STATE OF ILLINOIS

ILLINOIS COMMERCE COMMISSION

ILLINOIS COMMERCE COMMISSION	:	
ON ITS OWN MOTION	:	00-0337
- VS -	:	00-0338
CONSUMERS ILLINOIS WATER COMPANY	:	00-0339
	:	(Consolidated)
Proposed general increase in water rates	:	

AFFIDAVIT OF MICHAEL MCNALLY

STATE OF ILLINOIS	:	
	:	SS
COUNTY OF SANGAMON	:	

I, Michael McNally, being duly sworn on oath state that I am the same Michael McNally identified in the following exhibits:

ICC Staff Exhibit 7.00 (direct testimony consisting of a cover page; 52 pages of text in question-and-answer form; and Schedules 7.01, 7.02, 7.03, 7.04, 7.05, 7.06, 7.07, 7.08, 7.09, and 7.10) and

ICC Staff Exhibit 14.00 (rebuttal testimony consisting of a cover page; 38 pages of text in question-and-answer form; and Schedule 14.01);

that I have prepared the above exhibits and am familiar with the contents thereof; and that the above exhibits are true and correct to the best of my knowledge as of the date hereof.

Further affiant sayeth not.

Michael S. McNally

SUBSCRIBED AND SWORN to before me this 14th day of November, 2000.

Sandra S. Schmohe
NOTARY PUBLIC

OFFICIAL SEAL
SANDRA S. SCHMOHE
NOTARY PUBLIC, STATE OF ILLINOIS
MY COMMISSION EXPIRES 4-20-2003

OFFICIAL FILE
I.C.C. DOCKET NO. 00-0337, 00-0339
STAFF EXHIBIT NO. 7.0 + 14.0
Witness McNally
Date 11/17/00 Reporter Lee

DIRECT TESTIMONY

OF

MICHAEL MCNALLY

FINANCE DEPARTMENT

FINANCIAL ANALYSIS DIVISION

ILLINOIS COMMERCE COMMISSION

CONSUMERS ILLINOIS WATER COMPANY
PROPOSED GENERAL INCREASE IN WATER RATES

DOCKET NOS. 00-0337/00-0338/00-0339 CONSOLIDATED

AUGUST 31, 2000

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Witness Identification

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

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

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

A. I am presently a Financial Analyst in the Finance Department of the Financial Analysis Division.

3. Q. Please describe your qualifications and background.

A. 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 1999 as a Financial Analyst.

4. Q. Please state the purpose of your testimony in this proceeding.

A. The purpose of my testimony is to present the overall cost of capital and to recommend a fair rate of return on rate base for Consumers Illinois Water Company ("Company" or "CIWC"). I will also respond to the direct testimony of CIWC witness Pauline M. Ahern.

Cost Of Capital

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

A. The overall cost of capital for CIWC ranges from 9.14% to 9.39%, with a midpoint estimate of 9.27%, as shown on Schedule 7.01.

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

A. Under the traditional regulatory model, the proper balance of rate payer and shareholder interests occurs when the Commission authorizes a public utility a rate of return on its rate base equal to its overall cost of capital. If the authorized rate of return on rate base exceeds the overall cost of capital, then rate payers bear the burden of excessive prices. Conversely, if the authorized rate of return on rate base is lower than the overall cost of capital, then the utility will be unable to raise capital at a reasonable cost. Ultimately, the utility's inability to raise sufficient capital would impair service quality. Therefore, rate payer interests are served best 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 rate payer and investor interests.

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

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

Capital Structure

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

A. The Company proposes determining the rate of return on rate base on the basis of a forecasted average 2001 capital structure. The Company's proposed capital structure appears on Schedule 7.01.

9. Q. Did you make any adjustments to the Company's proposed capital structure?

A. Yes. I adjusted the average balance of long-term debt for 2001 and the corresponding unamortized debt expense to reflect an update in the proposed long-term debt issue, shown on line 8 of Schedule D-3, to correspond with the amount authorized by the Commission in ICC Docket No. 00-0422. Consequently, the average total carrying value of long-term debt for 2001 was adjusted as well. The new proposed average face amount outstanding was adjusted from $2,000,000 to $4,500,000; the average unamortized debt expense was adjusted from $66,212 to $362,128; and the average total carrying value of long-term debt was adjusted from $37,471,705 to $39,675,789.

With those adjustments, my proposed capital structure for CIWC comprises 2.87% short-term debt, 47.04% long-term debt, 0.47% preferred stock, and 49.62% common equity. That capital structure is shown on Schedule 7.01.

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

A. Yes. Financial theory suggests capital structure will affect the value of a firm and, therefore, its cost of capital, to the extent it affects the expected level of cash flows that accrue to third parties (i.e., other than debt and stock holders). Employing debt as a source of capital reduces a company's income taxes,[1] thereby reducing the cost of capital; however, as reliance on debt as a source of capital increases, so does the probability of bankruptcy. As bankruptcy becomes more probable, expected payments to attorneys, trustees, accountants and other third parties increase. Simultaneously, the expected value of the income tax shield provided by debt financing declines. Beyond a certain point, a growing dependence on debt as a source of funds increases the overall cost of capital. Therefore, the Commission should not determine the overall rate of return from a utility's actual capital structure if it determines that capital structure adversely affects the overall cost of capital.

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

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

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 all conditions, and if so, whether the cost of that financial strength is reasonable.

Towards that end, I compared Staff's proposed capital structure for CIWC to industry standards. For the four quarters ending March 2000, the weighted average common equity ratio for water utilities on *Standard & Poor's Utility Compustat* equaled 39.70%. The common equity ratio component of my proposed capital structure is 49.62%. In addition, Standard & Poor's 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.[2] Although no formula exists for determining a credit rating, Standard & Poor's publishes mean and median values of various financial ratios by credit rating. Water utilities that have an A credit rating have a mean total debt ratio of 50.05%, with a standard deviation of 16.37%.[3] The debt ratio component of my proposed capital structure is very close to the industry average at 49.91%. According to Standard & Poor's, an obligor rated 'A' has a strong capacity to meet its financial commitments but to a lesser degree than higher-rated

[2] Standard & Poor's, *Utility & Perspectives*, June 21, 1999, p. 1.
[3] Standard & Poor's, *Global Utilities Rating Service: Financial Statistics Twelve Months Ended September 30, 1999*, March 2000, p. 13.

obligors.[4] The above suggests that CIWC's capital structure is commensurate with a high but not excessive degree of financial strength. Therefore, I conclude my proposed capital structure for CIWC is reasonable for establishing rates.

Cost of Short-Term Debt

11. Q. What is the cost of short-term debt for CIWC?

A. CIWC issues short-term debt in the form of bank loans. The interest rate on those loans equals the thirty or 360-day London Interbank Offered Rate ("LIBOR") rate plus ninety-five basis points.[5] For the cost of short-term debt, I added 95 basis points to the August 9, 2000 thirty-day LIBOR rate, 6.62%, for a total cost of 7.57%.[6]

Cost of Long-Term Debt

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

A. As shown on Schedule 7.02, the embedded cost of long-term debt equals 8.48%. This calculation was based on CIWC Schedule D-3 with the following adjustments made to reconcile the information regarding the proposed new long-term debt issue, shown on line 8, with the Commission Order from Docket No. 00-0422 and to update the accompanying interest

[4] Id., at 4.
[5] CIWC Schedule D-2.
[6] *The Wall Street Journal*, August 10, 2000.

rate to a more current estimate: (1) the average face amount outstanding for 2001 was adjusted from $2,000,000 to $4,500,000; (2) the average unamortized debt expense was adjusted from $66,212 to $362,128, which reflects 4 months amortization in 2000; (3) the average total carrying value of long-term debt was adjusted from $37,471,705 to $39,675,789; and (4) the interest rate applied to the proposed new debt issue was adjusted from 6.12% to 5.85% to reflect the most recent tax-exempt bond yields.[7]

Cost of Preferred Stock

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

A. As shown on Schedule 7.03, the embedded cost of preferred stock equals 5.52%. On this matter, I agree with CIWC.

Cost of Common Equity

14. Q. How did you measure the investor required rate of return on common equity for CIWC?

A. I measured the investor required rate of return on common equity for CIWC with discounted cash flow ("DCF") and risk premium models. Since CIWC does not have market-traded common stock, DCF and risk premium models cannot be applied directly to CIWC; therefore, I applied both models to a

[7] Salomon Smith Barney, *Municipal Market Comment*, August 11, 2000, page 2.

water utility sample and a sample of utility companies comparable in risk to CIWC.[8]

Sample Selection

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

A. I selected my water sample based on three criteria. First, I began with a list of all domestic companies assigned an industry number of 4941 (i.e., water utilities) within *Standard & Poor's Utility Compustat*. Second, I removed any company which had neither Zacks Investment Research ("Zacks") nor Institutional Brokers Estimate System ("IBES") long-term growth rates. Third, I removed companies that are targets of acquisition. The remaining companies, American States Water Company; American Water Works Company, Inc.; Artesian Resources Corporation; Connecticut Water Service, Inc.; Middlesex Water Company; Pennichuck Corporation; and Philadelphia Suburban Corporation, compose my sample.

16. Q. How did you select a utility sample comparable in risk to CIWC?

A. According to financial theory, the market-required rate of return on common equity is a function of operating and financial risk. Thus, the method used to select a sample should reflect both the operating and financial characteristics of a firm. I selected a sample using twelve financial and operating ratios: (1) common equity; (2) cash flow to capitalization; (3) cash

[8] Hereafter referred to as *water sample* and *comparable sample*, respectively.

flow to debt; (4) expenditures to net utility plant; (5) fixed asset turnover; (6) free cash flow to capitalization; (7) funds flow interest coverage; (8) net cash flow to expenditures; (9) operating profit margin; (10) operating revenue stability; (11) operating income before income taxes stability; and (12) net income stability. The last three ratios were measured with the coefficient of determination of a least-squares regression of the natural logarithm of the ratios' respective quarterly data against time.[9] The stability ratios were measured over the period 1995-1999. Data from the period 1997-1999 were averaged to normalize the remaining ratios.

I began with all market-traded electric, natural gas, and water companies on *Standard & Poor's Utility Compustat* tape. Among those utilities, 124 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.[10][11] For each utility in the data base, the principal components analysis calculates a value for each component, known as a principal components score, which has a mean of zero and a standard deviation of one. From the principal components analysis, I retained four components for risk analysis. After

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

[10] 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.

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

calculating the scores for each principal component, I rank-ordered the companies in terms of least relative distance from CIWC's target scores. Distance was measured by calculating the difference between each principal component score for each firm and CIWC, summing the squared differences, and taking the square root of the summation. Schedule 7.04 presents CIWC and the 11 utilities the least distance from, and therefore, the most comparable to, CIWC that met two criteria: (1) they have either Zacks or IBES growth rates; and (2) they have neither pending nor recently completed significant mergers, acquisitions, or divestitures. Schedule 7.04 also presents the four principal component scores and the cumulative distance for CIWC and the companies composing the water and comparable samples.

DCF Analysis

17. Q. Please describe DCF analysis.

A. For a utility to attract common equity capital, it must provide a rate of return on common equity sufficient to meet investor requirements. DCF analysis establishes a rate of return directly from investor requirements. A comprehensive analysis of a utility's operating and financial risks becomes unnecessary in 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 stock equals the cumulative value of the expected stream of future dividends after each is discounted by the investor required rate of return.

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

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

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

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

where P ≡ the current stock price;

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

k ≡ the cost of common equity;

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

g ≡ the expected dividend growth rate.

That model assumes dividends will grow at a constant rate, and the market value of common stock (i.e., stock price) equals the sum of the discounted value of each dividend.

19. Q. *How did you estimate the growth rate parameter?*

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

I reviewed growth rate estimates available from IBES and Zacks which summarize and publish the earnings growth expectations of financial analysts that the research departments of investment brokerage firms employ. Schedule 7.05 presents the analyst growth rate estimates for the companies in the samples.

20. Q. How were these growth rates incorporated into your DCF analysis?

A. Since market-consensus expected growth is unobservable, any DCF estimate of the investor required rate of return includes an unknown degree of measurement error. To reflect that uncertainty, I grouped growth rate estimates based on the lower and higher observed mean growth rate of each company, which ultimately leads to a range for the cost of common equity.

The growth rate ranges for the companies in the samples are presented in Schedule 7.05.

21. Q. How did you measure the stock price?

A. A current stock price reflects all information that is available and relevant to the market; thus, it represents the market's assessment of the common stock's current value. I measured each company's current stock price with its closing market price from August 9, 2000. Those stock prices appear on Schedule 7.06.

Since stock prices reflect the market's expectation of the cash flows the securities will produce and the rate at which those cash flows are discounted, an observed change in the market price does not necessarily indicate a change in the required rate of return on common equity. Price changes may reflect an investor 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.

22. Q. Please explain the significance of the column titled "Next Dividend Payment Date" shown on Schedule 7.06.

A. Estimating year-end dividend values requires measuring the length of time between each dividend payment date and the first anniversary of the stock observation date. For the first dividend payment, that length of time is

measured from the "Next Dividend Payment Date." Subsequent dividend payments occur in quarterly intervals.

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

A. Most utilities declare and pay the same dividend per share for four consecutive quarters before adjusting the rate. Consequently, I assumed the dividend rate will 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 lower and higher expected growth rates were applied to the current dividend rate to estimate the expected dividend rate. Schedule 7.06 presents the current quarterly dividends. Schedule 7.07 presents the expected quarterly dividends.

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

A. The DCF analysis estimates the required rate of return on common equity ranges from 9.16% to 9.93% for the water sample and 9.80% to 10.80% for the comparable sample, as shown on Schedule 7.08. Those estimates are derived from the growth rates from Schedule 7.05, the stock price and dividend payment dates from Schedule 7.06, and the expected quarterly dividends from Schedule 7.07.

Risk Premium Analysis

25. Q. Please describe the risk premium model.

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

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

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

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

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

R_f ≡ the risk-free rate;

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

β_j ≡ the measure of market risk for security j.

In the CAPM, the risk factor is market risk which is defined as risk that cannot be eliminated through 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.

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

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

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

A. The proxy for the nominal risk-free rate should contain no risk premium and reflect similar inflation and real risk-free rate expectations to the security being analyzed through the risk premium methodology.[12] The yields of fixed income securities include premiums for default and interest rate risk. Default

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

risk pertains to the possibility of default on principal or interest payments. Securities of the United States Treasury are virtually free of default risk by virtue of the federal government's fiscal and monetary authority. Interest rate risk pertains to the effect of unexpected interest rate fluctuations on the value of securities.

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

28. Q. Given that 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 are similar, does it necessarily follow that the inflation and real risk-free rate

expectations that are reflected in the yields on U.S. Treasury bills and the prices of common stocks are dissimilar?

A. No. To the contrary, short and long-term inflation and real risk-free rate expectations, including those that are reflected in the yields on U.S. Treasury bills, U.S. Treasury bonds, and the prices of common stocks, should equal over time. Any other assumption unrealistically 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.[13] 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 found.

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

29. Q. What are the current yields on three-month U.S. Treasury bills and thirty-year U. S. Treasury bonds?

A. Three-month U.S. Treasury bills are currently yielding 6.40%. Thirty-year U.S. Treasury bond futures are currently yielding 5.81%. Both estimates are derived from quotes for August 9, 2000.[14] Schedule 7.09 presents the published quotes and effective yields.

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

A. In terms of the gross domestic product ("GDP") price index, WEFA forecasts the inflation rate will average 1.9% annually during the 2000-2019 period.[15] In terms of the consumer price index ("CPI"), the *Survey of Professional Forecasters* ("Survey") forecasts the inflation rate will average 2.7% during the next ten years.[16] In terms of real GDP growth, WEFA forecasts the real risk-free rate will average 3.1% during the 2000-2019 period.[17] The Survey forecasts real GDP growth will average 3.1% during the next ten years.[18] Those forecasts imply a long-term, nominal risk-free rate between 5.0% and 5.9%.[19,20] Therefore, to the extent inflation and real GDP growth expectations

[14] The Federal Reserve Board, *Federal Reserve Statistical Release: Selected Interest Rates, H.15 Daily Update*, http://www.federalreserve.gov/releases/H15/update/, August 10, 2000.

[15] *U.S. Long-Term Economic Outlook*, vol. 1, WEFA Group, Second Quarter 2000, pp. 4.4-4.5.

[16] *Survey of Professional Forecasters*, Federal Reserve Bank of Philadelphia, www.phil.frb.org/files/spf/spfq200.txt. The *Survey* aggregates the forecasts of approximately thirty forecasters.

[17] *U.S. Long-Term Economic Outlook*, vol. 1, WEFA Group, Second Quarter 2000, pp. 4.2-4.3.

[18] *Survey of Professional Forecasters*, Federal Reserve Bank of Philadelphia, www.phil.frb.org/files/spf/spfq200.txt.

[19] Nominal interest rates are calculated as follows:

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

coincide with WEFA and *Survey* forecasts, the U.S. Treasury bond yield more closely approximates the long-term risk-free rate. Therefore, I conclude that the U.S. Treasury bond yield is the better proxy for the long-term risk-free rate currently. It should be remembered, however, that the U.S. Treasury bond yield contains an upward bias due to the inclusion of an interest rate risk premium associated with its relatively long term to maturity.

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

A. The expected rate of return on the market was estimated by conducting a DCF analysis on the firms composing the Standard & Poor's 500 Index ("S&P 500"). That analysis used dividends and closing market prices as of June 30, 2000 as reported in the July 2000 edition of *Standard & Poor's Security Owner's Stock Guide*. Growth rate estimates were obtained from the June 2000 edition of *IBES Monthly Summary Data* and June 29 and August 7, 2000 Zacks reports. Firms not paying a dividend as of June 30, 2000 or for which neither IBES nor Zacks growth rates were 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 Salomon Brothers, *Performance and Weights of the S&P 500: Second Quarter 2000*. The estimated weighted average expected rate of return for the remaining 396 firms, composing 74.36% of the market capitalization of the S&P 500, equals 16.24%.

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

[20] Historically, the realized interest rate return premium averaged 1.4% during the last 75 years (Stocks Bonds, Bills, and Inflation, 2000 Yearbook, *Ibbotson Associates, p. 185)*.

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

A. I measured non-diversifiable risk with beta. When multiplied by the market risk premium, a security's beta produces a market risk premium specific to that security.

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

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

where $R_{j,t}$ ≡ the return on security j in period t;
$R_{f,t}$ ≡ the risk-free rate of return in period t;
$R_{m,t}$ ≡ the return on the market portfolio in period t;
a_j ≡ the intercept term for security j;
β_j ≡ beta, the measure of market risk for security j; and
$e_{j,t}$ ≡ the residual term in period t for security j.

A beta can be calculated for firms with market-traded common stock. For both samples, beta was calculated in three steps. First, the U.S. Treasury bill return is subtracted from the average percentage change in the two samples' stock prices and the percentage change in the S&P 500 to estimate each portfolio's return in excess of the risk-free rate. Second, the excess returns of each of the two samples are regressed against the excess returns of the S&P 500 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:

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

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

A. I use an adjusted beta estimate for two reasons. First, betas tend to regress towards the market mean value of 1.0 over time; therefore, the adjustment represents an attempt to estimate a forward-looking beta. Second, empirical tests of the CAPM suggest that the linear relationship between risk, as measured by raw beta, and return is flatter than the CAPM predicts. That is, securities with raw betas less than one tend to realize higher returns than the CAPM predicts. Conversely, securities with raw betas greater than one tend to realize lower returns than the CAPM predicts. Adjusting the raw beta estimate towards the market mean value of 1.0 compensates for the observed flatness in the linear relationship between risk and return.[21] 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.

34. Q. What are the beta estimates for the water sample and the comparable sample?

A. The raw beta for the water sample, estimated over the sixty months ending July 2000, equals 0.17; the adjusted beta equals 0.45. The raw beta for the

[21] Litzenberger, Ramaswamy and Sosin, "On the CAPM Approach to the Estimation of A Public Utility's Cost of Equity Capital," *Journal of Finance*, May 1980, pp. 375-376.

comparable sample, estimated over the same period, equals 0.13; the adjusted beta equals 0.42.

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

A. The risk premium model estimates a required rate of return on common equity of 10.50% for the water sample and 10.19% for the comparable sample. The computation of those estimates appears on Schedule 7.09.

Cost of Equity Recommendation

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

A. A thorough analysis of the required rate of return on common equity requires both the application of financial models and the analyst's informed judgment. An estimate of the required rate of return on common equity based solely on judgment is inappropriate. Nevertheless, because techniques to measure the required rate of return on common equity necessarily employ proxies for investor expectations, judgment remains necessary to evaluate the results of such analyses. Along with DCF and risk premium analyses, I have considered the observable 8.13% rate of return the market currently requires on less risky A-rated utility long-term debt.[22] Based on my analysis, in my

[22] *Moody's Long-Term Corporate Bond Yield Averages*, Moody's Investors Service, August 9, 2000, www.moodys.com/economics.nsf/web/econindyd?OpenDocument.

judgment, the investor required rate of return on common equity for CIWC ranges from 9.9% to 10.4%.

37. Q. Please summarize how you formed the range for the investor required rate of return on common equity for CIWC.

A. The models from which the individual company estimates were derived are correctly specified and thus contain no source of bias. Moreover, I am unaware of bias in any of my proxies for investor expectations.[23] Consequently, estimates for a sample as a whole are subject to less measurement error than individual company estimates. I formed a range for the investor-required rate of return on common equity by: 1) averaging the four DCF-derived estimates of the required rate of return on common equity, or 9.92%, and rounding to the nearest tenth of a percent, or 9.9%; and 2) averaging the two risk premium-derived estimates of the required rate of return on common equity, or 10.35%, and rounding to the nearest tenth of a percent, or 10.4%.

38. Q. In past CIWC rate cases Staff has recommended an additional premium be added to reflect the greater operating risk to which CIWC is exposed in comparison to that of the samples used as proxies.[24] Did you include such a premium?

[23] Except as discussed above in regard to U.S. Treasury bond yields as proxies for the long-term risk-free rate.
[24] ICC Docket Nos. 98-0632 and 99-0288.

A. No, I did not. My analysis of the risk of CIWC as compared to that of my two proxy samples, represented by the four factor scores, indicates that the risk of CIWC is equal to, or slightly less than, the risk of both the comparable sample and the water sample.

Overall Cost of Capital Recommendation

39. Q. What is the overall cost of capital for CIWC in this proceeding?

A. As shown on Schedule 7.01, the overall cost of capital for CIWC ranges from 9.14% to 9.39% with a midpoint estimate of 9.27%. The midpoint estimate incorporates a cost of common equity of 10.15%.

Response to Ms. Ahern

40. Q. Please evaluate Ms. Ahern's analysis of CIWC's cost of common equity.

A. Ms. Ahern's analysis contains several errors that lead her to over-estimate CIWC's cost of common equity. Critical errors occur in, or are the result of, her Discounted Cash Flow ("DCF"), Capital Asset Pricing Model ("CAPM"), Risk Premium ("RPM"), and Comparable Earnings ("CEM") analyses. The most significant flaws in Ms. Ahern's analysis of CIWC's cost of common equity are the following:

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

2. The growth rate Ms. Ahern used in her DCF model is questionable.

3. Ms. Ahern's CAPM analysis suffers from a number of errors, the most critical of which are her flawed derivation of the overall market return ("R_m") and an improper use of adjusted betas used in her "empirical" CAPM model.

4. Ms. Ahern's Risk Premium Model ("RPM") is flawed on several levels.

5. Ms. Ahern's Comparable Earnings Model ("CEM") is theoretically invalid.

6. Ms. Ahern's inclusion of a 0.2% size-based risk premium in her cost of equity is unwarranted.

Historical Data

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

A. The use of historical data is problematic. First, historical data improperly favors outdated information that the market no longer considers relevant over the most-recently available information. Second, historical data reflects

conditions that may not continue in the future. In other words, use of average historical data wrongly implies that securities data will revert to a mean. To the contrary, security return movements approximate a random walk, which suggests no tendency of mean reversion.[25] That is, in a random walk, the "future steps or directions cannot be predicted on the basis of past actions."[26] Finally, even if securities data were mean reverting, there is no method for determining the true value of that mean. Consequently, sample means, which depend upon the measurement period used, are substituted. Thus, any measurement period chosen is arbitrary, rendering the results uninformative.

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

A. Ms. Ahern used historical data, in part, to estimate the growth rates and dividend yields in her DCF analysis, the spread between the AAA-rated corporate bond yields and A-rated utility bond yields and the equity risk premium in her RPM analysis, the market equity risk premium in her CAPM analysis, and the return on book common equity for the two groups of 18 non-price regulated proxy companies in her CEM analysis.

43. Q. Please provide an example of how the use of historical data can distort cost of equity analyses.

[25] Burton G. Malkiel, *A Random Walk Down Wall Street*, Fourth Edition, Norton, 1985, pp. 132 and 146.
[26] Id., at 16, *emphasis added.*

A. First, consider Ms. Ahern's use of historical data[27] in determining the dividend yield (dividend ÷ stock price) in her DCF model. Since stock prices reflect all current information, only the most recent stock price can reflect the most recently available information. Historical stock prices must include observations that cannot reflect the most current information available to the market. For example, if the actual earnings for a company were much higher than anticipated, the market would react to that news and bid up its stock price. Consequently, the pre-earnings announcement stock prices would reflect obsolete information and understate the value of that company's stock.

Ms. Ahern claims that she used historical data to estimate the dividend yield because it "normalizes the recent volatility of the stock market which she believes is not representative [of] the period of time in which rates set in this docket will be in effect."[28] While it is true that measurement error is a problem inherent in cost of common equity analysis and should be reduced whenever possible, introducing old stock prices into an analysis simply substitutes one alleged source of measurement error, volatile stock prices, for another, irrelevant stock prices. Stock prices can be influenced by temporary imbalances in supply and demand; however, any distortions such imbalances might have on the measured cost of common equity can be

[27] Ms. Ahern used an average of the spot, 3 month, 6 month, and 12 month yields (Company Ex. 7, p. 26).

[28] Company response to Staff Data Request MGM 1.10.

reduced through the use of samples, a technique which Ms. Ahern already applies.

The CAPM calls for an estimate of the required rate of return on the market portfolio. Ms. Ahern estimates the required rate of return on the market using, in part, historical earned rates of return.[29] As proxies for current required rates of return, historical earned returns possess several shortcomings. First, the returns an investment generates are unlikely to have equaled investor return requirements due to unpredictable economic, industry-related, or company-specific events. Second, even if an investment's return equaled investor requirements in a given period, both the price of, and the investment's sensitivity to, each source of risk changes over time. Consequently, the past relationship between two investments, such as common equity and debt, is unlikely to remain constant. Third, the magnitude of the historical risk premium depends upon the measurement period used. Unfortunately, no widely-accepted guidelines exist for determining the appropriate measurement period. Thus, historical earned rates of return are not good estimates of the required rate of return, and the use of such data could distort the estimate of a company's cost of equity.

DCF Model

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

[29] CIWC Exhibit 7, p. 42, lines 23-26.

A. Ms. Ahern begins with growth rate estimates from seven different sources. Some are based on dividends per share ("DPS"), others on earnings per share ("EPS"); some are historical, others projected; some are from Value Line, others from IBES, and still others she derived herself.[30] She used different combinations of those growth rates to derive two average growth rate estimates. Her final DCF-based cost of equity estimate was the average of the DCF results obtained from using the two average growth rate estimates. The first average growth rate estimate reflects all seven earnings and dividend growth estimates. Specifically, Ms. Ahern's first growth rate estimate is the average of a) the mean of the highest and lowest growth estimates and b) the mean of all seven growth estimates. The second growth estimate comprises the average of the Value Line and IBES forecasts of EPS growth for each company in her samples.[31]

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

A. In addition to the short-comings of using historical data discussed previously, Ms. Ahern's growth rate contains two major problems. First, the integrity of the growth rate employed by Ms. Ahern is undermined because of missing data. For both proxy groups, the upper end of the range of estimates she employs (3.3-7.6% for the Water Group and 3.1-6.1% for the Utility Group) is based on average Value Line Projected 1996-1998 to 2002-2004 EPS

[30] CIWC Exhibit 7, Schedule 14, p. 1, columns 1-6 and 8.
[31] CIWC Exhibit 7, Schedule 14, p. 1, Column 7.

Growth Rates.[32] Unfortunately, Value Line estimates are available for only four of the seven Water Group companies and six of the eight Utility Group companies. A comparison of the Value Line Data with the IBES Projected Five Year EPS Growth Rates for the companies in her samples reveals that the companies with missing estimates have among the lowest IBES projected EPS growth rates, leaving only the companies with higher estimates to be averaged. Thus, it appears that the 7.6% and 6.1% upper end estimates of the growth rate ranges are overstated and would be lower if Value Line estimates for all companies were available. Consequently, the midpoint of those ranges appears to be overstated, as well. Likewise, Ms. Ahern's averages of all growth rates for each proxy group are uninformative because they include the Value Line Projected 1996-1998 to 2002-2004 Growth Rates for EPS and DPS, both of which suffer from missing data for lower-growth companies, as described above.

The second problem With Ms. Ahern's growth rate estimate is the inclusion of the "BR+SV" growth estimates (column 8) in her average of all seven growth estimates. Ms. Ahern's BR+SV method of estimating growth is flawed in that 1) it suffers from the same missing data problem discussed previously; 2) it requires the estimation of four variables rather than the single estimate required if growth were estimated directly, which translates into four times the estimating error potential; and 3) Ms. Ahern incorrectly substitutes the average return on all equity investment for "R," which is defined as the return on future investment only. The latter is appropriate since sustainable

[32] CIWC Exhibit 7, Schedule 14, p. 1, Column 5.

growth, which is what "BR+SV" growth rates are supposed to measure, is derived from new investment only. Capacity constraints render growth from existing investment unsustainable.

CAPM Model

46. Q. How did Ms. Ahern derive the overall market return she used in her CAPM models?

A. Ms. Ahern averaged two estimates of R_m to derive her estimate. One estimate is simply the long-term historical total equity earned return rate of 13.3%, as reported by Ibottson Associates.[33] The other estimate is based on projections reported in *The Value Line Investment Survey*.[34] For the Value Line estimate, Ms. Ahern added dividend yield and price appreciation projections in order to estimate R_m. As a proxy for the market portfolio's dividend yield, Ms. Ahern adopted the median of estimated dividend yields (for the next 12 months) of all dividend paying stocks under review in *The Value Line Investment Survey* (2.18%). For the proxy of expected growth in the market portfolio, Ms. Ahern adopted the geometric average of the Value Line 12-month, 6-month, 3-month, and spot 3-5 year estimated median price appreciation potential of all 1700 stocks in the hypothesized economic environment three to five years hence (15.83%). Those two rates were added for an R_m of 18.0%.

[33] CIWC Exhibit 7, p. 42.
[34] CIWC Exhibit 7, Schedule 16, p. 4, note (1).