

FLORIDA PUBLIC SERVICE COMMISSION  
Capital Circle Office Center • 2540 Shumard Oak Boulevard  
Tallahassee, Florida 32399-0850

M E M O R A N D U M

May 9, 1996

TO: DIRECTOR, DIVISION OF RECORDS AND REPORTING (BAYO)

FROM: DIVISION OF AUDITING & FINANCIAL ANALYSIS (MAUREY, JONES) *ALM*  
DIVISION OF WATER & WASTEWATER (MERCHANT, LOWE) *ARC*  
DIVISION OF LEGAL SERVICES (VACCARO) *OV JLS R MB*

RE: DOCKET NO. 960006- WS - WATER AND WASTEWATER INDUSTRY -  
ANNUAL REESTABLISHMENT OF AUTHORIZED RANGE OF RETURNS ON  
COMMON EQUITY OF WATER AND WASTERWATER UTILITIES;  
PURSUANT TO SECTION 367.081(4) (F), FLORIDA STATUTES

AGENDA: 05/21/96 - REGULAR AGENDA - PROPOSED AGENCY ACTION -  
INTERESTED PERSONS MAY PARTICIPATE

CRITICAL DATES: FINAL DECISION BY THE END OF 1996

SPECIAL INSTRUCTIONS: S:\PSC\AFA\WP\960006.RCM  
ATTACHMENT 1 PAGES 1-9 AND 12-13 ATTACHED  
R:\960061.WK3 - ATTACHMENT 1 PAGES 10-11

DISCUSSION OF ISSUE

ISSUE 1: What is the appropriate range of returns on common equity for water and wastewater utilities pursuant to Section 367.081 (4)(f), Florida Statutes?

RECOMMENDATION: Based on the current range of returns on equity authorized by the Commission for other regulated utilities, the 10.18% to 11.88% range of returns authorized in Order No. PSC-95-0892-FOF-WS is still reasonable for water and wastewater utilities for the period until the leverage formula is readdressed.

Staff recommends the authorized range of returns on common equity for water and wastewater utilities be based upon the following formula:

Return on Common Equity = 9.05% + 1.131/Equity Ratio where the

Equity Ratio = Common Equity / (Common Equity + Preferred Equity + Long-Term and Short-Term Debt)

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Staff further recommends the authorized return on common equity be limited to a maximum of 11.88% for all equity ratios of less than 40% in order to discourage imprudent financial risk. (MAUREY, JONES)

**STAFF ANALYSIS:** Pursuant to Section 367.081 (4) (f), Florida Statutes, the Commission is authorized to establish, not less than once each year, a leverage formula to calculate a reasonable range of returns on equity (ROE) for water and wastewater (WAW) utilities. The Commission last established this range of returns in Order No. PSC-95-0892-FOF-WS issued on August 10, 1995, in Docket No. 950006-WS.

Based on Commission decisions rendered since the leverage formula was last approved, Staff believes that the WAW leverage formula approved in Order No. PSC-95-0892-FOF-WS is still appropriate. The Commission has not changed the allowed return for any telephone, natural gas, or electric utility since it approved the last WAW leverage formula.

In Staff's opinion, the leverage formula range of 10.18% to 11.88% is still reasonable for WAW utilities. Therefore, Staff recommends that the current leverage formula continue to be used for determining the return on equity for WAW utilities. Staff has once before recommended the leverage formula remain constant in Docket No. 930006-WS. However, in that case the Commission approved the updated version of the leverage formula.

Even though Staff recommends the current leverage formula remain in place, Staff has provided in the attached schedules the most current information available for determining an updated leverage formula. The determination of an updated leverage formula results in a range of returns on equity from 9.51% to 11.00% based on a formula of  $8.51\% + .997/\text{Equity Ratio}$ . The midpoint of the 9.51% to 11.00% range has decreased by 77 basis points when compared to the existing midpoint.

In developing the updated leverage formula, Staff relied on the same methodologies used in the 1995 leverage formula docket. The difference between the existing leverage formula and the updated formula is the result of changes in underlying market conditions; that is, changes in bond yields and required rates of return.

The basic assumptions remain unchanged from the previous year and are as follows:

- 1) Business risk is similar for all WAW utilities.

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- 2) The cost of equity is an exponential function of the equity ratio.
- 3) The marginal weighted average cost of investor capital is constant over the 40% to 100% equity ratio range.
- 4) The cost rate at an assumed Moody's Baa3 bond rating, plus 25 basis points, is representative of the average marginal cost of debt to a Florida WAW utility over a 40% to 100% equity ratio range.

In the leverage formula, the 11.00% return on common equity can be divided into three segments. First, a 9.97% return on equity is derived by averaging the results of two Discounted Cash Flow (DCF) analyses, a Risk Premium analysis, and a Capital Asset Pricing Model (CAPM) analysis. Staff assigned one third weight to the average of the two DCF analyses, one third weight to the Risk Premium analysis, and one third weight to the CAPM analysis.

The DCF models are applied to an index of publicly traded WAW utilities. The difference between the two applications is one version relies on historic growth rates and the other version relies on projected growth rates. Until last year, only a DCF analysis using historic growth rates was used because of a lack of projected financial information on publicly traded WAW utilities. (See pages 3-4 of Attachment 1)

The Risk Premium model is applied to an index of publicly traded natural gas utilities. In addition, Staff added a 44 basis point premium to the return indicated by the Risk Premium analysis of natural gas utilities. This adjustment is made to compensate for the perceived difference in risk between the index of natural gas utilities and the index of WAW utilities. This is the same application used in the determination of the existing leverage formula. (See pages 1 and 5 of Attachment 1)

Finally, a CAPM analysis is performed. This return is based on the market return for all dividend-paying stocks followed by Value Line, the yield on the 30 year Treasury bond projected by Blue Chip Financial Forecasts, and the average beta of the WAW utilities followed by Value Line. (See page 6 of Attachment 1)

After the ROE for the indices is determined, a bond yield differential adjustment of 49 basis points is added to reflect the difference in risk between the indices of companies used in the DCF and Risk Premium models and an average WAW utility in Florida. Next, a private placement premium of 25 basis points is added to recognize that Florida WAW utilities do not have access to the public debt and equity markets. Finally, an adjustment of 29 basis

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points is added to reflect the required return on equity at a 40% equity ratio. (See page 1 of Attachment 1)

The bond yield differential adjustment of 49 basis points is comprised of the bond yield differential between the yield on A1-rated bonds and the yield on Baa3-rated bonds. (See pages 10-11 of Attachment 1) The A1 rating is the average bond rating for both the natural gas index and WAW index and the Baa3 rating is the bond rating assumed for the average WAW utility in Florida.

The private placement premium of 25 basis points is added to recognize that, because of their small size, lack of institutional interest in their securities, and the lack of liquidity of their issues, Florida WAW utilities must rely on the private placement market to obtain capital. This premium is based on the results of surveys of participants in the private placement market conducted by Staff and a review of the financial literature.

The 29 basis point adjustment represents the difference between the required return on equity at a 40.0% equity ratio and the required rate of return at the 45.34% equity ratio average for the indices of WAW utilities and natural gas utilities. (See pages 12-13 of Attachment 1) Using the most recently available capital structure for the index of publicly traded WAW utilities and the index of natural gas utilities as a proxy for the capital structure of an average WAW utility in Florida, Staff calculates the marginal cost of investor capital for an average WAW utility in Florida to be 9.51%.

In summary, Staff recommends the authorized range of returns on common equity for WAW utilities remain unchanged based on the following formula:

$$\text{Return on Common Equity} = 9.05\% + 1.131/\text{Equity Ratio}$$

We further recommend the authorized return on common equity be limited to a maximum of 11.88% for all equity ratios of less than 40%. This leverage formula maintains the range of returns approved in Order No. PSC-95-0892-FOF-WS.

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ISSUE 2: Should this docket be closed?

RECOMMENDATION: No. (MAUREY, JONES)

STAFF ANALYSIS: This docket should remain open to allow Staff to monitor the movement in capital costs and to readdress the reasonableness of the leverage formula as conditions warrant.

SUMMARY OF RESULTS

Leverage Formula Update

	<u>1995</u>	<u>1996</u>
DCF ROE for Water Index (Historic)	10.92%	10.32%
Risk Premium ROE for Gas Index	10.50%	9.57%
Gas Index premium	.18%	.44%
DCF ROE for Water Index (Projected)	10.37%	9.13%
CAPM ROE for Water Index	<u>11.00%</u>	<u>10.17%</u>
AVERAGE	10.78%	9.97%
Bond Yield Differential	.51%	.49%
Private Placement Premium	.25%	.25%
Adjustment to Reflect Required Equity Return at a 40% Equity Ratio	<u>.34%</u>	<u>.29%</u>
Cost of Equity for Average Florida WAW Utility at a 40% Equity Ratio	<u>11.88%</u>	<u>11.00%</u>

Existing Leverage Formula

Return on Common Equity = 9.05% + 1.131/ER  
Range of Returns on Equity = 10.18% - 11.88%

Updated Leverage Formula

Return on Common Equity = 8.51% + .997/ER  
Range of Returns on Equity = 9.51% - 11.00%

Leverage Formula = 8.51% + 0.997 / ER\*

Marginal Cost of Investor Capital  
Average Water and Wastewater Utility

<u>Capital Component</u>	<u>Ratio</u>	<u>Marginal Cost Rate</u>	<u>Weighted Marginal Cost Rate</u>
Common Equity	45.34%	10.71%	4.86%
Total Debt	54.66%	8.51% **	4.65%
	100.00%		9.51%

A 40% equity ratio is the floor for calculating the required return on common equity.  
 The return on equity at a 40% equity ratio =  $8.51\% + 0.997 / .40 = 11.00\%$

Marginal Cost of Investor Capital  
Average Water & Wastewater Utility at 40% Equity Ratio

<u>Capital Component</u>	<u>Ratio</u>	<u>Marginal Cost Rate</u>	<u>Weighted Marginal Cost Rate</u>
Common Equity	40.00%	11.00%	4.40%
Total Debt	60.00%	8.51% **	5.11%
	100.00%		9.51%

\* Where: Equity Ratio =  $\frac{\text{Common Equity}}{\text{Common Equity} + \text{Preferred Equity} + \text{Long-Term Debt} + \text{Short-Term Debt}}$

\*\* Assumed Baa3 rate for March 1996 plus 25 basis point private placement premium  
 Source: Moody's Bond Survey, 4/29/96

	Arithmetic Average Growth Rate	Current Dividend	Current Average Stock Price	Required Return on Equity %
American Water Works	8.58%	1.40	37.75	12.61
Aquarion Company	1.95%	1.62	25.50	8.43
California Water Services Co.	4.44%	2.08	34.31	10.77
Consumers Water Company	4.21%	1.20	17.13	11.51
Philadelphia Suburban Corp.	2.42%	1.16	22.50	7.70
United Water Resources	3.55%	0.92	12.94	10.91
Average	4.19%	1.40	25.02	10.32

DCF Analysis

$$K = D(1)/P(0) + g$$

K = Investors' required rate of return

D(1) = Dividend expected next period = Arithmetic growth rate x current dividend

P(0) = Current stock price = May average stock price

g = Projected long-term growth in dividends = Arithmetic growth rate

K = 10.32

Source: Standard & Poor's Stock Guide, April 1995 Edition



COST OF EQUITY FOR WATER INDEX COMPANIES  
 DISCOUNTED CASH FLOW MODEL

COMPANY	DIV1	DIV2	DIV3	DIV4	EPS4	ROE4	GR1-4	GR4+	MARCH		
									HI-PR	LO-PR	AVG-PR
AMERICAN WATER WORKS	1.40	1.49	1.59	1.70	3.00	11.00%	1.0669	1.0477	38.875	36.625	37.750
AQUARION CO.	1.82	1.79	1.99	2.20	2.75	14.50%	1.1074	1.0290	26.250	24.750	25.500
CALIFORNIA WATER SVC	2.08	2.12	2.16	2.20	2.90	11.00%	1.0189	1.0266	35.250	33.375	34.313
CONSUMERS WATER	1.21	1.23	1.25	1.27	1.45	10.50%	1.0163	1.0130	17.750	16.500	17.125
PHILADELPHIA SUBURBAN	1.18	1.20	1.23	1.25	1.60	12.50%	1.0194	1.0273	23.125	21.875	22.500
UNITED WATER RESOURCES	0.92	0.95	0.97	1.00	1.30	12.00%	1.0282	1.0277	13.125	13.125	13.125
AVERAGE	1.40	1.46	1.53	1.60	2.17	11.92%	1.0428	1.0285			25.052

\$24.30 = March 1995 average stock price less 3% flotation costs, or  $P_0(1-fc)$

9.13% = Cost of equity required to match the current stock price with the expected cash flows

Sources:

1. Stock Prices - S&P Stock Guide, April 1996 Edition
2. DPS, EPS, ROE - Value Line Edition 9, February 9, 1996

Risk Premium Cost of Equity for Moody's Natural Gas  
Distribution Index

Estimated Monthly Risk Premium	3.013 % (1)
Blue Chip Forecast for 30-Year Treasury Bond	<u>6.560 %</u> (2)
	<u>9.573 %</u>

Source: (1) Pages 7-9 of Attachment 1  
(2) Blue Chip Financial Forecasts, May 1, 1996

Capital Asset Pricing Model Cost of Equity for  
Water and Wastewater Industry

CAPM analysis formula

K = RF + Beta(MR - RF)  
K = Investor's required rate of return  
RF = Risk-free rate (Blue Chip forecast for 30-year  
Treasury bond)  
Beta = Measure of industry-specific risk (Average for  
water utilities followed by Value Line)  
MR = Market return

$$\underline{10.17\%} = 6.56\% + .57(12.89\% - 6.56\%)$$

Source: Blue Chip Financial Forecasts, May 1, 1996  
ValueScreen, April 1996

ESTIMATED MONTHLY RISK PREMIUMS  
 MOODY'S NATURAL GAS DISTRIBUTION INDEX  
 APRIL 1986 - APRIL 1996

YEAR	MONTH	Quarterly Cost of Equity Gas	Risk Free Rate	Risk Premium Quarterly	
1986	APR	12.944	7.96	4.984	
	MAY	12.684	7.39	5.294	
	JUN	12.726	7.52	5.206	
	JUL	11.818	7.57	4.248	
	AUG	11.683	7.27	4.413	
	SEP	11.653	7.33	4.323	
	OCT	11.408	7.62	3.788	
	NOV	11.617	7.70	3.917	
	DEC	11.336	7.52	3.816	
	1987	JAN	11.847	7.37	4.477
		FEB	11.642	7.39	4.252
		MAR	11.563	7.54	4.023
APR		11.293	7.55	3.743	
MAY		11.759	8.25	3.509	
JUN		11.903	8.78	3.123	
JUL		11.738	8.57	3.168	
AUG		11.856	8.64	3.216	
SEP		11.858	8.97	2.888	
OCT		12.148	9.59	2.558	
NOV		12.926	9.61	3.316	
DEC		13.078	8.95	4.128	
1988	JAN	13.226	9.12	4.106	
	FEB	12.850	8.83	4.020	
	MAR	12.416	8.43	3.986	
	APR	12.396	8.63	3.766	
	MAY	12.398	8.95	3.448	
	JUN	12.378	9.23	3.148	
	JUL	12.049	9.00	3.049	
	AUG	12.027	9.14	2.887	
	SEP	12.314	9.32	2.994	
	OCT	12.070	9.06	3.010	
	NOV	12.036	8.89	3.146	
	DEC	12.088	9.02	3.068	
1989	JAN	12.028	9.01	3.018	
	FEB	12.050	8.91	3.140	
	MAR	12.060	9.00	3.060	
	APR	12.580	9.16	3.420	
	MAY	12.480	9.02	3.460	
	JUN	12.312	8.83	3.482	
	JUL	12.071	8.26	3.811	
	AUG	11.882	8.07	3.812	
	SEP	11.788	8.11	3.678	

YEAR	MONTH	Quarterly Cost of Equity Gas	Risk Free Rate	Risk Premium Quarterly
1994	SEP	8.774	6.31	2.464
	OCT	8.813	5.99	2.823
	NOV	8.843	5.93	2.913
	DEC	9.136	6.21	2.926
	JAN	9.133	6.24	2.893
	FEB	8.805	6.28	2.525
	MAR	8.885	6.49	2.395
	APR	9.126	6.90	2.226
	MAY	9.431	7.25	2.181
	JUN	9.550	7.40	2.150
	JUL	9.737	7.39	2.347
	AUG	9.723	7.57	2.153
1995	SEP	9.802	7.48	2.322
	OCT	9.921	7.69	2.231
	NOV	9.813	7.93	1.883
	DEC	10.198	8.07	2.128
	JAN	10.342	7.86	2.482
	FEB	10.071	7.83	2.241
	MAR	9.891	7.60	2.291
	APR	9.865	7.44	2.425
	MAY	9.226	7.35	1.876
	JUNE	9.888	6.93	2.958
	JULY	9.858	6.57	3.288
	AUG	9.885	6.71	3.175
1996	SEPT	9.956	6.85	3.106
	OCT	9.502	6.55	2.952
	NOV	9.573	6.37	3.203
	DEC	9.622	6.25	3.372
	JAN	9.788	6.06	3.728
	FEB	9.216	6.05	3.166
	MAR	9.255	6.24	3.015
	APR	9.389	6.60	2.789

AVERAGE RISK PREMIUM

3.013

UPDATED: 04/15/96

SOURCE: Value Line 1986-1995  
 Moody's Bond Survey  
 U.S. Treasuries - 30-Year Bond

**BOND YIELD DIFFERENTIALS**  
 Public Utility Long Term Bond Yield Averages  
 Source: Moody's Bond Survey  
Long Term Corporate Bond Yield Average - Avg. Public Utility

120 Month Average -												0.1102	0.1102	0.0670	0.0670	0.0670	0.1053	0.1053	0.1053	0.1053		
YEAR MONTH	Aaa	SPREAD	Aa1	SPREAD	Aa2	SPREAD	Aa3	SPREAD	A1	SPREAD	A2	SPREAD	A3	SPREAD	Baa1	SPREAD	Baa2	SPREAD	Baa3			
1996	MAR	7.45	0.05	7.50	0.05	7.55	0.06	7.61	0.06	7.67	0.06	7.73	0.14	7.87	0.14	8.01	0.14	8.15	0.14	8.29		
	FEB	7.11	0.04	7.16	0.04	7.20	0.06	7.26	0.06	7.31	0.06	7.37	0.14	7.51	0.14	7.64	0.14	7.78	0.14	7.92		
	JAN	6.92	0.05	6.97	0.05	7.02	0.07	7.09	0.07	7.15	0.07	7.22	0.14	7.36	0.14	7.50	0.14	7.64	0.14	7.78		
	DEC	6.94	0.05	6.99	0.05	7.03	0.07	7.10	0.07	7.16	0.07	7.23	0.13	7.36	0.13	7.50	0.13	7.63	0.13	7.76		
	NOV	7.13	0.04	7.18	0.04	7.22	0.07	7.29	0.07	7.36	0.07	7.43	0.13	7.56	0.13	7.68	0.13	7.81	0.13	7.94		
	OCT	7.23	0.04	7.27	0.04	7.30	0.05	7.35	0.05	7.41	0.05	7.46	0.12	7.58	0.12	7.70	0.12	7.82	0.12	7.94		
	SEPT	7.42	0.03	7.45	0.03	7.48	0.05	7.53	0.05	7.57	0.05	7.62	0.12	7.74	0.12	7.86	0.12	7.98	0.12	8.10		
	AUG	7.66	0.03	7.69	0.03	7.71	0.04	7.75	0.04	7.79	0.04	7.83	0.14	7.97	0.14	8.10	0.14	8.24	0.14	8.38		
	JULY	7.51	0.04	7.56	0.04	7.60	0.03	7.63	0.03	7.67	0.03	7.70	0.14	7.84	0.14	7.97	0.14	8.11	0.14	8.25		
	JUNE	7.39	0.05	7.44	0.05	7.49	0.04	7.53	0.04	7.56	0.04	7.60	0.14	7.74	0.14	7.87	0.14	8.01	0.14	8.15		
	MAY	7.71	0.05	7.76	0.05	7.80	0.04	7.84	0.04	7.87	0.04	7.91	0.13	8.04	0.13	8.17	0.13	8.30	0.13	8.43		
	APR	8.08	0.05	8.13	0.05	8.17	0.03	8.20	0.03	8.24	0.03	8.27	0.13	8.40	0.13	8.54	0.13	8.67	0.13	8.80		
	MAR	8.18	0.05	8.24	0.05	8.29	0.03	8.32	0.03	8.34	0.03	8.37	0.13	8.50	0.13	8.63	0.13	8.76	0.13	8.89		
1995	FEB	8.33	0.06	8.39	0.06	8.45	0.02	8.47	0.02	8.50	0.02	8.52	0.14	8.66	0.14	8.79	0.14	8.93	0.14	9.07		
	JAN	8.53	0.07	8.60	0.07	8.66	0.02	8.68	0.02	8.71	0.02	8.73	0.14	8.87	0.14	9.01	0.14	9.15	0.14	9.29		
	DEC	8.55	0.07	8.62	0.07	8.69	0.02	8.71	0.02	8.74	0.02	8.76	0.13	8.89	0.13	9.03	0.13	9.16	0.13	9.29		
	NOV	8.77	0.06	8.84	0.06	8.90	0.03	8.93	0.03	8.95	0.03	8.98	0.12	9.10	0.12	9.23	0.12	9.35	0.12	9.47		
	OCT	8.65	0.07	8.72	0.07	8.78	0.03	8.81	0.03	8.83	0.03	8.86	0.13	8.99	0.13	9.11	0.13	9.24	0.13	9.37		
	SEP	8.41	0.08	8.49	0.08	8.56	0.03	8.59	0.03	8.61	0.03	8.64	0.11	8.75	0.11	8.87	0.11	8.98	0.11	9.09		
	AUG	8.15	0.09	8.24	0.09	8.32	0.03	8.35	0.03	8.38	0.03	8.41	0.11	8.52	0.11	8.63	0.11	8.74	0.11	8.85		
	JUL	8.21	0.09	8.30	0.09	8.38	0.03	8.41	0.03	8.44	0.03	8.47	0.11	8.58	0.11	8.69	0.11	8.80	0.11	8.91		
	JUN	8.07	0.07	8.14	0.07	8.21	0.03	8.24	0.03	8.28	0.03	8.31	0.11	8.42	0.11	8.53	0.11	8.64	0.11	8.75		
	MAY	8.11	0.07	8.18	0.07	8.24	0.03	8.27	0.03	8.30	0.03	8.33	0.09	8.42	0.09	8.52	0.09	8.61	0.09	8.70		
	APR	8.00	0.06	8.06	0.06	8.12	0.03	8.15	0.03	8.19	0.03	8.22	0.08	8.30	0.08	8.39	0.08	8.47	0.08	8.55		
	MAR	7.60	0.07	7.67	0.07	7.74	0.04	7.78	0.04	7.81	0.04	7.85	0.09	7.94	0.09	8.02	0.09	8.11	0.09	8.20		
1994	FEB	7.19	0.08	7.27	0.08	7.34	0.04	7.38	0.04	7.43	0.04	7.47	0.10	7.57	0.10	7.66	0.10	7.76	0.10	7.86		
	JAN	7.05	0.06	7.12	0.06	7.18	0.05	7.23	0.05	7.28	0.05	7.33	0.11	7.44	0.11	7.55	0.11	7.66	0.11	7.77		
	DEC	7.06	0.06	7.12	0.06	7.18	0.05	7.23	0.05	7.29	0.05	7.34	0.13	7.47	0.13	7.60	0.13	7.73	0.13	7.86		
	NOV	7.06	0.06	7.12	0.06	7.17	0.04	7.21	0.04	7.26	0.04	7.30	0.13	7.43	0.13	7.56	0.13	7.69	0.13	7.82		
	OCT	6.75	0.07	6.82	0.07	6.89	0.05	6.94	0.05	6.98	0.05	7.03	0.08	7.11	0.08	7.19	0.08	7.27	0.08	7.35		
	SEP	6.76	0.06	6.83	0.06	6.89	0.05	6.94	0.05	6.99	0.05	7.04	0.10	7.14	0.10	7.25	0.10	7.35	0.10	7.45		
	AUG	6.94	0.07	7.01	0.07	7.07	0.06	7.13	0.06	7.19	0.06	7.25	0.11	7.36	0.11	7.48	0.11	7.59	0.11	7.70		
	JUL	7.25	0.07	7.32	0.07	7.38	0.05	7.43	0.05	7.49	0.05	7.54	0.13	7.67	0.13	7.80	0.13	7.93	0.13	8.06		
	JUN	7.37	0.09	7.46	0.09	7.54	0.07	7.61	0.07	7.68	0.07	7.75	0.10	7.85	0.10	7.95	0.10	8.05	0.10	8.15		
	MAY	7.44	0.10	7.54	0.10	7.64	0.07	7.71	0.07	7.79	0.07	7.86	0.11	7.97	0.11	8.07	0.11	8.18	0.11	8.29		
	APR	7.50	0.07	7.57	0.07	7.64	0.06	7.70	0.06	7.75	0.06	7.81	0.10	7.91	0.10	8.01	0.10	8.11	0.10	8.21		
	MAR	7.64	0.06	7.70	0.06	7.76	0.05	7.81	0.05	7.85	0.05	7.90	0.07	7.97	0.07	8.03	0.07	8.10	0.07	8.17		
	FEB	7.75	0.09	7.84	0.09	7.92	0.04	7.96	0.04	8.00	0.04	8.04	0.09	8.13	0.09	8.22	0.09	8.31	0.09	8.40		
1993	JAN	7.94	0.10	8.04	0.10	8.14	0.04	8.18	0.04	8.23	0.04	8.27	0.10	8.37	0.10	8.47	0.10	8.57	0.10	8.67		
	DEC	8.01	0.15	8.17	0.15	8.32	0.04	8.36	0.04	8.39	0.04	8.43	0.09	8.52	0.09	8.60	0.09	8.69	0.09	8.78		
	NOV	8.11	0.20	8.31	0.20	8.51	0.04	8.55	0.04	8.59	0.04	8.63	0.08	8.71	0.08	8.78	0.08	8.86	0.08	8.94		
	OCT	8.06	0.18	8.24	0.18	8.42	0.04	8.46	0.04	8.50	0.04	8.54	0.07	8.61	0.07	8.69	0.07	8.76	0.07	8.83		
	SEP	8.04	0.12	8.16	0.12	8.28	0.04	8.32	0.04	8.36	0.04	8.40	0.05	8.45	0.05	8.49	0.05	8.54	0.05	8.59		
	AUG	8.04	0.13	8.17	0.13	8.30	0.05	8.35	0.05	8.39	0.05	8.44	0.05	8.49	0.05	8.53	0.05	8.58	0.05	8.63		
	JUL	8.12	0.17	8.29	0.17	8.45	0.04	8.49	0.04	8.53	0.04	8.57	0.04	8.61	0.04	8.65	0.04	8.69	0.04	8.73		
	JUN	8.26	0.18	8.45	0.18	8.63	0.05	8.68	0.05	8.73	0.05	8.78	0.04	8.82	0.04	8.86	0.04	8.90	0.04	8.94		
	MAY	8.32	0.18	8.51	0.18	8.69	0.06	8.75	0.06	8.81	0.06	8.87	0.05	8.92	0.05	8.96	0.05	9.01	0.05	9.06		
	APR	8.36	0.20	8.56	0.20	8.76	0.06	8.82	0.06	8.87	0.06	8.93	0.06	8.99	0.06	9.05	0.06	9.11	0.06	9.17		
	MAR	8.39	0.21	8.61	0.21	8.82	0.05	8.87	0.05	8.92	0.05	8.97	0.06	9.03	0.06	9.10	0.06	9.16	0.06	9.22		
	FEB	8.30	0.23	8.53	0.23	8.76	0.06	8.82	0.06	8.87	0.06	8.93	0.05	8.98	0.05	9.04	0.05	9.09	0.05	9.14		
1992	JAN	8.22	0.20	8.43	0.20	8.63	0.07	8.70	0.07	8.77	0.07	8.84	0.05	8.89	0.05	8.93	0.05	8.98	0.05	9.03		
	DEC	8.38	0.17	8.55	0.17	8.71	0.06	8.77	0.06	8.82	0.06	8.88	0.06	8.94	0.06	9.01	0.06	9.07	0.06	9.13		
	NOV	8.52	0.17	8.70	0.17	8.87	0.06	8.93	0.06	8.99	0.06	9.05	0.08	9.13	0.08	9.20	0.08	9.28	0.08	9.36		
	OCT	8.57	0.18	8.75	0.18	8.92	0.07	8.99	0.07	9.05	0.07	9.12	0.07	9.19	0.07	9.25	0.07	9.32	0.07	9.39		
	SEP	8.65	0.15	8.80	0.15	8.95	0.07	9.02	0.07	9.09	0.07	9.16	0.06	9.22	0.06	9.28	0.06	9.34	0.06	9.40		
	AUG	8.81	0.13	8.94	0.13	9.06	0.08	9.14	0.08	9.21	0.08	9.29	0.06	9.35	0.06	9.41	0.06	9.47	0.06	9.53		
	JUL	9.10	0.08	9.18	0.08	9.26	0.10	9.36	0.10	9.45	0.10	9.55	0.05	9.60	0.05	9.64	0.05	9.69	0.05	9.74		
	JUN	9.10	0.09	9.19	0.09	9.28	0.10	9.38	0.10	9.49	0.10	9.59	0.07	9.66	0.07	9.72	0.07	9.79	0.07	9.86		
	MAY	8.93	0.11	9.05	0.11	9.16	0.09	9.25	0.09	9.35	0.09	9.44	0.07	9.51	0.07	9.57	0.07	9.64	0.07	9.71		
	APR	8.95	0.10	9.05	0.10	9.14	0.11	9.25	0.11	9.35	0.11	9.46	0.06	9.52	0.06	9.58	0.06	9.64	0.06	9.70		
	MAR	9.04	0.09	9.14	0.09	9.23	0.11	9.34	0.11	9.44	0.11	9.55	0.06	9.61	0.06	9.68	0.06	9.74	0.06	9.80		
	FEB	8.92	0.12	9.04	0.12	9.16	0.10	9.26	0.10	9.37	0.10	9.47	0.07	9.54	0.07	9.61	0.07	9.68	0.07	9.75		
1991	JAN	9.17	0.11	9.28	0.11	9.39	0.11	9.50	0.11	9.60	0.11	9.71	0.08	9.79	0.08	9.88	0.08	9.96	0.08	10.04		
	DEC	9.18	0.12	9.30	0.12	9.42	0.10	9.52</														

YEAR MONTH	Aaa SPREAD	Aa1 SPREAD	Aa2 SPREAD	Aa3 SPREAD	A1 SPREAD	A2 SPREAD	A3 SPREAD	Baa1 SPREAD	Baa2 SPREAD	Baa3									
AUG	9.54	0.12	9.66	0.12	9.78	0.05	9.83	0.05	9.87	0.05	9.92	0.07	9.99	0.07	10.05	0.07	10.12	0.07	10.19
JUL	9.36	0.13	9.49	0.13	9.61	0.05	9.66	0.05	9.70	0.05	9.75	0.06	9.81	0.06	9.86	0.06	9.92	0.06	9.98
JUN	9.38	0.11	9.49	0.11	9.60	0.07	9.67	0.07	9.73	0.07	9.80	0.05	9.85	0.05	9.91	0.05	9.96	0.05	10.01
MAY	9.58	0.13	9.71	0.13	9.83	0.06	9.89	0.06	9.94	0.06	10.00	0.05	10.05	0.05	10.11	0.05	10.16	0.05	10.21
APR	9.60	0.11	9.71	0.11	9.81	0.04	9.85	0.04	9.88	0.04	9.92	0.07	9.99	0.07	10.06	0.07	10.13	0.07	10.20
MAR	9.48	0.06	9.54	0.06	9.60	0.08	9.68	0.08	9.77	0.08	9.85	0.07	9.92	0.07	9.99	0.07	10.06	0.07	10.13
FEB	9.35	0.11	9.46	0.11	9.57	0.06	9.63	0.06	9.70	0.06	9.76	0.07	9.83	0.07	9.89	0.07	9.96	0.07	10.03
1990 JAN	9.08	0.16	9.24	0.16	9.39	0.06	9.45	0.06	9.50	0.06	9.56	0.06	9.62	0.06	9.68	0.06	9.74	0.06	9.80
DEC	8.92	0.17	9.09	0.17	9.26	0.06	9.32	0.06	9.38	0.06	9.44	0.05	9.49	0.05	9.55	0.05	9.60	0.05	9.65
NOV	8.92	0.17	9.09	0.17	9.25	0.09	9.34	0.09	9.42	0.09	9.51	0.04	9.55	0.04	9.60	0.04	9.64	0.04	9.68
OCT	9.01	0.13	9.15	0.13	9.28	0.09	9.37	0.09	9.45	0.09	9.54	0.03	9.57	0.03	9.61	0.03	9.64	0.03	9.67
SEP	9.10	0.13	9.23	0.13	9.35	0.08	9.43	0.08	9.50	0.08	9.58	0.04	9.62	0.04	9.66	0.04	9.70	0.04	9.74
AUG	9.02	0.13	9.15	0.13	9.27	0.08	9.35	0.08	9.44	0.08	9.52	0.04	9.56	0.04	9.60	0.04	9.64	0.04	9.68
JUL	8.98	0.13	9.11	0.13	9.23	0.09	9.32	0.09	9.41	0.09	9.50	0.05	9.55	0.05	9.59	0.05	9.64	0.05	9.69
JUN	9.13	0.12	9.25	0.12	9.37	0.09	9.46	0.09	9.55	0.09	9.64	0.05	9.69	0.05	9.75	0.05	9.80	0.05	9.85
MAY	9.60	0.09	9.70	0.09	9.79	0.07	9.86	0.07	9.92	0.07	9.99	0.10	10.09	0.10	10.19	0.10	10.29	0.10	10.39
APR	9.68	0.07	9.85	0.07	10.02	0.05	10.07	0.05	10.13	0.05	10.18	0.10	10.28	0.10	10.39	0.10	10.49	0.10	10.59
MAR	9.87	0.09	9.96	0.09	10.05	0.06	10.11	0.06	10.17	0.06	10.23	0.09	10.32	0.09	10.41	0.09	10.50	0.09	10.59
FEB	9.71	0.11	9.82	0.11	9.93	0.05	9.98	0.05	10.02	0.05	10.07	0.10	10.17	0.10	10.28	0.10	10.38	0.10	10.48
1989 JAN	9.72	0.09	9.81	0.09	9.89	0.06	9.95	0.06	10.02	0.06	10.08	0.10	10.18	0.10	10.28	0.10	10.38	0.10	10.48
DEC	9.67	0.11	9.79	0.11	9.90	0.05	9.95	0.05	10.01	0.05	10.06	0.13	10.19	0.13	10.31	0.13	10.44	0.13	10.57
NOV	9.62	0.09	9.71	0.09	9.79	0.06	9.85	0.06	9.91	0.06	9.97	0.11	10.08	0.11	10.20	0.11	10.31	0.11	10.42
OCT	9.52	0.14	9.66	0.14	9.80	0.03	9.83	0.03	9.87	0.03	9.90	0.15	10.05	0.15	10.20	0.15	10.35	0.15	10.50
SEP	10.15	0.10	10.25	0.10	10.34	0.09	10.43	0.09	10.52	0.09	10.61	0.17	10.78	0.17	10.96	0.17	11.13	0.17	11.30
AUG	10.66	0.10	10.76	0.10	10.85	0.11	10.96	0.11	11.06	0.11	11.17	0.17	11.34	0.17	11.52	0.17	11.69	0.17	11.86
JUL	10.50	0.13	10.63	0.13	10.76	0.09	10.85	0.09	10.95	0.09	11.04	0.16	11.20	0.16	11.36	0.16	11.52	0.16	11.68
JUN	10.27	0.13	10.40	0.13	10.52	0.09	10.61	0.09	10.70	0.09	10.79	0.16	10.95	0.16	11.11	0.16	11.27	0.16	11.43
MAY	10.29	0.12	10.41	0.12	10.53	0.09	10.62	0.09	10.72	0.09	10.81	0.19	11.00	0.19	11.19	0.19	11.38	0.19	11.57
APR	10.07	0.11	10.18	0.11	10.29	0.08	10.37	0.08	10.46	0.08	10.54	0.23	10.77	0.23	11.00	0.23	11.23	0.23	11.46
MAR	9.72	0.10	9.82	0.10	9.92	0.06	9.98	0.06	10.03	0.06	10.09	0.20	10.29	0.20	10.49	0.20	10.69	0.20	10.89
FEB	9.77	0.07	9.84	0.07	9.91	0.06	9.97	0.06	10.04	0.06	10.10	0.18	10.28	0.18	10.47	0.18	10.65	0.18	10.83
1988 JAN	10.39	0.07	10.46	0.07	10.52	0.08	10.60	0.08	10.68	0.08	10.76	0.19	10.95	0.19	11.15	0.19	11.34	0.19	11.53
DEC	10.64	0.07	10.71	0.07	10.78	0.07	10.85	0.07	10.91	0.07	10.98	0.19	11.17	0.19	11.36	0.19	11.55	0.19	11.74
NOV	10.43	0.09	10.53	0.09	10.62	0.07	10.69	0.07	10.75	0.07	10.82	0.19	11.01	0.19	11.21	0.19	11.40	0.19	11.59
OCT	10.92	0.09	11.02	0.09	11.11	0.08	11.19	0.08	11.26	0.08	11.34	0.19	11.53	0.19	11.72	0.19	11.91	0.19	12.10
SEP	10.53	0.07	10.60	0.07	10.66	0.19	10.85	0.19	11.03	0.19	11.22	0.12	11.34	0.12	11.46	0.12	11.58	0.12	11.70
AUG	9.92	0.07	9.99	0.07	10.05	0.13	10.18	0.13	10.32	0.13	10.45	0.15	10.60	0.15	10.75	0.15	10.90	0.15	11.05
JUL	9.56	0.07	9.63	0.07	9.70	0.15	9.85	0.15	10.00	0.15	10.15	0.16	10.31	0.16	10.46	0.16	10.62	0.16	10.78
JUN	9.37	0.12	9.49	0.12	9.61	0.14	9.75	0.14	9.88	0.14	10.02	0.15	10.17	0.15	10.31	0.15	10.46	0.15	10.61
MAY	9.34	0.15	9.49	0.15	9.63	0.09	9.72	0.09	9.82	0.09	9.91	0.16	10.07	0.16	10.24	0.16	10.40	0.16	10.56
APR	8.83	0.16	8.99	0.16	9.15	0.08	9.23	0.08	9.30	0.08	9.38	0.16	9.54	0.16	9.69	0.16	9.85	0.16	10.01
MAR	8.21	0.22	8.43	0.22	8.64	0.10	8.74	0.10	8.83	0.10	8.93	0.09	9.02	0.09	9.10	0.09	9.19	0.09	9.28
FEB	8.29	0.20	8.49	0.20	8.69	0.10	8.79	0.10	8.90	0.10	9.00	0.08	9.08	0.08	9.16	0.08	9.24	0.08	9.32
1987 JAN	8.23	0.20	8.43	0.20	8.62	0.11	8.73	0.11	8.84	0.11	8.95	0.11	9.06	0.11	9.16	0.11	9.27	0.11	9.38
DEC	8.41	0.20	8.61	0.20	8.81	0.10	8.91	0.10	9.02	0.10	9.12	0.12	9.24	0.12	9.37	0.12	9.49	0.12	9.61
NOV	8.59	0.21	8.80	0.21	9.01	0.09	9.10	0.09	9.19	0.09	9.28	0.14	9.42	0.14	9.55	0.14	9.69	0.14	9.83
OCT	8.84	0.20	9.04	0.20	9.24	0.09	9.33	0.09	9.43	0.09	9.52	0.14	9.66	0.14	9.81	0.14	9.95	0.14	10.09
SEP	8.91	0.18	9.10	0.18	9.28	0.08	9.36	0.08	9.44	0.08	9.52	0.15	9.67	0.15	9.81	0.15	9.96	0.15	10.11
AUG	8.59	0.22	8.81	0.22	9.03	0.09	9.12	0.09	9.20	0.09	9.29	0.14	9.43	0.14	9.56	0.14	9.70	0.14	9.84
JUL	8.66	0.20	8.86	0.20	9.05	0.11	9.16	0.11	9.26	0.11	9.37	0.11	9.48	0.11	9.58	0.11	9.69	0.11	9.80
JUN	9.02	0.17	9.19	0.17	9.36	0.09	9.45	0.09	9.53	0.09	9.62	0.14	9.76	0.14	9.89	0.14	10.03	0.14	10.17
MAY	9.07	0.16	9.23	0.16	9.38	0.07	9.45	0.07	9.52	0.07	9.59	0.14	9.73	0.14	9.88	0.14	10.02	0.14	10.16
APR	8.45	0.21	8.66	0.21	8.87	0.09	8.96	0.09	9.05	0.09	9.14	0.16	9.30	0.16	9.47	0.16	9.63	0.16	9.79
MAR	8.75	0.20	8.96	0.20	9.16	0.11	9.27	0.11	9.37	0.11	9.48	0.14	9.62	0.14	9.77	0.14	9.91	0.14	10.05
FEB	9.65	0.17	9.82	0.17	9.98	0.09	10.07	0.09	10.17	0.09	10.26	0.16	10.42	0.16	10.58	0.16	10.74	0.16	10.90
1986 JAN	10.14	0.15	10.29	0.15	10.44	0.12	10.56	0.12	10.67	0.12	10.79	0.15	10.94	0.15	11.09	0.15	11.24	0.15	11.39
DEC	10.24	0.17	10.41	0.17	10.57	0.13	10.70	0.13	10.84	0.13	10.97	0.17	11.14	0.17	11.31	0.17	11.48	0.17	11.65
NOV	10.71	0.20	10.91	0.20	11.10	0.13	11.23	0.13	11.36	0.13	11.49	0.18	11.67	0.18	11.86	0.18	12.04	0.18	12.22
OCT	11.23	0.19	11.42	0.19	11.61	0.13	11.74	0.13	11.88	0.13	12.01	0.17	12.18	0.17	12.35	0.17	12.52	0.17	12.69
SEP	11.27	0.20	11.46	0.20	11.68	0.15	11.83	0.15	11.98	0.15	12.13	0.20	12.33	0.20	12.52	0.20	12.72	0.20	12.92
AUG	11.23	0.21	11.44	0.21	11.65	0.16	11.81	0.16	11.97	0.16	12.13	0.20	12.33	0.20	12.53	0.20	12.73	0.20	12.93
JUL	11.18	0.18	11.37	0.18	11.55	0.17	11.72	0.17	11.90	0.17	12.07	0.21	12.28	0.21	12.49	0.21	12.70	0.21	12.91
JUN	11.17	0.26	11.43	0.26	11.68	0.15	11.83	0.15	11.98	0.15	12.13	0.18	12.31	0.18	12.48	0.18	12.66	0.18	12.84
MAY	12.18	0.23	12.42	0.23	12.65	0.16	12.81	0.16	12.96	0.16	13.12	0.17	13.29	0.17	13.45	0.17	13.62	0.17	13.79
APR	12.77	0.20	12.97	0.20	13.17	0.15	13.32	0.15	13.46	0.15	13.61	0.17							

12/95 EQUITY RATIOS OF WATER INDEX COMPANIES						
	BOOK VALUE PER SHARE	COMMON SHARES OUTSTANDING	COMMON EQUITY	TOTAL DEBT	PREFERRED EQUITY	EQUITY RATIO
AMERICAN WATER WORKS	\$23.15	33,661,900	\$779,272,985	\$1,542,900,000	\$100,600,000	32.16%
AQUARION COMPANY	17.25	6,847,099	118,112,458	136,500,000	0	46.39%
CALIFORNIA WATER SERVICE CO.	23.45	6,258,729	146,767,195	148,900,000	3,500,000	49.06%
CONSUMERS WATER COMPANY	12.40	8,447,068	104,743,643	170,000,000	1,100,000	37.97%
PHILADELPHIA SUBURBAN CORP.	12.40	12,072,988	149,705,051	197,400,000	5,700,000	42.43%
UNITED WATER RESOURCES	10.50	32,515,422	341,411,931	611,100,000	107,000,000	32.22%
AVERAGE						40.04%

SOURCE: Value Line Investment Survey  
 Edition 9 February 9, 1996



12/95 EQUITY RATIOS OF GAS INDEX COMPANIES

	BOOK VALUE PER SHARE	COMMON SHARES OUTSTANDING	COMMON EQUITY	TOTAL DEBT	PREFERRED EQUITY	EQUITY RATIO
AGL RESOURCES	\$10.12	55,167,451	\$558,294,604	\$554,500,000	\$58,500,000	47.66%
BAY STATE GAS	16.48	13,377,394	220,191,905	248,500,000	5,100,000	46.47%
BROOKLYN UNION GAS	16.94	49,220,736	833,799,268	746,200,000	6,900,000	52.54%
INDIANA ENERGY	12.44	22,536,302	280,351,597	223,400,000	0	55.85%
LACLEDE GAS	13.05	17,466,380	227,936,259	251,300,000	2,000,000	47.36%
NORTHWEST NATURAL GAS	21.80	14,780,757	322,220,503	315,200,000	39,800,000	47.58%
PEOPLES ENERGY	18.38	34,938,792	642,174,997	547,100,000	0	54.00%
WASHINGTON GAS LIGHT	11.95	43,259,873	516,955,482	416,500,000	28,500,000	53.74%
AVERAGE						50.63%

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SOURCE: Value Line Investment Survey  
 Edition 3 March 29, 1996