premium] is not necessary in the face of common sense and empirical evidence?[50]

A. Theory explains <u>why</u> a pattern exists. If a systematic reason for an observed phenomenon exists, that phenomenon can be expected to continue into the future. In contrast, without theoretical underpinnings, empirical evidence cannot be presumed, much less proved, to continue into the future. A major shortcoming associated with the size premium is that <u>empirical evidence has been period specific</u>. Further, the "crossover effect" Fernholz found, which I explained on pages 37-38 of my direct

[50] Aqua Ex. R-3.0, p. 18.

testimony, indicates that the size effect is due to shortcomings in the design of the underlying empirical tests.

26. Q. What is your response to Ms. Ahern's argument that just because a study does not specifically refer to utilities does not mean that the study does not apply to utilities, because financial theory applies to a broad spectrum of firms and is not limited to any particular industry or industries?[51]

A. Ms. Ahern is trying to have it both ways. On the one hand, she argues that empiricism and "common sense" trumps theory. On the other hand, she argues that the size-effect must apply to utilities since theory is applicable across the broad spectrum of firms and industries.

Of course, theory is not on Ms. Ahern's side. The alleged "size effect" to the degree it really exists, would be an exception to financial theory; therefore, she cannot ingenuously rely upon theory to save her untenable argument. Ms. Ahern has not demonstrated that a size premium has any theoretical basis. That is precisely the problem, and precisely why Ms. Ahern argued that empirical data is more important than theory. Regardless, the fact that studies on size-based premiums do not specifically address utilities does matter. The average return on a sample of industries does not necessarily apply to each industry in the sample. For example, if data were found that warranted size-based premiums of

[51] Aqua Ex. R-3.0, p. 18.

2% for the steel industry, 1% for the airline industry, and 0% for the utility industry, the average size-based premium would be 1%. Clearly, it cannot be said that the 1% average size-based premium applies to the utility industry. That is, to draw a conclusion regarding the properties of an individual member of a subset (e.g., small utilities) of a class based on the collective properties of the class (e.g., small companies) is a logical fallacy.

The only evidence Ms. Ahern has presented that loosely relates to the utility industry is an excerpt from Ibbotson Associates ("Ibbotson") Valuation Edition - 2004 Yearbook. Ms. Ahern claims that Table 7-14, on pages 146 and 147 of that publication, verifies that a size premium does apply to utilities, and thus to Aqua IL. Ibbotson does not make that claim. To the contrary, on page 145 of that publication, Ibbotson states that "[t]he excess returns presented in this table [i.e., Table 7-14] should not be construed as size premia." Further, page 145 of the Ibbotson publication states that for that study, "[i]ndustries are defined at the two-digit SIC (Standard Industrial Classification) code level." Ms. Ahern states that "the two digit SIC code for utilities is 49."[52] However, other entities such as steam and air-conditioning supply companies are also included within the SIC code 49. Thus, while utilities are included in the group, what Ms. Ahern would refer to as the "utility" industry includes such entities as steam and air-conditioning supply companies and irrigation system companies in addition to regulated utilities. In contrast, when referring to

[52] Aqua Ex. R-3.0, p. 18.

532 utilities in my direct testimony, I meant specifically regulated utilities. As
533 indicated on page 37 of my direct testimony, regulated utilities differ from
534 other non-regulated industrial companies (even those assigned an SIC
535 code of 49) in that the cost of obtaining information regarding smaller
536 utilities in general, and Aqua IL in particular, is unlikely to be as high as
537 that of unregulated companies that are similar in size; hence, the
538 application of a size-based premium to a utility is highly questionable. The
539 Ibbotson study does not prove otherwise. In contrast, the Wong article
540 cited on page 37 of my direct testimony, applies directly to regulated
541 utilities. Also, unlike the Wong article, the statistical significance of the
542 results of the Ibbotson study, which Ibbotson does not present, are
543 questionable, particularly in light of the large standard deviations of returns
544 in SIC code 49.[53]

545 Further, Ibbotson provides neither the betas for the small and large groups
546 nor any indication of the size and industry of the companies in each group.
547 Without this information, both the degree to which beta can explain the
548 difference in the realized returns between the small and large groups and
549 even which group Aqua America, Inc. would reside is unknown.

550 Finally, an error in design likely influences the results of the Ibbotson two-
551 digit SIC code study, as explained above. In fact, the "crossover effect"

[53] Ibbotson estimates the size premium equals 3.12% for SIC Code 49. In comparison, the standard deviation of returns is almost 22% for the large company group and over 30% for the small company group. Aqua Ex. R-3.6, pp. 3-4.

would likely be even more pronounced in the Ibbotson study because companies were only broken down into two groups, small and large.

27. Q. What is your response to Ms. Ahern's claim that you were incorrect when you stated that, if allowed, any size-based risk premium should be based upon the size of Aqua IL's parent company, Aqua America, Inc. ("Aqua America")?[54]

A. Since the equity of Aqua IL is obtained indirectly from the investor through Aqua America, a much larger organization, neither Aqua IL nor Aqua America incur the additional costs allegedly associated with smaller companies. Aqua America can pass through equity capital to Aqua IL without incurring the costs that market-traded companies comparable in size to Aqua IL are alleged to incur. The fact that potential lenders are interested in the ability of Aqua IL alone to service any additional debt is irrelevant,[55] since Aqua IL is the sole obligor of that debt. In contrast, Aqua IL has only one equity investor, Aqua America, which incurs costs to raise equity commensurate with Aqua America's liquidity, not Aqua IL's liquidity.

On page 16 of Aqua Ex. R-3.0, Ms. Ahern provides an example that she claims demonstrates that if one investor transfers its stock in XYZ Company to another investor, it is irrelevant which investor owns the stock because the investment decision will be based on both the risk inherent in

[54] Aqua Ex. R-3.0, p. 17.
[55] Aqua Ex. R-3.0, p. 17.

stock XYZ and individual investor's preference for risk. However, Ms. Ahern's example fails to illustrate her point because neither investor in her example is the sole provider of XYZ's capital. In contrast, Aqua America raises equity capital on behalf of Aqua IL. Accordingly, Ms. Ahern's example is irrelevant and should not be given any weight in this proceeding.

Furthermore, the Commission rejected Ms. Ahern's argument in Aqua IL's last rate case. The Docket No. 03-0403 Order states, "[t]he Commission does not conclude that the size of [Aqua IL] warrants a risk premium. [Aqua IL] is a wholly-owned subsidiary within a much larger organization, and in that sense is distinguishable from an independent utility of the same size as [Aqua IL]."[56]

28. Q. Ms. Ahern argues that reductions in costs resulting from efficiencies will be reflected in the operating expenses component of the revenue requirement; hence, ratepayers will not be denied the benefits associated with the combined entity's stronger financial profile.[57] Do you agree?

A. No. Although operating efficiencies are reflected in the operating expenses component of the revenue requirement, capital market efficiencies are not. Thus, if efficiencies are gained, but are not reflected in the cost of capital,

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[56] Order, Docket No. 03-0403, April 13, 2004, p. 43.
[57] Aqua Ex. R-3.0, p. 17.

the ratepayers will be denied the benefits associated with the combined entity's stronger financial profile. As indicated on page 35 of my direct testimony, being a part of a much larger organization could enhance the ability of Aqua IL to access the common equity market on reasonable terms. In fact, in support of the Company's request to merge with Philadelphia Suburban Corporation ("PSC", now known as Aqua America), the Consumers Illinois Water Company ("Consumers Illinois", now known as Aqua IL) President testified that the merger "should enhance the ability of PSC and Consumers Illinois to access the capital markets on reasonable terms".[58] 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."[59]

29. Q. Ms. Ahern asserts that Ibbotson used adjusted betas; therefore, she concludes that her size-based risk premium is not inconsistent with Ibbotson's historical size-based premia.[60] Please comment.

A. I do not agree that Ibbotson performed his study of size-based risk premiums with adjusted betas. The description of the study does not mention any adjustment to betas. Such an omission is not trivial since academic studies must be described in detail sufficient for others to

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[58] Order, Docket No. 98-0602, January 21, 1999, p. 3.
[59] *Id.*
[60] Aqua Ex. R-3.0, p. 19.

replicate them. Rather than cite the study, Ms. Ahern cites another passage from Ibbotson that describes how Ibbotson estimates betas for cost of capital analysis.[61] Nevertheless, even if Ibbotson's size-based risk premium study incorporated adjusted betas as described in another part of the Ibbotson book, Ms. Ahern's application of an historical size-based premium would still be inconsistent with the manner in which Ibbotson measured the historical size-based risk premiums. Ms. Ahern added a size-based premium to her CAPM-based risk premium analysis, which is based on adjusted Value Line betas. Value Line uses a different methodology to estimate and adjust its betas than the one Ibbotson describes. The Value Line methodology was discussed on pages 26-27 of my direct testimony. Ibbotson uses the S&P 500 for its market data instead of the NYSE and it looks at data from 1926-2002 instead of the last five years. In addition, the parameters in the Ibbotson beta adjustment methodology are company-specific, varying according to the statistical quality of the regression for each security.[62] In contrast, Value Line uses the same adjustment for all securities. Thus, Ms. Ahern's application of a historical size-based premium is inconsistent with the manner in which Ibbotson estimated it regardless of whether or not Ibbotson's study used adjusted or raw betas.

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[61] Aqua Ex. R-3.0, p. 19.
[62] Ibbotson Associates Valuation Edition- 2004 Yearbook, pp.108-109, and 128.

Historical Data

30. Q. Do you agree with Ms. Ahern's criticism of spot market data and defense of historical data?

A. No. This issue was previously discussed in great detail on pages 17 and 44-46 of my direct testimony. To summarize, the market value of common stock equals the cumulative value of the expected stream of future dividends after each is discounted by the investor-required rate of return. Every day new information becomes available and investors re-evaluate their projections of future cash flows and the risk level of a company. Thus, only a current stock price will reflect all information, both historical and current, that is available and relevant to the market.

Ms. Ahern acknowledges that DCF theory indicates that spot market prices should be used in a DCF analysis, but defends her use of average historical stock prices claiming it "normalizes" the effects of market aberrations, volatility and dramatic company-specific events upon stock prices.[63] As explained in my direct testimony, historical data has many shortcomings. Conversely, the only shortcoming of spot prices Ms. Ahern cites, volatility, can be mitigated through the use of samples, a technique that both Ms. Ahern and I already implement. Thus, not only is the use of historical data *inappropriate*, but the use of samples renders it *unnecessary* as well.

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[63] Aqua Ex. R-3.0, p. 9.

31. Q. Ms. Ahern states that "absent empirical evidence to the contrary, it is reasonable to assume that investors utilize historical data in arriving at their expectations and required returns,"[64] thus suggesting that historical data should be used. Do you agree with Ms. Ahern?

A. No. I do not dispute that investors base their expectations, in part, upon historical data. Rather, I dispute the propriety of using historical data as a direct estimate of those expectations. Ms. Ahern has failed to demonstrate that investors use the same data she used, in the same manner she used it, a demonstration that her call to "emulate investors" necessitates.

32. Q. Ms. Ahern claims that "the average, *i.e.*, the arithmetic mean, is the best estimate of the next expected value of randomly generated data"[65] and that "using the arithmetic mean of randomly generated data, such as long-term historical stock market returns or risk premia, is…entirely appropriate for cost of capital determination."[66] Do you agree with this claim?

A. No. Ms. Ahern's use of the phrase "mean" wrongly implies an equivalence of the sample mean she uses with the single, true population mean. Unfortunately, due to the large variance of market returns, one would need so long a time period to accurately measure the true mean that the mean

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[64] Aqua Ex. R-3.0, p. 23.
[65] Aqua Ex. R-3.0, p. 25.
[66] Aqua Ex. R-3.0, p. 25.

most likely would have changed in the interim. Fischer Black provides the following explanation in the article, "Estimating Expected Return."

> Explaining variance is easy. We can use daily (or more frequent) data to estimate covariances. Our estimates are accurate enough that we can see the covariances change through time. Explaining return or average return is easy too, because that's just a way of explaining variance.
>
> Estimating expected return is hard. Daily data can hardly help at all. Only longer time periods help. We need decades of data for accurate estimates of average expected return. We need such a long period to estimate the average that we have little hope of seeing changes in expected return.[67]

Similarly, Nobel prize winner Merton Miller stated:

> As Fischer Black always reminded us, estimating variances is orders of magnitude easier than estimating the means or expected returns that are central to the models of Markowitz, Sharpe, or Modigliani-Miller. The precision of an estimate of the variance can be improved…by cutting time into smaller and smaller units – from weeks to days to hours to minutes. <u>For means, however, the precision of estimate can be enhanced only by lengthening the sample period, giving rise to the well-known dilemma that by the time a high degree of precision in estimating the mean from past data has been achieved, the mean itself as almost surely shifted</u>.[68]

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[67] Black, Fischer, "Estimating Expected Return," <u>Financial Analysts Journal</u>, January/February 1995, at 168-171.

[68] Emphasis added, Miller, Merton H., "The History of Finance: An eyewitness account," *The Journal of Portfolio Management*, Summer 1999, p. 100.

Furthermore, Ms. Ahern does not dispute that security return movements approximate a random walk.[69] According to an econometrics textbook, "a random walk is an example of a nonstationary time series."[70] A time series is nonstationary if its mean and variance change. Hence, securities prices and returns do not have the stable mean that the use of historical data requires. Moreover, the best naïve estimate of the next expected value in a random walk is, in fact, the last observed value,[71] rather than the historical average.

Finally, even if one were to incorrectly accept the means of historical data as accurate estimators of investor expectations, their use remains problematic. Since the true historical mean is unobservable, and no universally-accepted sample historical measurement period exists, analysts cannot know if the data they select is truly representative of the data investors use.

33. Q. Ms. Ahern claims that she did not "select" the 1928-2002 time period to develop her utility equity risk premium. Rather, she claims that 1928-2002 is the default time period, because that "represents all the years for which data were available."[72] Do you agree?

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[69] Aqua Ex. R-3.0, p. 24.
[70] Gujarati, Damodar, N., Basic Econometrics, McGraw-Hill, 1995, p. 718.
[71] Foster, George, Financial Statement Analysis, Prentice-Hall, Inc., 1978, p. 83.
[72] Aqua Ex. R-3.0, p. 39.

A. No. That claim may or may not be true for the S&P Utility Index, but that clearly is untrue for the market as a whole. Clifford Asness uses data from as far back as 1871 and Jeremy Siegel presents data from as far back as 1802.[73] Moreover, in Docket No. 02-0690, Illinois-American Water Company witness Paul Moul used the 1928-2001, 1952-2001, 1974-2001, and 1979-2001 time periods.[74] The inability of users of historical data to agree on a definitive time period demonstrates that one does not exist. Thus, any time period chosen is arbitrary and subject to manipulation. Ms. Ahern has failed to demonstrate that the measurement period she chose is appropriate for measuring Aqua IL's cost of common equity today.

Ms. Ahern's DCF Analysis

34. Q. In response to your criticism of her DCF estimate stemming from missing Value Line earning per share ("EPS") growth estimates, Ms. Ahern argues that it is reasonable to assume that the values of the missing data were equal to the average of the available data.[75] Do you agree with her assumption?

A. No. Ms. Ahern states that no real conclusions can be drawn regarding the value of the missing growth rate estimates and, since the companies were

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[73] Asness, Clifford S., Stocks Versus Bonds: Explaining the Equity Risk Premium, *Financial Analysts Journal*, March/April 2000, p. 96. AIMR Equity Risk Premium Forum, November 8, 2001, p. 31.
[74] Docket No. 02-0690, Illinois-American Water Co. Ex. 7.0, p. 47.
[75] Aqua Ex. R-3.0, p. 26.

selected on the basis of similar *risk*, it is reasonable to assume that the missing *growth* rate estimates equal the average for each proxy group. Ms. Ahern erroneously equates risk with growth. The two concepts are only tangentially related, in that growth is partly a function of expected return on new investment, which in turn, is partly a function of risk. However, growth is also a function of dividend policy, which has no direct relationship to risk. That is, the greater the proportion of cash earnings that a company pays out to investors as dividends, the lower the company's growth rate.[76] Ms. Ahern failed to demonstrate that the companies missing Value Line growth rates have the same dividend payout policies as those with Value Line growth rates. Nevertheless, I agree that no definitive conclusions can be drawn, which is precisely what reduces Ms. Ahern's supposed average Value Line EPS growth estimate to the level of conjecture and why it should be disregarded.

Aqua Exhibit 3.0, Schedule 12, page 1, presents all of the growth rate estimates Ms. Ahern used in her DCF analysis. Three of the water sample companies are missing Value Line projected growth rate estimates. Value Line historical growth rate estimates are provided for all of the companies comprising her water sample. Ms. Ahern improperly assumes that the missing growth rate estimates equal the mean growth rate estimate. To illustrate the problem inherent in Ms. Ahern's assumption, I averaged the historical Value Line DPS and EPS growth rate estimates, excluding the

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[76] Reilly, Frank K. and Keith C. Brown, Investment Analysis and Portfolio Management, Sixth Edition, 2000, p. 708.

companies for which no forecasted Value Line growth rate estimates were available. That is, I re-averaged the historical Value Line growth rate estimates for Ms. Ahern's water sample excluding Artesian Resources, Middlesex Water Company and York Water Company because those companies lack forecasted Value Line growth rate estimates. Excluding the historical growth rate estimates for those three water companies reduces the average historical DPS growth rate estimate to 2.8% (in comparison to 3.3% that reflects growth rate estimates for all of the companies comprising her water sample). Excluding the historical growth rate estimates for those three water companies raises the average historical EPS growth rate estimate to 7.3% (in comparison to 6.4%). Accordingly, Ms. Ahern's DCF analysis should be rejected because the growth rate estimates she uses in her DCF analysis are based on the faulty assumption that missing estimates equal the mean, which is a demonstrably false assumption.

35. Q. Respond to Ms. Ahern's claim that your statement that the "R" component of the BR+SV growth method is to be limited to incremental investment is incorrect.[77]

A. A simple review of the "BR+SV" formula demonstrates the rate of return on new investment to be the correct rate of return. The "B" factor to which the rate of return (i.e., "R") is applied is retained earnings. Retained earnings are earnings the company plows back into the company as *new*

[77] Aqua Ex. R-3.0, p. 27.

investment. The sustainable growth is the return the company is expected to earn on the reinvestment of those retained earnings. Thus, the correct "R" value to apply to the "B" factor is the rate of return on new investment.

The above synopsis notwithstanding, Morin, whom Ms. Ahern cites as an authority on this issue, reveals that the growth in earnings is based on future equity investment. In Morin's example, new investment is in the form of earnings reinvested in the company. The return on the original equity base is not growing at all, staying constant at $10 each year.[78] In other words, if the company continued to earn the same return on its existing equity, but had no new investment (including retained earnings), it could not grow. It is only through the return on the new investment that growth can be sustained.

In addition, the following passage from an investments textbook by Bodie, Kane and Marcus clearly reinforces this point:

> How do stock analysts derive forecasts of g, the expected growth rate of dividends? …They try to relate the expected growth rate of earnings to the expected profitability of the firm's *future* investment opportunities.
>
> The exact relationship is

$$g = b \times ROE \qquad (17.2)$$

[78] Morin, Roger A., Regulatory Finance: Utilities' Cost of Capital, Public Utilities Reports, Inc., 1994, p. 114.

> where b is the proportion of the firm's earnings that is reinvested in the business, called the plowback ratio or the earnings retention ratio, and the ROE is the rate of return (return on equity) on new investment.[79]

A footnote to that excerpt clarifies that "[t]he appropriate measure of ROE in equation 17.2 is really the internal rate of return (IRR) on the firm's future investments of equity capital."

Furthermore, it has been demonstrated mathematically that the "R" component of the BR+SV method, as stated in my direct testimony, should be based upon incremental investment only.[80]

The use of the return on all investment in a "BR+SV" growth rate calculation would serve only as an approximation for the return on new investment. Thus, the return on all investment would only reflect the correct return by coincidence. By using the return on all investment, Ms. Ahern implicitly assumes that the return on existing equity that she used is equal to the return on new equity investment. Ms. Ahern did not prove that assumption is valid.

36. Q. Ms. Ahern argues that the "circularity of using "BR+SV" is identical to the circularity inherent in using analysts' earnings growth forecasts."[81] Please comment.

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[79] Bodie, Kane and Marcus, Investments, 1989, p. 478.
[80] ICC Docket No. 95-0031, Direct Testimony of Dr. Charles M. Linke, Exhibit 8, pp. 9-23.

A. The "BR+SV" method requires Ms. Ahern to first estimate the expected return on equity ("R"), which she uses to estimate the growth rate, which she then uses to estimate the expected return on common equity ("R"). Whereas, Ms. Ahern starts with an expected return on equity, I begin with analysts' earnings growth rates and stock prices, which are determined exogenously, to estimate the expected return on equity that those parameters indicate.

Ms. Ahern's CAPM Analysis

37. Q. In defense of her estimate of the total market return in which she adds Value Line's forecast of median total market price appreciation with the median dividend yield of dividend-paying companies, Ms. Ahern again argues that rate of return analysts are to emulate investor behavior and that "information provided by Value Line is investor influencing and should not be rejected by any rate of return analyst."[82] Do you agree?

A. No. Ms. Ahern's argument implies that investors wrongly combine Value Line's estimate of median price appreciation and median dividend yield as she does. First, to my knowledge, Value Line never suggests that its median total market price appreciation and dividend yield should be combined to form a market return estimate.[83] Second, Ms. Ahern has

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[81] Aqua Ex. R-3.0, p. 27.
[82] Aqua Ex. R-3.0, p. 29.
[83] In fact, Value Line does not add those two numbers together.

failed to demonstrate that investors do, in fact, use Value Line data in the same flawed manner she employs.

38. Q. Respond to Ms. Ahern's argument that the median is the best estimate of the central tendency of securities data in the market portfolio.

A. First, Ms. Ahern argues that "the median compensates for the effect that extremely high or low expected price appreciation and number of shares outstanding have on either the simple or weighted arithmetic mean."[84] While that may be true for small samples, a few outliers are highly unlikely to distort the arithmetic mean of a sample of approximately 1,700 stocks.

39. Q. Respond to Ms. Ahern's assertion that your comments on the median expected dividend yield of all dividend paying stocks provided by Value Line is meritless because the average Value Line dividend yield (*i.e.*,1.62%) is nearly identical to the dividend yield on the S&P 500 at the end of the first quarter 2004 (*i.e.*, 1.60%).[85]

A. Ms. Ahern's argument does not address the problem inherent in her estimated Value Line market return. The Value Line dividend yield is not necessarily unreasonable. The problem relates to the manner in which she used the Value Line dividend yield. That is, her flawed methodology

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[84] Aqua Ex. R-3.0, p. 30.
[85] Aqua Ex. R-3.0, pp. 30-31.

for estimating the Value Line market return adds the Value Line projected dividend yield to the Value Line price appreciation potential for all companies comprising the Value Line universe even though not every company in that universe pays dividends. In fact, out of the 100 companies reviewed by Value Line with the highest projected price appreciation for the next 3-5 years, only 15 of those companies pay dividends. Thus, Ms. Ahern's Value Line market return is overstated and should be rejected.

40. Q. Respond to Ms. Ahern's argument that the arithmetic mean of long-term historical returns is appropriate to use when estimating the opportunity cost of capital.[86]

A. Ms. Ahern testifies that historical returns provide insight into the variance and standard deviations of returns. The standard deviation[87] of historical returns affect the geometric mean but not the arithmetic mean upon which Ms. Ahern relies. For example, consider two series of returns. In series A, a security realizes a 10% return three years in a row. In series B, a security earns -5% the first year, 0% the second year and 35% the third year. The table below presents the standard deviation, arithmetic mean and geometric mean of the two series of returns. Note that while the arithmetic mean is 10% for both series A and B, the geometric mean is inversely related to the standard deviation. Thus, Table 2 mathematically

[86] Aqua Ex. R-3.0, p. 28.
[87] Standard deviation is simply the square root of the variance; hence, for the sake of clarity, my discussion mentions only standard deviation but it applies equally to variance.

demonstrates that Ms. Ahern's historical risk premium analyses provide no insight into standard deviations of stock returns since they rely on arithmetic mean returns. Accordingly, Ms. Ahern's argument should not be given any weight in this proceeding.

Table 2

	Series A	Series B
Return Sequence	10%, 10%, 10%	-5%, 0%, 35%
Standard Deviation	0%	22%
Arithmetic Mean	10%	10%
Geometric Mean	10%	8.6%

41. Q. Explain how Ms. Ahern mischaracterizes your direct testimony regarding the forecasted interest rates.

A. Ms. Ahern advocates using forecasted interest rates to estimate Aqua IL's rate of return on equity and asserts that the projected yields for Aaa-rated corporate bonds, as provided in the March 1, 2004, Blue Chip Financial Forecast, were very close to the actual yields during the second quarter of 2004. That is not surprising given the forecast she cites was published only one month before the second quarter of 2004 began. Nonetheless, Ms. Ahern does not limit herself to interest rate forecasts for the next quarter only. Rather, her analyses rely on interest rate forecasts for 6

quarters into the future. The example in my direct testimony (See ICC Staff Exhibit 3.0, p. 55) demonstrates that accurately forecasting interest rates even one year ahead is problematic. The May 1, 2003, Blue Chip Financial Forecast that Ms. Ahern relied upon in Aqua IL's last rate case, Docket No. 03-0403, projected the yield on Aaa-rated corporate bonds would average 6.6% during the second quarter of 2004.[88] In reality, actual yield averaged 5.9% during the second quarter of 2004. Thus, my example illustrates that the accuracy of Ms. Ahern's forecasted yields diminishes as the forecast period lengthens. Thus, the Commission should continue to rely on current, observable, market interest rates rather than the projected interest rates that Ms. Ahern uses in her analysis.

Ms. Ahern's Empirical CAPM Analysis

42. Q. Please respond to Ms. Ahern's assertions that the article by Litzenberger, et al ("Litzenberger") cited in your direct testimony used both adjusted and unadjusted betas, contrary to your claim that it used only raw betas, and that that study does not support your claim that a beta adjustment is a solution to the discrepancy between the theoretically predicted and empirically observed relationship between risk and return.[89]

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[88] ICC Staff Ex. 3.0, p. 55, citing Docket No. 03-0403, CIWC Ex. 3, Sch. 13, p. 7.
[89] Aqua Ex. R-3.0, pp. 32-33.

A. Ms. Ahern has misinterpreted that article. Litzenberger sets forth the empirical evidence that risk premiums are not proportional to NYSE betas[90] as the CAPM predicts, but linear, with a positive intercept. This is Litzenberger's mathematically precise way of stating that the observed security market line, which maps the relationship between beta and return, is flatter than theory predicts. Litzenberger proceeds to discuss various ways of altering the CAPM itself <u>or beta</u> to bring the resulting predicted return more in line with actual results. That Litzenberger never combines adjusted betas with alternative versions of the CAPM is significant. Next, Litzenberger describes how the unadjusted (i.e., raw, or historical) betas may be used to predict risk premiums.[91] This procedure involves adjusting historical (i.e., raw) betas using the following equation:

$$\beta_{adjusted} = \omega \times \beta_{historical} + (1 - \omega) \times 1$$

The above adjustment, which I have applied to my raw (i.e., historical) beta estimates,[92] is known as the global adjustment approach. Litzenberger observes that if ω were constant, then the cost of equity

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[90] Litzenberger often refers to raw beta as a NYSE beta. 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, p. 369.

[91] Litzenberger, Ramaswamy and Sosin, "On the CAPM Approach to the Estimation of A Public Utility's Cost of Equity Capital," *Journal of Finance*, May 1980, p. 376.

[92] For my adjustment, ω = 0.66257, as adopted from Merrill Lynch.

estimates using the resulting adjusted betas would be identical to those using unadjusted betas in an empirically-derived CAPM.[93]

43. Q. Ms. Ahern argues that while you "correctly, and commendably, adjusted [your] calculated raw betas, [you] did so for the wrong reason"[94] since a beta adjustment does not correct for the observed flatness in the linear relationship between risk and return. Do you agree?

A. No. Ms. Ahern's claim is based on the misguided notion that an adjustment to beta and an adjustment to the CAPM model are discrete, unrelated adjustments. Her only support for this claim comes from Dr. Roger Morin, who incorrectly argued that the difference between an adjustment to beta and an adjustment to the CAPM model is that the Empirical Capital Asset Pricing Model ("ECAPM") is a required return (Y-axis) adjustment and the beta adjustment is a risk (X-axis) adjustment.[95] However, as I will demonstrate below, the mathematical effect of either adjustment is identical. As such, any adjustment to beta along the X-axis results in a corresponding change to the return along the Y-axis. Thus, the beta adjustment does correct for the observed flatness in the linear relationship between risk and return.

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[93] Litzenberger, Ramaswamy and Sosin, "On the CAPM Approach to the Estimation of A Public Utility's Cost of Equity Capital," *Journal of Finance*, May 1980, pp. 376, 380.
[94] Aqua Ex. R-3.0, p. 14.
[95] Aqua Ex. R-3.0, p. 14; Schedules R-3.2 and R-3.3.

The Security Market Line ("SML") shows the linear relationship between the required rate of return on a security (R_j, on the Y-axis) and beta (on the X-axis). Theoretically, the intercept of the SML is the risk-free rate, R_f, and the slope is the market risk premium (R_M - R_f).

Ms. Ahern's ECAPM adjusts the CAPM as follows:

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

This adjustment results in a higher intercept (i.e., $R_f + 0.25 \times (R_m - R_f)$ for the ECAPM in comparison to R_f in the CAPM) and a flatter slope (i.e., $0.75 \times (R_m - R_f)$ for the ECAPM in comparison to $R_m - R_f$ in the CAPM). The Value Line beta adjustment also flattens the slope of the SML, only more so:[96]

$$R_j = R_f + (0.35 + 0.67 \times \beta_j) \times (R_m - R_f) \qquad (1)$$

Rearranging the terms in Equation (1) above produces:

$$R_j = R_f + 0.35 \times (R_m - R_f) + 0.67 \times \beta_j \times (R_m - R_f) \qquad (2)$$

As Equation (2) shows, the CAPM, incorporating the Value Line beta adjustment, increases the intercept of the SML from R_f to $R_f + 0.35 \times (R_m$ -

[96] The two beta adjustment I employ are very similar. Merrill Lynch beta adjustment : $\beta_{adjusted} = 0.33743 + 0.66257 \times \beta_j$; Value Line beta adjustment of $\beta_{adjusted} = 0.35 + 0.67 \times \beta_j$.

R_f) and reduces the slope from R_m - R_f to 0.67 $\times$ (R_m - R_f). Except for a difference in the magnitude of the adjustment to the slope and intercept, the above mathematically demonstrates that adjusting a beta is mathematically identical to the adjustment behind the empirical CAPM. Therefore, a second adjustment to the CAPM above and beyond the adjustment to beta is neither necessary nor warranted. I do not dispute the use of either the ECAPM or beta adjustments in isolation. I dispute the appropriateness of combining the two together.

Ms. Ahern's Risk Premium Analyses

44. Q. Ms. Ahern denies that she applied a market risk premium-based beta to a non-market risk premium because "Value Line betas are calculated using price relatives."[97] Please comment.

A. Ms. Ahern's argument fails to respond to the assertion made. Ms. Ahern's risk premium analysis improperly measures a company-specific risk premium by multiplying beta by the difference between the market rate of return and the yield on AAA-rated corporate bonds.[98] However, as Ms. Ahern acknowledges,[99] beta is a measure of the quantity of market risk. The price of market risk equals the difference between the market rate of return and the risk-free rate. Yet, in Ms. Ahern's risk premium model ("RPM"), the price of "systematic risk" is the market rate of return less a

[97] Aqua Ex. R-3.0, pp. 37-38.
[98] Aqua Ex. 3.0, Sch. 13, p. 6.
[99] Aqua Ex. R-3.0, p. 38.

corporate bond yield. That is, the RPM changes the price of systematic risk (i.e., risk premium), but holds the quantity (i.e., beta) constant. Use of beta in Ms. Ahern's RPM is akin to a customer going to a checkout line with 2 apples and the cashier charging the customer for 2 oranges. Unless the price of oranges and apples is the same, the customer will be mischarged. The market risk premium does not equal the market rate of return less a corporate bond premium. Hence, Ms. Ahern's RPM "mischarges" the cost of equity.

45. Q. Ms. Ahern states that "the CAPM underestimates the common equity cost rate… because it does not capture unsystematic, non-diversifiable, company-specific risk," while "company specific, unsystematic, non-market, risk is fully captured in the RPM" without overestimating the cost of equity.[100] Is Ms. Ahern correct?

A. No. Ms. Ahern incorrectly claims that investors require compensation for all risk, systematic and unsystematic. That claim is contrary to portfolio theory, which posits that risk can be reduced without sacrificing returns through portfolio diversification. That is a fundamental principle of finance, one for which Harry Markowitz won a Nobel Prize and upon which a great deal of modern finance is built. According to portfolio theory, investors are only compensated for risk that cannot be eliminated through diversification (i.e., systematic risk). In the competitive financial market place, investors holding diversified portfolios will perceive less risk in a security than those

[100] Aqua Ex. R-3.0, p. 38.

investors who do not hold diversified portfolios. Consequently, diversified investors will place a greater value on securities than non-diversified investors; and the market clearing prices will reflect systematic risk only. Thus, unsystematic risk is not compensated. Bond yields, "company-specific" or otherwise, are not an exception to portfolio theory because investors can eliminate company-specific sources of risk inherent in a single company's bonds through diversification just as they can eliminate company-specific sources of risk inherent in a single company's stock. Therefore, corporate bond yields do not reflect unsystematic, non-market, company-specific risk and do not add unsystematic, non-market, company-specific risk to Ms. Ahern's risk premium model. The Commission should not reward an investor for the additional risk he incurs for his failure to diversify, when he could easily eliminate that additional risk.

In addition, since Ms. Ahern claims that her risk premium model estimates a cost of equity that reflects total risk rather than just non-diversifiable risk, as captured by the CAPM, the estimated cost of equity using Ms. Ahern's risk premium model should be systematically greater than the same estimate using the CAPM. However, Ms. Ahern's risk premium model estimates a lower cost of equity than the CAPM for companies with betas greater than 1. An example is provided in the following table.

Inputs: R_f = 5.4%; R_m = 15%; B_j = 1.5 and $R_{A\text{-}bond}$ = 7.2%	
CAPM	**Ms. Ahern's Risk Premium Model**
$R_j = R_f + \beta_j \times (R_m - R_f)$	$R_{\beta RPMj} = R_{A\text{-}bond} + \beta_j \times (R_m - R_{A\text{-}bond})$
R_j = 5.4% + 1.5 $\times$ (15% - 5.4%)	$R_{\beta RPMj}$ = 7.2% + 1.5 $\times$ (15% - 7.2%)
R_j = 19.8%	$R_{\beta RPMj}$ = 18.9%

46. Q. Ms. Ahern denies that her beta adjusted RPM is a CAPM derivation. Is she correct?

A. No. Ms. Ahern claims that her RPM is distinct from the CAPM and that both are recognized by the "financial literature."[101] The "financial literature" does recognize risk premium analysis, but not as Ms. Ahern has implemented it. As shown in my direct testimony,[102] Ms. Ahern's RPM analysis is an average of two distinct models. The first model can be reduced to the following equation:

$$R_j = R_{A2} + \beta_j \times (R_m - R_{Aa/Aaa})$$

In comparison, the CAPM is expressed as:

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

[101] Aqua Ex. R-3.0, pp. 36-37.
[102] ICC Staff Ex. 3.0, pp. 61-66.

These two models are exactly the same, except that Ms. Ahern's model substitutes for the risk-free rate the yield on A2 rated debt in one place and the yield on Aaa- and Aa-rated corporate debt in another. Thus, the first of the two models averaged in Ms. Ahern's RPM analysis, is, in fact, a CAPM derivation, in which Ms. Ahern improperly incorporates two different long-term corporate bond yields as substitutes for the risk-free rate.

47. Q. Please respond to Ms. Ahern's claim that your "algebraic manipulations" needlessly complicate her RPM and demonstrate your misunderstanding of the model.[103]

A. Ms. Ahern's assertion is akin to blaming math for the result "2+2=4" when one desires the answer "5". Unfortunately for Ms. Ahern, the laws of mathematics cannot be manipulated. My "algebraic manipulations" simply describe Ms. Ahern's methodology, step by step, exactly as she implemented it. My "algebraic manipulation" of her model breaks her model into its parts and demonstrates that when $R_{UtilityA2} \neq R_{Corporate\ Aaa}$, as is the case in Ms. Ahern's model (6.6% $\neq$ 6.2%), then the model will not produce identical returns for two securities with identical risk, which violates a fundamental financial principle. Those same mathematics also demonstrate that whenever R_{A2} is greater than $R_{Corporate\ Aaa}$, as is the case in Ms. Ahern's model (6.6% $>$ 6.2%%), then the model will systematically overestimate the cost of equity for companies with a beta less than one, which applies to every company in Ms. Ahern's samples. In his book

[103] Aqua Ex. R-3.0. p. 39.

Regulatory Finance: Utilities' Cost of Capital ("Regulatory Finance"), Dr. Morin,[104] states that distortions can occur when a risk premium is based on a corporate bond yield rather than a Treasury bond yield.[105] This is what the mathematical proof provided in my direct testimony illustrates. Regulatory Finance also notes that the choice of debt instrument used in the risk premium model must be applied consistently,[106] which Ms. Ahern's RPM fails to do and results in further inflating her cost of equity estimate for Aqua IL.

Ms. Ahern's Comparable Earnings Model Analysis

48. Q. In response to your argument that the return estimated by the comparable earnings model ("CEM") can be significantly distorted by accounting practices, Ms. Ahern claims that "different accounting practices also affect the growth rate component, projected or historical, of the DCF model" and that "because the criteria used to select the non-utility companies in my application of the CEM are based upon total risk, *i.e.*, the sum of non-diversifiable, market, risk and diversifiable, non-market or company-specific, risk, all impacts of accounting differences have been obviated."[107] Please comment.

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[104] Ms. Ahern cites Dr. Morin several times in her direct and rebuttal testimony as support for her ECAPM analysis.
[105] Morin, Roger A., Regulatory Finance: Utilities' Cost of Capital, Public Utilities Reports, Inc., 1994, p. 283.
[106] Morin, Roger A., Regulatory Finance: Utilities' Cost of Capital, Public Utilities Reports, Inc., 1994, p. 278.
[107] Aqua Ex. R-3.0, p. 40.

A. Neither of Ms. Ahern's comments refute my argument. Ms. Ahern's first rationalization does not dispute my claim, but rather, implies that the same problem occurs in the DCF model, which we both utilize. This, in turn, implies that accounting differences should be overlooked. However, the companies in both of my samples are all regulated utilities and, therefore, are required to employ similar accounting practices. Hence, differing accounting practices do not affect my DCF analysis.

The second rationalization asserts that because her CEM proxy groups were chosen based upon statistics derived from market prices, her CEM analysis is market-based. As previously discussed, that is simply not true. The cost of equity is the investor-required rate of return, which is a function of risk and manifested in market prices. As Ms. Ahern acknowledges, the results of her CEM analysis are based upon accounting returns,[108] which are not directly related to required market returns. Hence, her sample selection methodology does not obviate the impact of accounting differences.

49. Q. In response to your criticism that Ms. Ahern's CEM analysis uses samples with higher sample betas than her DCF, CAPM, and RPM analyses, Ms. Ahern claims that, "using Ms. Phipps' logic, [Consolidated Edison, Inc. and Northwest Natural Gas Co. and NICOR] should not be part of the same sample group because they

[108] Aqua Ex. R-3.0, p. 41.

are not of similar risk,"[109] based on the difference in their betas. What is your response?

A. Ms. Ahern was not using my logic. I noted that Ms. Ahern's CEM results are based upon the average accounting returns of two samples, which are meant to be proxies for the two samples she uses as surrogates for Aqua IL. (In other words, Ms. Ahern's CEM samples are proxies of proxies.) However, the average beta of Ms. Ahern's CEM proxy group for her water sample exceeds the average beta for her water sample by 0.07, not 7 basis points as Ms. Ahern claims.[110]

In addition, I noted that even if one were to wrongly assume that accounting book returns were reasonable proxies for investor-required returns, since the risk levels of the CEM proxy group for Ms. Ahern's water sample is higher than those of the water sample used as a surrogate for Aqua IL, the book returns of the CEM proxy group for Ms. Ahern's water sample would overstate the expected book returns of the water sample Ms. Ahern used as a surrogate for Aqua IL.

Somehow, Ms. Ahern extrapolated from my observation about the difference in risk between Ms. Ahern's CEM water sample and the Aqua IL surrogate water sample that no two companies whose betas differ should be allowed in the same sample group. My argument, however, has

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[109] Aqua Ex. R-3.0, p. 42.
[110] Aqua Ex. R-3.0, p. 42. A basis point is 1/100 of a percentage point. Beta is not measured in percent.

nothing to do with the difference of individual company betas within the groups. I estimated Aqua IL's cost of common equity with samples, not an individual company. Since no two companies are identical, one should expect that samples would contain companies with different levels of risk. Thus, I did not criticize Ms. Ahern's CEM samples for including companies with such disparate betas as 0.45 for International Aluminum and 0.85 for Abbot Labs.[111] Rather, the issue is whether a sample, as a whole, has the same level of risk as the company for which that sample is designed to be a proxy. Therefore, I criticized the difference between the average beta of her CEM sample in comparison to the average beta of her water sample. In addition, individual company betas are very unreliable. Fortunately, beta estimates can be greatly improved through the use of portfolios (i.e., samples). Therefore, differences in individual company betas are of far less significance than differences in sample betas.

50. Q. Does this conclude your rebuttal testimony?

A. Yes, it does.

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[111] Aqua Ex. 3.0, Sch. 15, p. 1.

AQUA ILLINOIS, INC.

Staff's Proposed Average 2005 Weighted Average Cost of Capital

Class of Capital	Average 2005 Balance	Percent of Total Capitalization	Cost	Weighted Cost
Short-Term Debt	$301,839	**0.25%**	**2.52%**	**0.006%**
Long-Term Debt	56,728,177	**47.79%**	**7.18%**	**3.431%**
Preferred Equity	382,372	**0.32%**	**5.48%**	**0.018%**
Common Equity	61,298,813	**51.64%**	**10.07%**	**5.200%**
Total	$118,720,615	**100.00%**		**8.655%**

Docket No. 04-0442
ICC Staff Exhibit 7.0
Schedule 7.2

AQUA ILLINOIS, INC.

Embedded Cost of Long-Term Debt
Average 2005

Coupon Rate	Debt Issue Type	Issue Date	Maturity Date	Principal Amount	Face Amt Outstanding	Unamort. Disc/Prem	Unamort. Debt Exp.	2005 Carrying Value	2004 Carrying Value	Average Carrying Value	Annual Coupon Interest	Annual Amort. Of Disc/Prem	Annual. Amort. Of Debt Exp.	Annual Interest Expense
10.40%	Series M	12/6/88	12/1/18	$ 6,000,000	$ 6,000,000	$ -	$ 77,493	$ 5,922,507	$ 5,916,508	$ 5,919,508	$ 624,000	$ -	$ 5,999	$ 629,999
9.69%	Series N	3/15/91	3/1/21	4,500,000	4,500,000	0	64,316	4,435,684	4,431,455	4,433,570	436,050	0	4,229	440,279
7.63%	Series O	9/21/95	9/1/25	8,000,000	8,000,000	0	55,503	7,944,497	7,941,687	7,943,092	610,400	0	2,810	613,210
9.19%	Series P	12/15/04	7/15/22	0	0	0	357,251	(357,251)	(358,872)	(358,061)	0	0	21,589	21,589
5.00%	Series U	11/1/02	11/1/32	9,970,000	9,970,000	0	744,788	9,225,212	9,197,456	9,211,334	498,500	0	27,756	526,256
4.90%	Series T	11/1/02	11/1/32	2,785,000	2,785,000	0	210,068	2,574,932	2,567,103	2,571,018	136,465	0	7,829	144,294
5.40%	Series S	9/1/00	9/30/30	4,500,000	4,500,000	0	270,589	4,229,411	4,218,441	4,223,926	243,000	0	10,970	253,970
5.20%	Series V (A)	12/15/03	2/1/14	6,500,000	6,500,000	0	63,299	6,436,701	6,428,880	6,432,791	338,000	0	7,821	345,821
5.40%	Series V (B)	12/15/03	2/1/16	6,500,000	6,500,000	0	65,885	6,434,115	6,427,587	6,430,851	351,000	0	6,528	357,528
5.42%	Series W	12/15/04	12/15/16	10,500,000	10,500,000	0	128,299	10,371,701	10,360,000	10,365,851	569,100	0	11,701	580,801
					$ 59,255,000	$ -	$ 2,037,490	$ 57,217,510	$ 57,130,245	$ 57,173,877	$ 3,806,515	$ -	$ 107,232	$ 3,913,747
0.00%	Non-Int. Note	6/17/75	Until Paid	$ 294,924	$ 28,334	$ -	$ -	$ 28,334	$ 28,334	$ 28,334	$ -	$ -	$ -	$ -
8.00%	Aroma Park			$ 1,000,000	$ 1,000,000	$ -	$ -	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ 80,000	$ -	$ -	$ 80,000
9.19%	Series I	7/24/92	7/15/22	$ 6,000,000	$ -	$ -	$ 85,472	(85,472)	$ (90,652)	$ (88,062)	$ -	$ -	5,180	$ 5,180
7.50%	Tax Exempt	2/1/90	2/1/20	10,000,000	0	176,841	389,874	(566,715)	(606,707)	(586,711)	0	12,632	27,360	39,992
6.10%	Series Q	9/21/95	9/1/25	9,970,000	0	178,968	430,228	(609,196)	(637,650)	(623,423)	0	6,670	21,784	28,454
6.00%	Series R	9/21/95	9/1/25	2,785,000	0	50,479	121,347	(171,826)	(179,851)	(175,839)	0	1,881	6,144	8,025
					$ -	$ 406,288	$ 1,026,921	$ (1,433,209)	$ (1,514,860)	$ (1,474,035)	$ -	$ 21,183	$ 60,468	$ 81,651
					$ 60,283,334	$ 406,288	$ 3,064,411	$ 56,812,635	$ 56,643,719	$ 56,728,177	$ 3,886,515	$ 21,183	$ 167,700	$ 4,075,398

Embedded Cost of Long-Term Debt = 7.18%

AQUA ILLINOIS, INC.

Utility Sample

Company	Factor 1	Factor 2	Factor 3	Factor 4
Northwest Natural Gas	-0.027	1.752	-0.041	0.265
Consolidated Edison	-0.288	1.127	-0.433	-0.169
WGL Holdings	0.407	1.411	0.107	-0.054
Piedmont Natural Gas	0.282	1.635	0.723	-0.270
NSTAR	0.038	-0.516	0.683	-0.265
Laclede Group	-0.329	1.699	-0.054	-1.284
Nicor, Inc.	4.137	-0.684	1.987	-0.225
Utility Sample Average	**0.603**	**0.918**	**0.425**	**-0.286**

Water Sample

Company	Factor 1	Factor 2	Factor 3	Factor 4
Aqua America, Inc.	-0.219	1.021	-0.573	2.113
York Water	-0.222	1.254	-0.617	2.212
Middlesex Water	-0.821	0.910	-0.792	1.126
California Water Service	-0.677	1.184	-1.117	0.443
Artesian Resources	-0.603	0.808	-2.146	1.537
Southwest Water	0.047	1.006	-0.943	-0.668
Water Sample Average	**-0.416**	**1.031**	**-1.031**	**1.127**
Aqua Illinois, Inc.	**0.048**	**0.647**	**-0.907**	**1.964**