COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

	)	
IN THE MATTER OF:	)	
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	)	
ADJUSTMENT OF THE RATES OF	)	**CASE NO. 2004-00103**
KENTUCKY-AMERICAN WATER COMPANY	)	
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REBUTTAL TESTIMONY
OF
DR. JAMES H. VANDER WEIDE
ON BEHALF OF

KENTUCKY-AMERICAN WATER COMPANY

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I.   WITNESS IDENTIFICATION

Q 1   What is your name and business address?

A 1   My name is James H. Vander Weide. I am Research Professor of Finance and Economics at the Fuqua School of Business of Duke University. I am also President of Financial Strategy Associates, a firm that provides strategic and financial consulting services to business clients. My business address is 3606 Stoneybrook Drive, Durham, North Carolina.

Q. 2   Are you the same James H. Vander Weide who presented direct testimony in this proceeding?

A 2   Yes, I am.

II.   PURPOSE OF TESTIMONY

Q 3   What is the purpose of your testimony?

A 3   I have been asked by Kentucky-American Water Company (KAWC) to review the direct testimony of Dr. J. Randall Woolridge on behalf of the Kentucky Office of Attorney General and to respond to his cost of capital recommendations in this proceeding.

Q 4   What areas of Dr. Woolridge's testimony will you address in your rebuttal testimony?

A 4   I will address Dr. Woolridge's comments regarding: (1) proxy companies; (2) discounted cash flow (DCF) approach; (3) capital asset pricing model (CAPM); (4) capital structure; (5) tests of reasonableness; and (6) my direct testimony.

Q 5 **Is there anything in Dr. Woolridge's testimony that would cause you to change your opinion regarding KAWC's cost of equity and capital structure?**

A 5   No, there is not.

III.   REBUTTAL OF DR. WOOLRIDGE'S DIRECT TESTIMONY

A. Proxy Companies

Q 6 **What is Dr. Woolridge's recommended rate of return on equity for KAWC?**

A 6   Dr. Woolridge recommends a rate of return on equity equal to 8.75 percent for KAWC.

Q 7 **How does Dr. Woolridge arrive at his recommended 8.75 percent rate of return on equity?**

A 7   Dr. Woolridge arrives at his recommended 8.75 percent rate of return on equity by applying both the DCF and CAPM cost of equity methodologies to two proxy groups of water companies.

Q 8 **What two proxy groups of water companies does Dr. Woolridge use to estimate KAWC's cost of equity?**

A 8   Dr. Woolridge's first proxy group of water companies consists of five small companies, including Artesian Resources Corp., Connecticut Water Services Inc., Middlesex Water Company, Pennichuck Corp., and York Water Company. His second proxy group of water companies consists of four larger companies, including American States Water, Aqua America Inc., California Water Service Group, and SJW Corp.

1	**Q 9**	**How large are Dr. Woolridge's proxy companies in terms of revenues, net**
2		**plant, and market capitalization?**
3	A 9	As Dr. Woolridge notes on page 8 of his testimony, the average company in his
4		proxy group of small water companies has total revenues of $39.1 million and
5		net plant of $147.9 million, while the average company in his proxy group of
6		larger water companies has total revenues of $259.5 million and net plant of
7		$780.4 million (data shown in Dr. Woolridge's Exhibit__(JRW-3.1). The
8		average market capitalization of the companies in the small company group is
9		approximately $136 million, and the average market capitalization of the
10		companies in the larger company group is approximately $761 million. The
11		average market capitalization of the larger company group is strongly affected
12		by the approximate $2 billion market capitalization of Aqua American, which is
13		four to seven times larger than the market capitalizations of the other
14		companies in this group.
15	**Q 10**	**Does Dr. Woolridge express an opinion regarding the most appropriate**
16		**proxy group for measuring the required rate of return for KAWC?**
17	A 10	Yes. On page 8 of his testimony, Dr. Woolridge states:
18		KAWC, with operating revenues and net plant of $43.5M and
19		$206.5M, respectively, is more similar to the SWC [Small Water
20		Company] Group and therefore the results for this group are most
21		appropriate in gauging a required rate of return for KAWC.
22	**Q 11**	**Are the companies in Dr. Woolridge's two proxy groups widely followed in**
23		**the investment community?**
24	A 11	No. Most of the companies in Dr. Woolridge's two proxy groups are small and
25		not widely followed in the investment community. Indeed, the stock prices for

1		three of the companies in Dr. Woolridge's small company group, Artesian
2		Resources, Pennichuck, and York Water, are not even reported in the S&P
3		Stock Guide.
4	**Q 12**	**Do you have any other evidence that Dr. Woolridge's proxy groups of**
5		**water companies are not widely followed in the investment community?**
6	A 12	Yes. Many investors use data from The Value Line Investment Survey to obtain
7		information on a company's future growth prospects. As shown in Dr.
8		Woolridge's Exhibit__(JRW-7), page 4 of 5, Value Line only presents historical
9		growth information for two of Dr. Woolridge's five small proxy companies
10		(presenting just five rather than 10 years of data), and presents growth
11		forecasts for only three of the nine companies in Dr. Woolridge's proxy groups
12		of small and large water companies. Since Value Line prepares growth
13		forecasts for approximately 1,600 publicly-traded companies, the fact that Value
14		Line only presents historical growth data for two of Dr. Woolridge's five small
15		companies and does not prepare growth forecasts for six of Dr. Woolridge's
16		nine proxy companies is strong evidence that his proxy companies are not
17		widely followed in the investment community.
18	**Q 13**	**Does Dr. Woolridge estimate the cost of equity for any risk proxy**
19		**companies in related industries?**
20	A 13	No, he does not.
21	**Q 14**	**Do you agree with Dr. Woodridge's sole reliance on water companies to**
22		**estimate KAWC's cost of equity?**

1 A 14   No. Dr. Woolridge relies primarily on the DCF model to estimate the cost of

2   equity in this proceeding. The DCF model requires information on investors'

3   expected growth rates for each of the proxy companies. Because Dr.

4   Woolridge's water companies are generally small, thinly traded, and not widely

5   followed in the investment community, the requisite information on investors'

6   expected growth rates for these companies is simply not available. For this

7   reason, I recommend that the Commission consider the results of applying cost

8   of equity models such as the DCF and risk premium to an additional set of

9   proxy companies that are: (1) similar in risk to the water companies; and

10   (2) more widely followed in the investment community.

11 **Q 15   Have other states recognized the problems of relying entirely on a proxy**

12   **group consisting only of water companies that are not widely followed in**

13   **the investment community?**

14 A 15   Yes. Recognizing the problems with using a sample of small water companies

15   that are thinly traded and not widely followed in the investment community, the

16   Florida Public Service Commission relies entirely on Value Line natural gas

17   companies to estimate the cost of equity for Florida water utilities. Based on

18   cost of equity studies for a proxy group of Value Line natural gas companies, in

19   July 2004, the Florida Commission established a cost of equity of 11.40 percent

20   for water utilities with 40 percent equity in their capital structure. (KAWC is

21   recommending a capital structure containing 40.9 percent in this proceeding.)[1]

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[1] http://www.psc.state.fl.us/psc/dockets/index.cfm?event=documentFilings&docket=040006&requestTimeout=240

B. DCF Approach

Q 16 **How does Dr. Woolridge estimate KAWC's cost of equity?**

A 16   On page 16 of his testimony, Dr. Woolridge states:

> I rely primarily on the discounted cash flow model to estimate the cost of equity capital. I believe that the DCF model provides the best measure of equity cost rates for public utilities. I have also performed a Capital Asset Pricing Model (CAPM) study, but I give these results less weight because I believe that risk premium studies, of which the CAPM is one form, provide a less reliable indication of equity cost rates for public utilities.

Q 17 **What is the DCF approach to estimating the cost of equity?**

A 17   The DCF approach is based on the assumption that investors value their investment in a company's stock on the basis of the future cash flows, or dividends, they expect to receive from owning the stock. Assuming that dividends are received only at the end of each year and grow at a constant annual rate, g, the DCF approach implies that the cost of equity can be estimated from the equation $k = D_1/P_s + g$, where k is the cost of equity, D_1 is the expected next period annual dividend, P_s is the current price of the stock, and g is the constant annual growth rate in earnings, dividends, and book value per share. The term D_1/P_s is called the dividend yield component of the annual DCF model, and the term g is called the growth component of the annual DCF model. When dividends are paid quarterly, the annual DCF model must be modified to correctly account for the quarterly payment of dividends.

Q 18 **Does Dr. Woolridge correctly modify the annual DCF model to account for the quarterly payment of dividends?**

A 18 No. Despite the fact that his proxy group of water companies all pay dividends quarterly, Dr. Woolridge continues to use a DCF model which incorrectly assumes that dividends are paid annually.

Q 19 How does Dr. Woolridge estimate the dividend yield component of the DCF cost of equity for his two proxy groups?

A 19 Dr. Woolridge estimates the dividend yield component of the annual DCF cost of equity for his two proxy groups in three steps. First, he calculates the average dividend yield for each company over the 12-month period ending August 2004. This step produces an average dividend yield for the small company group equal to 3.10 percent, and for the large company group, 3.30 percent. Second, Dr. Woolridge calculates the average dividend yield for both proxy groups for the month of August 2004, finding a yield equal to 3.50 percent for both groups. Third, Dr. Woolridge averages the 12-month and the August dividend yields for the two groups, obtaining a result for the small group equal to 3.30 percent and for the large group, 3.40 percent.

Q 20 Does Dr. Woolridge explain why he used both a 12-month dividend yield and a one-month dividend yield to estimate the DCF cost of equity for his proxy groups of water companies?

A 20 No, he does not.

Q 21 Since Dr. Woolridge is estimating the cost of equity in August 2004, is there any economic justification for using a 12-month average dividend yield for his proxy companies to estimate the DCF cost of equity?

A 21 No. The annual DCF approach clearly requires the use of a current dividend yield multiplied by one plus the growth rate. Since he is estimating the cost of equity in August 2004, Dr. Woolridge should have relied on the dividend yield in August 2004. His incorrect use of the lower 12-month dividend yield by itself caused Dr. Woolridge to underestimate his proxy companies' cost of equity by 10 to 20 basis points.

Q 22 How does Dr. Woolridge estimate the expected future growth component of the DCF cost of equity for his proxy groups?

A 22 Dr. Woolridge considers historical growth rates in sales, earnings, dividends, and book value, as well as projected growth rates in earnings, dividends, and book value in those cases where forecasted data is available. For most of his proxy companies, the average historical growth rates are significantly less than the projected growth rates. Dr. Woolridge's final estimate of the growth rate that investors expect for his proxy companies is based on his judgment and falls near the midpoint of a range determined by the historic and projected growth rates.

Q 23 Do you agree with Dr. Woolridge's use of historical growth rates to estimate investors' expectation of future growth in the DCF model?

A 23 No. My studies indicate that investors use analysts' earnings growth forecasts in making stock buy and sell decisions rather than historical growth rates such as those presented by Dr. Woolridge.

Q 24 What DCF results would Dr. Woolridge have obtained if he had implemented the DCF model correctly?

1   A 24   As shown on Vander Weide Rebuttal Schedule A, Dr. Woolridge would have

2   obtained a DCF cost of equity equal to 11.08 percent his small water company

3   group and 11.45 percent for the large water company group.

4   **C. CAPM**

5   **Q 25   You note that Dr. Woolridge also used the CAPM to estimate the cost of**

6   **equity for KAWC. Please describe the CAPM.**

7   A 25   The CAPM is an equilibrium model of the security markets in which the expected

8   or required return on a given security is equal to the risk-free rate of interest, plus

9   the company equity "beta," times the market risk premium:

10   *Cost of equity = Risk-free rate + Equity beta x Market risk premium*

11   The risk-free rate in this equation is the expected rate of return on a risk-free

12   government security, the equity beta is a measure of the company's risk relative

13   to the market as a whole, and the market risk premium is the premium investors

14   require to invest in the market basket of all securities compared to the risk-free

15   security.

16 **Q 26   How does Dr. Woolridge use the CAPM to estimate the cost of equity for**

17   **his proxy companies?**

18 A 26   The CAPM requires an estimate of the risk-free rate, the company-specific risk

19   factor or beta, and the expected return on the market portfolio. For his estimate

20   of the risk-free rate, Dr. Woolridge used the yield to maturity on 10-year U. S.

21   Treasury notes to arrive at his recommended rate of return on equity for KAWC.

22   For his estimate of the company-specific risk, or beta, Dr. Woolridge used the

1 average Value Line beta for his proxy companies. For his estimate of the

2 expected return on the market portfolio, Dr. Woolridge used:

3 the average of: (I) the 4.0% average ex ante expected equity risk
4 premiums from the studies covered in the Derrig and Orr (2003)
5 study, and (2) an ex ante expected equity risk premium developed
6 using Ibbotson and Chen's "building blocks methodology."
7 [Woolridge at p. 36.]

8 Using these data, Dr. Woolridge's risk premium estimate is 3.80 percent.

9 **Q 27 Do you agree with Dr. Woolridge's estimate of the risk-free rate?**

10 A 27 No. I disagree with Dr. Woolridge's use of the yield to maturity on 10-year

11 Treasury notes to estimate the risk-free rate in his CAPM approach. Dr.

12 Woolridge is using the CAPM to estimate the required rate of return on an

13 investment in the common stock of a company with a long-term expected life.

14 The yield to maturity on 10-year Treasury notes is not risk free over the long-

15 term expected life of his proxy companies because the interest and principle on

16 10-year Treasury notes would have to be reinvested at an unknown interest

17 rate once the notes matured. Thus, to estimate the risk-free rate in the CAPM,

18 Dr. Woolridge should have used the yield to maturity on long-term Treasury

19 bonds. Since the interest rate on long-term Treasury bonds is typically 25- 50

20 basis points higher than the interest rate on intermediate-term Treasury notes,

21 Dr. Woolridge's use of the yield to maturity on 10-year U.S. Treasury notes

22 biased his CAPM results downward and caused him to underestimate the cost

23 of equity for his proxy companies.

24 **Q 28 You mention that Dr. Woolridge's 3.80 percent market risk premium in his**

25 **CAPM is based in part on a 4 percent risk premium found in the studies**

1 **summarized in the Derrig-Orr paper. Does the Derrig-Orr paper endorse a**

2 **market risk premium of 4 percent?**

3 A 28 No. The Derrig-Orr paper merely reports the results of a large number of

4 papers in the finance literature. They do not endorse or even report the

5 4 percent risk premium that Dr. Woolridge uses in his CAPM. Furthermore,

6 Derrig and Orr provide several important caveats concerning the use of the

7 research results from the literature that their paper summarizes. In particular,

8 Derrig-Orr warn that many of the results reported in the literature they survey

9 were based on data for periods prior to the large market correction of 2000 –

10 2002 and that risk premiums calculated from data before this period may not

11 apply in the long run:

12 Therefore, actuaries should be wary of using the low long-run estimates
13 made prior to the large market correction of 2000 – 2002. [Richard A
14 Derrig and Elisha D. Orr, "Equity Risk Premium: Expectations Great
15 and Small," North American Actuarial Journal, Vol. 8, No. 1, page 59.]

16 In addition, Derrig and Orr argue that most of the equity risk premium estimates

17 that are lower than the long-run historical estimates[2] have been unduly

18 influenced by recent low dividend yields and data prior to 1926:

19 Most of the ERP estimates lower than the unconditional historical
20 estimate have an undue reliance on recent lower dividend yields
21 (without a recognition of capital gains) and/or on data prior to 1926.
22 [Derrig and Orr, p. 59.]

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[2] The best estimates of long-run historical risk premiums are found in the publication *Stocks, Bonds, Bills, and Inflation* published annually by Ibbotson Associates. The most recent long-run equity risk premium reported by Ibbotson Associates is 7.6 percent over 10-year Treasury notes and 7.2 percent on long-term Treasury bonds. See *Stocks, Bonds, Bills, and Inflation 2004 Yearbook*, page 175.

Finally, Derrig and Orr suggest that it is dangerous for actuaries to use ex ante forecasts that are different from the long-run realized averaged equity risk premium based on the Ibbotson data base:

> It is dangerous for actuaries to engage in simplistic analyses of historical ERPs to generate ex ante forecasts that differ from the realized mean. [Derrig and Orr, p. 60.]

Q 29 **You also note that Dr. Woolridge's final 3.8 percent market risk premium is based in part on his application of the "building blocks" methodology developed by Ibbotson and Chen. Does the Ibbotson-Chen paper support Dr. Woolridge's recommended 3.8 percent risk premium for use in the CAPM?**

A 29 No. The Ibbotson-Chen paper supports an equity risk premium of 6 percent. Dr. Woolridge achieves a lower risk premium than Ibbotson-Chen because he estimates a lower rate of inflation than Ibbotson-Chen, and he fails to recognize that Ibbotson-Chen properly use the arithmetic mean risk premium rather than the geometric mean risk premium to forecast future equity returns.

Q 30 **Is the Ibbotson who co-authored the Ibbotson-Chen equity risk premium paper also the Ibbotson who is President of Ibbotson Associates, a company that is the major provider of risk premium data to the financial community?**

A 30 Yes, he is.

Q 31 **What risk premium does Ibbotson Associates recommend for use in the CAPM?**

1 A 31 Ibbotson Associates recommends a risk premium equal to 7.2 percent over the

2   yield to maturity on 20-year Treasury bonds. Ibbotson Associates argues that

3   the long-run historic arithmetic mean risk premium is most appropriate for use in

4   the CAPM because the arithmetic mean is the best estimate of the expected

5   risk premium on a forward-looking basis, and there is no evidence that risk

6   premiums have declined over time as Dr. Woolridge suggests.

7 **Q 32 Does Ibbotson Associates recommend any other modifications to the**

8   **CAPM for small capitalization companies such as those in Dr. Woolridge's**

9   **two proxy groups?**

10 A 32 Yes.   Ibbotson Associates also recommends a risk premium adder for the

11   additional risks faced by small companies such as those in Dr. Woolridge's

12   proxy groups. Thus, the CAPM equation for small companies such as those

13   considered by Dr. Woolridge becomes:

14   *Cost of Equity = Risk-free Rate + Beta x Market Risk Premium + Small Company Risk Premium*

15   Ibbotson Associates estimates that the small company risk premium is equal to

16   approximately 4 percent for small companies such as KAWC.

17 **Q 33 What cost of equity would Dr. Woolridge have obtained from an**

18   **application of the CAPM if he had implemented the CAPM correctly?**

19 A 33 If he had implemented the CAPM correctly, Dr. Woolridge would have obtained

20   a cost of equity for KAWC equal to 13.5 percent ([4.5 + (.655 x 7.6) + 4] =

21   13.5).[3]

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[3] I used a risk premium of 7.6 percent in this calculation because Dr. Woolridge used the yield to maturity on 10-year Treasury notes to measure the risk-free rate of interest; and, as noted above 7.6 percent is Ibbotson Associates' recommended risk premium over the yield to maturity on 10-year Treasury notes.

D. Capital Structure

Q 34 **What capital structure does Dr. Woolridge recommend for the purpose of estimating KAWC's weighted average cost of capital?**

A 34 Dr. Woolridge recommends a capital structure containing 7.78 percent short-term debt, 46.41 percent long-term debt, 4.60 percent preferred stock, and 41.21 percent common equity.

Q 35 **How does Dr. Woolridge arrive at his recommended capital structure?**

A 35 Dr. Woolridge states on pp. 9 – 10 of his direct testimony that his recommended capital structure is the average of KAWC's quarterly capitalization ratios over the past three years.

Q 36 **How does Dr. Woolridge's recommended capital structure differ from KAWC's forecasted capital structure for the test year?**

A 36 Dr. Woolridge's recommended capital structure has significantly more short-term debt and less long-term debt than KAWC's forecasted capital structure for the test year. Since the cost rate for short-term debt is 2.70 percent, while the cost rate for long-term debt is 6.33 percent, Dr. Woolridge's over-weighting of short-term debt causes him to underestimate KAWC's projected cost of capital for the test year. Furthermore, if Dr. Woolridge's capital structure recommendation were adopted, KAWC would be unable to earn its cost of capital over the test period.

Q 37 **Are there any economic reasons why KAWC would want to rely less heavily on short-term debt during the test year than it did over the past three years?**

1   A 37   Yes. Since early 2001, the Federal Reserve has greatly reduced short-term

2   interest rates in an effort to stimulate the economy. In response to the

3   significant reductions in short-term interest rates in 2001 and 2002, many

4   companies relied more heavily on short-term debt than they would have under

5   more normal circumstances. Now that the Federal Reserve is increasing short-

6   term interest rates, companies such as KAWC should use less short-term debt

7   to finance business operations.

8   **E. Tests of Reasonableness**

9   **Q 38   Does Dr. Woolridge attempt to test the reasonableness of his**

10   **8.75 recommended cost of equity for KAWC?**

11   A 38   Yes. On page 48 of his testimony, Dr. Woolridge states, "To test the

12   reasonableness of my 8.75 percent recommendation, I have examined the

13   relationship between the return on common equity and the market-to-book

14   ratios for the water group."

15   **Q 39   What did Dr. Woolridge's examination of the relationship between the**

16   **return on common equity and the market-to-book ratios for the water**

17   **company groups reveal?**

18   A 39   Dr. Woolridge's examination revealed that his small water company group has

19   an average return on common equity equal to 8.7 percent and a market-to-book

20   ratio equal to 2.22, while his large water company group has an average return

21   on common equity equal to 9.1 percent and a market-to-book ratio equal to

22   1.94.

1 **Q 40 What conclusions does Dr. Woolridge draw from his analysis of the rates**

2 **of return on equity and the market-to-book ratios of his water companies?**

3 A 40 Dr. Woolridge concludes that : (1) his water companies "are earning returns on

4 equity significantly above their equity cost rates; and (2) "my recommended

5 equity cost rate of 8.75 percent is reasonable and fully consistent with the

6 financial performance and market valuation of the water group." [Woolridge at

7 p. 48.]

8 **Q 41 Do you agree with Dr. Woolridge's conclusion that market-to-book ratios**

9 **in excess of 1.0 indicate that his water companies are earning rates of**

10 **return on equity that are significantly above their equity cost rates?**

11 A 41 No. Contrary to Dr. Woolridge's assertion, market-to-book ratios cannot be used

12 to draw any conclusions regarding the relationship between his water

13 companies' current earned rates of return on equity and their cost of equity. If

14 anything, market-to-book ratios can only be used to draw conclusions about the

15 relationship between investors' expectation regarding a company's long-run

16 future earned rate of return on equity and its cost of equity. Since current

17 accounting rates of return are frequently poor indicators of long-run future

18 expected rates of return on equity, Dr. Woolridge's conclusions regarding the

19 adequacy of his water companies' current rates of return on equity is entirely

20 inappropriate.

21 **Q 42 Why are accounting rates of return on equity frequently a poor indicator**

22 **of expected long-run future rates of return on equity?**

A 42 Current accounting rates of return on equity are frequently poor indicators of expected long-run future rates of return on equity because they are: (1) intended to reflect the results of past performance rather than expectations for future performance; (2) based on historical prices and historical cost accounting principles rather than future expected prices and economic principles; (3) highly sensitive to estimates and assumptions that may not reflect the firm's future economic performance; and (4) sensitive to one-time events that are unlikely to occur in the future.

Q 43 **Does the fact that accounting rates of return on equity are frequently poor indicators of future economic rates of return on equity imply that a firm can have a market-to-book ratio greater than 1.0 even when its current accounting rate of return on equity is less than its cost of capital?**

A 43 Yes. Because current accounting rates of return on equity are poor indicators of expected long-run future rates of return on equity, and stock prices reflect the future, not the past, a firm can have a market-to-book ratio in excess of 1.0 even when its current accounting rate of return on equity is obviously less than its cost of equity capital. A high market-to-book ratio in this instance reflects investors' beliefs that the current accounting rate of return on equity is a poor measure of the firm's expected long-run future rate of return on equity.

Q 44 **Is it highly unusual for a company that is clearly earning less than its cost of common equity capital to have a market price exceeding the book value of its shares?**

1	A 44	No. It is common for companies whose accounting rates of return on book
2		equity are less than their costs of common equity capital to have market prices
3		exceeding the book values of their shares. For example, there are many
4		companies with negative returns on equity, or returns that are less than the
5		interest rate on A-rated utility bonds, but with market-to-book ratios in excess of
6		1.0. These companies clearly could not be earning more than their costs of
7		equity because the cost of equity cannot be negative and must certainly be
8		greater than the yield to maturity on A-rated utility bonds.
9	**Q 45**	**Have you prepared an exhibit showing firms that have market to book**
10		**ratios greater than 1.0 and negative rates of return on equity?**
11	A 45	Yes. The Value Line Investment Survey universe of firms has 170 companies
12		whose most recently reported accounting rates of return on equity are negative
13		and whose market prices exceed book values, as shown on Vander Weide
14		Rebuttal Schedule B. The average market-to-book ratio for these companies is
15		2.92, and their average rate of return on book equity is minus 16.83 percent.
16		Clearly, a company whose rate of return on common equity is negative cannot
17		be earning more than its cost of equity capital.
18	**Q 46**	**Have you also prepared an exhibit showing firms that have market-to-**
19		**book ratios greater than 1.0 and rates of return on book equity that are**
20		**clearly lower than their cost of equity?**
21	A 46	Yes. As shown on Vander Weide Rebuttal Schedule C, the Value Line universe
22		of firms has 229 companies that have market-to-book ratios above 1.0 and
23		rates of return on book equity in the range 0 percent to 6.5 percent, the

1	approximate yield on A-rated utility bonds in recent months. The average
2	earned rate of return on equity for these companies is 3.94 percent, and the
3	average market-to-book ratio, 2.25. Clearly these firms have market-to-book
4	ratios greater than 1.0 even though they are earning significantly less than the
5	return investors can earn on a less risky bond investment and therefore less
6	than their cost of equity capital.

Q 47 **How many companies are there in the Value Line universe of companies with reported market-to-book ratios?**

A 47 The Value Line universe contains a market-to-book ratio for 1,568 companies.

Q 48 **Of these 1,568 companies, how many companies have market-to-book ratios of less than 1.0?**

A 48 Of the 1,568 companies with market-to-book ratios, only 82 companies have market-to-book ratios of less than 1.0.

Q 49 **Is it likely, in a competitive economy such as ours, that only 82 out of 1,568 companies would be earning less than their costs of capital, as Dr. Woolridge would assert, while the remaining companies are earning in excess of their costs of capital?**

A 49 No. In a competitive economy such as ours, one would expect the average company to earn exactly its cost of capital. Thus, roughly half the companies would be earning more than their costs of capital, and half would be earning less than their costs of capital.

Q 50 **What conclusions do you draw from these long lists of companies that have negative or low rates of return on equity and market prices well in excess of book values?**

A 50 I conclude that no inferences about the reasonableness of Dr. Woolridge's estimated cost of equity can be made from an analysis of market-to-book ratios and current earned rates of return on equity. Dr. Woolridge's basic assumption that a company having a market-to-book ratio greater than 1.0 is earning more than its cost of equity is simply incorrect.

Q 51 **As an alternative test of reasonableness, have you compared Dr. Woolridge's recommended 8.75 percent cost of equity to the allowed rates of return on equity for public utilities across the country?**

A 51 Yes. In the last three years, public utility commissions have authorized rates of return on equity for utilities under their jurisdiction equal to approximately 11 percent, 225 basis points higher than Dr. Woolridge's recommended 8.75 percent rate of return on equity. From this data, it is evident that his recommended rate of return on equity is unreasonably low.

IV. REBUTTAL OF DR. WOOLRIDGE'S COMMENTS ON MY DIRECT TESTIMONY

A. Proxy Companies

Q 52 **What proxy companies do you recommend for use in estimating KAWC's cost of equity in this proceeding?**

A 52   I recommend a group of six publicly-traded water companies and 12 publicly-traded local natural gas distribution companies (LDC) for use as risk proxies in estimating KAWC's cost of equity.

Q 53   How did you choose your water company group?

A 53   I chose all the water companies included in The Value Line Investment Survey that have sufficient data to estimate a DCF cost of equity, including at least one analyst's growth forecast.

Q 54   How did you choose your LDC proxy group?

A 54   I chose all the companies in Value Line's natural gas industry groups that receive a significant percentage of revenues and income from regulated natural gas businesses and otherwise have sufficient data to estimate the DCF cost of equity.

Q 55   Does Dr. Woolridge agree with your choice of proxy companies?

A 55   No. Dr. Woolridge has three criticisms of my choice of proxy companies. First, he argues that my proxy water companies on average are significantly larger than KAWC. Second, he argues that Southwest Water Company receives only 30 percent of its revenues from water operations. Third, he argues that the LDCs have greater business risk than water companies. [Woolridge at page 51.]

Q 56   Does the fact that your water companies are larger than KAWC indicate that they are riskier than KAWC?

A 56   No. It is generally accepted by the financial community that larger companies are generally less risky than smaller companies, especially companies as small

1		as KAWC. Thus, if anything, my water company group is a conservative proxy
2		for the risks of investing in KAWC.
3	**Q 57**	**What are the primary advantages of using a sample of larger water**
4		**companies to estimate KAWC's cost of equity?**
5	A 57	The primary advantage of using a sample of larger water companies is that the
6		larger water companies are more widely followed by the investment community;
7		and hence, there is generally more information available regarding investors'
8		growth expectations for these companies. Many of the publicly-traded water
9		companies are so small that there is simply insufficient data available to
10		estimate the growth component of the DCF model. Such is the case for the
11		small companies in Dr. Woolridge's proxy groups.
12	**Q 58**	**Do you agree with Dr. Woolridge's comment on page 51 of his testimony**
13		**that Southwest Water Company "only receives 33 percent of its revenues**
14		**from water operations"?**
15	A 58	No. From the information in Southwest Water Company's 10K, Southwest
16		Water Company apparently receives 100 percent of its revenues from water-
17		related operations. Although some of Southwest Water Company's water
18		services are unregulated, these services are subject to similar economic
19		conditions as their regulated water services. Specifically, the unregulated
20		services group provides contractual water services to municipal utility districts.
21	**Q 59**	**Why do you recommend a group of LDCs in addition to a group of water**
22		**companies as risk proxies for KAWC?**

A 59   I recommend a group of LDCs as an additional risk proxy group for KAWC

because: (1) water companies are not widely followed in the investment

community; (2) the LDCs are comparable in risk to the water companies; and

(3) it is useful to examine the cost of equity results for a larger group of

companies of similar risk with a wider following in the investment community to

test the reasonableness of the results obtained from applying cost of equity

methodologies to a small group of publicly-traded water companies.

Q 60   Does Dr. Woolridge agree with your use of LDCs to estimate KAWC's cost

of equity?

A 60   No. Dr. Woolridge claims that the business risks of the LDCs are greater than

the business risks of the water companies.

Q 61   Did you provide any evidence in your direct testimony regarding the

relative risks of your proxy group of LDCs compared to your proxy group

of water companies?

A 61   Yes. On page 28 of my direct testimony, I provided evidence that the average

Value Line safety rank of my proxy group of LDCs is 2 on a scale where 1 is the

most safe and 5 is the least safe, whereas the water companies have an

average Value Line safety rank of approximately 3. Value Line defines "safety

rank" as follows:

> **Safety Rank**. A measure of potential risk associated with individual
> common stocks. The Safety Rank is computed by averaging two
> other Value Line indexes—the Price Stability Index and the
> Financial Strength rating. Safety Ranks range from 1 (Highest) to 5
> (Lowest). Conservative investors should try to limit purchases to
> equities ranked 1 (Highest) or 2 (Above Average) for Safety.

Q 62   Do you have any other evidence that the LDCs are conservative proxies for the risk of investing in water companies such as KAWC?

A 62   Yes.   The business and financial risks of investing in LDCs and water companies is increased by the high proportion of these companies' costs that are fixed.   One measure of fixed costs is the ratio of net plant to revenues, which indicates the number of dollars of fixed assets required to achieve one dollar of revenues.   As shown in Rebuttal Schedule D, the ratio of net plant to revenues for the water companies, 3.51, is significantly higher than the ratio of net plant to revenues for the LDCs, 1.24.   These data indicate that water companies have a significantly higher percentage of fixed costs than the LDCs.

B. DCF Model

Q 63   Did you employ the DCF model to estimate KAWC's cost of equity?

A 63   Yes, I did.

Q 64   What are Dr. Woolridge's major criticisms of your DCF studies?

A 64   On page 53 of his testimony, Dr. Woolridge states, "I have three major concerns with Dr. Vander Weide's DCF equity cost rate study: (1) quarterly model, (2) flotation cost adjustment, and (3) his biased and unjustifiable DCF growth rates."

Q 65   What is the major difference between the quarterly DCF model which you use and the annual DCF model employed by Dr. Woolridge?

A 65   The major difference is that my quarterly DCF model is based on the realistic assumption that dividends are paid quarterly, while Dr. Woolridge's annual DCF

1		model is based on the unrealistic assumption that dividends are paid once at
2		the end of each year.
3	**Q 66**	**Why does Dr. Woolridge disagree with your application of the quarterly**
4		**DCF model?**
5	A 66	Dr. Woolridge argues first that an early proponent of the DCF model, Dr. Myron
6		Gordon, has testified before the FCC that "the appropriate dividend yield
7		adjustment for growth in the DCF model is the expected dividend for the next
8		quarter multiplied by four." [Woolridge at p. 53.] Second, Dr. Woolridge argues
9		that Professor Bower has stated that the conventional DCF calculation does
10		produce a downwardly-biased estimate of the cost of equity, but the annual
11		DCF model provides the most appropriate estimate of the utility's required
12		return when the resulting required rate of return is applied to a forward-looking
13		rate base. [Woolridge at p. 54.]
14	**Q 67**	**Is the fact that Dr. Gordon testified in favor of an annual DCF model a**
15		**reasonable justification for use of the annual DCF model in this**
16		**proceeding?**
17	A 67	No. Although Dr. Gordon was certainly a major early proponent of the DCF
18		model, this does not imply that Dr. Gordon is correct in his arguments regarding
19		the quarterly DCF model. As shown in my Appendix 1 (filed with my direct
20		testimony), there can be no doubt that, when dividends are paid quarterly, the
21		quarterly DCF model must be used to estimate the cost of equity.

Q 68 **Do you agree with Dr. Bower's statement that the annual DCF calculation is a downwardly-biased estimate of the market cost of equity when companies pay dividends quarterly?**

A 68 Yes. That is why I use the quarterly DCF model to estimate the cost of equity in this proceeding.

Q 69 **Do you agree with Dr. Bower's argument that it is appropriate to apply the annual DCF model for a utility whose rate base is measured over a forward-looking period?**

A 69 No. I believe that it is important to measure the cost of equity correctly, as I have done in this proceeding. Once the cost of equity is estimated correctly, the Commission should ask the second question, "Will the company be able to earn its allowed rate of return when this cost of equity is applied to a forward-looking rate base?" For KAWC, it is evident from Exhibit MAM-1 of Mr. Miller's testimony that KAWC has not been able to earn its allowed rate of return in each of the last three years. In these circumstances, it would certainly be inappropriate to assume that KAWC would over-earn its cost of equity if the rate of return derived from use of a quarterly DCF model is applied to a forward-looking rate base.

Q 70 **Dr. Woolridge argues on page 55 of his testimony that your flotation cost adjustment should be rejected because KAWC did not issue stock during the past several years and has no plans to issue common stock during the test year. Is your flotation cost adjustment meant to recover flotation costs incurred in the past several years or during the test year?**

1   A 70   No. As I explain on page 21 of my direct testimony and in Exhibit__(JVW-1),

2   Appendix 2 filed with my direct testimony:

> a flotation cost adjustment is required whether or not a company issued new stock during the test year. Previously incurred flotation costs have not been recovered in previous rate cases; rather, they are a permanent cost associated with past issues of common stock. Just as an adjustment is made to the embedded cost of debt to reflect previously incurred debt issuance costs (regardless of whether additional bond issuances were made in the test year), so should an adjustment be made to the cost of equity regardless of whether additional stock was issued during the test year.

13   **Q 71   Dr. Woolridge also criticizes your use of analysts' growth rates in your**

14   **DCF model. Why do you use analysts' growth rates to estimate the**

15   **growth component of the DCF model?**

16   A 71   I use analysts' growth rates because my studies indicate that the analysts'

17   growth rates are highly correlated with stock prices. This evidence provides

18   strong support for the conclusion that investors use analysts' growth rates in

19   making stock buy and sell decisions, and thus the analysts' growth rates should

20   be used to estimate the growth component of the DCF model.

21   **Q 72   Does Dr. Woolridge agree with your statistical studies of the relationship**

22   **between analysts' growth rates and stock prices?**

23   A 72   No. Dr. Woolridge has four criticisms of my statistical study of the relationship

24   between analysts' growth rates and stock prices. First, he argues that my

25   statistical study is outdated. Second, he argues that my study is misspecified

26   because I used a "linear approximation" to the DCF model rather than a

27   modified version of the DCF model. Third, he argues that I did not use both

28   historical and analysts' forecasted growth rates in the same regression. Fourth,

1		he argues that I did not perform any tests to determine if the difference between
2		historic and projected growth measures is statistically significant.
3	**Q 73**	**Have you updated your statistical analysis of the relationship between**
4		**analysts' growth rates and stock prices since the time of your original**
5		**study?**
6	A 73	Yes. I updated my statistical study in August 2004 and found that the analysts'
7		growth rates continue to be more highly correlated with stock prices than
8		historical measures such as those employed by Dr. Woolridge. The updated
9		study was performed under my direction by State Street Global Advisors and is
10		provided in Attachment A.
11	**Q 74**	**Do you agree with Dr. Woolridge's criticism that your DCF model is**
12		**misspecified because you used a "linear approximation" to the DCF**
13		**model rather than a modified version of the DCF model?**
14	A 74	No. Most regression analyses are based on the assumption that the
15		relationship between the variables being studied is linear. As part of my
16		studies, I tested whether the linear assumption was sufficiently close to provide
17		reliable estimates of the model parameters. Applying a first order Taylor-series
18		approximation to the DCF equation, I found that the first order, or linear,
19		approximation was sufficiently close to the true equation to justify using linear
20		regression analysis to study the relationship between price/earnings ratios and
21		growth rates.
22	**Q 75**	**Why did you not use a combination of historical and analysts' growth**
23		**rates in the same regression?**

A 75 I did not use a combination of historical and analysts' growth rates in the same regression because there are an infinite number of such combinations which could be tested. My studies indicate that the relationship between analysts' forecasts and stock prices is so strong compared to the relationship between historical growth rates and stock prices that there would be little advantage to combining historical growth rates with analysts' forecasts to predict stock prices.

Q 76 **Is there a statistically significant difference between historical and projected growth measures in explaining stock prices in your statistical study?**

A 76 Yes. The difference in performance of historical and projected growth rates is both statistically significant and dramatic.

C. Risk Premium

Q 77 **What is the risk premium approach to estimating the cost of equity?**

A 77 The risk premium approach is based on the principle that investors expect to earn a return on an equity investment in KAWC that reflects a "premium" over and above the return they expect to earn on an investment in a portfolio of long-term bonds. This equity risk premium compensates equity investors for the additional risk they bear in making equity investments versus bond investments. Using the risk premium approach, the cost of equity is given by the following equation: cost of equity = interest rate plus risk premium.

Q 78 **How did you estimate the interest rate component of the risk premium approach?**

1   A 78   I estimated the interest rate component of the risk premium approach using the

2   yield to maturity on A-rated utility bonds.

3   **Q 79   Does Dr. Woolridge have any criticisms of your use of the yield to**

4   **maturity on A-rated utility bonds to estimate the interest rate component**

5   **of the risk premium approach?**

6   A 79   Yes. On page 62 of his testimony, Dr. Woolridge argues that my use of the

7   yield to maturity on A-rated utility bonds inflates the required return on equity

8   because long-term utility bonds are not risk free, that is, they are subject to both

9   interest rate risk and credit risk.

10   **Q 80   Do you agree with Dr. Woolridge's criticism of your use of the yield to**

11   **maturity on A-rated utility bonds to estimate the interest rate component**

12   **of the risk premium approach?**

13   A 80   No. Dr. Woolridge fails to recognize that the risk premium approach does not

14   require that the interest rate be "risk free." Indeed, the only requirement of the

15   risk premium approach is that the same interest rate be used to estimate the

16   interest rate component as is used to estimate the risk premium component.

17   Since the risk premium approach suggests that the cost of equity equals (the

18   interest rate) plus (the required return on equity minus the interest rate), the

19   cost of equity should be approximately the same in a risk premium analysis, no

20   matter what interest rate is used as the benchmark interest rate. Thus, use of

21   the interest rate on A-rated utility bonds in a risk premium analysis will produce

22   a higher interest rate component than use of a government bond interest rate,

23   but this difference will be offset by the correspondingly lower risk premium.

Q 81 **How did you estimate the risk premium component of the risk premium approach?**

A 81 I estimated the risk premium component of the risk premium approach in two ways. First, I estimated the difference between the DCF cost of equity for a proxy group of companies over the previous 68 months and the concurrent yield to maturity on A-rated utility bonds in those months, and then adjusted the average risk premium to account for changes in interest rates. This estimate is called my "ex ante risk premium approach." Second, I estimated the risk premium from an historical study of stock and bond returns over the period 1937 to the present. This second risk premium approach is my "ex post risk premium approach."

Q 82 **Does Dr. Woolridge have any criticisms of your ex ante risk premium approach?**

A 82 Yes. Dr. Woolridge criticizes my ex ante risk premium approach because it is based on a proxy group of LDCs rather than water companies, and it relies on analysts' forecasts to estimate the required return on equity using the DCF model.

Q 83 **Have you addressed these criticisms elsewhere in this rebuttal testimony.**

A 83 Yes, I have. (See Sections III, A, B.)

Q 84 **Does Dr. Woolridge agree with your use of historical stock and bond returns to estimate the equity risk premium?**

A 84 No. At pages 65 - 66 of his testimony, Dr. Woolridge states:

> There are a number of flaws in using historic returns over long time periods to estimate expected equity risk premiums. These issues

1   include: (A) Biased historic bond returns; (B) The arithmetic versus
2   the geometric mean returns; (C) Unattainable and biased historic
3   stock returns; (D) Survivorship bias; (E) The "Peso Problem;" (F)
4   Market conditions today are significantly different than the past; and
5   (G) Changes in risk and return in the markets.

6 **Q 85   Why does Dr. Woolridge believe that historic bond returns are biased?**

7 A 85   On page 66 of his testimony, Dr. Woolridge states:

8   Historic bond returns are biased downward as a measure of
9   expectancy because of capital losses suffered by bondholders in
10   the past. As such, risk premiums derived from this data are biased
11   upwards.

12 **Q 86   Do you agree with Dr. Woolridge's statement that historic bond returns**

13 **are biased downward because of capital losses suffered by past bond**

14 **investors?**

15 A 86   No. Because of capital gains and losses, historic bond returns may be higher

16   or lower than what investors expected at the time they purchased the bonds.

17   During the period since 1982, for example, historic bond returns have been

18   biased upward as a measure of expectancy because of the large capital gains

19   achieved by bondholders over this period. However, over the entire period

20   since 1926, capital gains and losses on bonds have approximately offset each

21   other, and consequently there is no significant bias as a result from either

22   capital gains or losses.

23 **Q 87   What is the difference between an arithmetic and a geometric mean**

24 **return?**

25 A 87   An arithmetic mean return is an additive return that is calculated by summing

26   the achieved return in each time period and dividing the total by the number of

27   periods. In contrast, the geometric mean return is a multiplicative return that is

1   calculated in two steps. First, one calculates the product of (1 plus the return)

2   in each period of the study. Second, one calculates the nth root of this product

3   and subtracts 1 from the result. Thus, if there are two periods, and r_1 and r_2 are

4   the returns in periods one and two, respectively, the arithmetic mean is

5   calculated from the equation: $a_m = (r_1 + r_2) \div 2$. The geometric mean is

6   calculated from the equation,

7    $a_g = [(1 + r_1) \times (1 + r_2)]^5 - 1.$

8   **Q 88   Please describe Dr. Woolridge's issue with regard to geometric versus**

9   **arithmetic mean returns.**

10 A 88   Dr. Woolridge believes that my study is biased because I calculated the

11   expected risk premium using the arithmetic mean of past returns, whereas he

12   believes I should have calculated the expected risk premium using the

13   geometric mean of past returns.

14 **Q 89   Is Dr. Woolridge's criticism valid?**

15 A 89   No. As Ibbotson Associates explains in *Stocks, Bonds, Bills, and Inflation*

16   *Valuation Edition 2004 Yearbook*, the arithmetic mean return is the best

17   approach for calculating the return investors expect to receive in the future. As

18   Ibbotson Associates states:

19   The equity risk premium data presented in this book are arithmetic
20   average risk premia as opposed to geometric average risk premia.
21   The arithmetic average equity risk premium can be demonstrated to
22   be most appropriate when discounting future cash flows. For use
23   as the expected equity risk premium in either the CAPM or the
24   building block approach, the arithmetic mean or the simple
25   difference of the arithmetic means of stock market returns and
26   riskless rates is the relevant number. This is because both the
27   CAPM and the building block approach are additive models, in
28   which the cost of capital is the sum of its parts. The geometric

1   average is more appropriate for reporting past performance, since it
2   represents the compound average return. [Ibbotson Associates,
3   *op. cit.*, p. 71.]

4   A discussion of the importance of using arithmetic mean returns in the context

5   of CAPM or risk premium studies is contained in Rebuttal Schedule E.

6   **Q 90 Dr. Woolridge also criticizes your ex post risk premium study because it**

7   **is based on "unattainable and biased historic stock returns." [Woolridge**

8   **at p. 68.] Is he correct?**

9   A 90 No. Dr. Woolridge bases his allegation on an article by Richard Roll in the

10   *Journal of Financial Economics* that does not apply to the returns in my ex post

11   risk premium study. The Roll paper demonstrates that there is possibly a bias

12   associated with portfolio rebalancing when there is serial correlation in the

13   returns over time. I have demonstrated that my ex post risk premium returns

14   are not characterized by serial correlation. Hence, Dr. Woolridge's criticism is

15   unfounded.

16   **Q 91 Do you agree with Dr. Woolridge's criticism on page 69 of his testimony**

17   **that your ex post risk premium study is characterized by "survivorship**

18   **bias"?**

19   A 91 No. Survivorship bias refers to problems that might arise when data for

20   companies that have failed are excluded from the sample. However, with

21   regard to the U.S. markets that I study, survivorship bias is not a major issue.

22   First, over the period 1937 to the present, there have been very few companies

23   in the S&P 500 and the S&P Utilities that have failed. Second, the S&P 500

24   includes the return on a stock until the day it is dropped from the index, and the

1   effect of a company being dropped from the S&P 500 is generally anticipated by

2   the market well in advance of the delisting. Thus, survivorship is not a material

3   issue with respect to U.S. stocks.

4   **Q 92   What does Dr. Woolridge mean when he refers to the "peso problem"?**

5   A 92   Dr. Woolridge uses the term "peso problem" to refer to the fact that U.S.

6   investors have earned higher returns on stock investments than investors in

7   other countries because the U.S. economy has not suffered many of the same

8   economic calamities as the economies of other countries. This criticism of the

9   use of U.S. stock returns in risk premium studies might be appropriate if one

10   were attempting to estimate the expected rates of return on non-U.S. stocks.

11   However, for U.S. stocks, since there is no indication that the U.S. will suffer the

12   economic calamities of other countries, such as hyper-inflation or military

13   invasion, there is no reason why the returns on U.S. stocks would be biased

14   upward. As Ibbotson Associates states with respect to "survivorship bias" and

15   the closely-related "peso problem":

16   While the survivorship bias evidence may be compelling on a worldwide
17   basis, one can question its relevance to a purely U.S. analysis. If the
18   entity being valued is a U.S. company, then the relevant data set should
19   be the performance of equities in the U.S. market.   [Ibbotson
20   Associates, *op. cit.*, p. 83.]

21   **Q 93   On page 70 of his testimony, Dr. Woolridge criticizes your use of**

22   **historical risk premiums on the grounds that "market conditions today are**

23   **significantly different than in the past."   What is the basis of Dr.**

24   **Woolridge's concern regarding "current market conditions"?**

1 A 93 Dr. Woolridge is concerned that, since price/earnings ratios are high, and

2 interest rates are at historic lows, stock returns in the future may be significantly

3 less than they have been in the past. [Woolridge at page 70.]

4 **Q 94 Is this a reasonable basis on which to reject the use of historical risk**

5 **premium data?**

6 A 94 No. While price/earnings ratios are high in relation to their long-run historic

7 average, there is no compelling evidence that they are unreasonably high in

8 light of current interest rate conditions in the capital markets. In fact, Dr.

9 Woolridge's assumption that price/earnings ratios are unreasonably high itself

10 violates the efficient market assumption underlying most of modern finance.

11 Furthermore, Dr. Woolridge fails to understand that my study involves the

12 difference between stock returns and bond returns, and bond returns may be

13 more sensitive to interest rates than stock returns. Thus, if anything, low

14 interest rates, according to his logic, should imply that risk premiums would

15 increase in the future, not decrease.

16 **Q 95 Dr. Woolridge's final criticism of your ex post risk premium study is that**

17 **the equity risk premium has declined in recent years. Did you present any**

18 **evidence in your direct testimony relating to this issue?**

19 A 95 Yes. I presented evidence on pp. 37 – 39 of my direct testimony that there has

20 been no significant trend in equity risk premiums over time. Since the time of

21 my direct testimony, Ibbotson Associates has published their 2004 Yearbook, in

22 which they agree with my finding that there has been no significant trend in

23 equity risk premiums over time:

1	The significance of this evidence is that the realized equity risk premium
2	next year will not be dependent on the realized equity risk premium
3	from this year. That is, there is no discernable pattern in the realized
4	equity risk premium—it is virtually impossible to forecast next year's
5	realized risk premium based on the premium of the previous year. For
6	example, if this year's difference between the riskless rate and the
7	return on the stock market is higher than last year's, that does not imply
8	that next year's will be higher than this year's. It is as likely to be higher
9	as it is lower. The best estimate of the expected value of a variable that
10	has behaved randomly in the past is the average (or arithmetic mean)
11	of its past values. [Ibbotson Associates' Valuation Edition 2004
12	Yearbook, page 75.]

13 **Q 96   Does this conclude your testimony?**

14 A 96   Yes, it does.

LIST OF REBUTTAL SCHEDULES AND ATTACHMENTS

Schedule A   Corrected DCF Results for Dr. Woolridge's Proxy Groups of Small and Large Water Companies.

Schedule B   Companies with Negative Rates of Return on Equity and Market-to-Book Ratios in Excess of 1.0.

Schedule C   Companies with Low Returns on Equity and Market-to-Book Ratios in Excess of 1.0

Schedule D   Comparison of Ratio of Net Plant/Revenues for Water Companies and Gas Companies.

Schedule E   Using the Arithmetic Mean to Estimate the Cost of Equity Capital.

Attachment A   Investor Growth Expectations, August 2004

KENTUCKY-AMERICAN WATER COMPANY
EXHIBIT__(JVW-1)
REBUTTAL SCHEDULE A
CORRECTED DCF RESULTS FOR DR. WOOLRIDGE'S PROXY GROUPS OF
SMALL AND LARGE WATER COMPANIES

Small Water Company Group

Company	Dividend	Price	Growth	Cost of Equity
Artesian Resources Corp.	0.208	25.717	8.5%	12.36%
Middlesex Water	0.165	18.630	6.0%	10.10%
York Water Company	0.145	18.028	7.0%	10.77%
Average				11.08%

Large Water Company Group

Company	Dividend	Price	Growth	Cost of Equity
American States Water	0.221	22.862	6.3%	10.75%
Aqua America	0.130	19.948	8.8%	11.77%
California Water	0.283	27.463	7.0%	11.83%
Average				11.45%

Average DCF Result for Both Small and Large Companies: 11.26%

Notes: DCF analysis for all of Dr. Woolridge's proxy companies that had analysts' growth estimates available [see Dr. Woolridge's Exhibit__(JRW-7), p. 5 of 5] using the same quarterly DCF model I used in my direct testimony. Price is the average of the monthly high and low stock prices during the three months ending August 2004 from Yahoo Finance, and growth is the average of I/B/E/S and Value Line forecasts of future earnings growth, September 2004. (Value Line forecasts are available only for the large water companies.)

KENTUCKY-AMERICAN WATER COMPANY
EXHIBIT__(JVW-1)
REBUTTAL SCHEDULE B
COMPANIES WITH NEGATIVE RETURNS ON EQUITY AND
MARKET-TO-BOOK RATIOS EXCEEDING 1.0

Company	Return on Equity	Stock Price	Book Value per Share	Market-to-Book
Abgenix Inc.	(38.86)	11.09	4.68	2.37
Abitibi-Consolidated	(12.68)	6.12	5.02	1.22
Active Power	(25.51)	3.23	2.02	1.60
ADC Telecom.	(12.21)	2.03	0.78	2.60
Advanced Energy	(11.88)	9.80	4.66	2.10
Advanced Micro Dev.	(11.25)	12.40	6.96	1.78
Agilent Technologies	(63.38)	22.81	5.93	3.85
Agnico-Eagle Mines	(4.86)	13.20	4.74	2.78
Alcatel ADR	(27.56)	11.94	6.29	1.90
Allegheny Energy	(22.04)	15.15	11.94	1.27
Allegheny Technologies	(76.47)	19.86	2.17	9.15
Amer. Superconductor	(23.15)	12.99	4.18	3.11
Amer. Tower 'A'	(14.16)	15.00	7.78	1.93
Amkor Technology	(10.06)	3.89	2.30	1.69
ANADIGICS Inc.	(41.93)	4.45	3.88	1.15
Arch Coal	(1.59)	34.20	10.23	3.34
Art Technology	(30.08)	1.06	0.29	3.66
Astec Inds.	(15.88)	18.49	8.49	2.18
Atmel Corp.	(12.62)	3.81	2.15	1.77
Avanex Corp.	(38.74)	2.48	1.39	1.78
Avaya Inc.	(7.50)	13.45	0.48	28.02
Avnet Inc.	(2.51)	17.29	15.33	1.13
AVX Corp.	(7.76)	12.06	7.99	1.51
Ballard Power Sys.	(13.85)	6.36	6.32	1.01
Biogen Idec Inc.	(12.40)	62.03	39.63	1.57
Bowater Inc.	(12.43)	36.46	28.25	1.29
Bowne & Co.	(2.61)	13.59	10.25	1.33
Broadcom Corp. 'A'	(8.20)	28.96	4.87	5.95
Brooks Automation	(33.70)	14.27	4.36	3.27
Brush Engineered	(4.35)	21.29	9.24	2.30
Capstone Turbine	(41.35)	1.58	1.37	1.15
Caraustar Inds.	(3.69)	16.85	7.79	2.16
Carpenter Technology	(2.69)	46.04	19.80	2.33
Central Parking	(0.34)	16.65	11.52	1.45
CEVA Inc.	(0.36)	8.28	5.42	1.53
CheckFree Corp.	(3.88)	28.20	14.21	1.98
Circuit City Stores	(0.03)	14.06	10.91	1.29
Cirrus Logic	(9.66)	5.01	2.54	1.97
Cleveland-Cliffs	(15.30)	74.96	21.73	3.45
CNET Networks	(15.46)	9.42	1.20	7.85
Coherent Inc.	(0.76)	25.67	18.17	1.41

Company	Return on Equity	Stock Price	Book Value per Share	Market-to-Book
Columbus McKinnon	(11.40)	9.36	3.63	2.58
Comcast Corp.	(0.52)	27.64	18.50	1.49
Comverse Technology	(0.62)	18.65	8.60	2.17
Concurrent Computer	(22.09)	1.66	0.70	2.37
Credence Systems	(26.26)	7.06	6.75	1.05
Crompton Corp.	(7.26)	8.11	2.64	3.07
Crown Castle Int'l	(15.03)	14.70	8.99	1.64
Crown Holdings	(10.00)	10.51	0.85	12.36
CryoLife Inc.	(38.46)	6.99	2.45	2.85
Cymer Inc.	(2.02)	29.64	13.24	2.24
DaimlerChrysler AG	(1.21)	42.74	42.92	1.00
Deutsche Telekom ADR	(0.15)	17.60	11.32	1.55
Diamond Offshore	(2.88)	29.87	12.99	2.30
Digene Corp.	(10.05)	25.60	2.32	11.03
DIRECTV Group (The)	(0.83)	16.66	6.96	2.39
Domtar Inc.	(8.98)	12.19	7.23	1.69
Dreyer's Grand	(12.36)	79.75	6.52	12.23
Eclipsys Corp.	(39.09)	14.95	3.11	4.81
Electro Scientific	(16.14)	21.16	11.15	1.90
EMCORE Corp.	(96.35)	2.30	1.20	1.92
Energy Conversion	(38.47)	13.64	4.56	2.99
Entrust Inc.	(44.45)	2.80	1.27	2.20
ExelixisInc.	(58.59)	8.58	2.27	3.78
Extended Systems	(21.90)	2.90	1.44	2.01
Extreme Networks	(9.82)	5.00	1.71	2.92
Fleetwood Enterprises	(2.94)	14.58	4.73	3.08
FSI Int'l	(34.14)	4.89	3.68	1.33
FuelCell Energy	(32.86)	10.90	5.20	2.10
Gateway Inc.	(58.69)	4.70	1.61	2.92
Gaylord Entertainm.	(3.88)	31.39	22.95	1.37
Global Inds.	(18.12)	6.16	3.72	1.66
Harmonic Inc.	(30.61)	6.29	1.49	4.22
Hartford Fin'l Svcs.	(3.28)	62.79	41.07	1.53
Heidrick & Struggles	(64.12)	29.84	7.36	4.05
Helix Technology	(2.13)	14.22	4.55	3.13
Human Genome	(20.51)	12.61	6.98	1.81
Identix Inc.	(9.97)	6.34	2.41	2.63
Illumina Inc.	(57.08)	6.83	1.44	4.74
IMC Global	(17.75)	16.51	4.55	3.63
Incyte Corp.	(65.61)	8.83	2.13	4.15
InFocus Corp.	(32.18)	9.49	6.02	1.58
Input/Output	(11.66)	10.43	2.58	4.04
Instinet Group	(5.37)	5.11	2.93	1.74
Interface Inc. 'A'	(7.12)	8.09	4.26	1.90
Interpublic Group	(24.76)	10.93	5.34	2.05
Interwoven Inc.	(5.61)	8.07	7.52	1.07
Ionics Inc.	(1.40)	26.86	23.25	1.16

Company	Return on Equity	Stock Price	Book Value per Share	Market-to-Book
JDS Uniphase	(13.70)	3.53	1.17	3.01
Keithley Instruments	(2.80)	17.88	5.33	3.35
KEMET Corp.	(3.65)	8.55	7.92	1.08
Lamar Advertising	(2.06)	42.00	16.66	2.52
Lone Star Techn.	(16.51)	34.91	8.63	4.05
Lyondell Chemical	(26.12)	20.00	6.54	3.06
Magnetek Inc.	(10.96)	6.67	3.38	1.97
Manugistics Group	(42.16)	2.65	2.45	1.08
Martha Stewart	(0.81)	11.82	4.76	2.48
Massey Energy	(5.24)	27.52	10.05	2.74
Material Sciences	(13.09)	12.62	7.93	1.59
MeadWestvaco	(1.26)	30.03	23.73	1.27
Medarex Inc.	(52.11)	6.74	2.96	2.28
Micron Technology	(25.61)	12.45	8.15	1.53
Millennium Pharmac.	(9.72)	13.34	8.27	1.61
MKS Instruments	(0.01)	16.02	11.69	1.37
Myriad Genetics	(15.18)	17.41	6.04	2.88
Navistar Int'l	(15.03)	36.46	4.45	8.19
Nektar Therapeutics	(28.43)	15.00	2.88	5.21
Neose Technologies	(52.18)	7.46	3.62	2.06
Netegrity Inc.	(3.67)	6.34	3.35	1.89
Neurocrine Biosci.	(12.28)	51.20	11.08	4.62
Newport Corp.	(2.40)	12.03	11.23	1.07
Noranda Inc.	(1.43)	17.09	7.93	2.16
Nortel Networks	(64.79)	3.60	0.51	7.06
Novellus Sys.	(0.24)	26.20	13.55	1.93
Nuance Communic.	(13.64)	4.30	2.07	2.08
OM Group	(5.09)	35.84	16.57	2.16
Openwave Systems	(56.52)	9.41	3.02	3.12
Parametric Technology	(34.32)	5.20	0.73	7.12
Park Electrochemical	(1.57)	22.27	12.32	1.81
Parker Drilling	(26.85)	3.49	2.05	1.70
Payless ShoeSource	(0.01)	10.96	8.94	1.23
Photon Dynamics	(10.60)	22.80	8.80	2.59
Photronics Inc.	(15.62)	16.36	9.49	1.72
Plexus Corp.	(2.82)	10.90	8.71	1.25
PMC-Sierra	(1.98)	9.58	1.30	7.37
Pope & Talbot	(16.94)	19.22	9.36	2.05
Power-One	(4.72)	7.50	3.44	2.18
Powerwave Techn.	(10.29)	6.21	4.28	1.45
Protein Design	(8.01)	21.07	4.78	4.41
Quanta Services	(0.73)	7.10	5.73	1.24
Quantum Corporation	(2.17)	2.29	1.70	1.35
RealNetworks Inc.	(4.01)	4.65	2.23	2.09
Regeneron Pharmac.	(78.06)	9.19	2.48	3.71
Rent-Way Inc.	(28.08)	7.41	4.10	1.81
Reuters ADR	(15.51)	37.54	1.83	20.51

Company	Return on Equity	Stock Price	Book Value per Share	Market-to-Book
Rowan Cos.	(0.68)	24.58	12.08	2.03
Ryerson Tull	(3.77)	15.80	15.26	1.04
Safeguard Scientifics	(14.09)	1.99	1.98	1.01
Sanmina-SCI Corp.	(4.12)	7.19	6.75	1.07
Sapient Corp.	(3.21)	7.89	1.25	6.31
Semitool Inc.	(9.18)	7.85	3.54	2.22
Silicon Storage	(19.65)	6.29	3.48	1.81
Skechers U.S.A.	(4.64)	14.79	6.73	2.20
SkillSoft ADR	(1.51)	6.15	0.84	7.32
Smurfit-Stone Cont.	(2.69)	18.60	8.73	2.13
Sotheby's Holdings 'A'	(20.78)	15.22	2.07	7.35
Steelcase Inc 'A'	(2.20)	13.12	8.15	1.61
Stewart & Stevenson	(12.71)	17.01	10.39	1.64
Stillwater Mining	(1.13)	14.19	5.33	2.66
Sun Microsystems	(0.49)	3.95	2.01	1.97
Sycamore Networks	(5.19)	3.82	3.65	1.05
Tasty Baking	(5.56)	7.96	5.24	1.52
TECO Energy	(0.87)	13.33	8.93	1.49
Telecom. de Chile ADR	(1.37)	9.98	7.48	1.33
Tellabs Inc.	(3.61)	9.90	5.35	1.85
Tenet Healthcare	(32.19)	10.20	9.38	1.09
Teradyne Inc.	(20.43)	13.88	4.95	2.80
Texas Inds.	(3.32)	46.40	34.54	1.34
Transmeta Corp.	(55.41)	1.25	0.78	1.60
Triarc Cos. 'A'	(4.54)	11.29	4.92	2.29
Trinity Inds.	(0.86)	29.80	19.72	1.51
TriQuint Semic.	(7.71)	3.91	3.40	1.15
U.S. Steel Corp.	(48.67)	38.40	8.36	4.59
ValueVision Media	(3.15)	13.75	6.15	2.24
Vertex Pharmac.	(90.53)	10.59	2.47	4.29
Vitesse Semiconductor	(10.38)	2.86	1.81	1.58
webMethods Inc.	(2.48)	4.86	4.22	1.15
Williams Cos.	(0.50)	12.09	7.92	1.53
Wind River Sys.	(5.96)	12.01	2.88	4.17
WMS Industries	(0.58)	22.72	6.84	3.32
Average	(16.83)			2.92

Source of data: The Value Line Investment Survey for Windows, September 2004. Companies shown in table are all those companies in Value Line data base with *negative* reported returns on common equity and market-to-book ratios exceeding 1.0.

KENTUCKY-AMERICAN WATER COMPANY
EXHIBIT__(JVW-1)
REBUTTAL SCHEDULE C
COMPANIES WITH LOW RETURNS ON EQUITY AND
MARKET-TO-BOOK RATIOS EXCEEDING 1.0

Company Name	Return on Common Equity	Stock Price	Book Value per share	Market-to-Book
AAR Corp.	1.49	13.04	9.36	1.39
Adaptec Inc.	2.94	7.76	5.87	1.32
Advanced Fibre	3.44	15.16	11.33	1.34
Agilysys Inc.	2.12	16.54	9.62	1.72
Alcan Inc.	2.31	43.94	28.90	1.52
Allied Waste	3.04	9.51	6.82	1.39
Amer. States Water	5.59	25.65	13.97	1.84
Andrew Corp.	0.88	11.40	8.94	1.28
Angelica Corp.	6.08	25.26	16.51	1.53
Apogee Enterprises	3.32	12.53	6.12	2.05
Apple Computer	1.80	36.47	11.52	3.17
Applied Ind'l Techn.	5.88	31.15	16.19	1.92
Applied Materials	3.35	17.02	4.87	3.49
Arch Chemicals	4.47	28.20	15.01	1.88
Archer Daniels Midl'd	6.19	16.49	10.96	1.50
Armor Holdings	5.75	38.83	10.44	3.72
Arrow Electronics	4.95	23.10	14.89	1.55
ArthroCare Corp.	6.18	27.95	5.71	4.89
Ascential Software	0.78	14.06	12.61	1.11
Ashland Inc.	4.48	54.69	33.13	1.65
AT&T Wireless Serv.	2.60	14.71	8.95	1.64
ATMI Inc.	1.46	20.97	8.21	2.55
Barrick Gold	4.95	19.40	6.53	2.97
Bassett Furniture	2.00	20.01	18.97	1.05
BearingPoint	3.47	8.95	6.21	1.44
Belden CDT	0.68	21.48	10.70	2.01
BMC Software	4.98	15.72	5.44	2.89
Boise Cascade	0.90	31.84	24.76	1.29
Bombay Co.	5.19	7.18	5.42	1.32
Borland Software	2.31	8.53	5.02	1.70
Brink's (The) Co.	3.67	29.80	9.12	3.27
Brocade Communic.	0.80	5.22	2.71	1.93
Caesars Entertain.	4.90	16.25	10.07	1.61
Calgon Carbon	2.77	6.97	4.15	1.68
Capitol Fed. Fin'l	5.32	34.14	13.31	2.56
Casella Waste Sys.	5.81	11.88	5.01	2.37
Celgene Corp.	4.11	58.43	3.87	15.10
Chemed Corp.	6.39	54.17	19.38	2.80
Cincinnati Financial	6.22	40.70	36.93	1.10

Company Name	Return on Common Equity	Stock Price	Book Value per share	Market-to-Book
CKE Restaurants	3.62	10.91	2.54	4.30
Clark Inc.	4.55	15.25	14.00	1.09
Clear Channel	4.63	33.54	25.25	1.33
Coachmen Ind.	3.48	16.11	13.57	1.19
Cognex Co.	4.14	28.27	8.76	3.23
Commercial Metals	3.72	37.49	18.11	2.07
CommScope	2.48	22.10	7.68	2.88
Computer Associates	1.63	25.22	8.10	3.11
Compuware Corp.	3.52	5.02	3.67	1.37
Conexant Systems	0.34	1.76	0.60	2.93
Cooper Cameron	5.66	52.49	21.13	2.48
Corning Inc.	2.02	11.23	4.01	2.80
CoStar Group	4.27	46.53	9.42	4.94
Cox Communic. 'A'	1.57	33.14	15.10	2.19
CSX Corp.	6.33	33.46	30.00	1.12
CTS Corp.	4.27	11.66	8.16	1.43
Cummins Inc.	5.69	69.79	23.49	2.97
Cypress Semic.	3.54	9.81	4.72	2.08
Disney (Walt)	5.69	23.29	11.63	2.00
Dixie Group	4.53	10.16	7.98	1.27
DoubleClick Inc.	1.30	5.59	4.60	1.22
Duke Energy	6.03	22.13	15.09	1.47
Dycom Inds.	3.80	28.62	9.39	3.05
Echelon Corp.	5.48	7.54	4.97	1.52
El Paso Electric	6.26	15.45	10.54	1.47
EMC Corp.	4.30	10.82	4.51	2.40
ENSCO Int'l	5.15	29.92	13.83	2.16
Enzo Biochem	3.51	15.33	3.65	4.20
Ericsson ADR	3.20	28.31	5.28	5.36
Fairchild Semic.	2.72	13.84	9.70	1.43
Fairmont Hotels	1.70	27.46	19.12	1.44
Ferro Corp.	5.73	21.76	10.98	1.98
FileNET Corp.	3.77	19.68	7.65	2.57
FirstEnergy Corp.	5.41	41.40	25.13	1.65
Flextronics Int'l	5.37	12.96	8.24	1.57
Forrester Research	5.49	16.65	9.27	1.80
Fuji Photo ADR	4.70	32.38	32.17	1.01
GenCorp Inc.	5.14	13.24	9.77	1.36
Gen'l Cable	6.14	10.72	3.51	3.05
Genzyme Corp.	3.51	54.41	13.43	4.05
Georgia-Pacific Group	6.15	35.25	21.32	1.65
Glatfelter	2.90	12.59	8.48	1.48
GlobalSantaFe Corp.	2.50	29.49	18.53	1.59
Goodrich Corp.	3.18	31.69	10.14	3.13
G't Lakes Chemical	2.15	26.24	14.69	1.79
Guess Inc.	3.98	17.45	4.18	4.17

Company Name	Return on Common Equity	Stock Price	Book Value per share	Market-to-Book
Hain Celestial Group	6.23	17.58	12.89	1.36
Helmerich & Payne	1.94	27.27	18.29	1.49
Hitachi Ltd. ADR	1.50	63.05	45.85	1.38
Hughes Supply	5.70	62.62	33.10	1.89
IAC/InterActiveCorp	1.38	21.85	14.72	1.48
IDACORP Inc.	4.24	29.39	22.54	1.30
Inco Limited	6.19	36.26	20.66	1.76
Informatica Corp.	4.77	6.04	3.42	1.77
Insituform Techn.	1.65	19.00	10.55	1.80
Integrated Device	0.81	10.47	7.40	1.41
Intergraph Corp.	2.79	26.41	10.52	2.51
Internet Security	4.37	17.21	9.40	1.83
Intersil Corp. 'A'	3.85	16.26	16.16	1.01
Int'l Paper	4.63	40.10	17.11	2.34
Int'l Rectifier	4.79	34.58	15.77	2.19
Invitrogen Corp.	3.40	55.81	35.16	1.59
JLG Industries	5.00	14.44	5.71	2.53
Johnson Outdoors	5.42	19.28	16.76	1.15
Joy Global	5.00	31.66	7.35	4.31
Juniper Networks	2.50	24.51	4.00	6.13
K2 Inc.	3.89	14.56	12.99	1.12
Kadant Inc.	5.58	19.34	15.02	1.29
Keane Inc.	5.42	15.54	7.18	2.16
Kelly Services 'A'	0.83	27.14	17.65	1.54
Kennametal Inc.	2.51	43.96	20.34	2.16
Kimball Int'l 'B'	1.28	14.50	11.44	1.27
KLA-Tencor	5.89	39.90	11.56	3.45
Lam Research	1.25	22.52	5.28	4.27
Laureate Education	1.20	35.73	14.88	2.40
Liberty Corp.	4.57	40.55	27.58	1.47
Lone Star Steakhouse	6.48	25.45	19.98	1.27
Longs Drug Stores	5.15	24.46	19.02	1.29
Longview Fibre	0.59	13.88	8.46	1.64
Manitowoc Co.	4.67	34.99	11.23	3.12
Marcus Corp.	5.22	20.12	12.54	1.60
Marvell Technology	2.07	26.47	8.31	3.19
McDATA Corp. 'A'	5.79	5.08	3.60	1.41
Media General 'A'	4.91	59.16	47.44	1.25
Micrel Inc.	2.04	10.39	3.07	3.38
Moldflow Corp.	0.64	11.62	6.05	1.92
Molecular Devices	5.32	24.25	9.85	2.46
Molex Inc.	5.98	30.19	9.94	3.04
Monsanto Co.	6.47	35.19	19.63	1.79
Monster Worldwide	1.56	23.15	4.14	5.59
Motorola Inc.	4.57	16.60	5.43	3.06
MPS Group	2.75	9.15	7.71	1.19

Company Name	Return on Common Equity	Stock Price	Book Value per share	Market-to-Book
Mueller Inds.	4.28	42.07	23.77	1.77
Myers Inds.	5.54	11.75	8.87	1.32
National Presto Ind.	6.28	41.91	36.12	1.16
NCR Corp.	4.28	47.84	19.80	2.42
NEC Corp. ADR	5.77	6.39	3.55	1.80
Netflix Inc.	5.77	16.57	2.22	7.46
Newmont Mining	5.57	42.78	16.72	2.56
News Corp. Ltd. ADR	6.37	33.50	11.43	2.93
Northrop Grumman	4.79	52.25	43.58	1.20
Novell Inc.	1.98	7.03	2.54	2.77
Nucor Corp.	2.68	88.23	29.80	2.96
Ohio Casualty	4.11	20.82	18.80	1.11
Orbotech Ltd.	2.71	17.80	9.12	1.95
Packaging Corp.	5.28	23.82	7.55	3.15
palmOne Inc.	1.62	34.76	10.45	3.33
PAREXEL Int'l	4.69	19.99	8.80	2.27
PC Connection	4.51	6.93	6.29	1.10
Pegasus Solutions	3.70	12.21	9.11	1.34
People's Bank	6.36	36.12	10.77	3.35
PeopleSoft	3.94	19.60	8.33	2.35
PerkinElmer Inc.	4.07	18.39	10.63	1.73
Phelps Dodge	1.33	84.88	33.65	2.52
Philips Electronics NV	5.55	23.82	11.96	1.99
Pixelworks Inc.	4.63	9.90	4.88	2.03
Playboy Enterprises 'B'	4.01	9.80	3.27	3.00
PNM Resources	6.33	22.59	17.84	1.27
Polycom Inc.	2.48	21.53	9.35	2.30
Potash Corp.	4.03	59.50	18.58	3.20
Pulitzer Inc.	4.95	48.75	39.59	1.23
Quebecor World	3.32	21.50	15.51	1.39
Radio One 'D'	2.63	14.51	12.20	1.19
Raytheon Co.	5.84	36.39	21.90	1.66
Red Hat Inc.	3.42	15.20	2.25	6.76
Regal-Beloit	6.32	23.80	16.03	1.48
Research in Motion Ltd	3.02	73.81	9.29	7.95
Reynolds American	4.25	73.12	35.92	2.04
Robbins & Myers	5.00	20.25	19.90	1.02
Robert Half Int'l	0.81	27.12	4.59	5.91
RSA Security	4.95	19.08	5.07	3.76
Sauer-Danfoss	2.82	18.38	8.37	2.20
Schering-Plough	6.13	19.36	4.99	3.88
Schulman (A.)	4.16	21.15	12.72	1.66
SeaChange Int'l	3.81	15.70	5.35	2.93
Sequa Corp. 'A'	0.07	58.73	55.65	1.06
Service Corp. Int'l	5.57	6.32	5.05	1.25
Siebel Systems	3.51	8.16	4.11	1.99

Company Name	Return on Common Equity	Stock Price	Book Value per share	Market-to-Book
Sinclair Broadcast	5.41	8.18	2.67	3.06
Sony Corp. ADR	3.80	35.13	24.68	1.42
Southern Union	4.74	19.31	12.00	1.61
Southwest Airlines	5.89	14.19	6.40	2.22
Southwest Gas	6.10	23.79	18.42	1.29
Sprint Corp.	2.28	19.99	9.30	2.15
Standard Motor Prod.	1.60	15.10	11.77	1.28
Standard Register	0.45	11.15	8.73	1.28
Starwood Hotels	3.74	45.31	21.44	2.11
Stewart Enterpr. 'A'	4.18	7.15	6.86	1.04
STMicroelectronics	5.23	17.91	9.11	1.97
Symbol Technologies	0.35	13.40	3.99	3.36
Symyx Technologies	3.60	22.05	5.04	4.38
Tech Data	6.39	38.60	28.74	1.34
Technitrol Inc.	6.23	19.15	11.14	1.72
Tektronix Inc.	4.51	31.02	9.18	3.38
Telephone & Data	2.40	83.62	54.31	1.54
TeleTech Holdings	0.64	9.55	3.91	2.44
Temple-Inland	4.87	65.85	36.05	1.83
Thomas & Betts	5.85	26.69	12.47	2.14
Thoratec Corp.	1.21	10.80	6.87	1.57
TIBCO Software	1.92	7.23	3.63	1.99
Tidewater Inc.	4.29	30.90	23.95	1.29
Time Warner	5.61	16.75	12.79	1.31
Timken Co.	5.14	24.05	12.23	1.97
Topps Co.	6.00	10.36	5.20	1.99
TransAlta Corp.	4.46	16.20	12.90	1.26
Transocean Inc.	1.00	33.35	22.48	1.48
Tredegar Corp.	5.16	17.83	11.72	1.52
Triad Hospitals	6.47	34.04	27.45	1.24
U.S. Cellular	3.00	43.66	28.97	1.51
UIL Holdings	5.99	49.71	34.42	1.44
United Rentals	4.05	15.62	14.79	1.06
Unitrin Inc.	5.30	43.23	26.84	1.61
Univision Communic.	3.04	32.40	15.79	2.05
USF Corp.	5.98	35.77	24.22	1.48
Varian Semiconductor	2.43	32.43	13.55	2.39
Veeco Instruments	1.11	21.10	10.38	2.03
Volt Info. Sciences	1.96	25.96	15.89	1.63
Volvo AB ADR	5.97	34.85	23.72	1.47
Walter Inds.	4.17	15.40	6.61	2.33
Washington Group Int'l	6.36	36.14	26.27	1.38
Wausau-Mosinee	4.52	15.82	6.80	2.33
Weatherford Int'l	6.21	48.07	20.52	2.34
WebMD Corp.	1.27	7.08	3.82	1.85
Weyerhaeuser Co.	5.37	64.87	32.28	2.01

Company Name	Return on Common Equity	Stock Price	Book Value per share	Market-to-Book
Wild Oats Markets	2.05	8.94	5.82	1.54
WPP Group ADR	4.10	47.15	27.80	1.70
XL Capital Ltd.	4.56	73.01	46.74	1.56
Yahoo! Inc.	5.45	33.64	3.30	10.19
Zoran Corp.	2.99	17.16	12.62	1.36
Zygo Corp.	1.21	10.70	7.32	1.46
Average	3.94			2.25

Source of data: The Value Line Investment Survey for Windows, September 2004. Companies shown in table are all those companies in Value Line data base with reported returns on common equity below 6.5%, the approximate current yield on A-rated utility bonds, and market-to-book ratios exceeding 1.0.

Value Line Water Companies

Company	Reported Annual Sales	Net Plant	Net Plant/Sales
Amer. States Water	213	602	2.83
Aqua America	367	1,824	4.97
California Water	277	760	2.74
Average			3.51

Value Line Natural Gas Companies

Company	Reported Annual Sales	Net Plant	Net Plant/Sales
AGL Resources	984	2,352	2.39
Atmos Energy	2,800	1,516	0.54
Energen Corp.	842	1,434	1.70
Equitable Resources	1,047	1,767	1.69
KeySpan Corp.	6,915	8,894	1.29
New Jersey Resources	2,544	853	0.34
NICOR Inc.	2,663	2,484	0.93
Northwest Nat. Gas	611	1,206	1.97
Peoples Energy	2,138	1,838	0.86
Southwest Gas	1,231	2,176	1.77
UGI Corp.	3,026	1,337	0.44
WGL Holdings Inc.	2,064	1,875	0.91
Average			1.24

Source of data: The Value Line Investment Survey for Windows, September 2004.

Consider an investment that in a given year generates a return of 30 percent with probability equal to .5 and a return of -10 percent with a probability equal to .5. For each one dollar invested, the possible outcomes of this investment at the end of year one are:

Ending Wealth	Probability
$1.30	0.50
$0.90	0.50

At the end of year two, the possible outcomes are:

Ending Wealth			Probability	Value x Probability
(1.30) (1.30)	=	$1.69	0.25	0.4225
(1.30) (.9)	=	$1.17	0.50	0.5850
(.9) (.9)	=	$0.81	0.25	0.2025
Expected Wealth	=			$1.21

The expected value of this investment at the end of year two is $1.21. In a competitive capital market, the cost of equity is equal to the expected rate of return on an investment. In the above example, the cost of equity is that rate of return which will make the initial investment of one dollar grow to the expected value of $1.21 at the end of two years. Thus, the cost of equity is the solution to the equation:

$$1(1+k)^2 = 1.21 \text{ or}$$

$$k = (1.21/1)^{.5} - 1 = 10\%.$$

The arithmetic mean of this investment is:

$$(30\%) (.5) + (-10\%) (.5) = 10\%.$$

Thus, the arithmetic mean is equal to the cost of equity capital.

The geometric mean of this investment is:

$$[(1.3) (.9)]^{.5} - 1 = .082 = 8.2\%.$$

Thus, the geometric mean is not equal to the cost of equity capital.

The lesson is obvious: for an investment with an uncertain outcome, the arithmetic mean is the best measure of the cost of equity capital.