BEFORE THE

FLORIDA PUBLIC SERVICE COMMISSION

DOCKET NO. 950495 - WS

APPLICATION FOR A GENERAL RATE INCREASE

VOLUME I
BOOK 3 OF 22

MINIMUM FILING REQUIREMENTS
PREFILED DIRECT TESTIMONY

Containing

ROGER A. MORIN, Ph.D.

DIRECT TESTIMONY OF ROGER A. MORIN, PH.D.

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

ON BEHALF OF

SOUTHERN STATES UTILITIES, INC.

DOCKET NO. 950495-WS

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND OCCUPATION.

A. My name is Dr. Roger A. Morin. My business address is 1515 Old Riverside Rd., Roswell, Georgia, 30076. I am Professor of Finance at the College of Business Administration, Georgia State University and Professor of Finance for Regulated Industry at the Center for the Study of Regulated Industry at Georgia State University.

Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND.

A. I hold a Bachelor of Engineering degree and an MBA in Finance from McGill University, Montreal, Canada. I received my Ph.D. in Finance and Econometrics at the Wharton School of Finance, University of Pennsylvania.

Q. PLEASE SUMMARIZE YOUR ACADEMIC AND BUSINESS CAREER.

A. I have taught at the Wharton School of Finance, University of Pennsylvania, Amos Tuck School of Business at Dartmouth College, Drexel University, University of Montreal, McGill University, and Georgia State University. I was a faculty member of Advanced Management Research International, and I am currently a faculty member of The Management Exchange Inc. where I conduct frequent national executive-level education seminars throughout the United States and Canada. In the last eleven years, and throughout 1995, I am conducting

national seminars on "Utility Cost of Capital", "Alternative Regulatory Frameworks," and on "Utility Capital Allocation" which I have developed on behalf of The Management Exchange Inc., now known as Exnet Inc., in conjunction with Public Utilities Reports, Inc.

I have authored or co-authored several books, monographs, and articles in academic scientific journals on the subject of finance. They have appeared in a variety of journals, including The Journal of Finance, The Journal of Business Administration, International Management Review, and Public Utility Fortnightly. I published a widely-used treatise on regulatory finance, Utilities' Cost of Capital, Public Utilities Reports Inc., Arlington, Virginia 1984. My new book, Regulatory Finance, a voluminous treatise on the application of finance to regulated utilities, was recently released by the same publisher. I have engaged in extensive consulting activities on behalf of numerous corporations and legal firms in matters of financial management and corporate litigation. Exhibit No. ____ (RAM-1) describes my professional credentials in more detail.

Q. HAVE YOU EVER TESTIFIED ON COST OF CAPITAL BEFORE?

A. Yes, I have been a cost of capital witness before numerous regulatory boards, including the Florida Public Service Commission ("FPSC"), the Federal Energy Regulatory Commission, and the Federal Communications Commission. I have also appeared before the following state and provincial commissions: Alabama, Alaska, Alberta, Arizona, British

Columbia, California, Colorado, Florida, Georgia, Hawaii, Illinois, Indiana, Iowa, Louisiana, Manitoba, Minnesota, Mississippi, Montana, Nevada, New Brunswick, New Jersey, New York, Newfoundland, North Carolina, North Dakota, Ohio, Oklahoma, Ontario, Oregon, Pennsylvania, Quebec, South Carolina, Tennessee, Texas, Utah, Vermont, Washington and West Virginia.

The details of my participation in regulatory proceedings are provided in Exhibit ____ (RAM-1).

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. I have been asked to conduct an independent appraisal of the cost of capital to Southern States Utilities ("Company" or "SSU") with particular emphasis on the fair return on SSU's common equity capital (ROE), and to recommend a return on such capital which will (1) be fair to the ratepayer, (2) allow the company to attract capital on reasonable terms, (3) maintain its financial integrity, and (4) be comparable to returns offered on comparable risk investments. I have also been asked to comment on related topics, including the current risk circumstances of the water utility industry in general and SSU in particular, the FPSC's leverage formula employed in setting the allowed ROE, and the notion of an optimal capital structure.

Q. PLEASE SUMMARIZE YOUR TESTIMONY AND

RECOMMENDATION.

A. I have examined SSU's risks both on an absolute basis and relative to the water utility industry and relative to other regulated energy utilities. I have concluded that: (1) the risks of the water industry as a whole, including SSU, have increased substantially in recent years, (2) the risks of the Florida water utilities, including those of SSU, exceed the national industry average because of their relatively small size, very large construction programs and the attendant financing stress, substantial regulatory risks, and rate relief pressures, and (3) although the company's size is a slight advantage, SSU is exposed to most of the same risks as the other water utilities operating in the State of Florida.

From a methodological standpoint, my recommendation is derived from the Commission's Leverage Formula and from suggested modifications and refinements which would improve the formula's conceptual foundations, applicability to the current circumstances of the water utility industry in Florida, and applicability to SSU's own risk circumstances.

Following the results of this procedure and based on my professional judgment, it is my opinion that a just and reasonable return on common equity for SSU is 12.25%, that is, SSU should have the opportunity to earn 12.25% on its common equity capital. In arriving at my recommended return, I considered the favorable risk-reduction impact

of adopting some form of Revenue Adjustment Mechanism ("RAM"), such as the weather normalization clause being proposed by SSU in this proceeding. My return recommendation is predicated on the adoption of a RAM. However, in the event that such a mechanism is not adopted, SSU's cost of equity would increase by as much as 25 basis points.

I believe that my recommended return will allow the Company to (1) attract capital on reasonable terms, (2) to maintain its financial integrity, and (3) offer a return comparable to that offered by competing comparable risk investments, but it will also (4) enhance the Company's ability to finance its herculean construction program at reasonable terms and cost.

Q. PLEASE DESCRIBE HOW YOUR TESTIMONY IS ORGANIZED.

A. My testimony is organized in five (5) broad sections:

i. Regulatory Framework and Rate of Return;

ii. Risk Environment;

iii. Cost of Equity Capital Estimates;

iv. Summary and Recommendation; and

v. Capital Structure.

The first section discusses the rudiments of rate of return regulation and the basic notions underlying rate of return. The second section focuses on SSU's current risk environment. A number of business, regulatory, and financial risk factors unique to the water industry at both

the national and state level and unique to SSU are described in that section. The third section contains the application of the Commission's Leverage Formula which I have refined in order to improve its conceptual foundations and applicability to the current risk circumstances of the industry. In the fourth section, I summarize my rate of return recommendation and address some germane issues. In the fifth section, the need for the Company to achieve an optimal bond rating is discussed.

Q. HOW SHOULD A UTILITY'S RATES BE SET?

A. The rates set by the regulatory commission should be sufficient to cover the utility's operating costs, including taxes and depreciation, plus an adequate dollar return on the capital invested. The required return in dollars is obtained by multiplying the established rate of return set by the regulator by the "rate base". The rate base is essentially the net book value of the utility's plant considered used and useful in dispensing service.

Q. HOW SHOULD A REGULATORY COMMISSION DETERMINE A RATE OF RETURN THAT IS FAIR AND REASONABLE?

A. The heart of utility regulation is the setting of just and reasonable rates by way of a fair and reasonable return. There are two landmark United States Supreme Court cases which define the legal principles underlying the regulation of a public utility's rate of return and provide the foundations for the notion of a fair return:

1. Bluefield Water Works & Improvement Co. v. Public Service Commission of West Virginia, 262 U.S. 679 (1923); and

2. Federal Power Commission v. Hope Natural Gas Company, 320 U.S. 391 (1944).

The Bluefield case set the standard against which just and reasonable rates are measured:

> "A public utility is entitled to such rates as will permit it to earn a return on the value of the property which it employs for the convenience of the public equal to that generally being made at the same time and in the same general part of the country on investments in other business undertakings which are attended by corresponding risks and uncertainties ... The return should be reasonable, sufficient to assure confidence in the financial soundness of the utility, and should be adequate, under efficient and economical management, to maintain and support its credit and enable it to raise money necessary for the proper discharge of its public duties."

The Hope case expanded on the guidelines to be used to assess the reasonableness of the allowed return. The Court reemphasized its statements in the Bluefield case and recognized that revenues must cover "capital costs". The Court stated:

"From the investor or company point of view it is important that there be enough revenue not only for operating expenses but also for the capital costs of the business. These include service on the debt and dividends on the stock ... By that standard the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks. That return, moreover, should be sufficient to assure confidence in the financial integrity of the enterprise, so as to maintain its credit and attract capital."

The United States Supreme Court reiterated the criteria set forth in Hope in Federal Power Commission v. Memphis Light, Gas & Water Division, 411 U.S. 458 (1973), in Permian Basin Rate Cases, 390 U.S. 747 (1968), and most recently in Duquesne Light Co. and Pennsylvania Power Co. vs. D.M. Barasch, etc., et al., 109 U.S. 609 (1989). In the Permian cases, the Supreme Court stressed that a regulatory agency's rate of return order should:

"...reasonably be expected to maintain financial integrity, attract necessary capital, and fairly compensate investors for the risks they have assumed..."

Therefore, the "end result" of this Commission's decision should be to

allow SSU to earn a return on equity that is: (1) commensurate with returns on investments in other firms having corresponding risks, (2) sufficient to assure confidence in SSU's financial integrity, and (3) maintains SSU's creditworthiness and ability to attract capital on reasonable terms.

Q. HOW IS THE FAIR RATE OF RETURN DETERMINED?

A. The aggregate return required by investors in SSU's securities is called "cost of capital". The cost of capital is the opportunity cost, expressed in percentage terms, of the total pool of capital employed by SSU. It is the composite weighted cost of the various classes of capital (bonds, preferred stock, common stock) used by the utility, with the weights reflecting the proportions of the total which each class of capital represents.

While utilities like SSU enjoy varying degrees of monopoly in the sale of public utility services, they must compete with everyone else in the free, open market for the input factors of production, whether it be labor, materials, machines, or capital. The prices of these inputs are set in the competitive marketplace by supply and demand, and it is these input prices which are incorporated in the cost of service computation. This is just as true for capital as for any other factor of production. Since utilities and other investor-owned businesses must obtain capital in competition with every other issuer, there is obviously a market price to pay for the capital they require, for example, the interest on debt capital, or the expected

return on equity.

It does not matter from where a given utility company obtains its funds. For example, if a utility company such as SSU happens to be a subsidiary company whose capital is obtained from its parent, the source of the capital has no bearing on its cost. Financial theory clearly establishes that the cost of equity is the risk-adjusted opportunity cost to the investors and not the cost of the specific capital sources employed by investors. The true cost of capital depends on the use to which the capital is put and not on its source. The relevant considerations in calculating a company's cost of capital are the alternatives available to investors and the returns and risks associated with those alternatives. The specific source of funding an investment and the cost of the funds to the investor are irrelevant considerations. The cost of capital is governed by the risk to which the capital is exposed and not by whether the funds were obtained from the parent company, and at what cost. The identity of the subsidiary's investors should have no bearing on its cost of equity because it is the risk to which the subsidiary's equity is exposed which governs its cost of money. Had the parent company not been in the picture, and had the subsidiary's stock been widely held by the public, the subsidiary would be entitled to a return which would fully cover the cost of both its debt and equity.

Q. HOW DOES FAIR RETURN RELATE TO THE CONCEPT OF

OPPORTUNITY COST?

A. The concept of a fair return is intimately related to the concept of opportunity costs. When investors supply funds to a utility by buying its stocks or bonds, not only are they postponing consumption, giving up the alternative of spending their dollars in some other way, but they are also exposing their funds to risk. Investors are willing to incur this double penalty only if they are adequately compensated. The compensation they require is the price of capital. If there are differences in the risk of the investments, competition among firms for a limited supply of capital will bring different prices. These differences in risk are translated into price differences by the capital markets in much the same way that commodities which differ in characteristics will trade at different prices.

The important point is that the prices of debt capital and equity capital are set by supply and demand, and both are influenced by the relationship between the risk and return expected for those securities and the risks expected from the overall menu of available securities.

Q. HOW DOES SSU OBTAIN ITS CAPITAL?

A. SSU's funds are obtained in two general forms, debt capital and equity capital. The cost of debt funds can be easily ascertained from an examination of the contractual interest payments and preferred dividends. The cost of common equity funds, that is, equity investors' required rate of return, is more difficult to estimate because the dividend payments

received from common stock are not contractual or guaranteed in nature. They are uneven and risky, unlike interest payments. This testimony addresses the issue of a fair and reasonable return on the common equity capital of SSU. The return on common equity estimate can then be easily combined with the embedded costs of debt together with the Company's capital structure, in order to arrive at SSU's overall cost of capital.

Q. WHAT IS THE MARKET REQUIRED RATE OF RETURN ON EQUITY CAPITAL?

A. The market required rate of return on common equity, or cost of equity, is the return demanded by the equity investor. Investors determine the price for equity capital through their buying and selling decisions in capital markets. Investors set return requirements according to their perception of the risks inherent in the firm, recognizing the opportunity cost of foregone investments in other firms, and the returns available from other investments and comparable risk.

Q. DR. MORIN, HOW DID YOU ESTIMATE THE FAIR RETURN ON EQUITY FOR THE COMPANY?

A. Under normal circumstances, I would employ three market-based methods designed to estimate the return required by investors on equity capital committed to SSU: (1) DCF, (2) Risk Premium, and (3) CAPM. I would then adjust the results from the methods to account for SSU's own risk circumstances relative to the risks of the comparable groups employed in

applying the three methods. In this proceeding, however, I have chosen to use the Commission's Leverage Formula as a starting foundation and amend the implementation details of the formula to improve its applicability and conceptual validity.

Q. DR. MORIN, PLEASE COMMENT ON THE RELATIVE INVESTMENT RISKS OF THE WATER AND ELECTRIC & GAS UTILITY INDUSTRIES.

A. In a recent Commission workshop held on February 23, 1995, I provided the Commission with an overview of the relative investment risks of the water and electric-gas utility industry in a paper entitled Return on Common Equity Determination for Florida Water & Wastewater Utilities. A copy of the paper is provided in Exhibit ____ (RAM- 2). The paper described how changes in the operating environment of Florida Water and Wastewater Utilities (FWUs) and SSU have increased their investment risk and their cost of capital, both in absolute terms and relative to other utilities. The changing investment risk of water utilities status relative to other utilities was analyzed by examining trends in key financial variables.

Q. WHAT DID THIS EXAMINATION REVEAL ON THE RELATIVE RISK STATUS OF THOSE INDUSTRIES?

A. This examination revealed that water utilities like SSU are riskier than in earlier years, both in absolute terms and relative to energy utilities. Therefore, rate of return awards should reflect the divergent trends of the

water and energy utility industry.

FWUs are smaller in size and their securities possess very low market visibility and very low liquidity on capital markets. Compliance with the various environmental problems, regulations and the securing of added sources of water supply will necessitate large additional capital requirements and large increases in operating expenses.

A large portion of those supplementary capital needs will have to be financed externally, increasing the industry's financial exposure and financial risks. The investor-owned water utilities are much more dependent on external financing than are gas and electric utilities, and this dependence will increase further as water companies increase their capital investments to comply with new water standards.

Standard comparative measures of market valuation for the water utility industry, such as the pre-tax interest coverage ratios, market-to-book (M/B) ratios, and price-earnings (P/E) ratios, have been at and are below those for the other utilities. Realized returns on average equity and authorized returns on equity are both lower than for the gas and electric industries, in spite of the relative reversal in risk between water and energy utilities.

Because of inadequate authorized returns, rising operating expenses, and low internal cash generation, the water utility's operating income has been gradually eroding, in spite of a growing rate base. As a result of

declining earning power, deteriorating cash flow relative to capital expenditures, falling pre-tax interest coverage ratios, and falling realized returns on equity, stock prices relative to book value have declined relative to electric utilities.

This comparative financial profile demonstrates clearly that the risks of water utilities now exceed those of the energy utilities and that ROE awards should reflect those circumstances.

Q. WHY ARE THE INVESTMENT RISKS OF FWUs ESCALATING?

A. The major reason why the investment risks of FWUs have increased to levels higher than the investment risks of energy utilities include the following:

1. Water quality regulations in the 1990's. New and evolving water quality regulations have generated additional substantial capital and operational costs. These compliance costs increase the utility's operating and financial leverage, which in turn increase the utility's risk and cost of capital.

   The final financial effects of the Safe Drinking Water Act (SDWA) on water utilities are uncertain. Water companies will need to upgrade their facilities to comply with evolving environmental standards. Because the standards are still evolving and are yet to be fully determined, there are uncertainties related to upgrading and compliance costs. Plants presently in use do not

comply with newly regulated contaminant levels, and new plants will have to be installed to meet new standards.

2. Uncertainty regarding future demand. In earlier years when water supplies were abundant, the conservation ethic was absent, rates were stable, and forecasting demand for water was straightforward. Now, there is far greater uncertainty about future demand. Higher service rates resulting from supply adjustment charges and from increased water regulation compliance costs will cause customers to curtail demand for water, compounding the forecasting risk. Moreover, the FPSC, Florida Water Management Districts, and the Florida Department of Environmental Protection are all strongly encouraging and even requiring implementation of conservation rate structures and other programs such as those being proposed by SSU in this proceeding.

3. Uncertainty regarding future supply. Uncertainty about availability and reliability of water supplies abounds. Fears of water shortages and uncertainty about rates are also problems. Recent and continuing questions about the availability and costs of water supplies suggest that this uncertainty will continue. Water supply issues and shortages are noteworthy in Florida.

4. Earnings erosion. Water utilities are exposed to the risk of long run earnings decline and deteriorating quality. The predictability

of reported earnings will deteriorate, due to the volatility of earnings over time and the probability of a permanent erosion of earnings power. Increased financial leverage from financing the capital required by more stringent water quality requirements compounds the problem, and even a small decline in operating income can cause low earnings and impact the cost of capital.

5. Water Safety. The issue of water quality, facility closings, and environmental accidents have heightened investors' awareness of water safety. Contamination of drinking water from salt water intrusion, toxic waste dumping, pesticides, and agricultural fertilizers are major concerns. New plants may not be licensed for lack of compliance with evolving water quality standards, and existing facilities may be closed permanently or for prolonged modifications.

6. Construction risk. The term construction risk refers to the financial risks caused by the magnitude of a company's capital budget. Water utilities will have a large construction program relative to their size. The large compliance capital expenditures program over the next several years, relative to size, will increase their dependence on capital markets which have become volatile and more unpredictable.

Clearly, FWUs will require substantial external financing in

the near future, and it is imperative that these companies have access to needed capital funds on reasonable terms and conditions. The companies must secure funds from capital markets in order to fund new construction commitments, irrespective of capital market conditions, interest rate conditions, and quality consciousness of market participants. The return allowed on common equity will play a crucial role in determining those terms and conditions.

On debt markets, construction is one of several key determinants of credit quality and, hence, of capital costs. Future construction plans are scrutinized by lenders before assessing credit quality of a company. The construction budget in relation to internal cash generation is a key quantitative determinant of credit quality, along with construction expenditures as a proportion of capitalization.

Of course, construction risk and regulatory risk are directly related. Because of large new construction programs over the next few years, rate relief requirements and regulatory treatment uncertainty will increase regulatory risks. Generally, regulatory risks include approval risks, lags and delays, potential rate base exclusions, and potential disallowances. Moreover, regulators must compensate the FWU companies for the lack of liquidity of their securities in the marketplace. Allowed rates of return should

reflect the relatively illiquid nature of their stock and debt offerings.

7. Revenue Stability. Variation in rates of return occur due to both weather variations and sales change. Weather temperature changes introduce substantial volatility to earnings and financial results. A revenue adjustment mechanism (RAM) would certainly reduce this volatility, which is acute for SSU because of its large irrigation load.

Variability is also caused by sales forecasting risk. Under test year ratemaking, the company takes the risk that demand will be greater or smaller than forecast and the resulting risk that its recovery will differ from that estimated in the rate case. Associated with the risk is an incentive to promote water sales. RAM removes the risk and the associated disincentive for conservation.

Under RAM, utilities keep track of the difference between actual and forecast base rate revenues. At regular intervals, the over- or under-collection is divided by projected sales in the next period, and the resulting quantity is added to or subtracted from rates to amortize the over-or under-collection. Thus, changes in sales volumes do not affect earnings.

8. Regulatory risks. How will regulators respond to the profound

metamorphosis in the water utility industry? Will the allowed ROE respond to increased risks faced by water utilities? Will innovative rate designs and automatic adjustment clauses result from the New Era? Or will prudence questions and possible exclusions of investments from rate base prevail? If regulators succumb to the temptation to exclude some compliance plant investment from rate base, a portion of investor-supplied capital will have no earning power.

Q. PLEASE COMMENT ON THE COMMISSION'S USED AND USEFUL ADJUSTMENT.

A. The rate base exclusion issue is particularly harmful to SSU's risk profile. The Commission has substantially reduced the allowable investment on which FWUs may earn by performing a used and useful adjustment, based on a comparison of existing water flows and capacity of facilities. No such adjustment is employed for other Florida utility groups. The net result of the used and useful adjustment is to disallow some significant investment. Another consequence of the used and useful adjustment is that the company is disincented to pursue scale economies in its multi-year construction program for fear of incurring used and useful penalties.

Investors supply dollars of capital, not physical plant. Each dollar of capital has an earnings requirement (interest, dividends, earnings) irrespective of the manner in which the utility employs that dollar. The

exclusion of plant investment from rate base for any variety of reasons and the failure to provide earnings assurance on the excluded investment result in a part of total capital that has no earnings power, but which nevertheless has ongoing capital costs. These costs must be absorbed by earnings from existing investments, raising the possibility of severe losses. I understand that AFPI charges are authorized by the Commission, however, these charges also leave investment stranded and subject to significant risk in a manner not inflicted on energy utilities. The AFPI recovery is wholly dependent on the occurrence of growth within a five-year period.

The totality of a company's capital has to be serviced, whether through the medium of operating revenues or in part through the accrual of AFPI. Therefore, the allowed ROE is applicable to the total common equity component of the total investments of the utility company. The exclusion of a portion of a plant from rate base undermines a utility's integrity.

Q. WHAT IS THE NET RESULT OF THE ABOVE RISK FACTORS?

A. Based on the financial trends and new socio-political and economic forces, the FWUs clearly confront higher risks and higher costs of capital than those suggested by the Commission's leverage formula.

Q. ARE THE INVESTMENT RISKS OF FWUs REFLECTED IN HISTORICAL DATA?

A. No, they are not. The fundamental risks of water utilities are changing

rapidly, as discussed above. Environmental problems, demand-supply uncertainties, stringent water quality regulations, and uncertainties of compliance costs are raising the risk level of water utilities. This structural shift in the risk of water utilities is not fully reflected in the historical risk measures. Thus, any historical risk difference between water utility stocks, other utility stocks and stocks in general are misleading, and likely to be higher than that implied by a simple comparison of current risk measures. For example, current changes in the fundamentals of FWU operations and risk posture are not yet reflected in historical beta estimates. Historical betas are not indicative of future trends in the water utility industry.

Hence, backward-looking statistical analysis will only provide limited evidence that the risk and the cost of capital to water utilities have increased.

Q. HOW DOES THE COMMISSION ESTABLISH THE ROE FOR FLORIDA WATER UTILITIES?

A. Since 1981, the Commission established a leverage formula each year which is intended to reasonably reflect the range of returns on common equity (ROE) for an average Florida water utility. Private FWUs are then authorized to apply this leverage formula to their capital structure rather than file expert cost of capital testimony in each rate proceeding.

Q. DO YOU HAVE ANY RESERVATIONS ON THE COMMISSION'S

LEVERAGE FORMULA?

A. Yes, I do. Although I generally endorse the notion of a generic mechanistic approach to the determination of a fair ROE, I have concerns that the results produced by the formula are unrealistically low and not responsive to the risks of the water utility industry, both in an absolute sense and relative to other Florida utilities. For 1994, the ROE authorized range for FWUs is 9.81% to 11.34%, at 100% and 40% common equity ratio, respectively. For the last few years, the ROEs authorized under the leverage formula generally have slipped below those authorized for the much larger and financially strong electric, gas, and telephone utilities despite the substantial increase in the risk of the water utility industry. The table shown in Exhibit ____ (RAM-3) displays the current authorized ROEs for the various utility groups in Florida versus the midpoint authorized ROE for FWUs.

Q. **DID YOU RELY ON THE COMMISSION'S LEVERAGE FORMULA FOR RECOMMENDING A RATE OF RETURN FOR SSU IN THIS PROCEEDING?**

A. I will use the leverage formula as a foundation. I provided the Commission with an independent evaluation of the leverage formula at a workshop held on February 23, 1995, and recommended a variety of improvements. I will proceed on the fundamental premise that these improvements are incorporated into the leverage formula. I believe that

the leverage formula approach must be preserved and that my proposed improvements should be incorporated. I believe that the leverage formula approach is cost efficient, administratively expedient, and reduces rate case costs.

Q PLEASE DESCRIBE THE COMMISSION'S LEVERAGE FORMULA.

A. The Commission's leverage formula provides an automated generic mechanism for determining the allowable ROE for the average FWU and for adjusting the authorized ROE to reflect the degree of financial leverage of each FWU, within a prescribed range of common equity ratios. Given that there is no FWU whose common stock is publicly-traded and given that traditional market information (stock price, earnings per share, beta, bond rating, etc.) is lacking, an indirect approach is required. The leverage formula and the attendant ROE determination process consists of six steps:

Step 1. Estimate the cost of equity for a reference group of 6 publicly-traded water utilities for which market data is available, using the DCF methodology. In Order No. 94-1051, the cost of equity for the index of water companies is calculated as 10.50% at an average common equity ratio of 41.04%.

Step 2. Estimate the cost of equity for a reference group consisting of the eight companies in Moody's Natural Gas Distribution Index, using the Risk Premium methodology. In Order 94-1051, the cost of equity for

the index of gas distribution companies is calculated as 10.72% at an average common equity ratio of 50.27%.

Step 3. Average the DCF result from the water companies and the Risk Premium result from the gas companies to come up with a benchmark ROE. The average of the two above results is 10.61% at an average common equity ratio of 45.66%.

Step 4. Adjust the benchmark ROE obtained from Step 3 upward to reflect the additional risk of the average FWU over and above that of the two reference groups. The bond yield differential between a Baa2 and A1 rating is used as an estimate of the equity cost differential. Adding the Baa2 versus A1 bond yield differential spread of 41 basis points results in a cost of equity to the average FWU of 11.02%, that is, 10.61% + 0.41% = 11.02%.

Step 5. Calculate the weighted average cost of capital (WACC) for an average FWU. In the current order, the WACC is calculated as 9.81%, based on an 11.02% cost of equity, the current cost of Baa2 debt of 8.80% and a 45.66% common equity ratio. This is shown in Table 1 in Exhibit ___ (RAM-4) with the known quantities boldfaced.

Step 6. Express the cost of equity as a function of the common equity ratio. Assuming that the WACC and the cost of debt remain constant over the 40% to 100% common equity ratio range, and, therefore, that the latter two variables in the WACC formula are known, the cost of

equity can be expressed as a function of the common equity ratio. Table 2 in Exhibit ___ (RAM-4), shows the WACC calculation at the 40% common equity ratio and the implied cost of equity of 11.34% at 40% common equity ratio. The known quantities are boldfaced.

The current leverage formula derived from the WACC equation is:

$$k_e = 8.80\% + 1.014 / ER$$

The range of ROEs obtained from the above formula at equity ratios ranging from 100% to 40% is 9.81% to 11.34%, with a midpoint of 10.58%. For SSU, with a common equity ratio of 40.7%, the allowed ROE is 11.29% under the Commission's existing formula.

Q. WHAT FUNDAMENTAL ASSUMPTIONS UNDERLIE THE FORMULA?

A. From the step-by-step procedure outlined above, it is clear that several assumptions underlie the Commission's leverage formula. The key implicit assumptions are:

1. Because Step 1 in the above process applies the DCF method to an index of water companies and Step 2 applies a DCF-driven risk premium method to a group of gas companies, the DCF formula alone provides an accurate and reliable estimate of the cost of equity.

2. The referenced water companies and the referenced gas distribution utilities used in deriving the leverage formula are similar in risk.

3. All FWUs possess similar business risks.

4. A Moody's Baa2 bond rating is applicable to the debt of the average FWU over a 40% to 100% equity ratio range.

5. The WACC is constant over the 40% to 100% equity ratio range.

6. A common equity ratio less than 40% is inappropriate.

Q. DO YOU AGREE WITH THOSE UNDERLYING ASSUMPTIONS?

A. I take issue with some of the inherent assumptions and offer suggestions for improvement. I will now describe each item of disagreement.

Q. DO YOU AGREE THAT THE COMMISSION SHOULD PLACE SOLE RELIANCE ON THE DCF METHODOLOGY?

A. No, I do not. It is dangerous to rely on only one generic approach to estimate the cost of capital. By relying almost exclusively on only one methodology, namely, on the DCF approach, the Commission limits its flexibility and increases the risk of authorizing unreasonable rates of return. The results from one generic method are likely to contain a high degree of measurement error, particularly for an industry in transitional flux. The Commission's hands should not be bound to one methodology of estimating equity costs, nor should the Commission ignore relevant evidence.

When measuring equity costs, which essentially deals with the measurement of investor expectations, no one single methodology provides a foolproof panacea. Each methodology requires the exercise of

considerable judgment on the reasonableness of the assumptions underlying the methodology and on the reasonableness of the proxies used to validate the theory. The failure of the traditional infinite growth DCF model to account for changes in relative market valuation and the questionable applicability of the model when M/B ratios deviate substantially from 1.00 are vivid examples of the potential shortcomings of the DCF model. The prohibitive difficulties of specifying the expected growth component of water utilities in the DCF model is another. The task is particularly difficult for both the water utilities and the gas distribution utilities used as benchmarks in the leverage formula at this time, given the profound change occurring in these industries. It follows that more than one methodology should be employed in arriving at a judgment on the cost of equity.

Each methodology possesses its own way of examining investor behavior, its own premises, and its own set of simplifications of reality. Each method proceeds from different fundamental premises which cannot be validated empirically. Investors do not necessarily subscribe to any one method, nor does the stock price reflect the application of any one single method by the price-setting investor. There is no monopoly as to which method is used by investors. Absent any hard evidence as to which method outdoes the other, all relevant evidence should be used and weighted equally, in order to minimize judgmental error, measurement

error, and conceptual infirmities.

Several fundamental changes have recently transformed the water utility industry from the times when the standard DCF model and its assumptions were developed. Environmental concerns, conservation ethics, changes in customer attitudes regarding water utility services, reduced reliability of water supplies and corporate restructurings have all influenced stock prices in ways vastly different from the early assumptions of the DCF model. These changes suggest that some of the raw assumptions underlying the standard DCF model, particularly that of constant growth, are of questionable pertinence at this point in time for water utility stocks, and that the DCF model should be at least complemented by alternate methodologies to estimate the cost of common equity. For example, near-term projections of growth are downward-biased by the increased costs of regulatory compliance.

An additional concern deals with the realism of the constant growth rate assumption and with the difficulty of finding an adequate proxy for that growth rate. The standard DCF model assumes that a single growth rate of dividends is applicable in perpetuity. Not only is the constant growth rate assumption somewhat unrealistic, but it is difficult to proxy. Analysts' growth forecasts are usually made for not more than two to five years in time, or if they are made for more than a few years, they are dominated by the near-term earnings and dividends picture.

Also, there is an element of logical circularity inherent in the growth component of the DCF model. The cost of equity capital depends on investors' growth expectations, which in turn depends partially on investors' perception of the regulatory process. The net result is that the cost of equity depends in part on anticipated regulatory action, since both components of the cost of equity, dividend yield and growth, are influenced by the regulatory process. Carried to its extreme, this implies that regulation would in effect deliver whatever equity return investors expect. One solution to this potential predicament is to employ other market-based techniques, such as the CAPM, which examine market data not directly related to the firm's financial statistics.

One last concern is that the DCF model does not explicitly quantify risk. The risk is somehow subsumed, or buried, in the stock price. A riskier stock will command a lower price, according to the DCF model. In other words, the DCF model only treats risk implicitly and informally.

Q. PLEASE ELABORATE ON YOUR CONCERNS REGARDING THE APPLICABILITY OF THE STANDARD DCF MODEL AT THIS TIME.

A. Caution has to be used in applying the DCF model to utility stocks at this time because the traditional DCF model is not equipped to deal with erratic movements in market-to-book (M/B) and price-earnings (P/E) ratios, as has been experienced by the utility stocks in recent years. The standard

infinite growth DCF model assumes constancy in such ratios. That is, the model assumes that investors expect the ratio of market price to dividends (or earnings) in any given year to be the same as the current price/dividend (or earnings) ratio. This must be true if the infinite growth assumption is made.

Contrary to the standard DCF assumption of a constant P/E ratio, stock price may not necessarily be expected to grow at the same rate as earnings and dividends by investors. This is especially true in the short run. Investors may very well assume that the price/earnings will in fact continue to increase in the short run, fueling the expected rate of return. The converse is also true. P/E ratios have proved volatile and unstable in recent years. The essential point is that the constancy of the P/E ratio required in the standard DCF model may not always be a valid assumption. To the extent that increases (decreases) in relative market valuation are anticipated by investors, especially myopic investors with short-term investment horizons, the standard DCF model will understate (overstate) the cost of equity. Another way of stating the same point is that the DCF model does not account for the ebb and flow of investor sentiments over the course of the business cycle.

Q. CAN YOU ILLUSTRATE THE IMPACT OF ERRATIC MARKET VALUATION MULTIPLES ON THE DCF MODEL BY MEANS OF A SIMPLE EXAMPLE?

A. Yes. Assume that a stock is trading at $100. Assume further that its earnings per share are expected to be $8.00 for the current year, and are expected to grow at 10% per year in the future. Finally, assume that the company pays out one-half of its earnings as dividends. If the stock is initially trading at 12.5 times earnings, the dividend yield is 4%. If investors do not expect the price/earnings ratio of 12.5 to change in the next year, the estimated expected return from holding the stock for one year using the standard DCF model is as follows: a dividend yield of 4%, plus growth in value (stock price) from $100 to $110, or 10%, for a total return of 14%. The ending stock price is $110, that is, 12.5 times next year's earnings of $8.80.

But what if investors expect an increase in the price/earnings ratio from 12.5 to say 13.0? Then, the growth in value is from $100 to $114.40, or 13.0 times next year's earnings of $8.80, for a total return of 18.40% (dividend yield of 4%, plus growth in value of 14.40%). The orthodox DCF model would indicate returns of 14%, whereas the investors' true expected return is 18.4%. Investor expected returns are substantially understated whenever investors anticipate increases in relative market valuation, and conversely.

Q. CAN YOU ILLUSTRATE THE IMPACT OF MARKET-TO-BOOK RATIOS ON THE DCF MARKET RETURN BY MEANS OF A SIMPLE EXAMPLE?

A. Application of the DCF model produces estimates of common equity cost that are consistent with investors' expected return only when stock price and book value are reasonably similar, that is, when the M/B is close to unity. As shown below, application of the standard DCF model to utility stocks understates the investor's expected return when the M/B ratio of a given stock exceeds unity. This is particularly relevant in the current capital market environment where utility stocks are trading at M/B ratios well above unity. The converse is also true, that is, the DCF model overstates the investor's return when the stock's market-to-book ratio is less than unity. The reason for the distortion is that the DCF market return is applied to a book value rate base by the regulator, that is, a utility's earnings are limited to earnings on a book value rate base.

The simple numerical illustration shown in Exhibit ___ (RAM-5) entitled "Effect of Market-to-Book Ratio on Market Return", demonstrates the result of applying a market value cost rate to book value rate base under three different M/B scenarios. The three columns correspond to three M/B situations: the stock trades below, equal to, and above book value, respectively. The last situation is noteworthy and representative of the current capital market environment. The DCF cost rate of 10%, made up of a 5% dividend yield and a 5% growth rate, is applied to the book value rate base of 450 to produce $5.00 of earnings. Of the $5.00 of earnings, the full $5.00 are required for dividends to produce a dividend

yield of 5% on a stock price of $100.00, and no dollars are available for growth. The investor's return is therefore only 5% versus his required return of 10%. A DCF cost rate of 10%, which implies $10.00 of earnings, translates to only $5.00 of earnings on book value, a 5% return. The situation is reversed in the first column when the stock trades below book value. The $5.00 of earnings are more than enough to satisfy the investor's dividend requirements of $1.25, leaving $3.75 for growth, for a total return of 20%. This is because the DCF cost rate is applied to a book value rate base well above the market price. Therefore, the DCF cost rate understates the investor's required return when stock prices are well above book, as is the case presently for each utility group.

In summary, caution and judgment are required in interpreting the results of the DCF model because of (1) the questionable applicability of the DCF model to utility stocks in general in the current capital market environment, and (2) the conceptual and practical difficulties associated with the growth component of the DCF model. Hence, there is a clear need to go beyond the results produced by the DCF model by incorporating into the Commission's formula results produced by alternate methodologies.

Q. CAN YOU OFFER ANY RECOMMENDATION WHICH WOULD ATTENUATE THE LEVERAGE FORMULA'S SOLE RELIANCE ON THE DCF FRAMEWORK?

A. Yes, I can. Because of the unreliable result produced by the DCF model in the current capital market environment and because the Capital Asset Pricing Model (CAPM) framework treats risk explicitly and formally, I recommend that the Commission also apply a routine CAPM test in Steps 1 and 2 of the development of the leverage formula when deriving the cost of equity for the index water and gas utilities. A routine CAPM test can easily be performed by using the Value Line betas of the reference companies, the same estimate of the risk-free rate used in the gas Risk Premium test, and a market risk premium in the range of 6% to 7%.

Denoting the risk-free rate by "R_F", the beta risk factor of ß and the return on the market as a whole by "R_M", the CAPM is stated as follows:

$$K = R_F + ß\ (R_M - R_F)$$

As a proxy for the risk-free rate R_F, the Commission should use the same yield on long-term Treasury bonds which it already uses in the Risk Premium test of gas distribution utilities. As a proxy for beta, Value Line betas of the index water and gas companies can be used. For the market risk premium, a range of 6.0% to 7.0% should be used based on the long-term historical stock and bond returns spread published by Ibbotson Associates and on a prospective risk premium derived from applying the DCF model to a market-wide index. The issue of the proper risk-free rate and market risk premium is elaborated in Exhibit ___ (RAM-6).

Using those input values, current CAPM estimates of equity costs

for the water index companies would range from 11.44% to 12.08%, with a midpoint of 11.76%. For example, using a risk free rate of 7.6%, a water company beta of 0.64 and a market risk premium of 7%, the CAPM cost of equity becomes:

$$K = 7.6\% + 0.64 \times (7\%) = 12.08\%$$

Averaging the CAPM result with the two DCF and Risk Premium results already used by the Commission would produce a benchmark ROE which is about 40 basis points higher than the current Commission benchmark ROE for the index companies.

Q. DOES THE CAPM FRAMEWORK OFFER ANY INSIGHTS INTO THE CURRENT PLIGHT OF WATER UTILITIES?

A. Indeed, it does. The CAPM framework is useful to portray the current plight of FWUs and to quantify their new risks. It can be shown that systematic risk (beta) has three main components: demand risk, operating leverage, and financial leverage.

BETA = DEMAND RISK x OPERATING LEVERAGE x FINANCIAL LEVERAGE

Future SDWA requirements will increase operating leverage by mandating incremental treatment investment. This will increase rate base and fixed costs as the additional plant is depreciated over a constant retail ratepayer base. Financial leverage will increase as well. Large mandated capital investments, which exceed the availability of internally generated

funds, must be funded externally. External financing will thus be required, most of which is likely to be in the form of additional debt, raising the degree of financial leverage. Stock issues are likely to prove virtually non-existent given the lack of visibility and marketability of water company securities, the dilution potential, and high flotation costs.

As a result of the increase in fixed costs provoked by SDWA compliance requirements, the beta risk measure increases by about 0.25, and the attendant cost of equity increase is of the order of 150 basis points.

Q. DID YOU DETECT ANY COMPUTATIONAL BLEMISH IN THE DCF COMPUTATION EMPLOYED IN THE LEVERAGE FORMULA?

A. Yes, I did. In Step 1, the average cost of equity for the group is computed by dividing the average dividend by the average price to obtain the average dividend yield. The latter is then added to the average growth for the group to produce the average ROE. The practice of dividing averages (D/P) is inappropriate. There is an old well-known theorem in basic statistics which says that the average of a product is not equal to the product of the averages, that is, using the letter E to denote the expected value operator, $E(ab) \neq E(a) \times E(b)$. Similarly, $E(a/b) \neq E(a) / E(b)$. The correct procedure is to calculate the ROE for each individual utility (D/P + g) and then average the results from each company to obtain the group average. Allowing for this minor blemish produces an average ROE for

the index water companies which is 20 basis points higher. The net impact on the average ROE is one-half of that, or 10 basis points.

Q. DO YOU AGREE WITH THE NOTION THAT THE INVESTMENT RISKS OF WATER UTILITIES ARE THE SAME AS THOSE OF GAS UTILITIES?

A. No, I do not. The leverage formula procedure fundamentally assumes that the index water utilities have the same risk as the gas distribution utilities. To assess the reasonableness of this assumption, I have examined a broad array of classic risk measures for both the water companies and the gas companies used in developing the leverage formula. As shown on Exhibit ___ (RAM-7), relative to the gas companies group, the water companies have: a lower Value Line Safety Rank index, a lower Value Line Financial Strength index, a higher beta risk factor, smaller market capitalization, a higher debt ratio, a lower M/B ratio, lower P/E ratio, lower interest coverage ratio, and higher volatility of earnings per share, revenues, and operating profits. The comparative risk measures of the water and gas companies unanimously and unambiguously indicate that the former are riskier than the latter. Thus, a cost of equity estimate based in part on the gas companies group understates the cost of equity of water utilities.

One solution to this shortfall is to add a premium to the gas premium estimate. One reasonable method to quantify the risk premium

is based on the CAPM. The difference in beta between the two groups, which is of the order of 0.05, multiplied by the market risk premium in the range of 6% to 7%, provides a reasonable measure of the risk premium in the range of 30 to 35 basis points. The net effect on the average of the DCF-Risk Premium estimates, hence on the leverage formula, would be one-half the risk premium, or about 15 to 20 basis points.

One anomaly in the leverage formula methodology is that, despite the fact that the myriad risk measures indicate that water companies are riskier than gas companies, the DCF estimate for gas companies exceeds the DCF estimate for water companies. This only reinforces my earlier admonitions on the realism and validity of the DCF model and the need to supplement the DCF result with additional methodologies, such as the CAPM.

Q. DO YOU THINK THAT FLORIDA WATER UTILITIES POSSESS THE SAME DEGREE OF RISK AS THE NATIONAL AVERAGE?

A. No, I do not. While the assumption that all FWUs have similar business risk is reasonable and allows the Commission to adopt a single leverage formula for all FWUs, the assumption that they are similar in risk to the national industry at large, as proxied by the index of water companies used by the Commission, is unreasonable.

FWUs are significantly riskier than the industry. FWUs are different than those in other states because they are generally much smaller

and are subjected to additional regulatory risks in the form of used and useful adjustments and substantial concerns about future water supplies and deterioration of existing supplies.

Compared to the companies used in the index, the FWUs, including SSU, are smaller in size than the index water companies. The FWUs generate less internal funds than their larger counterparts, and are forced to borrow through credit enhancements and/or private placements, as was the case for SSU in a recent financing.

Q. DOES THE COMMISSION RECOGNIZE THIS DIFFERENCE IN RISK BETWEEN THE FWUs AND THE NATIONAL INDEX?

A. Yes, the Commission recognizes the difference in business risk by adopting a Baa2 cost of debt in the leverage formula versus the A rating of the index water companies. In my view, however, a Baa2 bond rating is not representative of the cost of debt to a FWU nor is such a rating representative of the risk of FWUs.

Q. IS SSU'S FINANCIAL PROFILE CONSISTENT WITH THAT OF A BAA2 COMPANY?

A. No, it is not. SSU's financial profile is more consistent with that of a BB- or BBB - company, as shown in Exhibit ___ (RAM-8) rather than a BBB company. I point out that the Standard & Poors (S&P) bond rating category of BBB is comparable to Moody's rating of Baa. Exhibit ___ (RAM-8) computes SSU's financial ratios and compares the results with

the water utility benchmarks published by S&P for various bond rating categories. As shown in the bottom panel of the exhibit, SSU's ratios are more consistent with that of a BB- or BBB - company rather than a BBB company. The S&P benchmarks are reproduced in Exhibit ___ (RAM-9).

Q. IS THE FINANCIAL PROFILE OF AN AVERAGE FWU CONSISTENT WITH THAT OF A BAA2 COMPANY?

A. No, it is not. Consider the case of a FWU with a 40% common equity ratio and application of the leverage formula to derive the cost of equity. The Commission's cost of capital calculation is shown in Exhibit ___ (RAM-10). The interest coverage (IC) implied by the cost of capital can be calculated, and compared to the S&P benchmark target IC ratios. Exhibit ___ (RAM-10) shows the calculation of the implicit IC ratio using the cost of debt, cost of equity, capital structure, and a tax rate of 34% employed in the Commission's leverage formula calculation. The IC is calculated by dividing the overall return of 12.17%, inclusive of taxes, by the interest burden of 5.28%. The implied coverage is 2.30.

The IC calculation is based on highly idealized circumstances, and assumes that all reported income can be used to meet the coverage requirements, that interest is the only fixed charge to be covered and that rate base equals total invested capital. The calculation assumes that all the utility's income is in cash, with no AFUDC allowance. Inclusion of the latter will reduce the IC well below 2.3, given the significant component

of AFUDC for most FWUs. The calculation also assumes that the company incurs income taxes at the full 34% rate and actually earns the allowed return. Moreover, the calculation assumes that the rate base coincides with invested capital, a fragile assumption under the Commission's "used and useful" test.

Realistically, the actual coverage attained by the FWU will be far lower in view of the significant component of non-used plant AFUDC earnings, the discrepancy between rate base and invested capital, and the questionable ability to earn the allowed return, particularly because of the high costs of SDWA compliance.

There are many other factors considered by bond rating agencies in assessing credit quality, other than coverage and debt ratio. Size of issue is prominent, as a measure of liquidity. Given the smaller size of FWUs and the limited marketability of their securities, a Baa bond rating is highly unlikely.

The magnitude of the construction budget in relation to rate base is another key driver of bond rating quality and equity risk, and so is the ability to generate cash internally. Consideration of these factors strongly suggests that the cost of capital to the average FWU is not consistent with a Baa risk class, nor with the Baa2 class. The assumption of a Baa2 risk class is unlikely to result in a compensatory return.

Very few water utilities have their securities rated by bond rating

agencies and/or investment houses, and most of the FWUs are too small to have rated debt or publicly-held stock, and none issue debt on a stand alone basis. Any debt issue must be guaranteed by a parent corporation or must be guaranteed at the personal level.

Even if the Baa2 class was representative of the risks of FWUs, the latter must frequently resort to the private placement market for debt capital. A public underwritten issue of debt is simply out of the question. Lenders in private placements require adequate compensation for the risks assumed and for the costs of research and negotiation. They must also be compensated for investing in a non-marketable illiquid asset. These factors are incorporated into the cost of debt. A typical yield differential between private placements and public bond issues is of the order of 50 basis points. A similar premium is generally applicable to term loans.

The leverage formula should therefore be derived under the more realistic assumption that the cost of debt exceeds the Baa2 cost of debt. The Baa3 - BB cost of debt with an added private placement premium of 50 basis points would be a reasonable starting point. The benchmark ROE should also be augmented by a risk premium based on Baa3 - A spreads rather than Baa2 - A spreads, again with the added marketability premium of 50 basis points.

Q. PLEASE DESCRIBE THE FUNDAMENTAL RELATIONSHIP BETWEEN COST OF CAPITAL AND LEVERAGE.

A. Assuming perfectly functioning capital markets and the absence of corporate taxes, Modigliani-Miller (MM) have shown that the cost of capital is independent of capital structure. If the overall cost of capital remains unchanged with leverage, it follows that the required return on equity resulting from the added risk of leverage completely offsets the low-cost advantage of debt. Otherwise, the WACC could not remain constant. The exact relationship between leverage and the cost of equity is linear and is expressed as:

$$K_e = p + (p-i)\ D/S \qquad (1)$$

where p, is the cost of equity for an all-equity firm, D/S is the leverage ratio, and 'i' is the current rate of interest. This equation states the cost of equity is equal to the cost of capital of an unlevered (no debt) firm plus the after-tax difference between the cost of capital of an unlevered firm and the cost of debt, weighted by the leverage ratio. The cost of equity rises with the debt-equity ratio in a linear fashion, with the slope of the line equal to (p-i) D/S. This is the capital structure model inherent in the Commission's leverage formula.

Q. DO YOU AGREE WITH THE CAPITAL STRUCTURE MODEL INHERENT IN THE COMMISSION'S LEVERAGE FORMULA?

A. Yes, I do.

Q. DO YOU AGREE WITH THE COST OF DEBT ASSUMPTION IN THE LEVERAGE FORMULA?

A. No, I do not. The leverage formula assumes that the cost of debt remains invariant over a common equity ratio ranging from 100% all the way up to 40%. This assumption is unrealistic. Surely, the cost of debt is higher for a company with 40% equity than for a company which has no debt at all. The leverage formula should allow for the rising cost of debt as leverage rises.

One way to accomplish the adjustment is to allow the cost of debt to vary in a linear fashion over this range by plus or minus 50 basis points from the average cost of debt assumed at a 40% common equity ratio. So, for example, if the assumed average cost of debt is 8%, the cost of debt is allowed to vary from a low of 7.5% for a company with 100% equity to a high of 8.5% for a company with 40% common equity.

I also believe that there is nothing magical about the 40% common equity floor imposed by the formula. While I sympathize with the Commission's desire to discourage the employment of high leverage, there is nothing imprudent or unusual about higher dosages of debt. As I discussed earlier in this testimony, the small private FWUs do not have access to the equity markets, generate limited internal funds, and therefore must resort to the private debt markets for funding, particularly in light of the SDWA compliance requirements. I recommend that the 40%-100% common equity constraint be relaxed to a lower level, perhaps to 30% - 100%.

Q. WHAT DO YOU CONCLUDE FROM YOUR EXAMINATION OF THE COMMISSION'S LEVERAGE FORMULA?

A. The leverage formula employed by the FPSC to measure water utilities' cost of equity capital should be amended as follows:

1. Because of the unreliable result produced by the DCF model and because the CAPM framework treats risk explicitly and formally, I recommend that the Commission also apply a routine CAPM test over and above the two DCF-driven tests currently utilized. Averaging the CAPM result with the two DCF and Risk Premium results already used by the Commission would produce a benchmark ROE which is about 40 basis points higher than the current Commission benchmark ROE for the index companies.

2. The practice of dividing averages in computing DCF estimates is inappropriate. The net impact of allowing for this minor blemish is an average ROE which is 20 basis points higher.

3. The comparative risk measures of the water and gas utilities clearly indicate that the water utilities are riskier than the gas utilities. Thus, a cost of equity estimate based in part on the gas companies group understates the cost of equity of water utilities. One solution to the shortfall is to add a premium to the gas premium estimate. A risk premium in the range of 30 to 35 basis points is reasonable. The net effect on the leverage formula is one-half the risk premium

or about 15 to 20 basis points.

4. Given the very small size of FWUs, the financial profile produced by application of the leverage formula, and the limited marketability of their securities, the assumption of a Baa2 bond rating for a typical FWU is unrealistic. The leverage formula should be amended under the more realistic assumption that the cost of debt exceeds the Baa2 cost of debt. The Baa3 - BB cost of debt with an added private placement premium of 50 basis points would be a reasonable starting point. The benchmark ROE should also be augmented by a risk premium based on Baa3 - A spreads rather than Baa2 - A spreads, again with the added marketability premium of 50 basis points.

5. Because the small private FWUs do not have access to the equity markets, generate limited internal funds, and must therefore resort to the private debt markets for funding, particularly in light of the SDWA compliance requirements, I recommend that the 40%-100% common equity constraint be relaxed to a lower level, perhaps to 30% - 100%. Exhibit ___ (RAM-11) summarizes the magnitude of the various adjustments to the leverage formula which total some 115 basis points.

Q. WHAT IS THE COMMISSION'S REVISED LEVERAGE FORMULA IF THE ABOVE ADJUSTMENTS ARE ADOPTED?

A. The amended generic formula if all the above adjustments totaling 115 basis points are incorporated is shown below, along with the original formula:

Original Formula: Cost of Equity = 8.8 + 1.014 / ER

New Formula: Cost of Equity = 8.8 + 1.540 / ER

Q. WHAT RATE OF RETURN ON EQUITY DO YOU RECOMMEND FOR SSU?

A. Straightforward application of the 1994 existing leverage formula produces a cost of equity of 11.29% for SSU, using a common equity ratio of 40.7%. Using the amended leverage formula brings this estimate to 12.58%.

Because SSU is somewhat less risky than the other FWUs, given its larger size and larger visibility, I believe that the liquidity adjustment of 50 basis points should be reduced to 20 basis points, which would bring the cost of equity to 12.28%, or 12.25% to the nearest quartile.

Therefore, based on the results of all my analyses and the risk circumstances of SSU, it is my opinion that a just and reasonable return on the common equity of SSU at this time is 12.25%, that is, the Company should have the opportunity to earn 12.25% on its equity capital. My recommended return on equity reflects my various analyses and the application of my professional judgment. I point out that the water utility industry's and SSU's changing risk circumstances warrant a higher return

on equity than is suggested by the results of models derived from financial theory on a business-as-usual basis. I also point out that my recommended return is predicated on the adoption of a Revenue Adjustment Mechanism (RAM). Failure to adopt such a revenue stabilizer could increase my recommended return by 25 basis points.

Q. PLEASE COMMENT ON SSU'S CONSTRUCTION RISKS.

A. SSU has an extremely large construction program relative to its size. The projected additional construction required to meet SSU's system capacity requirements and, in particular, the large expenditures associated with SDWA compliance exacerbate construction-related risks. SSU's construction budget of some $50-$60 million for the next three years is very large as a proportion of its total equity investment base of $80 million.

Large investments in environmental compliance facilities as opposed to investments in water distribution create significantly greater construction risks. Environmental control capital is a sunk investment in non- productive capital.

Q. PLEASE COMMENT ON THE IMPACT OF CONSTRUCTION ON REGULATORY RISK.

A. Of course, regulatory risk factors are related to construction-related risks. Because of SSU's large construction program over the next few years, rate relief pressures and uncertainty with respect to regulatory treatment will

increase. Construction-related regulatory risks include approval risks, lags and delays, potential rate base exclusions, and potential disallowances

Q. DO SSU'S SUBSTANTIAL NEW CONSTRUCTION REQUIREMENTS HAVE AN IMPACT ON ITS FINANCIAL RISK?

A. Yes, they do. The Company requires substantial external financing in the immediate future, and it is imperative that the Company have access to needed capital funds on reasonable terms and conditions. The Company must secure funds from capital markets in order to fund new construction commitments, irrespective of capital market conditions, interest rate conditions, and quality consciousness of market participants. Construction is one of several key determinants of credit quality and, hence, of capital costs. The construction budget in relation to internal cash generation is a key quantitative determinant of financial risk.

Q. PLEASE COMMENT ON THE IMPACT OF REVENUE ADJUSTMENT MECHANISMS.

A. One approach to compensate for selected risks of the water utility industry is the adoption of a rate adjustment mechanism (RAM). While I recognize the value of automatic adjustments as a regulatory mechanism, I view it only as an additional complementary tool to deal with uncertainty.

Q. IS THERE A RELATIONSHIP BETWEEN FINANCIAL RISK AND THE AUTHORIZED RETURN ON EQUITY?

A. There certainly is. The strength of that relationship is amplified for

utilities with large construction programs and debt ratings that are below average for the industry. For utilities facing financial pressures, a low authorized return on equity increases the likelihood the utility will have to rely increasingly on debt financing for its capital needs. This creates the specter of a spiraling cycle that further increases risks to both equity and debt investors; the resulting increase in financing costs is ultimately borne by the utility's customers through higher capital costs and rates of return.

Q. PLEASE EXPLAIN HOW LOW AUTHORIZED RETURNS ON EQUITY CAN INCREASE BOTH THE FUTURE COST OF EQUITY AND DEBT FINANCING.

A. If a utility is authorized a return on equity below the level required by equity investors, the utility will find it difficult to access the equity market through common stock issuances at its current market price. Investors will not provide equity capital at the current market price if the earnable return on equity is below the level they require given the risks of an equity investment in the utility. The equity market corrects this by generating a stock price in equilibrium that reflects the valuation of the potential earnings stream from an equity investment at the risk-adjusted return equity investors require. In the case of a utility that has been authorized a return below the level investors believe is appropriate for the risk they bear, the result is a decrease in the utility's market price per share of common stock. This reduces the financial viability of equity financing two

ways. First, because the utility's share price per common stock decreases, the net proceeds from issuing common stock is reduced. Second, since the utility's market to book ratio decreases with the decrease in the share price of common stock, the potential risks from dilution of equity investments reduces investors inclination to purchase new issuances of common stock. The ultimate effect is the utility will have to rely more on debt financing to meet its capital needs. This creates the momentum for a spiraling cycle. As the company relies more on debt financing, its capital structure becomes more leveraged. Since debt payments are a fixed financial obligation to the utility, this decreases the operating income available for dividend and earnings growth, since income available to common equity is subordinate to fixed charges. Consequently, equity investors face greater uncertainty about future dividends and earnings from the firm. As a result, the firm's equity becomes a riskier investment. The risk of default on the company's bonds also increase, making the utility's debt a riskier investment. Ultimately, to ensure the company has access to capital markets for its capital needs, a higher authorized rate of return is required. The bottom line to utility customers is that it is impossible to avoid adequately compensating the utility's security holders for the risks they bear without adversely impacting the utility's overall rate of return and, ultimately, adversely impacting customers in the long term.

Q. IN YOUR OPINION, WHAT BOND RATING TARGET SHOULD A

REGULATED UTILITY PURSUE?

A. In the utility regulation context, the idea of an optimal strong "A" to "AA" bond rating is widely supported. The New York Public Service Commission agreed that, in the case of electric and gas utilities, based on data from 1981 and earlier, a strong "A" rating was optimal from the standpoint of both overall capital cost and availability. There have been significant changes since that 1982 decision, notably the tightening of utility bond rating criteria by Standard & Poor's in response to the increased business risks of utilities, tax reform, and a transformed capital market environment. The New York Public Service Commission has reaffirmed its position that a strong "A" is the optimal rating for electric utilities.

I have performed several studies and I have frequently used these studies in rate proceedings through 1995 to identify the optimal capital structure for various utilities. One common theme in these studies and testimonies is the desirability of a strong "A" to "AA" bond rating from both the ratepayers' and investors' standpoint. The study results show than on an incremental cost basis, a strong "A" to "AA" bond rating generally results in the lowest pre-tax cost of capital, and hence the lowest ratepayer burden. Under adverse economic conditions, the optimal bond rating is "AA". This result prevails regardless of the cost of common equity model utilized, and remains very robust to changes in key assumptions. Over the

long run, a strong "A" to "AA" bond rating will minimize the pre-tax cost of capital to ratepayers.

Q. COULD YOU SUMMARIZE THE RESULTS OF YOUR STUDY ON OPTIMAL BOND RATINGS?

A. The study examined utility bond yields from 1979 to 1990 under two market conditions: normal capital markets and adverse or tight capital markets. The results indicate that during normal capital markets the yield difference between "AA" and "A"-rated utility bonds was 28 basis points and the yield difference between "A" and "BBB"-rated utility bonds was 42 basis points, with "BBB"-rated utility bond yields 70 basis points over the "AA"-rated bond yield. During adverse capital markets, there is a flight to higher quality securities and the yield spreads increase. In adverse markets, the difference between "AA" and "A"-rated utility bonds was 86 basis points and the yield difference between "A" and "BBB"-rated bonds was 65 basis points, with "BBB"-rated utility bond yield 151 basis points over the "AA"-rated bond yield.

The implication is clear. Long-term achievement and maintenance of a strong "A" to "AA" rating is in the ratepayers' best interests. During normal times, a utility company should conserve enough unused borrowing capacity so that during periods of financial adversity it can use this capacity to avoid foregoing investment opportunities, selling stock at confiscatory prices, or jeopardizing its mandated obligation to serve. The

yield advantage of a higher bond rating increases dramatically in adverse capital market conditions. Bond flotation costs, which must be borne by ratepayers, increase also as bond ratings decline, particularly in years of difficult financial markets. Not only is lower bond quality associated with higher yields, but lower-rated utility bonds also carry shorter maturities, especially in tight capital markets. The result is a maturity mismatch between the firm's long-term capital assets and its liabilities. Moreover, lower bond quality is associated with more years of call protection, particularly during difficult financial markets; since bonds are frequently called after a decrease in interest rates, bonds which carry call protection for a greater number of years are more costly to utility companies. Finally, as bond ratings decline, the probability that a company will reduce the dollar amount or shorten the maturity of its bond issues increases dramatically; this in turn reduces the marketability of a bond issue, and hence increases its yield.

The results from my study are clear: over the long term, a strong "A" to "AA" debt rating minimizes the pre-tax cost of capital, even on the basis of the embedded cost of debt. This is critical for rate making purposes, which relies on the embedded cost of debt. These results are robust over a wide range of assumptions. In terms of analyzing various capital structures for utilities, the results of my study indicate that a strong equity base is important in providing the company the equity cushion it

needs to allow it access to capital markets irrespective of the current market conditions. The need to maintain borrowing capacity is well documented; indeed the fundamental tenets from the Bluefield and Hope capital attraction standard is that effective regulation of public utilities requires sufficient returns commensurate with the risks to allow companies access to the funds necessary for the continued provision of services. During normal markets, a utility should conserve enough unused borrowing capacity to enable it to employ this capacity to avoid foregoing investment opportunities or issuing common stock at confiscatory prices during adverse market conditions, thereby threatening the utility's obligation to serve its customers. This is particularly important for utilities with large construction programs, since the magnitude of a utility's construction program is an important source of business risk.

Q. DID THE ANALYSIS IN YOUR STUDY CONSIDER CHANGES IN BUSINESS RISKS?

A. The analysis in my study focused on the financial risks associated with various degrees of debt leverage. An increase in the utility's business risks would result in still higher required returns for both equity and fixed-income investors beyond the levels indicated in my study. As I discussed earlier in my testimony, both financial and business risks determine the return investors require. An increase in either source of risk will result in investors requiring higher returns for their utility investments.

It is impossible to divorce the returns investors require from the risks inherent in security investments.

Q. DOES THAT CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

EXHIBIT (RAM-1)

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RESUME
(SPRING 1995)

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DATE OF BIRTH: 3/5/1945

PRESENT EMPLOYER: Georgia State University
College of Business Administration
Atlanta, Ga. 30076

RANK: Professor of Finance

HONORS: Professor of Finance for Regulated Industry
Center for the Study of Regulated Industry, College of Business, Georgia State University.

EDUCATIONAL HISTORY

- Bachelor of Electrical Engineering, McGill University, Montreal, Canada, 1967.
- Master of Business Administration, McGill University, Montreal, Canada, 1969.
- Ph D in Finance & Econometrics, Wharton School of Finance, University of Pennsylvania, Phila., Pa., 1976.

EMPLOYMENT HISTORY

- Lecturer, Wharton School of Finance, Univ. of Pa., 1972-3
- Assistant Professor, University of Montreal School of Business, 1973-1976.
- Associate Professor, University of Montreal School of Business, 1976-1979.
- Professor of Finance, Georgia State University, 1979-1994
- Professor of Finance for Regulated Industry, Center for the Study of Regulated Industry, College of Business, Georgia State University, 1985-1994.
- Visiting Professor of Finance, Amos Tuck School of Business, Dartmouth College, Hanover, N.H.., 1986

OTHER BUSINESS ASSOCIATIONS

- Communications Engineer, Bell Canada, 1962-1967.
- Member of the Board of Directors, Financial Research Institute of Canada, 1974-1980.
- Co-founder and Director Canadian Finance Research Foundation, 1977.
- Vice-President of Research, Garmaise-Thomson & Associates., Investment Management Consultants, 1980-1981.
- Member of Board of Directors, Techmar Jones International, 1988-1991
- Member of Board of Directors, Executive Visions Inc. 1986-94
- Board of External Advisors, College of Business, Georgia State University, Member 1987-1991

CORPORATE CONSULTING CLIENTS

AT & T Communications
Alagasco - Energen
Alaska Anchorage Municipal Light & Power
Alberta Power Ltd.
American Water Works Company
Ameritech
B.C. Telephone
B C GAS
Bell Canada
Bellcore
Bell South Corp.
Bruncor (New Brunswick Telephone)
Burlington-Northern
C & S Bank
Canadian Radio-Television & Telecomm. Commission
Canadian Utilities
Canadian Western Natural Gas
Centel
Centra Gas
Central Illinois Light & Power Co
Central Telephone
Central South West Corp.
Cincinnatti Gas & Electric
Cinergy Corp
Citizens Utilities
CN-CP Telecommunications

CORPORATE CONSULTING CLIENTS (CONT'D)

Columbia Gas System
Deerpath Group
Edmonton Power Company
Engraph Corporation
Florida Water Association
Garmaise-Thomson & Assoc., Investment Consultants
Gaz Metropolitain
General Public Utilities
Georgia Broadcasting Corp.
Georgia Power Company
GTE California
GTE Northwest Inc
GTE Service Corp.
GTE Southwest Incorporated
Gulf Power Company
Havasu Water Inc.
Hope Gas Inc.
Hydro-Quebec
ICG Utilities
Illinois Commerce Commission
Island Telephone
Jersey Central Power & Light
Kansas Power & Light
Maritime Telephone
Metropolitan Edison Co.
Minnesota Power & Light

CORPORATE CONSULTING CLIENTS (CONT'D)

Mississipi Power Company
Mountain Bell
Newfoundland Light & Power - Fortis Inc.
NewTel Enterprises Ltd.
New York Telephone Co.
Northern Telephone Ltd.
Northwestern Bell
Northwestern Utilities Ltd.
NYNEX
Oklahoma G & E
Ontario Telephone Service Commission
Orange & Rockland
Pacific Northwest Bell
People's Gas System Inc.
People's Natural Gas
Pennsylvania Electric Co.
Price Waterhouse
PSI Energy
Public Service Elec & Gas
Quebec Telephone
Rochester Telephone
Southern Bell
Southern States Utilities
South Central Bell
Sun City Water Company
The Southern Company

Touche Ross and Company

Trans-Quebec & Maritimes Pipeline

U S WEST Communications

Utah Power & Light

Vermont Gas Systems Inc.

MANAGEMENT DEVELOPMENT AND PROFESSIONAL EXECUTIVE EDUCATION

- Canadian Institute of Marketing, Corporate Finance, 1971-73

- Hydro-Quebec, "Capital Budgeting Under Uncertainty, 1974-75

- University of Montreal Continuing Education:

  Computerized Financial Planning Seminar

  Quantitative Methods in Finance Seminar

- Institute of Certified Public Accountants, Mergers & Acquisitions, 1975-78

- Investment Dealers Association of Canada, 1977-78

- Financial Research Foundation, bi-annual seminar, 1975-79

- Advanced Management Research (AMR), faculty member, 1977-80

- Financial Analysts Federation, Educational chapter:
  "Financial Futures Contracts" seminar

- The Management Exchange Inc. (now EXNET), faculty member, 1981-1995.

NATIONAL SEMINARS:

"Risk and Return on Capital Projects"

"Cost of Capital for Regulated Utilities"

"SEC, Accounting, Tax Changes for Utilities"

"Capital Allocation for Utilities"

"Alternative Regulatory Frameworks"

"Utility Directors' Workshop"

- Georgia State University College of Business, Management Development Program, faculty member, 1981-1995

EXPERT TESTIMONY & UTILITY CONSULTING AREAS OF EXPERTISE

Rate of Return

Capital Structure

Generic Cost of Capital

Phase-in Plans

Costing Methodology

Depreciation

Flow-Through vs Normalization

Revenue Requirements Methodology

Utility Capital Expenditures Analysis

Risk Analysis

Capital Expenditures Allocation

Divisional Cost of Capital

Publicly-owned Municipals

Telecommunications, CATV, Energy, Pipeline, Water

Incentive Regulation

EXHIBIT (RAM-1)

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Alternative Regulatory Frameworks

Shareholder Value Creation

REGULATORY BODIES:

Federal Communications Commission

Federal Energy Regulatory Commission

Georgia Public Service Commission

South Carolina Public Service Commission

North Carolina Utilities Commission

Pennsylvania Public Service Commission

Ontario Telephone Service Commission

Quebec Telephone Service Commission

Newfoundland Brd of Commissionners of Public Utilities

Georgia Senate Committee on Regulated Industries

Alberta Public Service Board

Tennessee Public Service Commission

Oklahoma State Board of Equalization

Mississippi Public Service Commission

Minnesota Public Utilities Commission

Canadian Radio-Television and Telecomm. Commission

New Brunswick Board of Public Commissioners

Alaska Public Utility Commission

National Energy Board of Canada

Florida Public Service Commission

Montana Public Service Commission

Arizona Corporation Commission

Quebec Natural Gas Board

New York Public Service Commission
Washington Utilities & Transportation Commissio
Manitoba Board of Public Utilities
New Jersey Board of Public Utilities
Alabama Public Service Commission
Utah Public Service Commission
Nevada Public Service Commission
Louisiana Public Service Commission
Colorado Public Utilities Board
West Virginia Public Service Commission
Ohio Public Utilities Commission
California Public Service Commission
Hawaii Public Service Commission
Illinois Commerce Commission
British Columbia Board of Public Utilities
Indiana Utility Regulatory Commission
Minnesota Public Utilities Commission

SERVICE AS EXPERT WITNESS

Southern Bell, So. Carolina PSC, Docket #81-201C
Southern Bell, So. Carolina PSC, Docket #82-294C
Southern Bell, North Carolina PSC, Docket #P-55-816
Metropolitan Edison, Pennsylvania PUC, Docket #R-822249
Pennsylvania Electric, Pennsylvania PUC,Docket#R-822250
Georgia Power, Georgia PSC, Docket # 3270-U, 1981
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Georgia Power, F.E.R.C., Docket # ER 80-326, 80-327

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Bell Canada, CRTC 1987

Northern Telephone, Ontario PSC

GTE-Quebec Telephone, Quebec PSC, Docket 84-052B

Newfoundland Tel., Nfld. Brd of Public Commiss.PU 11-87-

CN-CP Telecommunications, CRTC

Quebec Northern Telephone, Quebec PSC

Edmonton Power Company, Alberta Public Service Board

Kansas Power & Light, F.E.R.C., Docket # ER 83-418

NYNEX, FCC generic cost of capital Docket #84-800

Bell South, FCC generic cost of capital Docket #84-800

American Water Works - Tennessee, Docket #7226

Burlington-Northern - Oklahoma State Board of Taxes

Georgia Power, Georgia PSC, Docket # 3549-U

GTE Service Corp., FCC Docket #84-200

Mississippi Power Co., Miss. PSC, Docket U-4761

Citizens Utilities, Ariz. Corp. Comm., D # U2334-86020

Quebec Telephone, Quebec PSC, 1986, 1987, 1992

Newfoundland L & P, Nfld. Brd. Publ Comm. 1987, 1991

Northwestern Bell, Minnesota PSC, #P-421/CI-86-354

GTE Service Corp., FCC Docket #87-463

Anchorage Municipal Power & Light, Alaska PUC, 1988

New Brunswick Telephone, N.B. PUC, 1988

Trans-Quebec Maritime, Nat'l Energy Brd. of Cda, '88-92

Gulf Power Co., Florida PSC, Docket #88-1167-EI

Mountain States Bell, Montana PSC, #88-1.2

Mountain States Bell, Arizona CC, #E-1051-88-146

Georgia Power, Georgia PSC, Docket # 3840-U, 1989

Rochester Telephone, New York PSC, Docket # 89-C-022

Noverco - Gaz Metro, Quebec Natural Gas PSC, #R-3164-89

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Orange & Rockland, New York PSC, Case 89-E-175

Central Illinois Light Company, ICC, Case 90-0127

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Gulf Power, Florida PSC, Case # 891345-EI

ICG Utilities, Manitoba BPU, Case 1989

Newtel Enterprises, CRTC, Docket #90-15

Peoples Gas Systems, Florida PSC

Jersey Central Pwr & Light, N.J. PUB, Case ER 89110912J

Alabama Gas Co., Alabama PSC, Case 890001

Trans-Quebec Maritime Pipeline, Cdn. Nat'l Energy Board

Mountain Bell, Utah PSC,

Mountain Bell, Colorado PUB

South Central Bell, Louisiana PS

Hope Gas, West Virginia PSC

Vermont Gas Systems, Vermont PSC

Alberta Power Ltd., Alberta PUB

Ohio Utilities Company, Ohio PSC

Georgia Power Company, Georgia PSC

Sun City Water Company

Havasu Water Inc.

Centra Gas (Manitoba) Co.

Central Telephone Co. Nevada

AGT Ltd., CRTC 1992

BC GAS, BCPUB 1992

California Water Association, California PUC 1992

Maritime Telephone 1993

BCE Enterprises, Bell Canada, 1993

Citizens Utilities Arizona gas division 1993

PSI Resources 1993-5

CILCORP gas division 1994

GTE Northwest Oregon 1993

Stentor Group

Bell Canada 1994-1995

PROFESSIONAL AND LEARNED SOCIETIES

- Corporation of Engineers, 1967-1972
- Engineering Institute of Canada, 1967-1972
- Canada Council Award, recipient 1971 and 1972
- Canadian Association Administrative Sciences,1973-80
- American Association of Decision Sciences, 1974-1978
- American Finance Association, 1975-1995
- Financial Management Association, 1978-1995
- Southern Finance Association, 1980-1994
- Institute of Industrial Engineers 1985-1995

ACTIVITIES IN PROFESSIONAL ASSOCIATIONS AND MEETINGS

- Chairman of meeting on "New Developments in Utility Cost of Capital", Southern Finance Asscociation, Atlanta, Nov. 1982

- Chairman of meeting on "Public Utility Rate of Return", Southeastern Public Utility Conference, Atlanta, Oct. 1982

- Chairman of meeting on "Current Issues in Regulatory Finance", Financial Management Association, Atlanta, Oct. 1983

- Chairman of meeting on "Utility Cost of Capital", Financial-Management Association, Toronto, Canada, Oct. 1984.

- Committee on New Product Development, FMA, 1985

- Discussant, "Tobin's Q Ratio", paper presented at Financial Management Association, New York, N.Y., Oct. 1986

- Guest speaker, "Utility Capital Structure: New Developments", National Society of Rate of Return Analysts 18th Financial Forum, Wash., D.C. Oct. 1986

- Opening address, "Capital Expenditures Analysis: Methodology vs Mythology," Bellcore Economic Analysis Conference, Naples Fla., 1988.

PAPERS PRESENTED:

"An Empirical Study of Multiperiod Asset Pricing," annual meeting of Financial Management Assoc., Las Vegas Nevada, 1987.

"Utility Capital Expenditures Analysis: Net Present Value vs Revenue Requirements", annual meeting of Financial Management Assoc., Denver, Colorado, October 1985.

"Intervention Analysis and the Dynamics of Market Efficiency", annual meeting of Financial Management Assoc., San Francisco, Oct. 1982

"Intertemporal Market-Line Theory: An Empirical Study," annual meeting of Eastern Finance Assoc., Newport, R.I. 1981

"Option Writing for Financial Institutions: A Cost-Benefit Analysis", 1979 annual meeting Financial Research Foundation
"Free-lunch on the Toronto Stock Exchange", annual meeting of Financial Research Foundation of Canada, 1978.

"Simulation System Computer Software SIMFIN", HP International Business Computer Users Group, London, 1975.

"Inflation Accounting: Implications for Financial Analysis." Institute of Certified Public Accountants Symposium, 1979.

OFFICES IN PROFESSIONAL ASSOCIATIONS

- President, International Hewlett-Packard Business Computers Users Group, 1977

- Chairman Program Committee, International HP Business Computers Users Group, London, England, 1975

- Program Coordinator, Canadian Assoc. of Administrative Sciences, 1976

- Member, New Product Development Committee, Financial Management Association, 1985-1986

- Reviewer: Journal of Financial Research

  Financial Management

  Financial Review

  Journal of Finance

PUBLICATIONS

"Risk Aversion Revisited", Journal of Finance, Sept. 1983

"Hedging Regulatory Lag with Financial Futures," Journal of Finance, May 1983. (with G. Gay, R. Kolb)

"The Effect of CWIP on Cost of Capital, " Public Utilities Fortnightly, July 1986.

"The Effect of CWIP on Revenue Requirements" Public Utilities Fortnightly, August 1986.

"Intervention Analysis and the Dynamics of Market Efciciency," Time-Series Applications, (New York: North Holland, 1983. (with K. El-Sheshai)

"Market-Line Theory and the Canadian Equity Market," Journal of Business Administration, Jan. 1982, M. Brennan, editor

"Efficiency of Canadian Equity Markets," International Management Review, Feb. 1978

"Intertemporal Market-Line Theory: An Empirical Test," Financial Review, Proceedings of the Eastern Finance Association, 1981

BOOKS

Utilities' Cost of Capital, Public Utilities Reports Inc., Arlington, Va., 1984.

Regulatory Finance, Public Utilities Reports Inc., Arlington, Va., 1994

MONOGRAPHS

Determining Cost of Capital for Regulated Industries, Public Utilities Reports, Inc., and The Management Exchange Inc., 1982 - 1993. (with V.L. Andrews)

Alternative Regulatory Frameworks, Public Utilities Reports, Inc., and The Management Exchange Inc., 1993. (with V.L. Andrews)

Risk and Return in Capital Projects, The Management Exchange Inc., 1980, (with B. Deschamps)

Utility Capital Expenditure Analysis, The Management Exchange Inc., 1983.

Regulation of Cable Television: An Econometric Planning Model, Quebec Department of Communications, 1978.

An Economic & Financial Profile of the Canadian Cablevision Industry. Canadian Radio-Television & Telecomm. Commission, 1978

Computer Users' Manual: Finance and Investment Programs, University of Montreal Press, 1974, revised 1978.

Fiber Optics Communications: Economic Characteristics, Quebec Department of Communications, 1978.

"Canadian Equity Market Inefficiencies", Capital Market Research Memorandum, Garmaise & Thomson Investment Consultants, 1979.

MISCELLANEOUS CONSULTING REPORTS

"Operational Risk Analysis: California Water Utilities, Calif. Water Association, 1993.

"Cost of Capital Methodologies for Independent Telephone Systems", Ontario Telephone Service Commission, March 1989.

"The Effect of CWIP on Cost of Capital and Revenue Requirements", Georgia Power Company, 1985.

"Costing Methodology and the Effect of Alternate Depreciation and Costing Methods on Revenue Requirements and Utility Finances", Gaz Metropolitan Inc., 1985.

"Simulated Capital Structure of CN-CP Telecommunications: A Critique", Canadian Radio-Television & Telecomm. Commission, 1977.

"Telecommunications Cost Inquiry: Critique", Canadian Radio-Television & Telecomm. Commission, 1977.

"Social Rate of Discount in the Public Sector", Canadian Radio-Television & Telecomm. Commission Policy Statement, 1974.

"Technical Problems in Capital Projects Analysis", Canadian Radio-Television & Telecomm. Commission Policy Statement, 1974.

RESEARCH GRANTS

"Econometric Planning Model of the Cablevision Industry", International Institute of Quantitative Economics, CRTC, $20,000

"Application of the Averch-Johnson Model to Telecommunications Utilities", Canadian Radio-Television Commission (CRTC), $12,000

"Economics of the Fiber Optics Industry", Quebec Department of Communications, $50,000

"Intervention Analysis and the Dynamics of Market Efficiency", Georgia State Univ. College of Business, 1981

"Firm Size and Beta Stability", Georgia State University College of Business, 1982

"Risk Aversion and the Demand for Risky Assets", Georgia State University College of Business, 1981.

Chase Econometrics, Interactive Data Corp., Research Grant, $50,000 per annum, 1986-1989.

UNIVERSITY SERVICE

- University Senate, elected departmental senator
- Faculty Affairs Committee, elected departmental representative
- Professional Continuing Education Committee member
- Director Master in Science (Finance) Program

EXHIBIT (RAM-2)

PAGE 1 OF 72

RETURN ON COMMON EQUITY DETERMINATION

FOR

FLORIDA WATER & WASTEWATER UTILITIES

MEMORANDUM

PREPARED ON BEHALF OF

THE FLORIDA WATERWORKS ASSOCIATION

by ROGER A. MORIN, PhD

UTILITIES RESEARCH INTERNATIONAL INC.

FEBRUARY 1995

EXHIBIT (RAM-3)

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RETURN ON COMMON EQUITY DETERMINATION FOR FLORIDA WATER & WASTEWATER UTILITIES

EXHIBIT (RAM-2)

PAGE 3 OF 72

RETURN ON COMMON EQUITY DETERMINATION FOR FLORIDA WATER & WASTEWATER UTILITIES

PERSONAL INTRODUCTION AND QUALIFICATIONS

My name is Dr. Roger A. Morin. My business address is 1515 Old Riverside Rd., Roswell, Georgia 30076. I am Professor of Finance at the College of Business Administration, Georgia State University and Professor of Finance for Regulated Industry at the Center for the Study of Regulated Industry at Georgia State University. I hold a Bachelor of Engineering degree and an MBA in Finance from McGill University, Montreal, Canada. I received my Ph.D. in Finance and Econometrics at the Wharton School of Finance, University of Pennsylvania.

I have taught at the Wharton School of Finance, University of Pennsylvania, Amos Tuck School of Business at Dartmouth College, Drexel University, University of Montreal, McGill University, and Georgia State University. I was a faculty member of Advanced Management Research International, and I am currently a faculty member of Exnet Inc. where I conduct frequent national executive-level education seminars throughout the United States and Canada. In the last fourteen years, and throughout 1995, I am conducting national seminars on "Utility Cost of Capital," "Alternative Regulatory Frameworks," and on "Utility Capital Allocation" which I have developed on behalf of Exnet Inc. in conjunction with Public Utilities Reports, Inc..

I have authored or co-authored several books, monographs, and articles in academic scientific journals on the subject of finance. They have appeared in a variety of journals, including The Journal of Finance, The Journal of Business Administration, International Management Review, and Public Utility Fortnightly. I published a widely used treatise on regulatory finance, Utilities' Cost of Capital, Public Utilities Reports Inc., Arlington, Va. 1984. My new book, Regulatory Finance, a voluminous treatise on the application of finance to regulated utilities, has just been released by the same publisher. I have engaged in extensive consulting activities on behalf of numerous corporations and legal firms in matters of financial management and corporate litigation. Exhibit RAM-1 describes my professional credentials in more detail.

I have been a cost of capital witness before numerous regulatory boards, including the Florida Public Service Commission, the Federal Energy Regulatory Commission, and the Federal Communications Commission. I have appeared before some forty (40) regulatory commissions, including the following state and provincial commissions:

Alabama	Illinois	New Jersey	Pennsylvania
Alaska	Indiana	New York	Quebec
Alberta	Iowa	Newfoundland	South Carolina
Arizona	Louisiana	North Carolina	Tennessee
British Columbia	Manitoba	North Dakota	Texas
California	Minnesota	Ohio	Utah
Colorado	Mississippi	Oklahoma	Vermont
Florida	Montana	Ontario	Washington
Georgia	Nevada	Oregon	West Virginia
Hawaii	New Brunswick		

The details of my participation in regulatory proceedings are provided in Exhibit RAM-1.

BACKGROUND

Since 1981, the Florida Public Service Commission ("FPSC", "the Commission") establishes a leverage formula each year which is intended to reasonably reflect the range of returns on common equity (ROE) for an average Florida water utility[1] ("FWU"). Private FWUs are then authorized to apply this leverage formula to their capital structure rather than file expert cost of capital testimony in each rate proceeding.

Although the industry generally endorses the notion of a generic mechanistic approach to the determination of a fair ROE, there are serious concerns that the results produced by the formula are unrealistically low and not responsive to the risks of the water utility industry, both in an absolute sense and relative to other Florida utilities. For 1994, the ROE authorized range is 9.81% to 11.34%, at 100% and 40% common equity ratio, respectively. For the last two years, the ROEs authorized under the leverage formula have slipped below those authorized for the much larger and financially strong electric, gas, and telephone utilities despite the substantial increase in the risk of the water utility industry. The table below displays the current authorized ROEs for the various utility groups in Florida vs the midpoint authorized ROE for FWUs.

[1] Throughout the remainder of this memorandum , the expression "water utility" is meant to encompass both water and wastewater operations. Most large utilities in Florida have both types of operations.

TABLE 1
AUTHORIZED RATES OF RETURN FOR FLORIDA UTILITIES

Utility	Authorized ROE Mid-point
Telephone	11.68%
Natural Gas	11.08%
Electrics	11.64%
Water	10.58%

PURPOSE

I was asked by the Florida Waterworks Association ("FWA") to conduct an independent evaluation of the Commission's leverage formula and discuss my findings at a workshop to be held on February 23rd, 1995. The objectives of this memorandum are:

1) to determine how changes in the operating environment of FWUs have increased their investment risk and their cost of capital, both in absolute terms and relative to other utilities,

2) to review the Commission's leverage formula, and

3) to recommend modifications for improving the leverage formula.

I proceed on the fundamental premise that the generic formula approach is to be preserved. The generic approach is cost efficient, administratively expedient, and reduces the regulatory burden. Rather than engage in a comprehensive reexamination and revamping of the formula, I will concentrate on potential improvements and adjustments to the formula.

ORGANIZATION

The memorandum is organized in two major sections: Section I describes the FWUs' changing investment risk status relative to other utilities, and shows that FWUs are riskier than in earlier years, both in absolute terms and relative to energy utilities. This is accomplished by examining broad trends in the financial profile of water utilities relative to energy utilities. Section II critically reviews the leverage formula employed by the FPSC in light of current risk dynamics, and offers recommendations for improvement.

MAIN FINDINGS

Florida water utilities are at least as risky as energy utilities and should therefore be authorized returns at least as great. Current and future water quality regulations will increase fixed costs and capital investment, which will increase operating and financial leverage. Increasing operating and financial leverage increases risk and required rate of return. Therefore, authorized rates of return on equity should be correspondingly increased both in absolute terms and relative to those granted energy utilities. The required increase is of the order of 100 to 150 basis points. The leverage formula employed by the FPSC to measure the cost of common equity capital understates the cost of equity and needs to be amended.

I. CHANGING INVESTMENT RISKS OF WATER UTILITIES

I.A. WATER UTILITIES VS ENERGY UTILITIES

In recent years, the risks of FWUs have changed dramatically in absolute terms and relative to other utilities. In the 1990's, chiefly because of environmental concerns and water supply reliability problems, the FWUs' investment risks are increasing relative to those of other utilities and industrials. This conclusion is supported by a broad array of data[2], displayed graphically in Exhibits RAM-2 to RAM-15. These data, as I discuss below, indicate that water utilities can no longer be considered the "risk-free rate" on the utility risk spectrum, and have become riskier relative to other utilities in recent years. The increased risk position of the water utility industry vis-à-vis other utilities, of course, impacts its cost of capital, which increases correspondingly.

Below, broad trends in the financial profile of FWUs relative to other utilities are described. It will be abundantly clear from these trends that FWUs have increased in risk relative to other utilities.

1. MARKET VISIBILITY

The water utility industry is relatively unknown, and there is also a lack of institutional interest. In comparison to gas, electric, and telephone companies, investor-owned water utilities have a very low profile in the market. Rate increases are given little attention in the press other than at the local level. This is not surprising, considering that monthly residential water bills run about one third or 32% of monthly electric bills and about 40% of monthly residential gas

[2] This section draws heavily on a comprehensive study of the water utility industry in California. See Morin, R.A., *"Operational Risk Analysis for Class A California Water Utilities"*, May 1992, testimony filed before the California PUC.

bills, as shown on Exhibit RAM-2. Residential water bills are significantly lower than gas and electric bills.

Very few water utilities have their securities rated by bond rating agencies and/or investment houses. Unlike the vast majority of energy utilities, most of the FWU are too small to have rated debt or publicly-held stock, and none issue debt on a stand alone basis. Any debt issue must be guaranteed by a parent corporation or must be guaranteed by shareholders at the personal level. Access to the equity market by the FWUs is virtually non-existent.

2. SIZE EFFECT

Water utilities possess small revenue and asset bases and are small in size, both in absolute terms and relative to other utilities. Exhibit RAM-3 shows the relative size of water, gas, and electric utilities as measured by total assets and the average market value of their common equity. Pages 1 and 2 of Exhibit RAM-20 contrast the S&P bond rating and stock rating of small versus large capitalization stocks. For bond ratings, the first quintile of companies ranked in descending order of market value of equity is ranked A- on average, versus CC for the last quintile. For stock ratings, the first quintile of companies is ranked A- to B+, versus C for the last quintile.

As a result of their small size, market information is not easily accessible. Standard & Poor's computes indexes for almost 100 different industries but not the water industry. There are only 15 actively traded water companies. Of those 15 companies, only 6 are covered by Value Line. Analyst coverage is scarce. For example, IBES publishes long-term growth forecasts for only 8 water companies. Zacks provides long-term growth estimates for only 6 companies.

More importantly, investment risk increases as company size diminishes, all else remaining constant. The size phenomenon is well documented in the finance literature. Reinganum ("Misspecification of Capital Asset Pricing: Empirical Anomalies Based on Earnings, Yields and Market Values," Journal of Financial Economics, 9, no. 1 March 1981) examined the relationship between the size of the firm and its P/E ratio, and found that small firms experienced average returns greater than those of large firms that were of equivalent systematic risk (beta). He found that small firms produce greater returns than could be explained by their risks. These results were confirmed in a separate test by Banz ("The Relationship between Return and Market Value of Common Stock," Journal of Financial Economics, 9, no. 1 March 1981), who examined stock returns over the much longer 1936-1975 period, finding that stocks of

small firms earned higher risk-adjusted abnormal returns than those of large firms.

Ibbotson Associates' widely-used annual historical return series publication covering the period from 1926 to the present reinforces this evidence (see Exhibit 47 in Stocks, Bonds, Bills, and Inflation 1994 Yearbook, Ibbotson Associates, Chicago 1995).

Small companies have very different returns than large ones and on average those returns have been higher. The greater risk of small stocks does not fully account for their higher returns over many historical periods. The average small stock premium is in excess of 5% over the average stock, more than could be expected by risk differences alone, suggesting that the cost of equity for small stocks is considerably larger than for large capitalization stocks. In addition to earning the highest average rates of return, small stocks also had the highest volatility, as measured by the standard deviation of returns. Ibbotson defines small stocks as those in the lowest size decile among NYSE stocks, with size defined as the dollar value of shares outstanding. The size trigger point occurs at a market value in the vicinity of $60 million, which is substantially larger than the average FWU, and in fact larger than all but one or two FWU of which I am aware.

Much research effort has gone into the investigation of the size effect. In addition to statistical measurement problems, the economic rationale for the size effect is difficult to unravel. Presumably, small stocks provide less utility to the investor and require a higher return. The size effect may be a statistical mirage, whereby size is proxying for the effect of different economic variables. For example, small firms may have low price-earnings ratios or low market prices. The size effect is most likely the result of a liquidity premium, whereby investors in small stocks demand greater returns as compensation for lack of marketability and liquidity. Investors prefer high to low liquidity and demand higher returns from less liquid investments, holding other factors constant.

The size effect is particularly relevant for FWUs which are smaller and whose equity market value is considerably less than $60 million. FWU revenues and assets are Lilliputian compared to other utilities in the state. Most of the FWUs are closely-held and their securities are illiquid. Not only do these very small FWUs possess higher risks than their larger water utility counterparts but they are also subjected to a significant size/liquidity effect, strongly suggesting that their cost of equity capital is higher.

3. CAPITAL REQUIREMENTS

Compliance with the various environmental regulations and the securing of added sources of water supply will necessitate additional capital requirements. Because FWUs are so small and virtually all of those supplementary capital needs will have to be financed externally, the financial exposure and financial risks of the FWUs will increase. For the smaller FWUs with limited access to the public equity market, the external financing needs will have to be met from additional debt financing, thus increasing their financial leverage.

The increased environmental requirements related to maximum contaminant levels outlined in the Safe Drinking Water Act (SDWA) will result in substantial increases in capital cost as well as higher operating costs for all water companies. The capital investments required to comply with the more stringent environmental standards are non-productive mandatory investments which do not generate economic profits. Moreover, compliance with escalating regulations related to monitoring, performance tests and plant upgrades will improve water quality but will not increase water consumption.

It is likely that higher rates coupled with mandatory conservation programs will push water consumption even lower. Under this scenario, rate base and operating costs will grow faster than consumption. This risk is particularly relevant to FWUs as water sources diminish, in contrast to other national water utilities.

4. EXTERNAL FINANCING REQUIREMENTS

The large capital outlays required will necessarily be financed mostly from external sources. The investor-owned water utilities are much more dependent on external financing than are gas and electric utilities. In the early 1990s, the water utility industry generated 45% of its capital needs internally while the gas and electric utility industries generated 57% and 78% respectively as shown on Exhibit RAM-4. The ratio of internally generated funds to capital expenditures will decrease further as water companies increase their capital investments to comply with new water standards. For the FWUs, the percentage of external financing requirements far exceeds the national water utility figures.

5. INTERNAL CASH GENERATION

Water utilities have a lower depreciation rate compared to electric or gas utilities. This is one reason for the deficiency in internal cash generation. As shown on Exhibit RAM-5 page 1, the average annual depreciation rate for water utilities is smaller than for gas and electric utilities. Dividend payout ratios are

not responsible for the low internal cash generation. The common stock dividend payout ratio was approximately 70% while gas and electric utilities had an 80% payout ratio, as seen on Exhibit RAM-5 page 2. FWUs have virtually no dividend payout.

Another reason is that the water utility industry's capital spending (over and above depreciation and customer advances for construction) is now running at a much higher rate relative to current capitalization than that for the gas and electric industries. Many plants are nearing the end of their useful lives and the SDWA magnifies the need for even more capital. As illustrated in Exhibit RAM-6, investor-owned water utilities increased their capitalization by 8.9% to fund their capital investments compared to 6.6% and 2.4% for the gas distribution and electric industries.

6. CAPITAL EXPENDITURES VS INTERNAL CASH GENERATION

Even under status quo conditions, the water utility industry will resort to capital markets for a mix of common and long term debt in order to add capital at the current rate. Referring to Exhibit RAM-7, water utilities will have to increase their equity base by 4.5% per year versus 3.7% and 0% for the gas and electric utilities. They will also have to increase their long term debt by 8.5% per year versus 7.2% and 0% for gas distribution and electric utilities.

The ability of each industry to fund its needs internally can be measured by the ratio of internally generated funds over capital expenditures. As shown on Exhibit RAM-8, over the last six years, the water utility industry's percent of internally generated funds over capital expenditures has been consistently lower than that of the gas distribution and electric industry. The same ratio for the gas distribution industry has remained constant but always higher than the water industry. The electric industry's ratio has increased significantly from the 50% range to over 100%.

7. INTEREST COVERAGE

In establishing bond ratings, agencies rely on pretax interest coverage ratios as one important quantitative measure of a firm's ability to service debt. These bond ratings determine the cost and marketability of utility debt and hence ultimately affect customer rates.

As shown on Exhibit RAM-9, water, gas distribution and electric utilities had virtually the same pretax interest coverage ratios of about 3.2 to 3.3 times in 1985. The ratio has dropped to 2.5 times for the water industry while the gas and electrics only dropped to 3.1 and 2.6 times respectively. Ignoring the one

time asset write-downs in the electric industry in 1988, the pre-tax interest coverage ratios for the water utility industry have been at or below those for the other utilities since 1985.

8. ACHIEVED RETURNS

As shown on Exhibit RAM-10, the realized returns on average equity steadily decreased for the water industry due to falling authorized returns, rising operating expenses, and rising capital needs. In five out of six years, realized returns on equity were lower than for electric utilities. The current February 1995 edition of C.A.Turner Utility Reports cites an average return on common equity of 11.0% for water utilities versus 11.8% and 11.2% for natural gas and electric utilities, respectively

9. MARKET VALUATION

Deteriorating cash flow relative to capital expenditures, falling pre-tax interest coverage ratios, and falling realized returns on equity are pushing stock prices down relative to book value. As illustrated in Exhibit RAM-11, the average market-to-book (M/B) ratio for the water utility industry in 1985 was nearly 1.6 times. This was the highest of the three utility industries. Currently, water utility companies have the lowest M/B at 1.24 times book versus 1.42 and 1.31 for the gas distribution and electric utility industries. A similar trend applies to price-earnings (P/E) ratios. Water utility companies have the lowest P/E at 11.8 versus 13.3 and 12.5 for the gas distribution and electric utility industries.

In light of rising capital investment and operating expenses, increased external funding requirements, falling coverage ratios, returns and share prices, the evidence raises questions concerning the adequacy of authorized returns in the water utility industry and whether water utilities are provided with the opportunity to earn the authorized returns.

10. AUTHORIZED RETURNS

Authorized returns on equity for the water companies have been about 50 basis points lower than for electric utilities throughout the 1980's, as shown on Exhibit RAM-12. The February 1995 edition of C.A.Turner Utility Reports cites an average authorized return on common equity of 11.96% for water utilities versus 12.5% and 12.68% for natural gas and electric utilities, respectively. Earlier, Table 1 showed a similar picture prevailing in Florida whereby FWU authorized ROEs are less than for the other utilities in the state. This scenario is no longer plausible. The water utility industry has entered a New Era and is

experiencing the same profound metamorphosis as the electric industry did through the mid 1970's and early 1980's.

At one time, the electric industry faced enormous capital needs, which, for the moment, have dissipated. Now, the water utility industry confronts enormous capital investment needs, both for compliance and for replacement purposes, with the attendant risks of raising funds, completing projects on time and on budget, and obtaining rate treatment which allows a satisfactory return on new capital.

11. INVESTMENT RATE AND RETURN

An opportunity to realize a fair return on invested capital is a fundamental aspect of rate of return regulation. All utilities are entitled to a reasonable opportunity to earn their authorized returns. Unfortunately, utilities that invested their own capital to meet customer needs and improve service have not been as successful at earning their authorized returns when compared to those utilities that did not invest.

As shown on Exhibit RAM-13, in eight of the last ten years, companies investing their own capital to meet customer needs did not perform nearly as well as those companies that chose not to invest. The larger water companies which are covered in the National Association of Water Companies (NAWC) data base were split into two groups, a low investment group consisting of those companies whose rate base grew at a rate below the average for the entire group and a high investment group consisting of those companies whose rate base grew at a rate higher than the average for the entire group. The low investment group that did not grow utility plant at all or used developer's contributions to fund their growth consistently outperformed the high investment group that invested their own capital to grow their rate base faster in order to meet customer needs. Obviously, current ratemaking policies do not encourage capital investment even though new regulations will require substantial increases in capital expenditures.

In the next few years, it is reasonable to postulate that water companies that will be mandated to invest capital in water quality projects which do not increase revenue, will resemble the under performing, high growth group of Exhibit RAM-13. Water utilities will be incented to invest in additional real physical assets only if the expected return on these investments exceeds or equals the utility's cost of capital.

12. RATE BASE AND EARNINGS GROWTH

Clearly, utility operating income must be expected to grow at the same rate as rate base, if the utility is to maintain its earning power. Exhibit RAM-14 compares the evolution of rate base versus utility operating income for a water utility versus an electric company over a four year period. It is clear from the graphs that the electric company's operating income has increased during that period while its rate base has barely increased. In sharp contrast, the water utility's rate base has increased substantially, while its operating income has declined. The under earning syndrome faced by water utilities results from inadequate authorized returns, changes in consumption, rising operating expenses, and low internal cash generation as illustrated in Exhibit RAM-15.

13. RATE BASE DISALLOWANCE

The Commission has substantially reduced the allowable investment on which FWUs may earn by performing a used and useful adjustment. The latter adjustment is based on a comparison of existing water flows and capacity of facilities. No such adjustment is employed for other Florida utility groups. The premise upon which this adjustment is performed is no longer relevant for the larger FWUs. The net result of the used and useful adjustment is to disallow some significant investment.

Investors supply dollars of capital, not physical plant. Each dollar of capital has an earnings requirement (interest, dividends, earnings) irrespective of the manner in which the utility employs that dollar. The exclusion of plant investment from rate base for any variety of reasons and the failure to provide earnings in the form of AFPI on the excluded investment result in a part of total capital that has no earnings power, but which nevertheless has ongoing capital costs. These costs must be absorbed by earnings from existing investments, raising the possibility of severe losses. While the FPSC does allow AFPI, it requires a separate ratesetting analysis and is wholly dependent on the occurrence of growth within a five-year period.

The totality of a company's capital has to be serviced, whether through the medium of operating revenues or in part through the accrual of AFPI. Therefore, the allowed ROE is applicable to the total common equity component of the total investments of utility company. The exclusion of a portion of a plant from rate base undermines a utility's integrity.

Compounding the rate base disallowance issue is the high level of contributions-in-aid-of-construction (CIAC) established by the Commission, reducing the rate base on which the utility can earn further. While this decision

by the FPSC to promote high levels of CIAC des result in lower rates, it also results in lower and more volatile earnings, which in turn equates to increased risk.

14. WATER SUPPLY

FWUs also have an environmental risk. With the enactment of more stringent water quality standards and the increases sophistication of scientific instrumentation, water utilities face the increased possibility of losing its existing water supply.

This comparative financial profile demonstrates clearly that the risks of water utilities now exceed those of the energy utilities and that ROE awards should reflect those circumstances.

This conclusion was echoed by the bond rating agency Standard and Poor's (S&P). In response to more intense supply risks and environmental risks, S&P announced a substantial revision of water utility benchmarks in the May 25, 1992 issue of Creditweek:

"The more stringent standards were implemented as a result of S&P's conclusion that credit risk has escalated in the water utility industry in recent years due to significant challenges related to developing future water supplies and assuring the quality of existing supplies." (Page 41)

For a given bond rating, the financial benchmarks have become more stringent and have been brought closer to the benchmarks for electric utilities. More equity and less debt, and/or greater coverages are required for water utilities for the same bond rating now than in the past. To illustrate, the total debt to total capital benchmark for a single A rating has been revised from 52-60% to 48-56%. The pre-tax interest coverage for a single A rating has been revised from 2.0 - 3.5 to 2.25 - 3.75 times.

Over and above its concerns with the adequacy of water supply, S&P cites the more stringent water quality standards of the SDWA which are contributing to significant financing and regulatory pressures for the water industry:

"This will result in significant capital additions on top of already escalating spending on distribution infrastructure. Financing these large rate-base additions - which are nonrevenue-producing assets - will be difficult. Internal cash generation is weak, with low depreciation rates (usually about 2% versus around 3% for electric utilities), and low authorized return on equity. As a result,

dependence on external financing and rate relief requirements will intensify.....Poor internal cash generation along with modest demand growth of under 1% will require state utility regulators to play an even more significant role in the future financial well-being of the industry." (page 42)

The degree of change is noteworthy. Comparison of the benchmarks for the water industry both before and after the revision and the benchmarks for the electric industry reveals that S&P has reduced its spread between the two industries by a factor of 50%.

I. B. RISK FACTORS

The major reasons why the investment risks of FWU have increased, and will continue to increase, include the following:

1. Water quality regulations in the 1990's
2. Uncertainty regarding future demand
3. Uncertainty regarding future supply
4. Earnings erosion
5. Water Safety
6. Regulatory risks
7. Construction risks

1. Water quality regulations in the 1990's. New and evolving water quality regulations have generated additional substantial capital and operational costs. These compliance costs increase the utility's operating and financial leverage, which in turn increase the utility's risk and cost of capital.

The final financial effects of the SDWA on water utilities are uncertain. Water companies will need to upgrade their facilities to comply with evolving environmental standards. Because the standards are still evolving and are yet to be fully determined, there are uncertainties related to upgrading and compliance costs. Plants presently in use do not comply with newly regulated contaminant levels, and new plants will have to be installed to meet new standards.

2. Uncertainty regarding future demand. In earlier years when water supplies were abundant, the conservation ethic was absent, and rates were stable, forecasting demand for water was straightforward. Now, there is far greater uncertainty about future demand. Higher service rates resulting from supply adjustment charges and from increased water regulation compliance costs will cause customers to curtail demand for water, compounding the forecasting risk.

Moreover, the FPSC, Water Managerial Districts, and the Department of Environmental Regulation have are all strongly encouraging and even requiring implementation of conservation rate structures and other programs.

3. Uncertainty regarding future supply. Uncertainty about availability and reliability of water supplies abounds. Fears of water shortages and uncertainty about rates are also problems. Recent and continuing questions about the availability and costs of water supplies suggest that this uncertainty will continue. Water supply issues and shortages are noteworthy in Florida.

4. Earnings erosion. Water utilities are exposed to the risk of long run earnings decline and deteriorating quality. The predictability of reported earnings will deteriorate, due to the volatility of earnings over time and the probability of a permanent erosion of earnings power. Increased financial leverage from financing the capital required by more stringent water quality requirements compounds the problem, and even a small decline in operating income can cause low earnings and impact the cost of capital.

5. Water Safety. The issue of water quality, facility closings, and environmental accidents have heightened investors' awareness of water safety. Contamination of drinking water from salt water intrusion, toxic waste dumping, pesticides, and agricultural fertilizers are major concerns. New plants may not be licensed for lack of compliance with evolving water quality standards, and existing facilities may be closed permanently or for prolonged modifications.

6. Regulatory risks. How will regulators respond to the profound metamorphosis in the water utility industry? Will the allowed ROE respond to increased risks faced by water utilities? Will innovative rate designs and automatic adjustment clauses result from the New Era? Or will prudence questions and possible exclusions of investments from rate base prevail? If regulators succumb to the temptation to exclude some compliance plant investment from rate base, a portion of investor-supplied capital will have no earning power.

7. Construction risk. All the above risk factors can be compressed under the heading of construction risk. The term construction risk refers to the financial risks caused by the magnitude of a company's capital budget. Water utilities will have a large construction program relative to their size. The large compliance capital expenditures program over the next several years, relative to size, will increase their dependence on capital markets which have become volatile and more unpredictable.

Clearly, FWUs will require substantial external financing in the near future, and it is imperative that these companies have access to needed capital

funds on reasonable terms and conditions. The companies must secure funds from capital markets in order to fund new construction commitments, irrespective of capital market conditions, interest rates conditions, and quality consciousness of market participants. The return allowed on common equity will play a crucial role in determining those terms and conditions.

On debt markets, construction is one of several key determinants of credit quality and, hence, of capital costs. Future construction plans are scrutinized by bond rating agencies before assessing credit quality of a company. The construction budget in relation to internal cash generation is a key quantitative determinant of credit quality, along with construction expenditures as a proportion of capitalization.

Of course, construction risk and regulatory risk are directly related. Because of large new construction programs over the next few years, rate relief requirements and regulatory treatment uncertainty will increase regulatory risks. Generally, regulatory risks include approval risks, lags and delays, potential rate base exclusions, and potential disallowances. Moreover, regulators must compensate the FWU companies for the lack of liquidity of their securities in the marketplace. Allowed rates of return should reflect their small size and the relatively illiquid nature of their stock and bond offerings.

Based on the financial trends identified in this section and based on the above discussion of new socio-political and economic forces, the FWUs clearly confront higher risks and higher costs of capital.

II. LEVERAGE FORMULA REVIEW

II. A. OVERVIEW OF LEVERAGE FORMULA

The FPSC's leverage formula provides an automated generic mechanism for determining the allowable ROE for the average FWU and for adjusting the authorized ROE to reflect the degree of financial leverage of each FWU, within a prescribed range of common equity ratios. Given that there are no FWU whose common stock is publicly-traded and given that traditional market information (stock price, earnings per share, beta, bond rating, etc.) is lacking, an indirect approach is required. The leverage formula and the attendant ROE determination process consists of six steps:

Step 1. Estimate the cost of equity for a reference group of 6 publicly traded water utilities for which market data is available, using the DCF methodology. In

Order No. 94-1051, the cost of equity for the index of water companies is calculated as 10.50% at an average common equity ratio of 41.04%.

Step 2. Estimate the cost of equity for a reference group consisting of the eight companies in Moody's Natural Gas Distribution Index, using the Risk Premium methodology. In Order No. 94-1051, the cost of equity for the index of gas distribution companies is calculated as 10.72% at an average common equity ratio of 50.27%.

Step 3. Average the DCF result from the water companies and the Risk Premium result from the gas companies to come up with a benchmark ROE. The average of the two above results is 10.61% at an average common equity ratio of 45.66%

Step 4. Adjust the benchmark ROE obtained from Step 3 upward to reflect the additional risk of the average FWU over and above that of the two reference groups. The bond yield differential between a Baa2 and A1 rating is used as an estimate of the equity cost differential. Adding the Baa2 vs A1 bond yield differential spread of 41 basis points results in a cost of equity to the average FWU of 11.02%, that is, 10.61% + 0.41% = 11.02%.

Step 5. Calculate the weighted average cost of capital (WACC) for an average FWU. In the current order, the WACC is calculated as 9.81%, based on a 11.02% cost of equity, the current cost of Baa2 debt of 8.80% and a 45.66% common equity ratio. This is shown in Table 2 below with the known quantities boldfaced.

TABLE 2
COST OF TOTAL CAPITAL FOR THE AVERAGE FWU

Type of Capital	Weight	Cost	Weighted Cost
Debt	**54.35%**	**8.80%**	**4.78%**
Equity	**45.66%**	**11.02%**	**5.03%**
	100.00%		9.81%

Step 6. Express the cost of equity as a function of the common equity ratio. Assuming that the WACC and the cost of debt remain constant over the 40% to 100% common equity ratio range, and, therefore, that the latter two variables in the WACC formula are known, the cost of equity can be expressed as a function of the common equity ratio. The table below shows the WACC calculation at the

40% common equity ratio and the implied cost of equity of 11.34% at 40% common equity ratio. The known quantities are boldfaced.

TABLE 3
COST OF TOTAL CAPITAL FOR THE AVERAGE FWU
AT 40% COMMON EQUITY RATIO

Type of Capital	Weight	Cost	Weighted Cost
Debt	**60.00%**	**8.80%**	**5.28%**
Equity	**40.00%**	11.34%	4.53%
	100.00%		**9.81%**

The current leverage formula derived from the WACC equation is:

$$k_e = 8.80\% + 1.014 / ER$$

The range of ROEs obtained from the above formula at equity ratios ranging from 100% to 40% is 9.81% to 11.34%, with a midpoint of 10.58%.

II. B. ASSUMPTIONS UNDERLYING THE FORMULA

From the step-by-step procedure outlined above, several assumptions underlie the Commission's leverage formula. The key implicit assumptions are:

1. Because Step 1 in the above process applies the DCF method to an index of water companies and Step 2 applies a DCF-driven risk premium method to a group of gas companies, it must be assumed that the DCF formula alone provides an accurate and reliable estimate of the cost of equity.

2. The reference water companies and the reference gas distribution utilities used in deriving the leverage formula are similar in risk.

3. All FWUs possess similar business risks.

4. A Moody's Baa2 bond rating is applicable to the debt of the average FWU over a 40% to 100% equity ratio range.

5. The WACC is constant over the 40% to 100% equity ratio range.

6. A common equity ratio less than 40% is inappropriate.

II. C. CRITICAL REVIEW OF THE FORMULA

This section examines the validity of the above assumptions and offers suggestions for improvement.

1) SOLE RELIANCE ON DCF METHODOLOGY

It is dangerous to rely on only one generic approach to estimate the cost of capital. By relying almost exclusively on only one methodology, namely, on the DCF approach, the Commission limits its flexibility and increases the risk of authorizing unreasonable rates of return. The results from one generic method are likely to contain a high degree of measurement error, particularly for an industry in transitional flux. The Commission's hands should not be bound to one methodology of estimating equity costs, nor should the Commission ignore relevant evidence.

When measuring equity costs, which essentially deals with the measurement of investor expectations, no one single methodology provides a foolproof panacea. Each methodology requires the exercise of considerable judgment on the reasonableness of the assumptions underlying the methodology and on the reasonableness of the proxies used to validate the theory. The failure of the traditional infinite growth DCF model to account for changes in relative market valuation and the questionable applicability of the model when M/B ratios deviate substantially from 1.00 are vivid examples of the potential shortcomings of the DCF model[3]. The prohibitive difficulties of specifying the expected growth component of water utilities in the DCF model is another. The task is particularly difficult for both the water utilities and the gas distribution utilities used as benchmarks in the leverage formula at this time, given the profound change occurring in these industries. It follows that more than one methodology should be employed in arriving at a judgment on the cost of equity.

Each methodology possesses its own way of examining investor behavior, its own premises, and its own set of simplifications of reality. Each method proceeds from different fundamental premises which cannot be validated empirically. Investors do not necessarily subscribe to any one method, nor does the stock price reflect the application of any one single method by the price-setting investor. There is no monopoly as to which method is used by investors.

[3] The realism of the DCF assumptions is discussed fully in Chapter 9 of my new book, Regulatory Finance, Public Utility Reports Inc., Arlington, Va., 1994.

Absent any hard evidence as to which method outdoes the other, all relevant evidence should be used and weighted equally, in order to minimize judgmental error, measurement error, and conceptual infirmities.

Several fundamental changes have recently transformed the water utility industry from the times when the standard DCF model and its assumptions were developed. Environmental concerns, conservation ethics, changes in customer attitudes regarding water utility services, reduced reliability of water supplies and corporate restructurings have all influenced stock prices in ways vastly different from the early assumptions of the DCF model. These changes suggest that some of the raw assumptions underlying the standard DCF model, particularly that of constant growth, are of questionable pertinence at this point in time for water utility stocks, and that the DCF model should be at least complemented by alternate methodologies to estimate the cost of common equity. Clearly, historical dividend and earnings per share growth rates are not indicative of future trends in the water utility industry. Near-term projections of growth are downward-biased by the increased costs of regulatory compliance.

An additional concern deals with the realism of the constant growth rate assumption and with the difficulty of finding an adequate proxy for that growth rate. The standard DCF model assumes that a single growth rate of dividends is applicable in perpetuity. Not only is the constant growth rate assumption somewhat unrealistic, but it is difficult to proxy. Analysts' growth forecasts are usually made for not more than two to five years in time, or if they are made for more than a few years, they are dominated by the near-term earnings and dividends picture.

The DCF model does not explicitly quantify risk. The risk is somehow subsumed, or buried, in the stock price. A riskier stock will command a lower price, according to the DCF model. In other words, the DCF model only treats risk implicitly and informally.

Because of the unreliable result produced by the DCF model in the current capital market environment and because the Capital Asset Pricing Model (CAPM) framework treats risk explicitly and formally, I recommend that the Commission also apply a routine CAPM test in Step 1 of the development of the leverage formula when deriving the cost of equity for the index water and gas utilities. A routine CAPM test can easily be performed by using the Value Line betas of the reference companies, the same estimate of the risk-free rate used in the gas Risk Premium test, and a market risk premium in the range of 6% to 7%.

Denoting the risk-free rate by "R_F", the beta risk factor by β and the return on the market as a whole by "R_M", the CAPM is stated as follows:

$$K = R_F + \beta (R_M - R_F)$$

As a proxy for the risk-free rate R_F, the Commission should use the same yield on long-term Treasury bonds which it already uses in the Risk Premium test of gas distribution utilities. As a proxy for beta, Value Line betas of the index water and gas companies can be used. For the market risk premium, a range of 6.0% to 7.0% should be used based on the long-term historical stock and bond returns spread published by Ibbotson Associates.

Using those input values, current CAPM estimates of equity costs for the water index companies would range from 11.44% to 12.08%, with a midpoint of 11.76%. For example, using a risk-free rate of 7.6%, a water company beta of 0.64 and a market risk premium of 7%, the CAPM cost of equity becomes:

$$K = 7.6\% + 0.64 \times (7\%) = 12.08\%$$

Averaging the CAPM result with the two DCF and Risk Premium results already used by the Commission would produce a benchmark ROE which is about 40 basis points higher than the current Commission benchmark ROE for the index companies.

2) DCF COMPUTATIONAL BLEMISH

In Step 1, the average cost of equity for the group is computed by dividing the average dividend by the average price to obtain the average dividend yield. The latter is then added to the average growth for the group to produce the average ROE. The practice of dividing averages (D/P) is inappropriate. There is an old well-known theorem in basic statistics which says that the average of a product is not equal to the product of the averages, that is, using the letter E to denote the expected value operator, E(ab) = E(a) x E(b). Similarly, E(a/b) = E(a) / E(b). The correct procedure is to calculate the ROE for each individual utility (D/P + g) and then average the results from each company to obtain the group average. Allowing for this minor blemish produces an average ROE for the index water companies which is 20 basis points higher. The net impact on the average ROE is one-half of that, or 10 basis points.

3) RELATIVE RISKS OF WATER VS GAS UTILITIES

The leverage formula procedure fundamentally assumes that the index water utilities have the same risk as the gas distribution utilities. To assess the

reasonableness of this assumption, I have examined a broad array of classic risk measures for both the water companies and the gas companies used in developing the leverage formula. As shown on Exhibit RAM-16 and 17, relative to the gas companies group, the water companies have: a lower Value Line Safety Rank index, a lower Value Line Financial Strength index, a higher beta risk factor, smaller market capitalization, a higher debt ratio, a lower M/B ratio, lower interest coverage ratio, and higher volatility of earnings per share, revenues, and operating profits. The comparative risk measures of the water and gas companies unanimously and unambiguously indicate that the former are riskier than the latter. Thus, a cost of equity estimate based in part on the gas companies group understates the cost of equity of water utilities.

One solution to the shortfall is to add a premium to the gas premium estimate. One reasonable method to quantify the risk premium is based on the CAPM. The difference in beta between the two groups, which is of the order of 0.05, multiplied by the market risk premium in the range of 6% to 7%, provides a reasonable measure of the risk premium in the range of 30 to 35 basis points. The net effect on the average of the DCF-Risk Premium estimates, hence on the leverage formula, would be one-half the risk premium, or about 15-20 basis points.

One glaring anomaly in the leverage formula methodology is that, despite the fact that the myriad risk measures indicate that water companies are riskier than gas companies, the DCF estimate for gas companies exceeds the DCF estimate for water companies. This only reinforces my earlier admonitions on the realism and validity of the DCF model and the need to supplant the DCF result with additional methodologies, such as the CAPM.

4) RELATIVE RISKS OF FLORIDA WATER UTILITIES VS WATER INDUSTRY

While the assumption that all FWUs have similar business risk is reasonable and allows the Commission to adopt a single leverage formula for all FWUs, the assumption that they are similar in risk to the industry, as proxied by the index of water companies used by the Commission, is unreasonable.

FWUs are significantly riskier than the industry. FWUs are differerent than those in other states because they are generally much smaller, have less access to capital markets and are subjected to additional regulatory risks in the form of used and useful adjustments, high levels of CIAC, and substantial concerns about future water supplies and deterioration of existing supplies.

A large part of my discussion of water utility risks vs energy utility risks in Section I is transferable and applicable to the comparison of FWUs within the water industry. The FWUs are considerably smaller in size (revenues, net plant, rate base) than the index water companies. Earlier, I discussed at length the notion that smaller companies face greater business risks. The FWUs have very limited access to capital markets, generate less internal funds than their larger counterparts, and are forced to borrow through personal garantees and/or private placements. They have a significantly larger proportion of contributed property as compared to net plant, which also makes them riskier.

The Commission recognizes the difference in business risk by adopting a Baa2 cost of debt in the leverage formula versus the A rating of the index water companies. In my view, however, a Baa2 bond rating is not representative of the cost of debt to a FWU nor is representative of the risk of FWUs.

The financial profile of a typical FWU is not very consistent with that of a Baa2 company. Consider the case of a FWU with a 40% common equity ratio and application of the leverage formula to derive the cost of equity. The Commission's cost of capital calculation is shown in Table 4 below.

TABLE 4
COST OF TOTAL CAPITAL FOR THE AVERAGE FWU
AT 40% COMMON EQUITY RATIO

Type of Capital	Weight	Cost	Weighted Cost	Tax Factor	Overall Return
Debt	60.00%	8.80%	5.28%	1.00	5.28%
Equity	40.00%	11.34%	4.53%	1.52	5.87%
	100.00%		9.81%		12.15%
			INTEREST COVERAGE		2.30

The interest coverage (IC) implied by the cost of capital can be calculated, and compared to benchmark target IC ratios, such as those published by Standard & Poors (S&P) for various bond rating categories. Table 4 shows the calculation of the implicit IC ratio using the cost of debt, cost of equity, capital structure, and a tax rate of 34% employed in the Commission's leverage formula calculation. The IC is calculated by dividing the overall return of 12.15%, inclusive of taxes, by the interest burden of 5.28%. The implied coverage is 2.30.

The IC calculation is based on highly idealized circumstances, and assumes that all reported income can be used to meet the coverage requirements, that interest is the only fixed charge to be covered and that rate base equals total invested capital. The calculation assumes that all the utility's income is in cash, with no non-cash AFPI allowance. Its inclusion will reduce the IC well below 2.3, given the significant component of AFPI for most FWUs. The calculation also assumes that the company incurs income taxes at the full 34% rate and actually earns the allowed return. Moreover, the calculation assumes that the rate base coincides with invested capital, a fragile assumption under the Commission's "used and useful" test.

Exhibit RAM-18 replicates the S& P benchmark ratios for water utilities. The "best of all possible worlds" IC of 2.3 coupled with a 60% debt ratio are consistent with the S&P bond rating category of BBB, which is comparable to Moody's rating of Baa. Realistically, the actual coverage attained by the FWU is likely to be far lower in view of the significant component of non-used plant AFPI earnings, the discrepancy between rate base and invested capital, and the questionable ability to earn the allowed return, particularly because of the high costs of SDWA compliance.

There are many other factors considered by bond rating agencies in assessing credit quality, other than coverage and debt ratio. Size of issue is prominent, as a measure of liquidity. Earlier in Section I, I discussed the negative relationship between bond rating and company size. Given the very small size of FWUs and the limited marketability of their securities, a Baa bond rating is highly unlikely.

Limited access to equity markets, and extent of contributed property are other factors taken into account in a bond rating determination. The magnitude of the construction budget in relation to rate base is another key driver of bond rating quality and equity risk, and so is the ability to generate cash internally. Consideration of these factors strongly suggests that the cost of capital to the average FWU is not consistent with a Baa risk class, nor with the Baa2 class. The assumption of a Baa2 risk class is unlikely to result in a compensatory return.

Very few water utilities have their securities rated by bond rating agencies and/or investment houses, and most of the FWU are too small to have rated debt or publicly-held stock, and none issue debt on a stand alone basis. Any debt issue must be guaranteed by a parent corporation or must be guaranteed at the personal level.

Even if the Baa2 class was representative of the risks of FWUs, the latter must frequently resort to the private placement market for debt capital. A public

underwritten issue of debt is simply out of the question. Lenders in private placements require adequate compensation for the risks assumed and for the costs of research and negotiation. They must also be compensated for investing in a non-marketable illiquid asset. These factors are incorporated into the cost of debt. A typical yield differential between private placements and public bond issues is of the order of 50 basis points. A similar premium is generally applicable to term loans.

The leverage formula should therefore be derived under the more realistic assumption that the cost of debt exceeds the Baa2 cost of debt. The Baa3 - BB cost of debt with an added private placement premium of 50 basis points would be a reasonable starting point. The benchmark ROE should also be augmented by a risk premium based on Baa3 - A spreads rather than Baa2 - A spreads, again with the added marketability premium of 50 basis points.

5) THE RELATIONSHIP BETWEEN COST OF CAPITAL AND LEVERAGE

5) a) COST OF EQUITY VS LEVERAGE

Assuming perfectly functioning capital markets and the absence of corporate taxes, Modigliani-Miller (MM) have shown that the cost of capital is independent of capital structure. If the overall cost of capital remains unchanged with leverage, it follows that the required return on equity resulting from the added risk of leverage completely offsets the low-cost advantage of debt. Otherwise, the WACC could not remain constant. The exact relationship between leverage and the cost of equity is linear and is expressed as:

$$K_e = \rho + (\rho - i)\, D/S \qquad (1)$$

where ρ, is the cost of equity for an all-equity firm, D/S is the leverage ratio, and 'i' is the current rate of interest. This equation states the cost of equity is equal to the cost of capital of an unlevered (no debt) firm plus the after-tax difference between the cost of capital of an unlevered firm and the cost of debt, weighted by the leverage ratio. The cost of equity rises with the debt-equity ratio in a linear fashion, with the slope of the line equal to $(\rho - i)$ D/S. This is the capital structure model which is inherent in the Commission's leverage formula.

There are several other formulations of the formal relationship between the cost of capital and leverage. Introducing corporate income taxes, the implied relationship between the cost of equity and leverage remains linear as in the no-tax situation of Equations 1, but the rate of increase (slope) is lessened by the tax advantage of debt. Equation 1 becomes:

$$K_e = \rho + (\rho - i)(1 - T)\, D/S \qquad (2)$$

Miller (1977) explored the effect of personal taxes, in addition to corporate taxes, on the overall cost of capital, and concluded that when personal tax effects are considered, the tax advantages of debt financing dissipate. By introducing both corporate and personal taxes into the analysis, Miller found the following relationship between the cost of equity and financial leverage, which bears a close family resemblance to the MM version in Equation 2, which only considers corporate taxes:

$$K_e = \rho + [\rho - i(1-T)]\ D/S \qquad (3)$$

There is yet another framework linking the cost of equity to leverage. Earlier, the CAPM was discussed and was represented by the following equation:

$$K = R_F + \beta\ (R_M - R_F) \qquad (4)$$

The beta risk measure of the company can in turn be decomposed into a business risk and a financial risk component. The fundamental idea is contained in the following relationship:

OBSERVED BETA = BUSINESS RISK BETA + FINANCIAL RISK PREMIUM

The following equation formally expresses the decomposition of observed beta as between a business risk-related component, or "unlevered beta", and a financial risk component related to the use of debt financing:

$$\beta_L = \beta_U\ [1 + (1-T)\ D/S] \qquad (5)$$

where β_L is the observed levered beta of a company, β_U is the unlevered beta of the same company with no debt in its capital structure, D/S is the ratio of debt to equity, and T the corporate income tax rate.

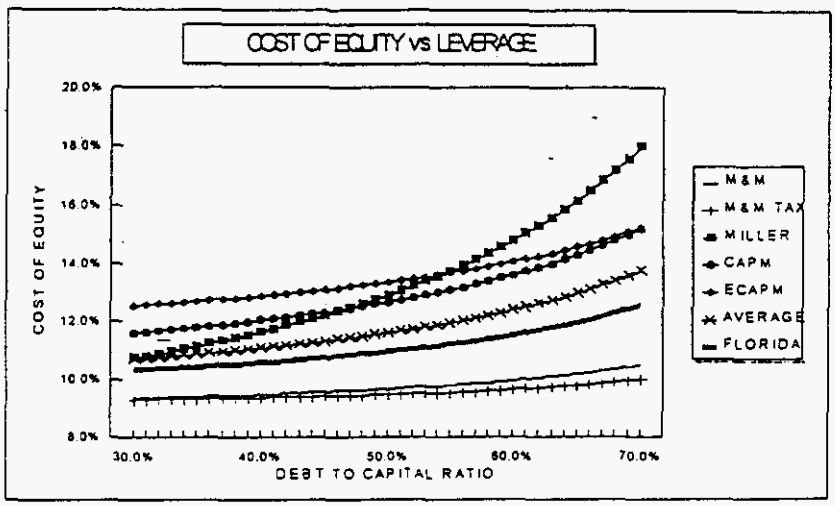
Substituting the above equation into the CAPM for β_L produces the following relationship between the cost of equity and leverage:

$$K = R_F + \beta_U\ [1 + (1-T)\ D/S](R_M - R_F)\ . \qquad (6)$$

A similar relationship can be obtained using the empirical version of the CAPM ("ECAPM").

In a nutshell, we have five formal relationships linking the cost of equity to leverage: MM with no tax, MM with tax, Miller, CAPM and ECAPM. These

relationships, along with the average of the five, are shown graphically below[4]. The Commission's leverage formula is also depicted on the graph. It is clear from the graph that the Commission's leverage formula produces the lowest cost of equity estimate from among all the various conceptual frameworks.



A reasonable suggestion is to amend the leverage formula so as to produce the same result as the average from all the five frameworks. In other words, how can the leverage formula be altered so that on the above graph it coincides with the line labeled "average"? The amended formula shown below accomplishes the equivalence:

EXISTING LEVERAGE FORMULA: COST OF EQUITY = 8.8 + 1.014 / ER
AMENDED LEVERAGE FORMULA: COST OF EQUITY = 8.8 + 1.340 / ER

The amended formula is equivalent to adding an 80 basis points increment to the cost of equity benchmark under the Commission's leverage formula procedure. The 80 basis points adder is in turn consistent with a beta increase of 0.15, which I believe to be conservative.

5) b) BETA RISK OF WATER UTILITIES

[4] The unlevered beta for the water industry is 0.38 per equation 5. The unlevered cost of equity is 9.05%, the average implied by the M&M and Miller equations at a cost of equity of 11.34%.

While we are on the subject of beta risk, I point out that the true beta of a security can never be observed. Historically-estimated betas serve only as proxies for the true beta. In the case of FWUs, current changes in the fundamentals of their operations and risk posture are not yet reflected in historical beta estimates. Historical betas are not indicative of future trends in the water utility industry.

By construction, backward-looking betas are sluggish in detecting fundamental changes in a company's risk. For example, if a water utility increases its debt to equity ratio, one expects an increase in beta. However, if 60 months of return data are used to estimate beta, only one of the 60 data points reflects the new information, one month after the utility increased its leverage. Thus, the change in leverage only has a minor effect on the historical beta. Even one year later, only 12 of the 60 return points reflect the event.

This type of bias certainly applies to FWUs at this time. The fundamental risks of water utilities are changing rapidly, as discussed earlier. Environmental problems, demand-supply uncertainties, stringent water quality regulations, and uncertainties of compliance costs are raising the risk level of water utilities. This structural shift in the risk of water utilities is not fully reflected in the historical risk measures. Thus, any historical risk difference between water utility stocks, other utility stocks and stocks in general are misleading, and likely to be higher than that implied by a simple comparison of current risk measures.

Hence, backward-looking statistical analysis will only provide limited evidence that the risk and the cost of capital to water utilities have increased.

I also point out that the CAPM - BETA framework is useful to portray the current plight of FWUs and to quantify their new risks. It can be shown that systematic risk (beta) has three main components: demand risk, operating leverage, and financial leverage[5].

BETA = DEMAND RISK x OPER. LEVERAGE x FIN'L LEVERAGE

If a company has no fixed operating costs or uses no debt financing (OPER. LEVERAGE = FIN'L LEVERAGE = 1), its risk simply reflects its demand risk. However, as fixed costs or operating leverage increases, margins increase. Margins reflect the difference between sales revenue and variable costs, and measure the fraction of revenues available to cover fixed costs and generate profits. The larger the margin, the greater the impact on profits for a given level of sales fluctuation. Higher margins, due to increased fixed cost or

[5] See Morin, op. cit., 1992

operating leverage, magnify the effect of demand risk on beta. A similar magnification effect is associated with the fixed costs of financing. If fixed-income securities are issued to raise the capital required to meet water regulations, the degree of financial leverage, hence investment risk, increases.

Future SDWA requirements will increase operating leverage by mandating incremental treatment investment. This will increase rate base and fixed costs as the additional plant is depreciated over a constant retail ratepayer base. Financial leverage will increase as well. Large mandated capital investments, which exceed the availability of internally generally funds, must be funded externally. External financing will thus be required, most of which is likely to be in the form of additional debt, raising the degree of financial leverage. Stock issues are likely to prove virtually non-existent given the lack of visibility and marketability of water company securities, the dilution potential, and high flotation costs.

As a result of the increase in fixed costs provoked by SDWA compliance requirements, the beta risk measure increases by about 0.25, and the attendant cost of equity increase is of the order of 150 basis points.

5) c) COST OF DEBT VS LEVERAGE

The leverage formula also assumes that the cost of debt remains invariant over a common equity ratio ranging from 100% all the way up to 40%. This assumption is unrealistic. Surely, the cost of debt is higher for a company with 40% equity than for a company which has no debt at all. The leverage formula should allow for the rising cost of debt as leverage rises.

One way to accomplish the adjustment is to allow the cost of debt to vary in a linear fashion over this range by plus or minus 50 basis points from the average cost of debt assumed at a 40% common equity ratio. So, for example, if the assumed average cost of debt is 8%, the cost of debt is allowed to vary from a low of 7.5% for a company with 100% equity to a high of 8.5% for a company with 40% common equity.

I also believe that there is nothing magical about the 40% common equity floor imposed by the formula. While I sympathize with the Commission's desire to discourage the employment of high leverage, there is nothing imprudent or unusual about higher dosages of debt. As I discussed in Section I, the very small private FWUs do not have access to the equity markets, generate limited internal funds, and therefore must resort to the private debt markets for funding, particularly in light the SDWA compliance requirements. I recommend that the 40%-100% common equity constraint be relaxed to a lower level, perhaps to 30% - 100%.

CONCLUSIONS

The purpose of this memorandum was to 1) determine how changes in the operating environment of FWUs have increased their investment risk and their cost of capital, both in absolute terms and relative to other utilities, 2) to critically review the Commission's leverage formula, and 3) to recommend modifications for improving the leverage formula.

The changing investment risk of water utilities status relative to other utilities was first analyzed by examining trends in key financial variables. This examination revealed that FWUs are riskier than in earlier years, both in absolute terms and relative to energy utilities. Therefore, return awards should reflect the divergent trends of the water and energy utility industry.

FWUs are very small in size and their securities possess very low market visibility and very low liquidity on capital markets. Compliance with the various environmental problems, regulations and the securing of added sources of water supply will necessitate large additional capital requirements and large increases in operating expenses.

A large portion of those supplementary capital needs will have to be financed externally, increasing the industry's financial exposure and financial risks. The investor-owned water utilities are much more dependent on external financing than are gas and electric utilities, and this dependence will increase further as water companies increase their capital investments to comply with new water standards.

The pre-tax interest coverage ratios for the water utility industry have been at or below those for the other utilities since 1986.

Realized returns on average equity have been decreasing for the water industry and are lower than for the gas and electric industries. Authorized returns on equity have been lower than for electric and gas utilities, in spite of the relative reversal in risk between water and energy utilities.

Because of inadequate authorized returns, rising operating expenses, and low internal cash generation, the water utility's operating income has been gradually eroding, in spite of a growing rate base. As a result of declining earning power, deteriorating cash flow relative to capital expenditures, falling pre-tax interest coverage ratios, and falling realized returns on equity, stock prices relative to book value have declined relative to electric utilities.

The decline in the relative market valuation and the changing investment risk of water utilities relative to other utilities is attributable to several factors: 1) mounting water quality regulations in the 1990's, 2) uncertainty regarding future demand, 3) uncertainty regarding future supply and safety of water, 4) earnings erosion, 5) regulatory risks, and 6) new construction risks.

SDWA compliance requirements will increase operating leverage by mandating incremental water treatment capital investments to FWUs. This will increase rate base and fixed costs as the additional plant is depreciated over a constant retail ratepayer base. New water quality regulation will also increase the amount of fixed costs. Financial leverage will increase as well because of limited internal generation of funds and limited access to the equity market.

Therefore, authorized rates of return on equity should be correspondingly increased both in absolute terms and relative to those granted energy utilities. The required increase is of the order of 100-200 basis points.

The leverage formula employed by the FPSC to measure water utilities' cost of equity capital should be amended. Several specific suggestions were made:

1. Because of the unreliable result produced by the DCF model and because the CAPM framework treats risk explicitly and formally, I recommend that the Commission also apply a routine CAPM test over and above the two DCF-driven tests currently utilized. Averaging the CAPM result with the two DCF and Risk Premium results already used by the Commission would produce a benchmark ROE which is about 40 basis points higher than the current Commission benchmark ROE for the index companies.

2. The practice of dividing averages in computing DCF estimates is inappropriate. The net impact of allowing for this minor blemish is an average ROE which is 20 basis points higher.

3. The comparative risk measures of the water and gas companies clearly indicate that the former are riskier than the latter. Thus, a cost of equity estimate based in part on the gas companies group understates the cost of equity of water utilities. One solution to the shortfall is to add a premium to the gas premium estimate. A risk premium in the range of 30 to 35 basis points is reasonable. The net effect on the leverage formula is one-half the risk premium or about 15-20 basis points

4. Given the very small size of FWUs, the financial profile produced by application of the leverage formula, and the limited marketability of their

securities, the assumption of a Baa2 bond rating for a typical FWU is unrealistic. The leverage formula should be amended under the more realistic assumption that the cost of debt exceeds the Baa2 cost of debt. The Baa3 - BB cost of debt with an added private placement premium of 50 basis points would be a reasonable starting point. The benchmark ROE should also be augmented by a risk premium based on Baa3 - A spreads rather than Baa2 - A spreads, again with the added marketability premium of 50 basis points.

5. Financial theory provides several formal relationships linking the cost of equity to leverage. The leverage formula produces the lowest cost of equity estimate from among all the various conceptual frameworks. A reasonable suggestion is to amend the leverage formula so as to produce the same result as the average from all the different frameworks. The amended formula shown below produces the same result as the average from all the frameworks:

$$\text{COST OF EQUITY} = 8.8 + 1.340 / \text{ER}$$

The amended formula is equivalent to adding an 80 basis points increment to the cost of equity benchmark under the leverage formula procedure. The 80 basis points adder is in turn consistent with a beta increase of 0.15, which I believe to be conservative.

6. The leverage formula unrealistically assumes that the cost of debt remains invariant over a common equity ratio ranging from 100% to 40%. The leverage formula should allow for the rising cost of debt as leverage rises. One way to accomplish the adjustment is to allow the cost of debt to vary in a linear fashion over this range by plus or minus 50 basis points from the average cost of debt assumed at a 40% common equity ratio.

7. Because the very small private FWUs do not have access to the equity markets, generate limited internal funds, and must therefore resort to the private debt markets for funding, particularly in light the SDWA compliance requirements, I recommend that the 40%-100% common equity constraint be relaxed to a lower level, perhaps to 30% - 100%.

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PRESENT EMPLOYER: Georgia State University
College of Business Administration
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RANK: Professor of Finance

HONORS: Professor of Finance for Regulated Industry
Center for the Study of Regulated Industry, College
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EDUCATIONAL HISTORY

- Bachelor of Electrical Engineering, McGill University, Montreal, Canada, 1967.
- Master of Business Administration, McGill University, Montreal, Canada, 1969.
- Ph D in Finance & Econometrics, Wharton School of Finance, University of Pennsylvania, Phila., Pa., 1976.

EMPLOYMENT HISTORY

- Lecturer, Wharton School of Finance, Univ. of Pa., 1972-3
- Assistant Professor, University of Montreal School of Business, 1973-1976.
- Associate Professor, University of Montreal School of Business, 1976-1979.
- Professor of Finance, Georgia State University, 1979-1993
- Professor of Finance for Regulated Industry, Center for the Study of Regulated-Industry, College of Business, Georgia State University, 1985-1994.
- Visiting Professor of Finance, Amos Tuck School of Business, Dartmouth College, Hanover, N.H.., 1986

OTHER BUSINESS ASSOCIATIONS

- Communications Engineer, Bell Canada, 1962-1967.
- Member of the Board of Directors, Financial Research Institute of Canada, 1974-1980.
- Co-founder and Director Canadian Finance Research Foundation, 1977.
- Vice-President of Research, Garmaise-Thomson & Associates., Investment Management Consultants, 1980-1981.
- Member of Board of Directors, *Techmar Jones International*, 1988-1991
- Member of Board of Directors, Executive Visions Inc. 1986-94
- Board of External Advisors, College of Business, Georgia State University, Member 1987-1991

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CORPORATE CONSULTING CLIENTS

AT & T Communications

Alagasco - Energen

Alaska Anchorage Municipal Light & Power

Alberta Power Ltd.

American Water Works Company

Ameritech

B.C. Telephone

B C GAS

Bell Canada

Bellcore

Bell South Corp.

Bruncor (New Brunswick Telephone)

Burlington-Northern

C & S Bank

Canadian Radio-Television & Telecomm. Commission

Canadian Utilities

Canadian Western Natural Gas

Centel

Centra Gas

Central Illinois Light & Power Co

Central Telephone

Central South West Corp.

Citizens Utilities

CN-CP Telecommunications

Columbia Gas System

Deerpath Group

CORPORATE CONSULTING CLIENTS (CONT'D)

Edmonton Power Company

Engraph Corporation

Garmaise-Thomson & Assoc., Investment Consultants

Gaz Metropolitain

General Public Utilities

Georgia Broadcasting Corp.

Georgia Power Company

GTE California

GTE Northwest Inc

GTE Service Corp.

GTE Southwest Incorporated

Gulf Power Company

Havasu Water Inc.

Hope Gas Inc.

Hydro-Quebec

ICG Utilities

Illinois Commerce Commission

Island Telephone

Jersey Central Power & Light

Kansas Power & Light

Maritime Telephone

Metropolitan Edison Co.

Minnesota Power & Light

Mississipi Power Company

Mountain Bell

Newfoundland Light & Power - Fortis Inc.

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CORPORATE CONSULTING CLIENTS (CONT'D)

NewTel Enterprises Ltd.
New York Telephone Co.
Northern Telephone Ltd.
Northwestern Bell
Northwestern Utilities Ltd.
NYNEX
Oklahoma G & E
Ontario Telephone Service Commission
Orange & Rockland
Pacific Northwest Bell
People's Gas System Inc.
People's Natural Gas
Pennsylvania Electric Co.
Price Waterhouse
Public Service Elec & Gas
Quebec Telephone
Rochester Telephone
Southern Bell
South Central Bell
Sun City Water Company
The Southern Company
Touche Ross and Company
Trans-Quebec & Maritimes Pipeline
U S WEST Communications
Utah Power & Light
Vermont Gas Systems Inc.

MANAGEMENT DEVELOPMENT AND PROFESSIONAL EXECUTIVE EDUCATION

- Canadian Institute of Marketing, Corporate Finance, 1971-73

- Hydro-Quebec, "Capital Budgeting Under Uncertainty, 1974-75

- University of Montreal Continuing Education:

  Computerized Financial Planning Seminar

  Quantitative Methods in Finance Seminar

- Institute of Certified Public Accountants, Mergers & Acquisitions, 1975-78

- Investment Dealers Association of Canada, 1977-78

- Financial Research Foundation, bi-annual seminar, 1975-79

- Advanced Management Research (AMR), faculty member, 1977-80

- Financial Analysts Federation, Educational chapter:
  "Financial Futures Contracts" seminar

- The Management Exchange Inc. (now EXNET), faculty member, 1981-1994.

  NATIONAL SEMINARS:

  "Risk and Return on Capital Projects"

  "Cost of Capital for Regulated Utilities"

  "SEC, Accounting, Tax Changes for Utilities"

  "Capital Allocation for Utilities"

  "Alternative Regulatory Frameworks"

- Georgia State University College of Business, Management Development Program, faculty member, 1981-1994

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EXPERT TESTIMONY & UTILITY CONSULTING AREAS OF EXPERTISE

Rate of Return

Capital Structure

Generic Cost of Capital

Phase-in Plans

Costing Methodology

Depreciation

Flow-Through vs Normalization

Revenue Requirements Methodology

Utility Capital Expenditures Analysis

Risk Analysis

Capital Expenditures Allocation

Divisional Cost of Capital

Publicly-owned Municipals

Telecommunications, CATV, Energy, Pipeline, Water

Incentive Regulation

Alternative Regulatory Frameworks

Shareholder Value Creation

REGULATORY BODIES:

Federal Communications Commission

Federal Energy Regulatory Commission

Georgia Public Service Commission

South Carolina Public Service Commission

North Carolina Utilities Commission

Pennsylvania Public Service Commission

Ontario Telephone Service Commission

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REGULATORY BODIES (CONT'D):

Quebec Telephone Service Commission

Newfoundland Brd of Commissionners of Public Utilities

Georgia Senate Committee on Regulated Industries

Alberta Public Service Board

Tennessee Public Service Commission

Oklahoma State Board of Equalization

Mississippi Public Service Commission

Minnesota Public Utilities Commission

Canadian Radio-Television and Telecomm. Commission

New Brunswick Board of Public Commissioners

Alaska Public Utility Commission

National Energy Board of Canada

Florida Public Service Commission

Montana Public Service Commission

Arizona Corporation Commission

Quebec Natural Gas Board

New York Public Service Commission

Washington Utilities & Transportation Commissio

Manitoba Board of Public Utilities

New Jersey Board of Public Utilities

Alabama Public Service Commission

Utah Public Service Commission

Nevada Public Service Commission

Louisiana Public Service Commission

Colorado Public Utilities Board

West Virginia Public Service Commission

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REGULATORY BODIES (CONT'D):

Ohio Public Utilities Commission

California Public Service Commission

Hawaii Public Service Commission

Illinois Commerce Commission

British Columbia Board of Public Utilities

Indiana Utility Regulatory Commission

Minnesota Public Utilities Commission

SERVICE AS EXPERT WITNESS

Southern Bell, So. Carolina PSC, Docket #81-201C

Southern Bell, So. Carolina PSC, Docket #82-294C

Southern Bell, North Carolina PSC, Docket #P-55-816

Metropolitan Edison, Pennsylvania PUC, Docket #R-822249

Pennsylvania Electric, Pennsylvania PUC,Docket#R-822250

Georgia Power, Georgia PSC, Docket # 3270-U, 1981

Georgia Power, Georgia PSC, Docket # 3397-U, 1983

Georgia Power, Georgia PSC, Docket # 3673-U, 1987

Georgia Power, F.E.R.C., Docket # ER 80-326, 80-327

Georgia Power, F.E.R.C., Docket # ER 81-730, 80-731

Georgia Power, F.E.R.C., Docket # ER 85-730, 85-731

Bell Canada, CRTC 1987

Northern Telephone, Ontario PSC

GTE-Quebec Telephone, Quebec PSC, Docket 84-052B

Newfoundland Tel., Nfld. Brd of Public Commiss.PU 11-87

CN-CP Telecommunications, CRTC

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SERVICE AS EXPERT WITNESS (CONT'D):

Quebec Northern Telephone, Quebec PSC

Edmonton Power Company, Alberta Public Service Board

Kansas Power & Light, F.E.R.C., Docket # ER 83-418

NYNEX, FCC generic cost of capital Docket #84-800

Bell South, FCC generic cost of capital Docket #84-800

American Water Works - Tennessee, Docket #7226

Burlington-Northern - Oklahoma State Board of Taxes

Georgia Power, Georgia PSC, Docket # 3549-U

GTE Service Corp., FCC Docket #84-200

Mississippi Power Co., Miss. PSC, Docket U-4761

Citizens Utilities, Ariz. Corp. Comm., D # U2334-86020

Quebec Telephone, Quebec PSC, 1986, 1987, 1992

Newfoundland L & P, Nfld. Brd. Publ Comm. 1987, 1991

Northwestern Bell, Minnesota PSC, #P-421/CI-86-354

GTE Service Corp., FCC Docket #87-463

Anchorage Municipal Power & Light, Alaska PUC, 1988

New Brunswick Telephone, N.B. PUC, 1988

Trans-Quebec Maritime, Nat'l Energy Brd. of Cda, '88-92

Gulf Power Co., Florida PSC, Docket #88-1167-EI

Mountain States Bell, Montana PSC, #88-1.2

Mountain States Bell, Arizona CC, #E-1051-88-146

Georgia Power, Georgia PSC, Docket # 3840-U, 1989

Rochester Telephone, New York PSC, Docket # 89-C-022

Noverco - Gaz Metro, Quebec Natural Gas PSC, #R-3164-89

GTE Northwest, Washington UTC, #U-89-3031

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SERVICE AS EXPERT WITNESS (CONT'D):

Orange & Rockland, New York PSC, Case 89-E-175

Central Illinois Light Company, ICC, Case 90-0127

Peoples Natural Gas, Pennsylvania PSC, Case

Gulf Power, Florida PSC, Case # 891345-EI

ICG Utilities, Manitoba BPU, Case 1989

Newtel Enterprises, CRTC, Docket #90-15

Peoples Gas Systems, Florida PSC

Jersey Central Pwr & Light, N.J. PUB, Case ER 89110912J

Alabama Gas Co., Alabama PSC, Case 890001

Trans-Quebec Maritime Pipeline, Gdn. Nat'l Energy Board

Mountain Bell, Utah PSC,

Mountain Bell, Colorado PUB

South Central Bell, Louisiana PS

Hope Gas, West Virginia PSC

Vermont Gas Systems, Vermont PSC

Alberta Power Ltd., Alberta PUB

Ohio Utilities Company, Ohio PSC

Georgia Power Company, Georgia PSC

Sun City Water Company

Havasu Water Inc.

Centra Gas (Manitoba) Co.

Central Telephone Co. Nevada

AGT Ltd., CRTC 1992

BC GAS, BCPUB 1992

California Water Association, California PUC 1992

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SERVICE AS EXPERT WITNESS (CONT'D):

Maritime Telephone 1993

BCE Enterprises, Bell Canada, 1993

Citizens Utilities Arizona gas division 1993

PSI Resources 1993-4

CILCORP gas division 1994

GTE Northwest Oregon 1993

PROFESSIONAL AND LEARNED SOCIETIES

- Corporation of Engineers, 1967-1972
- Engineering Institute of Canada, 1967-1972
- *Canada Council Award, recipient* 1971 and 1972
- Canadian Association Administrative Sciences,1973-80
- American Association of Decision Sciences, 1974-1978
- American Finance Association, 1975-1994
- Financial Management Association, 1978-1994
- Southern Finance Association, 1980-1994
- Institute of Industrial Engineers 1985-1994

ACTIVITIES IN PROFESSIONAL ASSOCIATIONS AND MEETINGS

- Chairman of meeting on "New Developments in Utility Cost of Capital", Southern Finance Asscociation, Atlanta, Nov. 1982

- Chairman of meeting on "Public Utility Rate of Return", Southeastern Public Utility Conference, Atlanta, Oct. 1982

- Chairman of meeting on "Current Issues in Regulatory Finance", Financial Management Association, Atlanta, Oct. 1983

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ACTIVITIES IN PROFESSIONAL ASSOCIATIONS AND MEETINGS (CONT'D):

- Chairman of meeting on "Utility Cost of Capital", Financial Management Association, Toronto, Canada, Oct. 1984.
- Committee on New Product Development, FMA, 1985
- Discussant, "Tobin's Q Ratio", paper presented at Financial Management Association, New York, N.Y., Oct. 1986
- Guest speaker, "Utility Capital Structure: New Developments", National Society of Rate of Return Analysts 18th Financial Forum, Wash., D.C. Oct. 1986
- Opening address, "Capital Expenditures Analysis: Methodology vs Mythology," Bellcore Economic Analysis Conference, Naples Fla., 1988.

PAPERS PRESENTED:

"An Empirical Study of Multiperiod Asset Pricing," annual meeting of Financial Management Assoc., Las Vegas Nevada, 1987.

"Utility Capital Expenditures Analysis: Net Present Value vs Revenue Requirements", annual meeting of Financial Management Assoc., Denver, Colorado, October 1985.

"Intervention Analysis and the Dynamics of Market Efficiency", annual meeting of Financial Management Assoc., San Francisco, Oct. 1982

"Intertemporal Market-Line Theory: An Empirical Study," annual meeting of Eastern Finance Assoc., Newport, R.I. 1981

"Option Writing for Financial Institutions: A Cost-Benefit Analysis", 1979 annual meeting Financial Research Foundation
"Free-lunch on the Toronto Stock Exchange", annual meeting of Financial Research Foundation of Canada, 1978.

"Simulation System Computer Software SIMFIN", HP International Business Computer Users Group, London, 1975.

"Inflation Accounting: Implications for Financial Analysis." Institute of Certified Public Accountants Symposium, 1979.

EXHIBIT (Ramaswamy)
PAGE 14 OF 78

OFFICES IN PROFESSIONAL ASSOCIATIONS

- President, International Hewlett-Packard Business Computers Users Group, 1977

- Chairman Program Committee, International HP Business Computers Users Group, London, England, 1975

- Program Coordinator, Canadian Assoc. of Administrative Sciences, 1976

- Member, New Product Development Committee, Financial Management Association, 1985-1986

- Reviewer: Journal of Financial Research

  Financial Management

  Financial Review

  Journal of Finance

PUBLICATIONS:

"Risk Aversion Revisited", Journal of Finance, Sept. 1983

"Hedging Regulatory Lag with Financial Futures," Journal of Finance, May 1983. (with G. Gay, R. Kolb)

"The Effect of CWIP on Cost of Capital, " Public Utilities Fortnightly, July 1986.

"The Effect of CWIP on Revenue Requirements" Public Utilities Fortnightly, August 1986.

"Intervention Analysis and the Dynamics of Market Efciciency," Time-Series Applications, (New York: North Holland, 1983. (with K. El-Sheshai)

"Market-Line Theory and the Canadian Equity Market," Journal of Business Administration, Jan. 1982, M. Brennan, editor

"Efficiency of Canadian Equity Markets," International Management Review, Feb. 1978

"Intertemporal Market-Line Theory: An Empirical Test," Financial Review, Proceedings of the Eastern Finance Association, 1981

EXHIBIT ____ (RAM-2)
PAGE 48 OF 78

BOOKS:

Utilities' Cost of Capital, Public Utilities Reports Inc., Arlington, Va., 1984.

Regulatory Finance, Public Utilities Reports Inc., Arlington, Va., 1994

MONOGRAPHS:

Determining Cost of Capital for Regulated Industries, Public Utilities Reports, Inc., and The Management Exchange Inc., 1982 - 1993. (with V.L. Andrews)

Alternative Regulatory Frameworks, Public Utilities Reports, Inc., and The Management Exchange Inc., 1993. (with V.L. Andrews)

Risk and Return in Capital Projects, The Management Exchange Inc., 1980, (with B. Deschamps)

Utility Capital Expenditure Analysis, The Management Exchange Inc., 1983.

Regulation of Cable Television: An Econometric Planning Model, Quebec Department of Communications, 1978.

An Economic & Financial Profile of the Canadian Cablevision Industry. Canadian Radio-Television & Telecomm. Commission, 1978

Computer Users' Manual: Finance and Investment Programs, University of Montreal Press, 1974, revised 1978.

Fiber Optics Communications: Economic Characteristics, Quebec Department of Communications, 1978.

"Canadian Equity Market Inefficiencies", Capital Market Research Memorandum, Garmaise & Thomson Investment Consultants, 1979.

EXHIBIT ____(RAM-2)
PAGE 49 OF 78

MISCELLANEOUS CONSULTING REPORTS:

"Operational Risk Analysis: California Water Utilities, Calif. Water Association, 1993.

"Cost of Capital Methodologies for Independent Telephone Systems", Ontario Telephone Service Commission, March 1989.

"The Effect of CWIP on Cost of Capital and Revenue Requirements", Georgia Power Company, 1985.

"Costing Methodology and the Effect of Alternate Depreciation and Costing Methods on Revenue Requirements and Utility Finances", Gaz Metropolitan Inc., 1985.

"Simulated Capital Structure of CN-CP Telecommunications: A Critique", Canadian Radio-Television & Telecomm. Commission, 1977.

"Telecommunications Cost Inquiry: Critique", Canadian Radio-Television & Telecomm. Commission, 1977.

"Social Rate of Discount in the Public Sector", Canadian Radio-Television & Telecomm. Commission Policy Statement, 1974.

"Technical Problems in Capital Projects Analysis", Canadian Radio-Television & Telecomm. Commission Policy Statement, 1974.

RESEARCH GRANTS:

"Econometric Planning Model of the Cablevision Industry", International Institute of Quantitative Economics, CRTC, $20,000

"Application of the Averch-Johnson Model to Telecommunications Utilities", Canadian Radio-Television Commission (CRTC), $12,000

"Economics of the Fiber Optics Industry", Quebec Department of Communications, $50,000

"Intervention Analysis and the Dynamics of Market Efficiency", Georgia State Univ. College of Business, 1981

"Firm Size and Beta Stability", Georgia State University College of Business, 1982

EXHIBIT ____ (RAM-3)
PAGE 50 OF 72

RESEARCH GRANTS (CONT'D):

"Risk Aversion and the Demand for Risky Assets", Georgia State University College of Business, 1981.

Chase Econometrics, Interactive Data Corp., Research Grant, $50,000 per annum, 1986-1989.

UNIVERSITY SERVICE:

- University Senate, elected departmental senator
- Faculty Affairs Committee, elected departmental representative
- Professional Continuing Education Committee member
- Director Master in Science (Finance) Program

MONTHLY RESIDENTIAL BILL

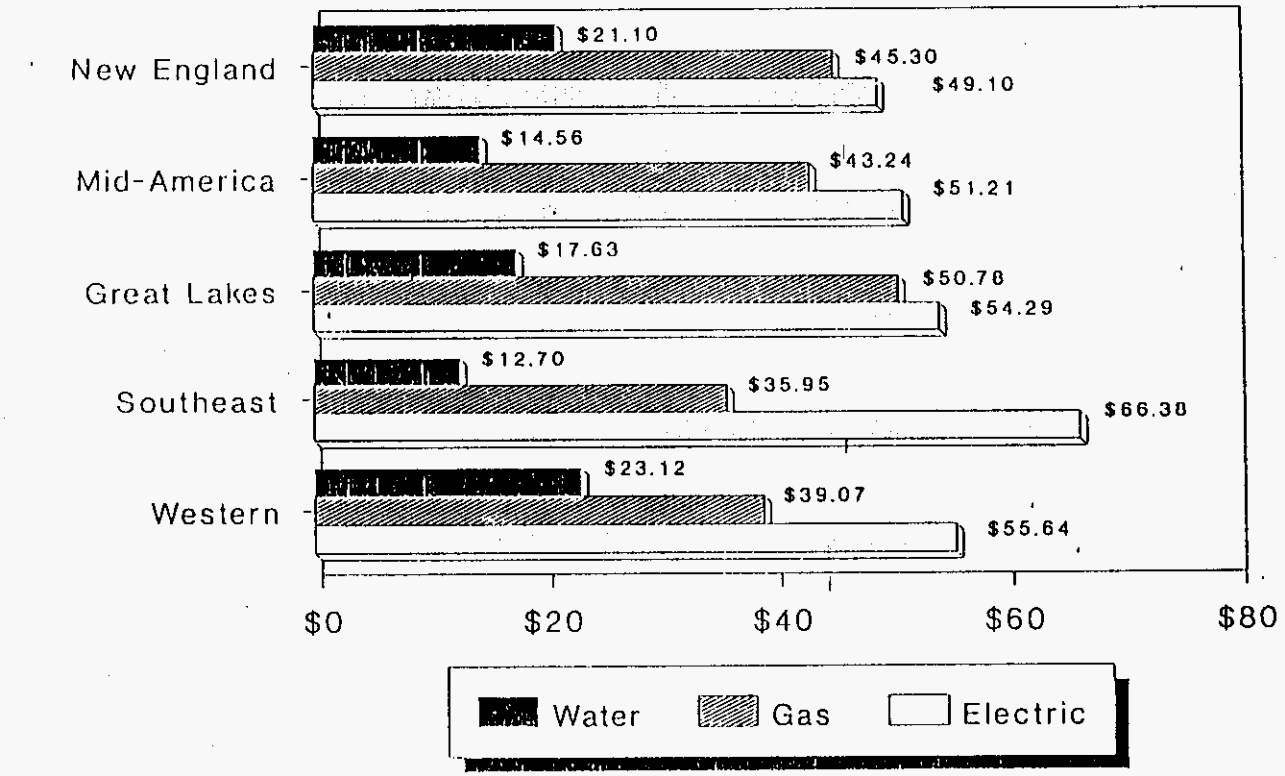

EXHIBIT (RAM-2) PAGE 51 OF 78

Exhibit RAM-2

TOTAL ASSETS
WATER, GAS AND ELECTRIC

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Total Assets – Electric	2955.05	3265.44	3559.16	3908.59	4157.49	4418.56	4624.64	4836.92	5020.75	5187.71
		10.50%	20.44%	32.27%	40.69%	49.53%	56.50%	63.68%	69.90%	75.55%
Total Assets – Gas	504.52	388.46	403.11	436.80	468.97	498.95	561.28	758.43	795.34	848.82
		-23.00%	-20.10%	-13.42%	-7.05%	-1.10%	11.25%	50.33%	57.64%	68.25%
Total Assets – Water	207.45	220.66	235.12	257.15	279.68	308.95	335.19	362.07	395.35	428.76
		6.37%	13.33%	23.95%	34.81%	48.92%	61.57%	74.53%	90.57%	106.68%
Water as % of Electric	7.02%	6.76%	6.61%	6.58%	6.73%	6.99%	7.25%	7.49%	7.87%	8.26%
Water as % of Gas	41.12%	56.80%	58.33%	58.87%	59.64%	61.92%	59.72%	47.74%	49.71%	50.51%

EXHIBIT RAM-3 Page 1 of 2

EXHIBIT (RAM-3)

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MARKET VALUE
WATER, GAS AND ELECTRIC

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Market Value - Electric	662.21	906.31	998.54	1179.73	1469.85	1841.88	1586.35	1773.95	2194.06	2110.83
		36.86%	50.79%	78.15%	121.96%	178.14%	139.55%	167.88%	231.32%	218.75%
Market Value - Gas	127.96	97.10	121.05	159.07	211.44	238.24	248.09	281.12	308.73	341.20
		-24.11%	-5.40%	24.32%	65.24%	86.19%	93.88%	119.70%	141.28%	166.66%
Market Value - Water	31.07	45.03	59.89	72.46	116.22	140.16	131.98	137.52	139.61	122.17
		44.93%	92.75%	133.20%	274.03%	351.07%	324.75%	342.57%	349.31%	293.17%
Water as % of Electric	4.69%	4.97%	6.00%	6.14%	7.91%	7.61%	8.32%	7.75%	6.36%	5.79%
Water as % of Gas	24.28%	46.38%	49.48%	45.55%	54.97%	58.83%	53.20%	48.92%	45.22%	35.80%

EXHIBIT RAM-3 Page 2 of 2

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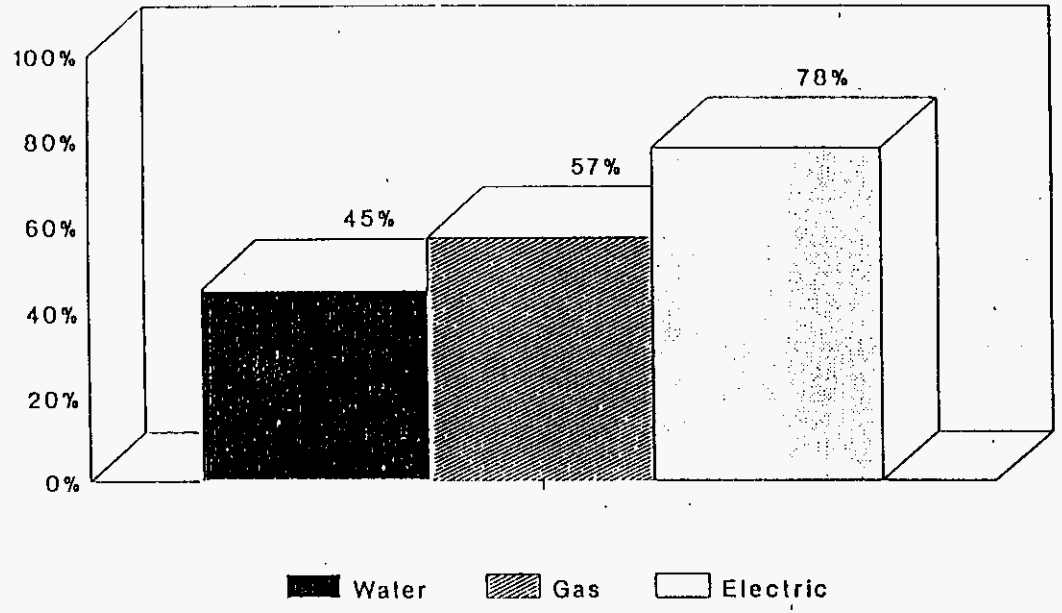
INTERNALLY GENERATED FUNDS AS A PERCENT OF CAPITAL EXPENDITURES - 1990



WATER UTILITIES ARE MORE DEPENDENT ON EXTERNAL CAPITAL

- The water utility industry generated 45% of its capital needs internally in 1990 while the gas distribution and electric industries generated 57% and 78%.
- This ratio of internally generated funds to capital expenditures will drop as water utilities increase their construction outlays to meet the requirements of the SDWA.

EXHIBIT RAM-4

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EXHIBIT (RAM-3)

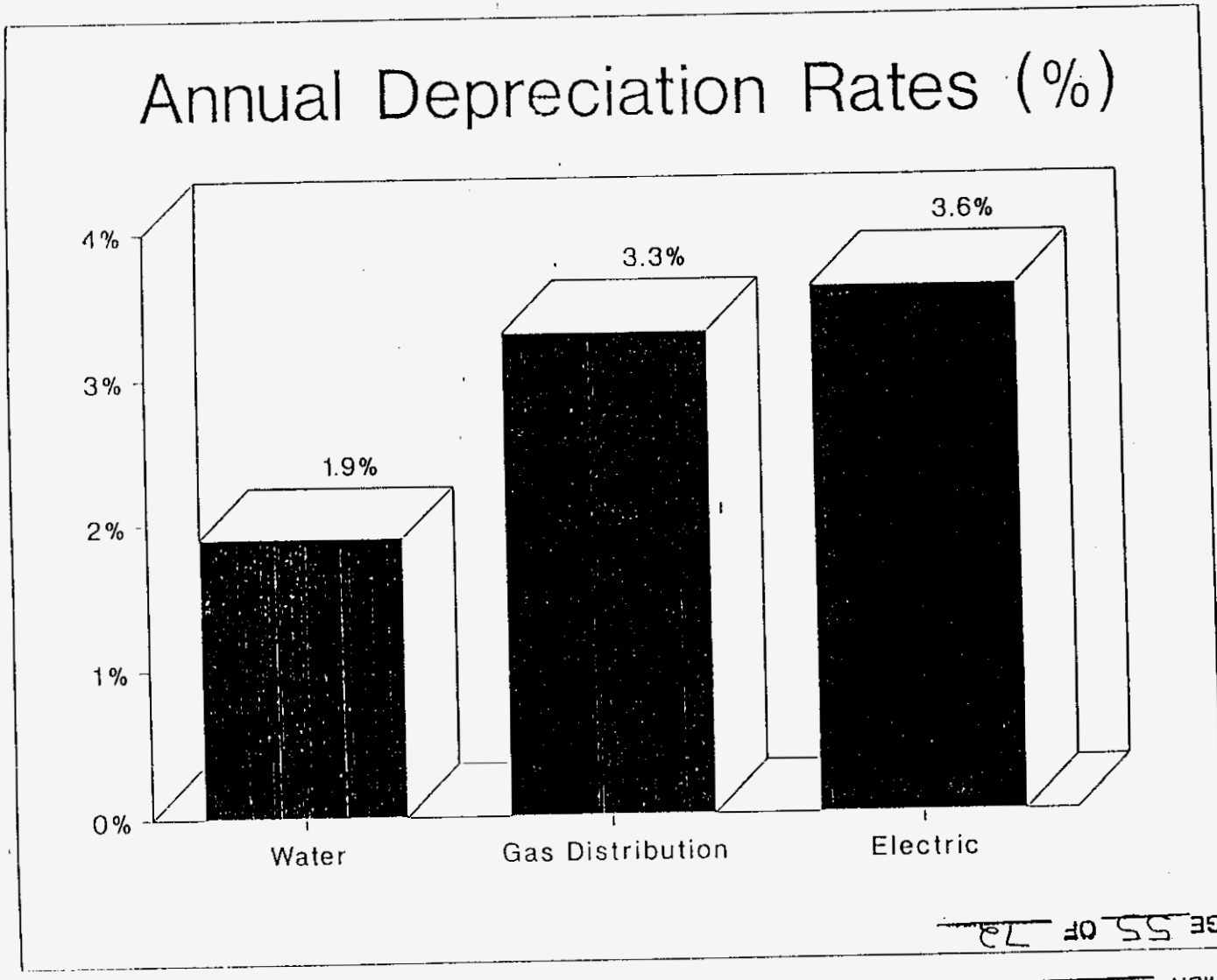

EXHIBIT (RAM-3)

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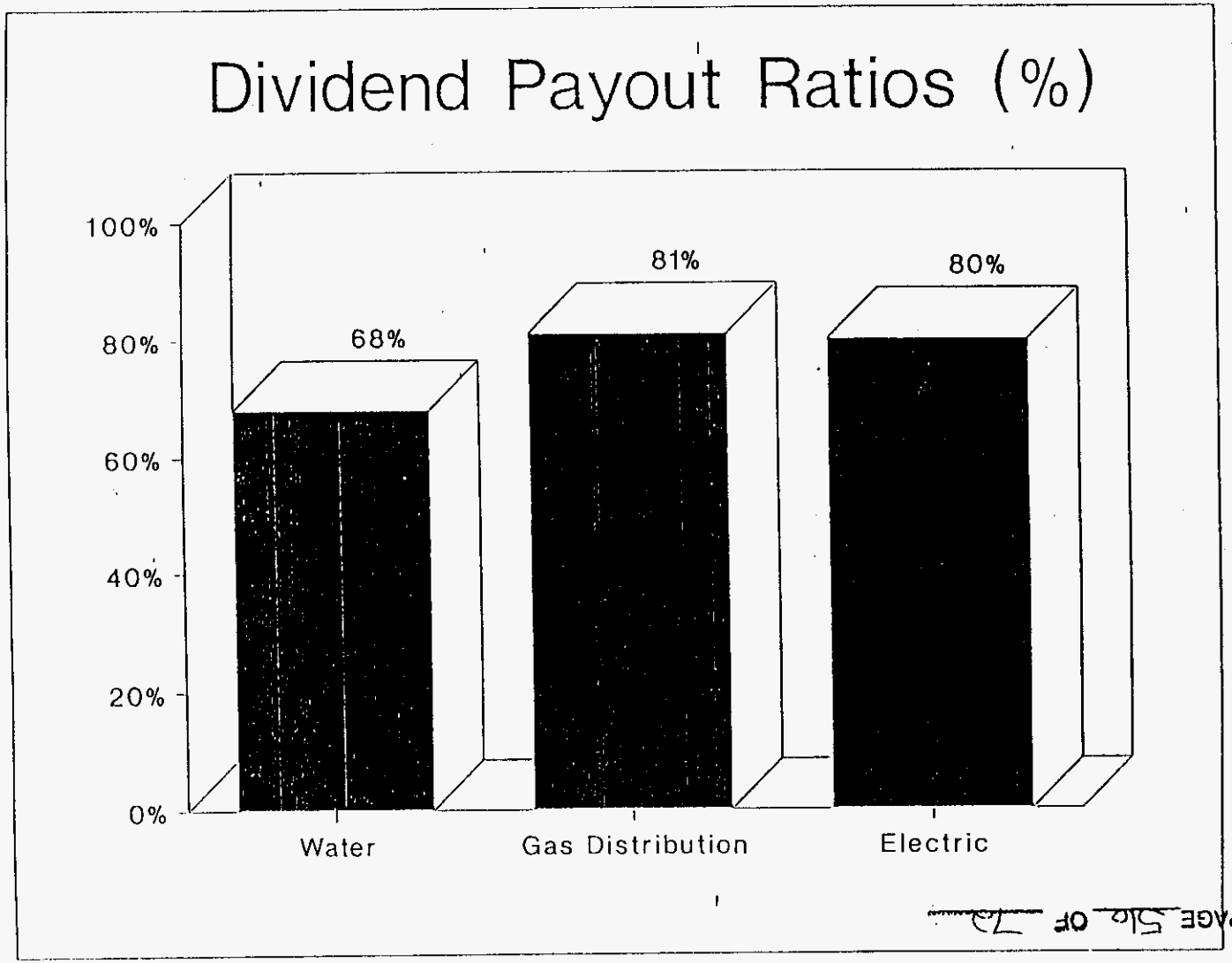

EXHIBIT (RAM-2)
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Exhibit RAM-5 Page 2 of 2

Capital Expenditures (Exceeding Depreciation) as a Percent of Capitalization

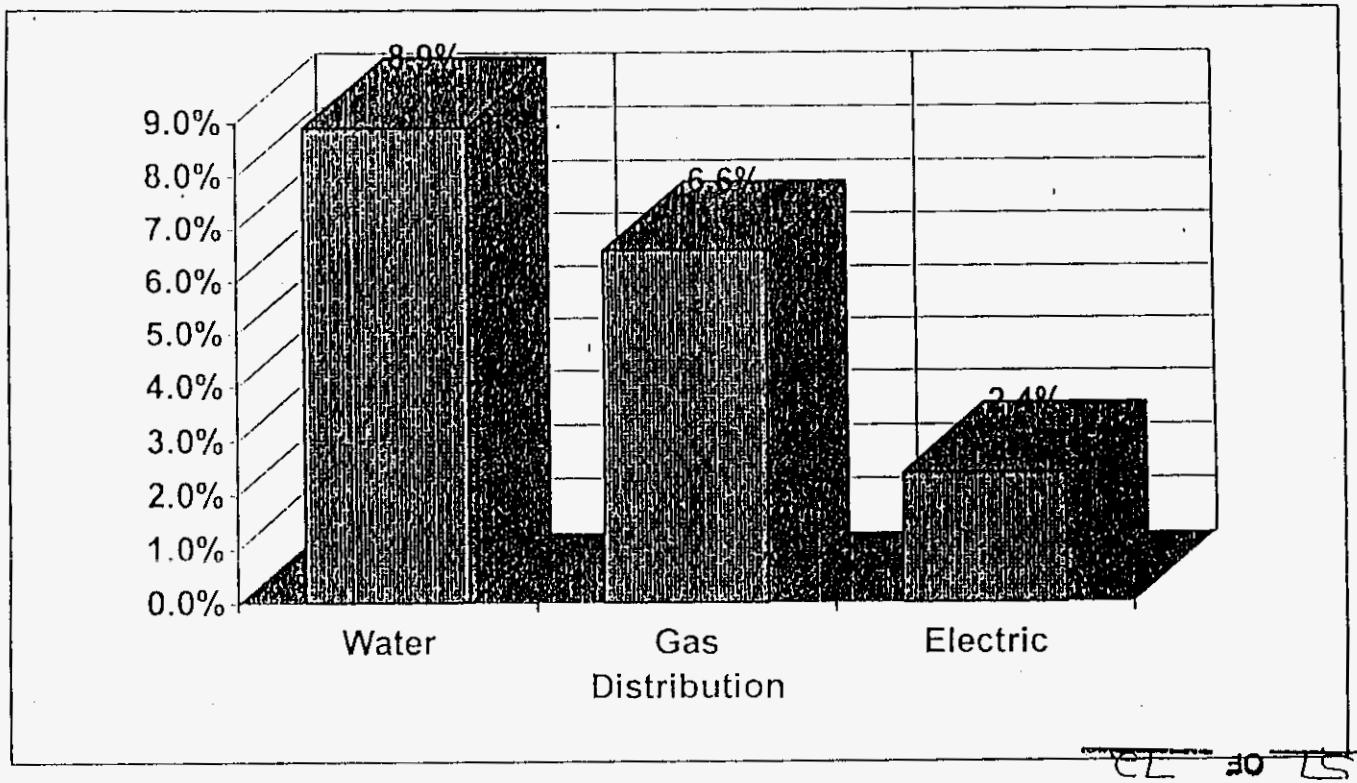

EXHIBIT (RAM-3)
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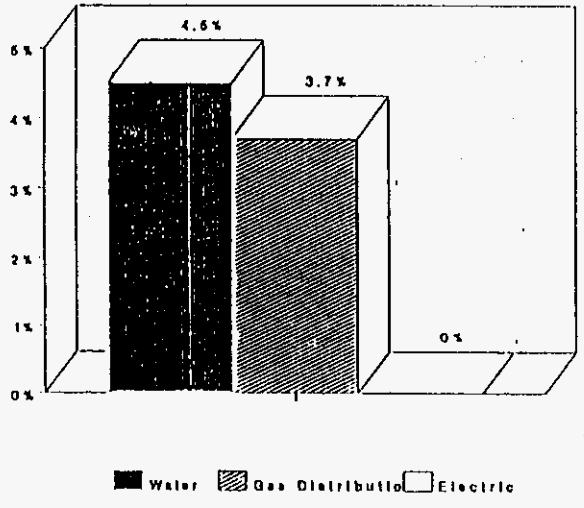
Exhibit RAM-6

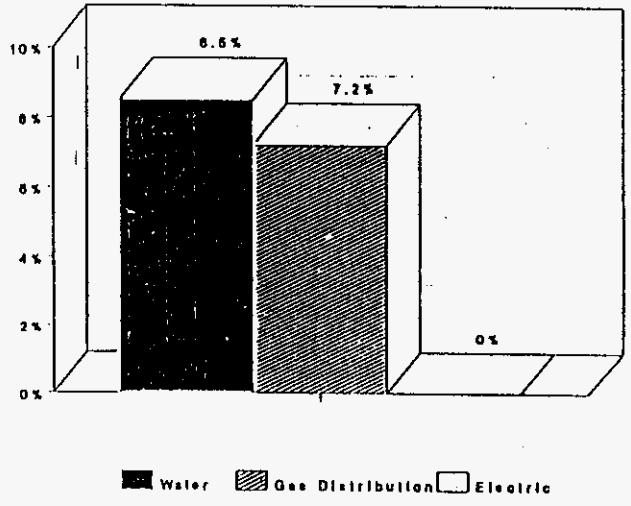
COMPARATIVE FINANCING NEEDS

External Financing as a Percent of Capitalization

Common Equity (%)



Long Term Debt (%)



NEED FOR ADDITIONAL CAPITAL WILL REQUIRE WATER UTILITIES TO SECURE FUNDS FROM CAPITAL MARKETS ...

- Water utilities must grow their equity base by 4.5% per year vs. 3.7% and 0% for the gas distribution and electric industries.
- Water utilities must grow their debt capital by 8.5% per year vs. 7.2% and 0% for gas distribution and electric industries.

EXHIBIT RAM-7

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EXHIBIT (RAM-3)

Internally Generated Funds/ Capital Expenditures (%)

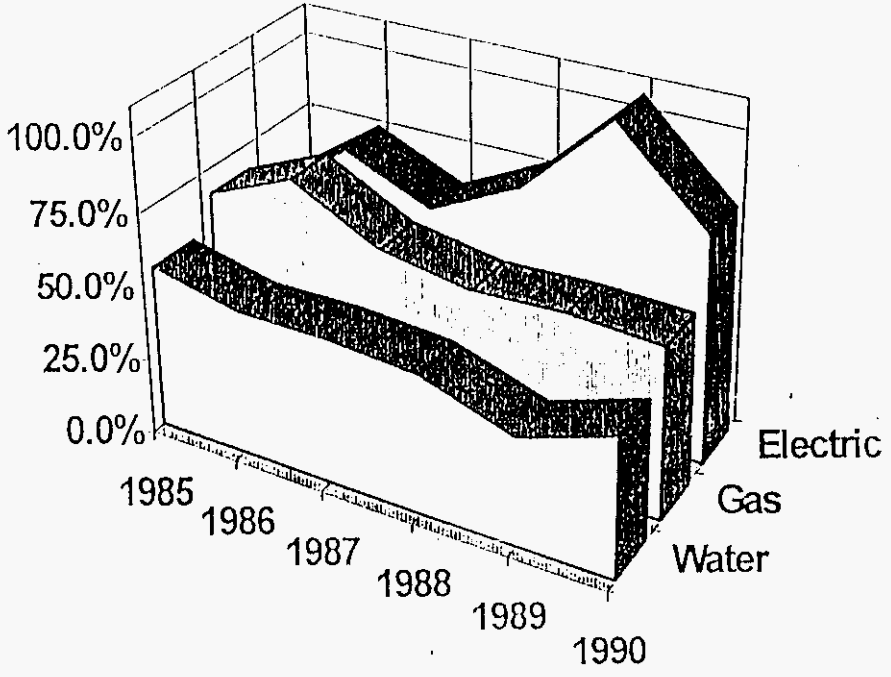

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Exhibit RAM-8

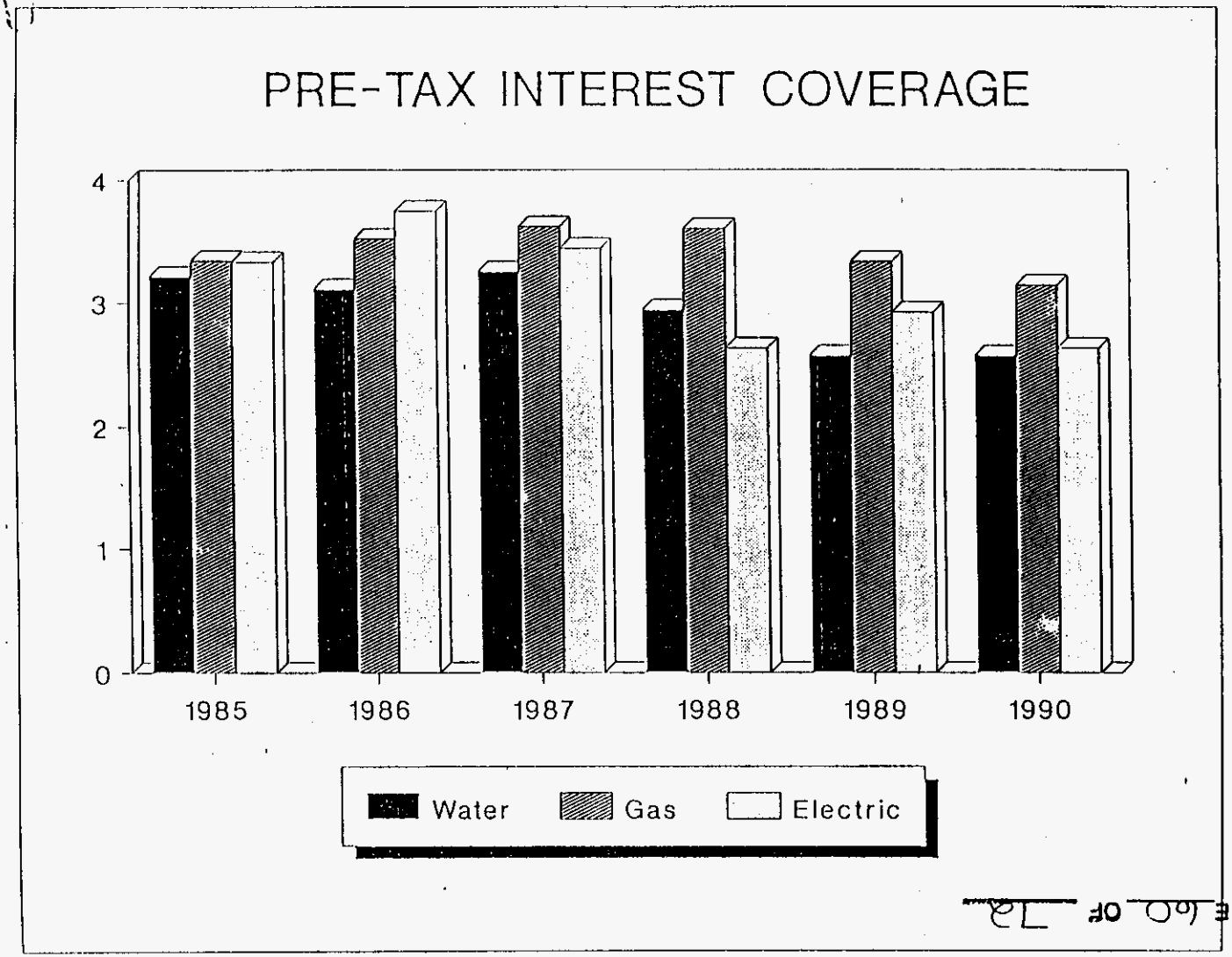

Exhibit RAM-9

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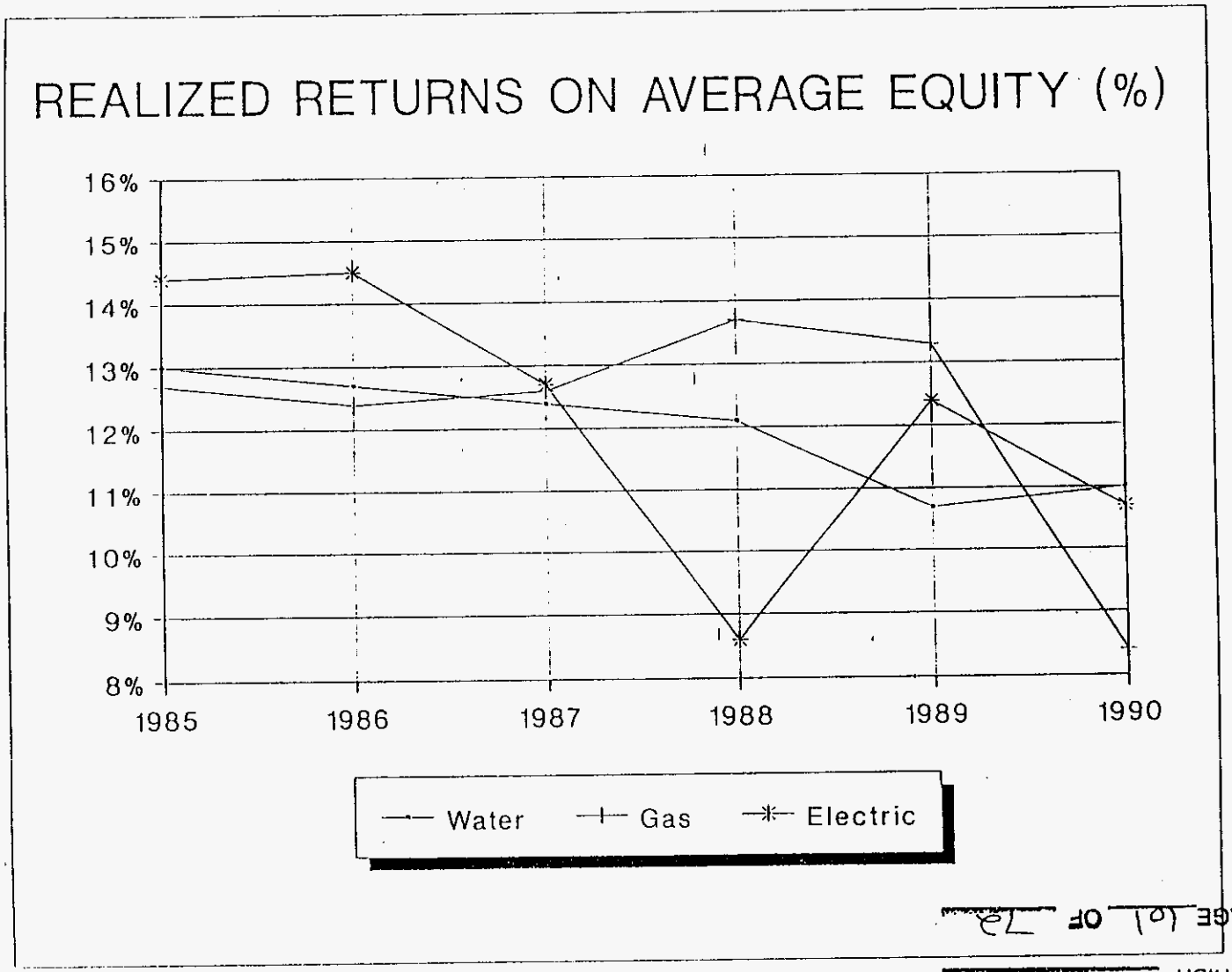

EXHIBIT (RAM-3)

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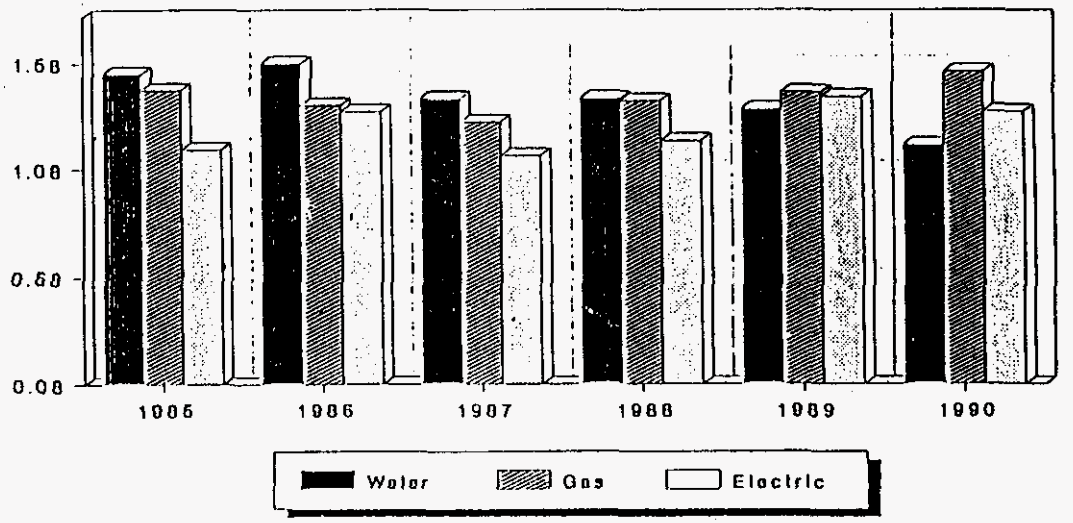
Exhibit RAM-10

MARKET TO BOOK VALUE



WATER UTILITY STOCK PRICES HAVE DROPPED DRAMATICALLY RELATIVE TO BOOK VALUE

- Deteriorating cash flow relative to capital expenditures, falling pretax coverage ratios, and falling realized returns on equity are pushing market to book values down for the water industry.
- Five years ago the average market to book ratio for the water utility industry was the highest of the three fixed utilities at 1.6 times book. As of the end of 1990, the water industry was the lowest at 1.2 times book while the electric and gas industries were 1.4 and 1.5 times book.

EXHIBIT RAM-11

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EXHIBIT (RAM-3)

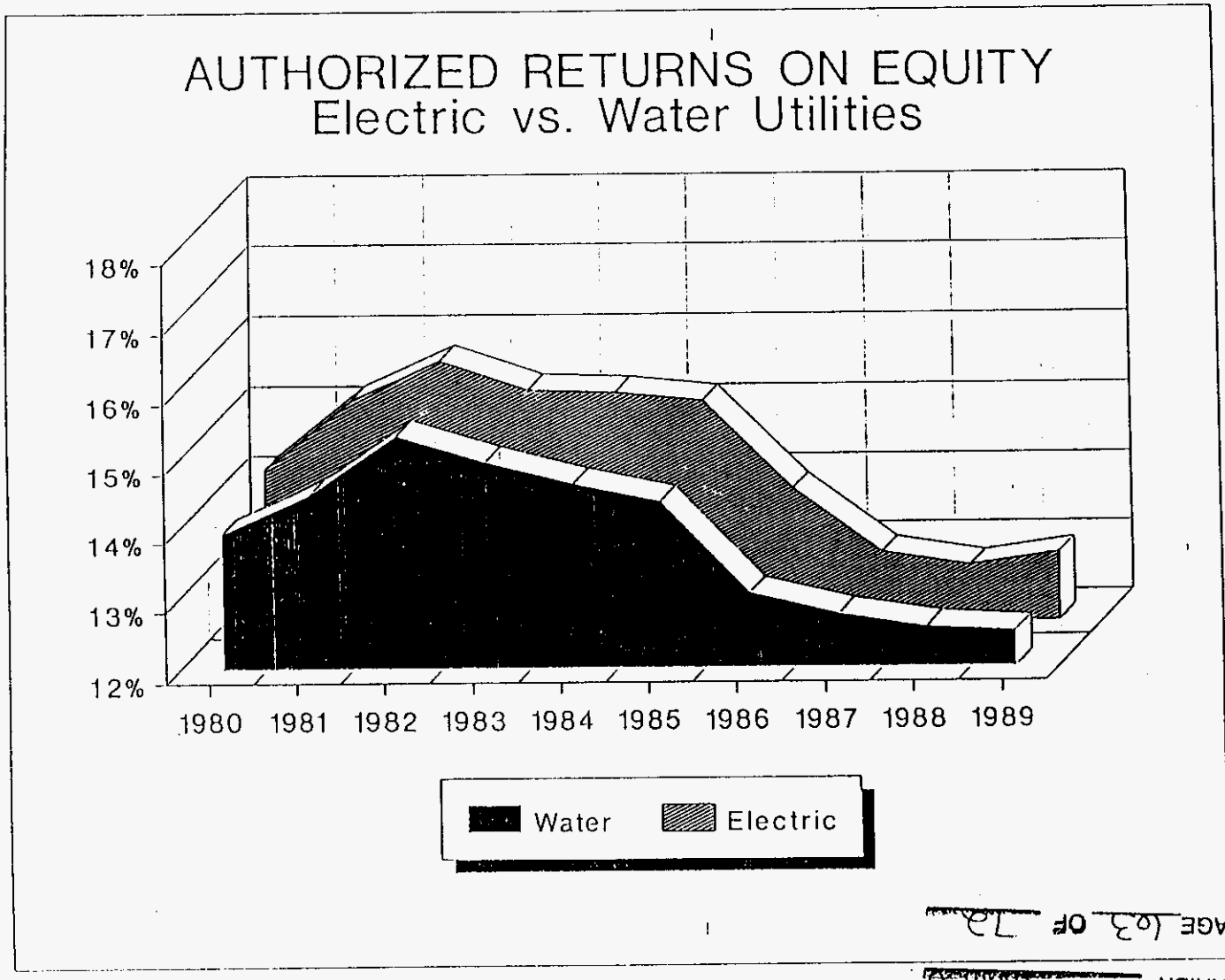

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Exhibit RAM-12

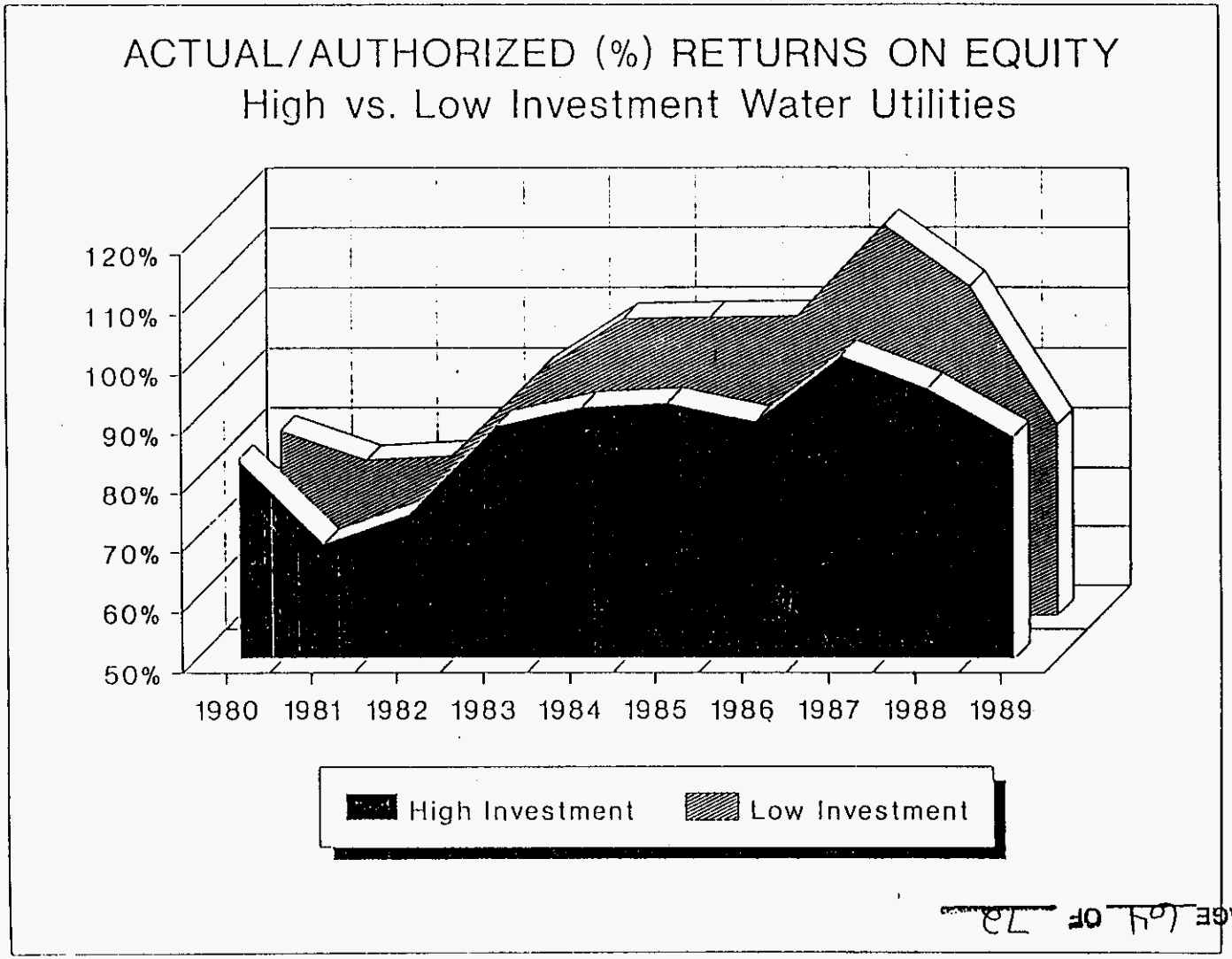

EXHIBIT (RAM-3)

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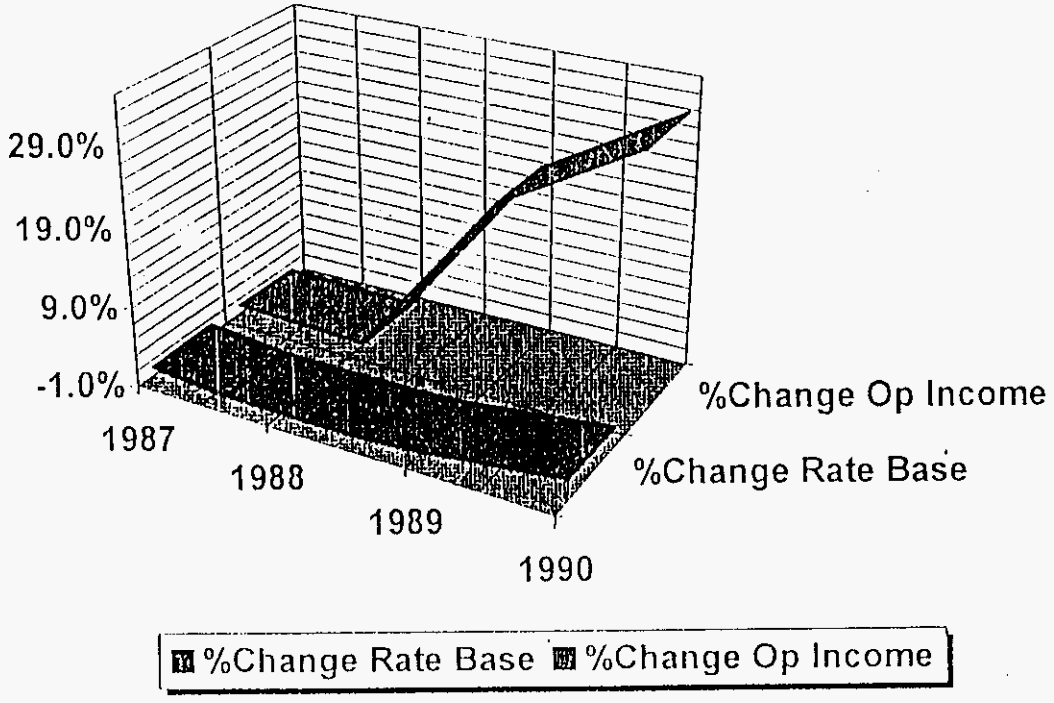
Exhibit RAM-13

Relative Change in Rate Base vs. Utility Operating Income Electric Utility



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Relative Change in Rate Base vs. Utility Operating Income

Water Utility

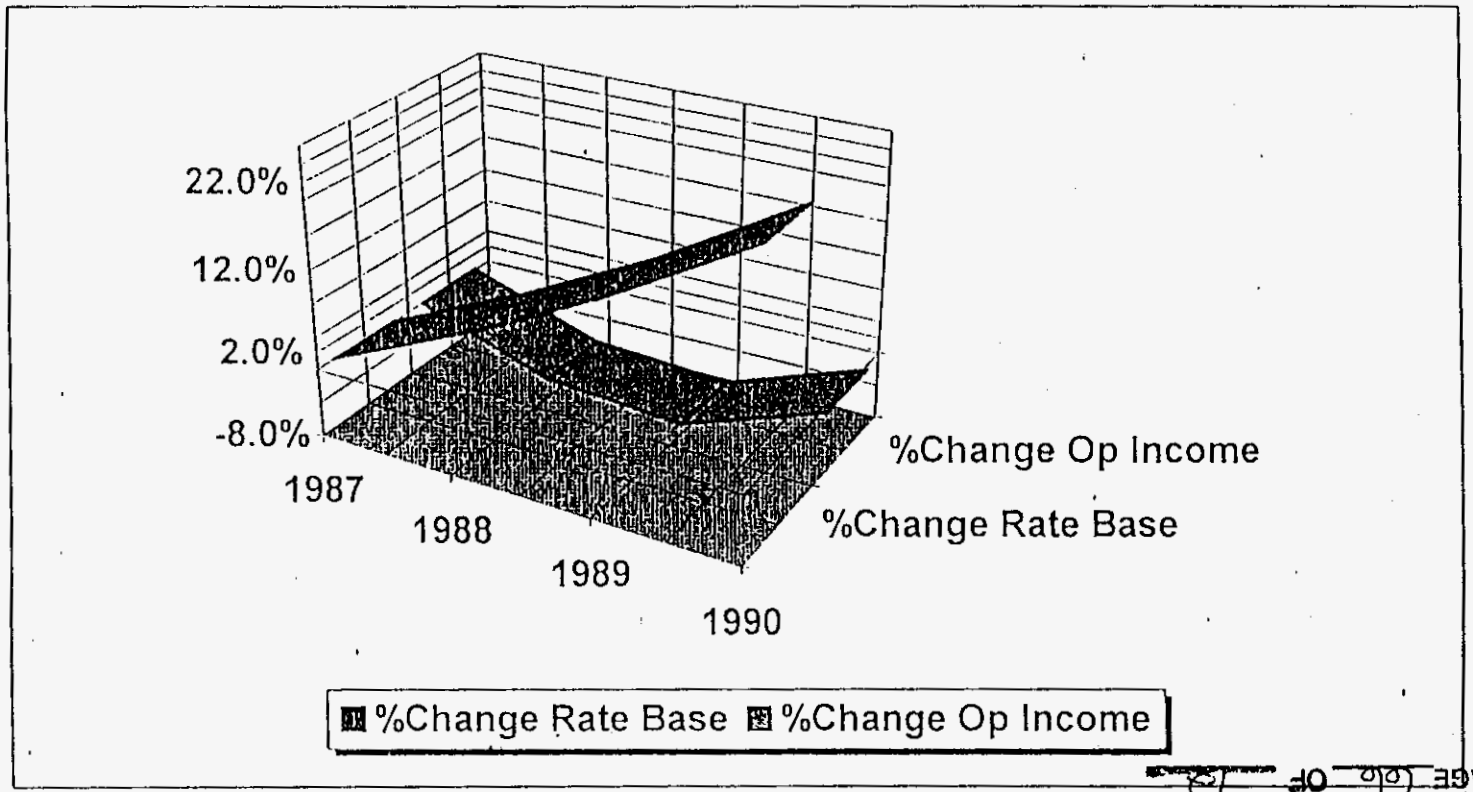

EXHIBIT (RAM-2)
PAGE 2 OF 2

Exhibit RAM-14 Page 2 of 2

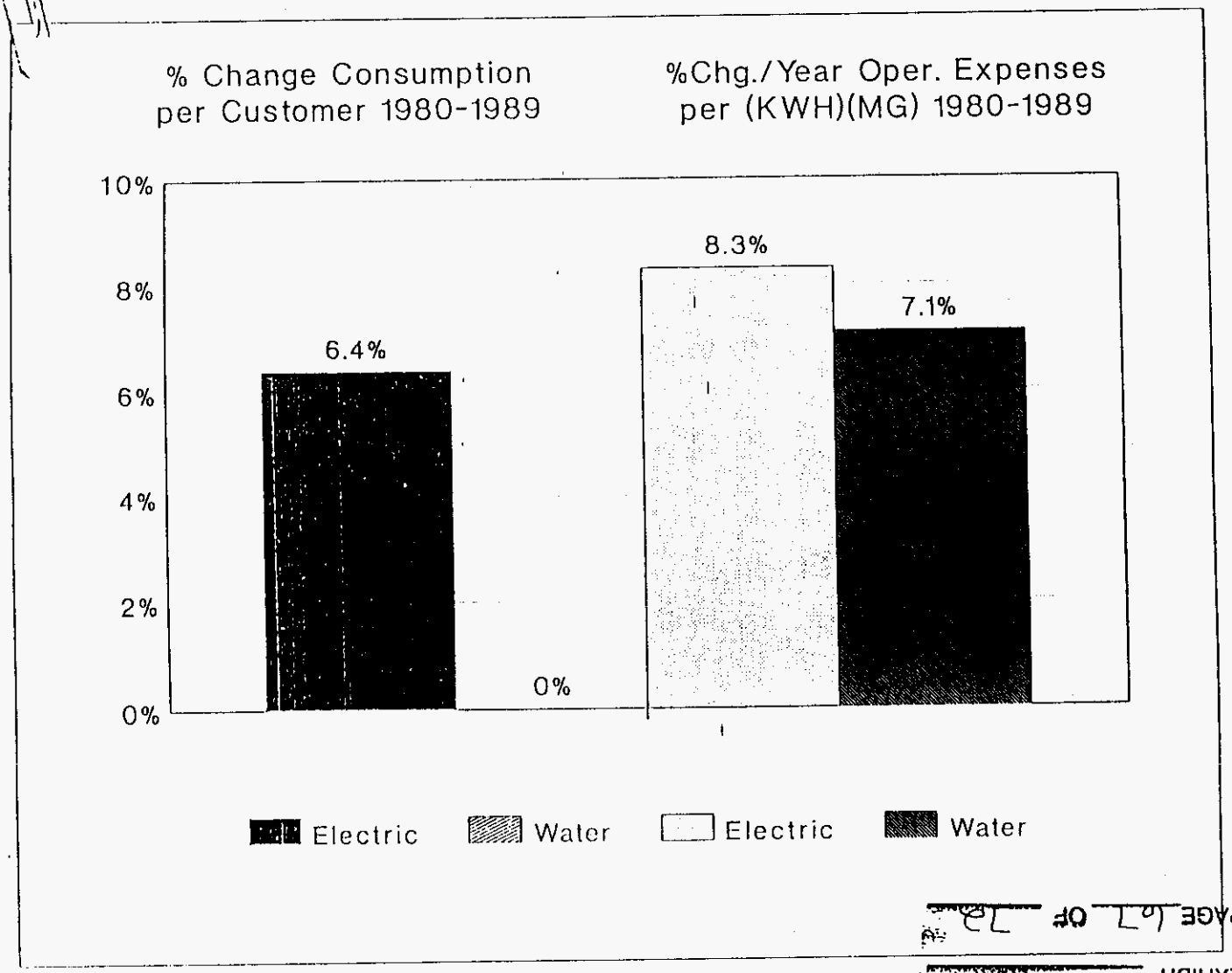

EXHIBIT (Ram-2)

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Exhibit RAM-15

Index Companies
Investment Characteristics

Ticker	Company Name	Safety Rank	Fin'l Strgth	Beta	PC Plus S&P Bond Rating	Current Div	Current EPS	5-Yr Div Growth	Market Cap	Debt % Capital	Market to Book	Price to Earnings	VL 8/12/94 Interest Coverage
AWK	AMER. WATER WKS	2	A =3	0.70		1.14	2.27	8.0	839.7	61	1.28	11.8	2.3
WTR	AQUARION CO.	3	B =6	0.75	A =8	1.62	1.85	2.0	155.1	51	1.40	12.8	2.9
CWT	CALIF. WATER	1	A =3	0.50	AA- =6	2.02	2.70	4.5	179.2	50	1.44	11.7	3.3
CONW	CONSUMERS WATER	3	B =6	0.55		1.18	1.12	4.0	140.7	56	1.45	15.6	2.1
PSC	PHILA. SUBURBAN	3	B+ =5	0.65		1.15	1.34	2.0	201.0	50	1.48	13.2	2.9
UWR	UNITED WATER	3	B+ =5	0.70		0.92	1.15	3.5	260.3	54	1.29	11.2	2.6
	Averages	2.5	4.67	0.64	7	1.34	1.74	4.0	296.0	54	1.39	12.7	2.7
													VL 9/30/94
ATG	ATLANTA GAS LT	2	B+ =5	0.65	A- =9	2.08	2.32	5.5	752.0	41	1.53	13	3.1
BGC	BAY STATE GAS	2	B++ =4	0.55	A =8	1.46	1.95	5.5	309.0	46	1.44	11.9	2.5
BU	BROOKLYN UNION	1	A =3	0.50	A =8	1.40	2.00	3.0	1020.4	49	1.42	11	2.5
IEI	INDIANA ENERGY	1	A =3	0.65		1.08	1.45	6.0	460.4	39	1.78	14.1	3.7
LG	LACLEDE GAS	1	A =3	0.50	AA- =6	1.24	1.44	3.0	311.7	46	1.64	13.9	3.1
NWNG	NW NATURAL GAS	2	B++ =4	0.55	A =8	1.78	2.57	2.0	388.7	47	1.5	11.5	3.1
PGL	PEOPLES ENERGY	2	A =3	0.75		1.84	2.04	4.5	893.9	46	1.42	12.6	3.2
WGL	WASHINGTON GAS	1	A =3	0.70	AA- =6	2.25	2.64	3.5	700.2	42	1.53	12.8	4.2
	Averages	1.5	3.5	0.61	7.5	1.64	2.05	4.1	604.5	44.5	1.5	12.6	3.2

Source: Value Screen 1/95
Compustat and Value Line 8/94

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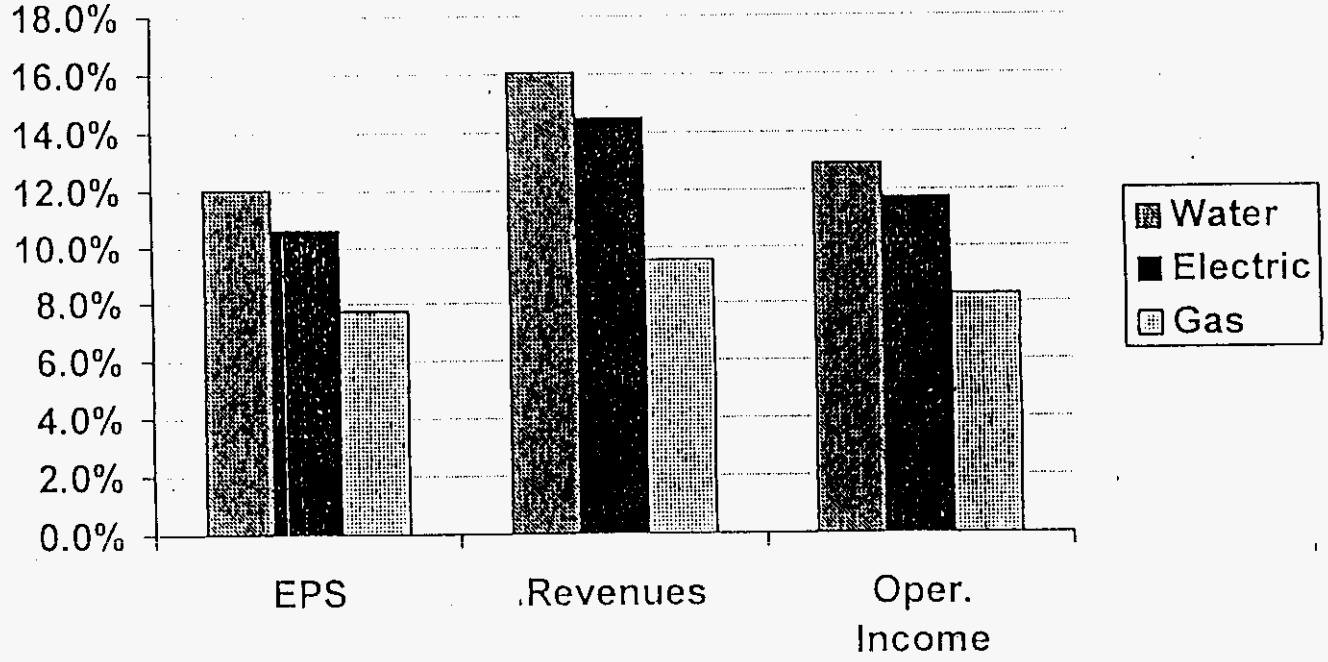
Exhibit RAM-17

Comparative Risk Measures

10-Year Coefficient of Variation*



* Defined as the Standard Deviation divided by the mean

Exhibit RAM-17

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EXHIBIT ____ (RAM-2)
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COMPARISON OF STANDARD AND POORS
BENCHMARK RATINGS FOR THE
WATER AND ELECTRIC UTILITY INDUSTRIES

	AA	A	BBB	BB
Pretax Interest Coverage				
Water (before)	over 3.00x	2.00-3.50x	1.00-2.50x	under 1.25x
Water (after)	over 3.25x	2.25-3.75x	1.25-2.75x	under 1.50x
Electric	over 3.50x	2.50-4.00x	1.50-3.00x	under 1.75x
Percentage change(1)	50.0%	50.0%	50.0%	50.0%
Total Debt/ Total Capital				
Water (before)	under 54%	52%-60%	58%-66%	over 65%
Water (after)	under 50%	48%-56%	54%-62%	over 62%
Electric	under 46%	44%-54%	50%-62%	over 60%
Percentage change(1)	50.0%	50%-67%	50%-100%	60.0%
Funds Flow Interest Coverage				
Water (before)	over 3.25x	2.25-3.75x	1.25-2.75x	under 1.50x
Water (after)	over 3.50x	2.50-4.00x	1.50-3.00x	under 1.75x
Electric	over 3.75x	2.75-4.25x	1.75-3.25x	under 2.00x
Percentage change(1)	50.0%	50.0%	50.0%	50.0%
Funds from Oper./ Total Debt				
Water (before)	over 23%	15%-27%	10%-20%	under 10%
Water (after)	over 25%	15%-27%	10%-20%	under 12%
Electric	over 27%	17%-30%	12%-22%	under 15%
Percentage change(1)	50.0%	0.0%	0.0%	40.0%
Net Cash Flow/ Capital Expend.				
Water (before)	over 70%	55%-85%	30%-65%	under 35%
Water (after)	over 75%	60%-90%	35%-65%	under 40%
Electric	over 80%	65%-95%	40%-70%	under 45%
Percentage change(1)	50.0%	50.0%	0%-50%	50.0%

(1) Represents the relative movement in the water benchmarks as compared to the electric benchmark.

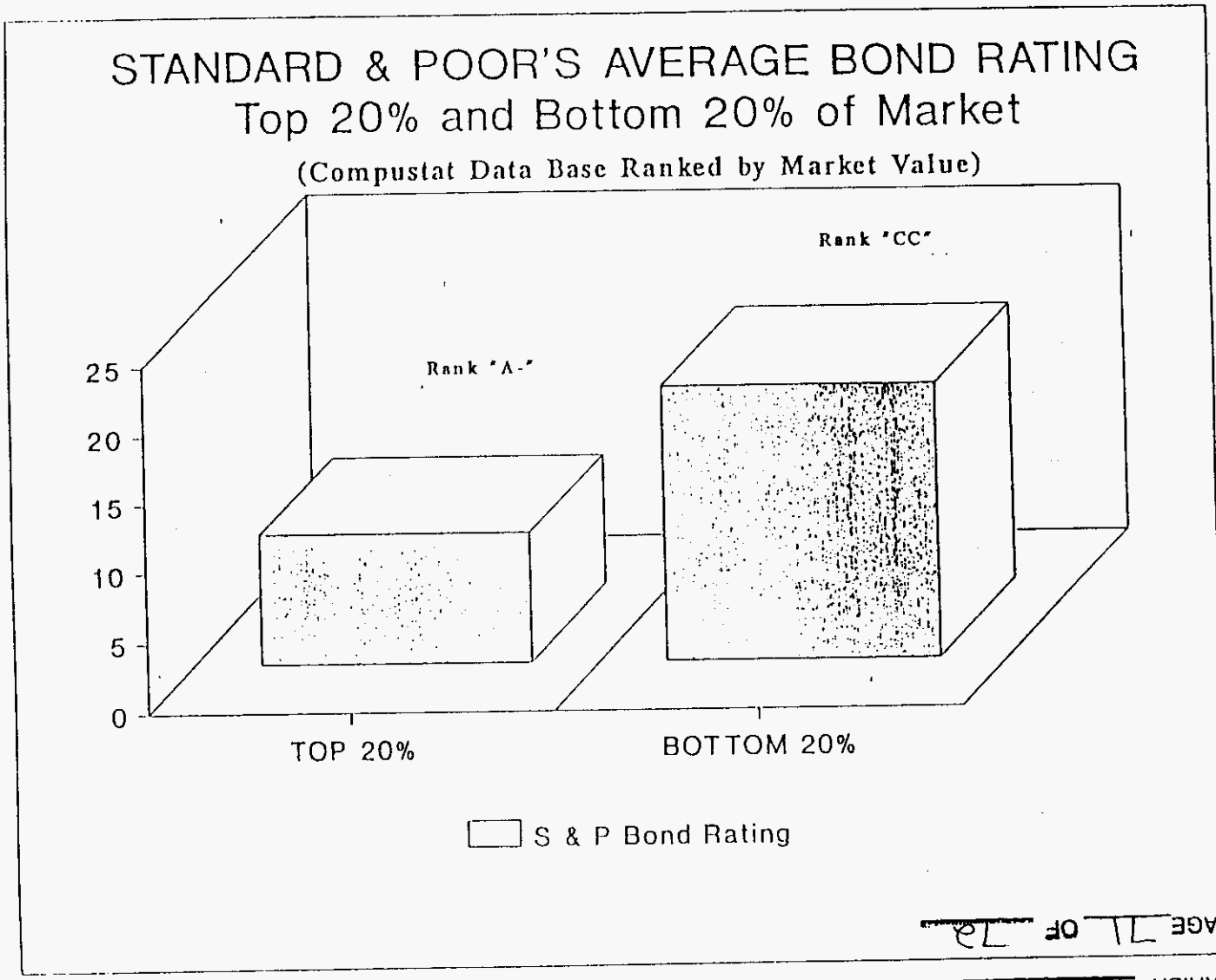

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EXHIBIT RAH-20 Page 1 of 2

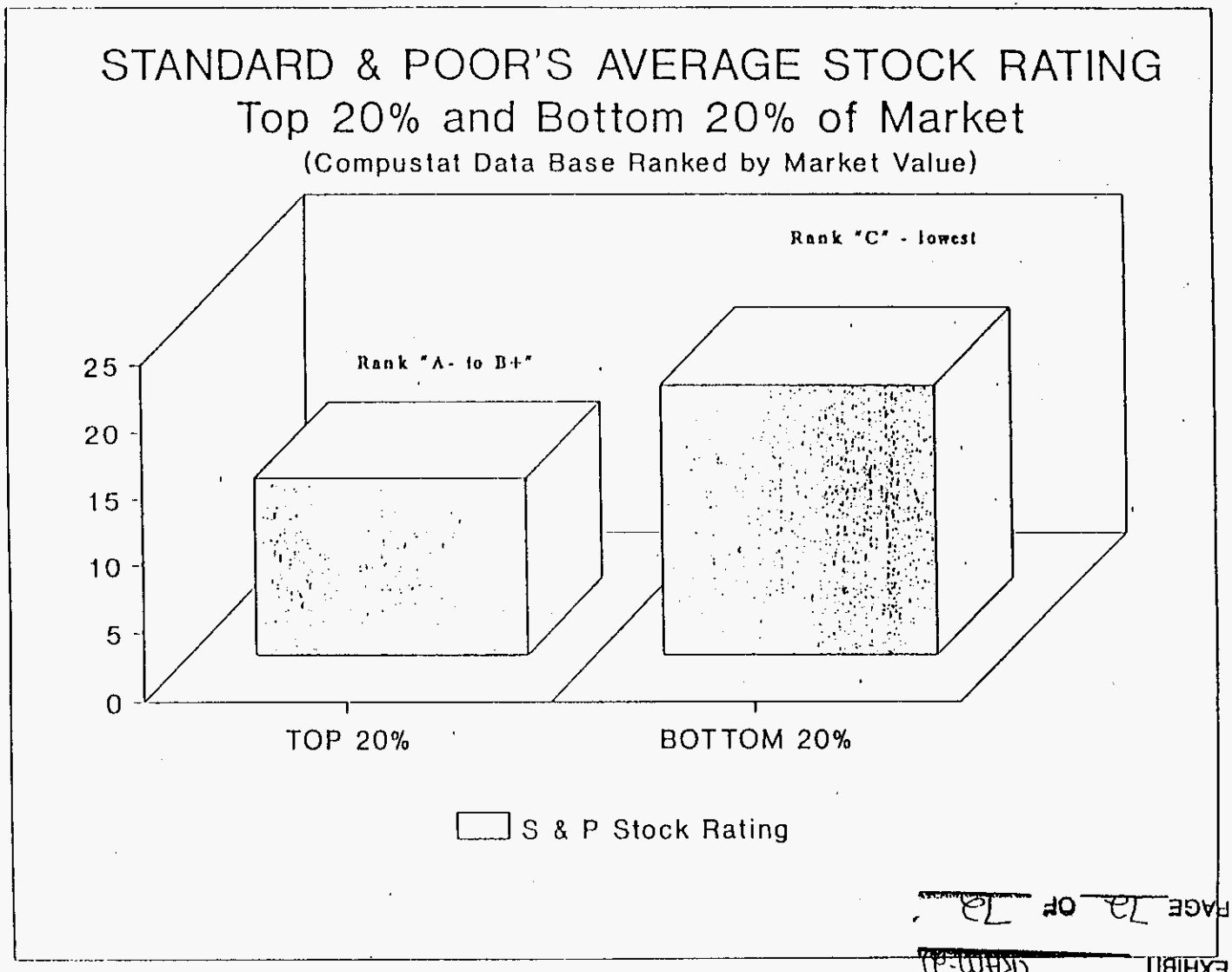

EXHIBIT (RAM-2)
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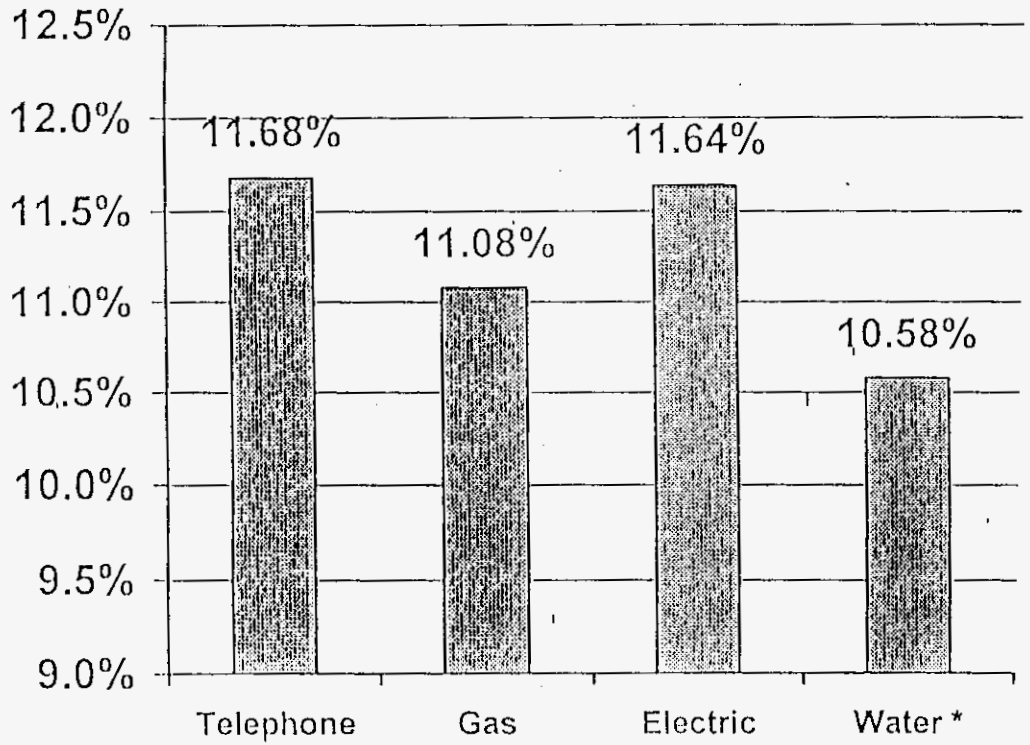
Florida PSC Most Recent Allowed ROE Mid-points



* Mid-point of 1.5% range, others have 2% range

EXHIBIT (Ram-3)
PAGE 1 OF 1

EXHIBIT (RAM-4)

PAGE 1 OF 1

TABLE 1
COST OF TOTAL CAPITAL FOR THE AVERAGE FWU

Type of Capital	Weight	Cost	Weighted Cost
Debt	54.35%	8.80%	4.78%
Equity	45.66%	11.02%	5.03%
	100.00%		9.81%

TABLE 2
COST OF TOTAL CAPITAL FOR THE AVERAGE FWU
AT 40% COMMON EQUITY RATIO

Type of Capital	Weight	Cost	Weighted Cost
Debt	60.00%	8.80%	5.28%
Equity	40.00%	11.34%	4.53%
	100.00%		9.81%

EXHIBIT (RAM-5)

PAGE 1 OF 1

EFFECT OF MARKET-TO-BOOK RATIO ON MARKET RETURN

	SITUATION 1	SITUATION 2	SITUATION 3
1 Initial purchase price	$25.00	$50.00	$100.00
2 Initial book value	$50.00	$50.00	$50.00
3 Initial M/B	0.50	1.00	2.00
4 DCF Return 10%=5%+5%	10.00%	10.00%	10.00%
5 Dollar Return	$5.00	$5.00	$5.00
6 Dollar Dividends 5% Yield	$1.25	$2.50	$5.00
7 Dollar Growth 5% Growth	$3.75	$2.50	$0.00
8 Market Return	20.00%	10.00%	5.00%

EXHIBIT (RAM-6)

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APPENDIX A

CAPM APPLICATION

1. RISK-FREE RATE

Theoretically, the yield on 90-day Treasury Bills is virtually riskless, devoid of default risk and subject to a negligible amount of interest rate risk. But the T-Bill rate fluctuates widely, leading to volatile and unreliable equity return estimates. Moreover, yields on 90-day Treasury Bills typically do not match the equity investor's planning horizon. Equity investors generally have an investment horizon far in excess of 90 days. More importantly, short-term Treasury Bills yields reflect the impact of factors different from those influencing long-term securities such as common stock. The premium for expected inflation impounded into 90- day Treasury Bills is likely to be far different than the inflationary premium impounded into long-term securities yields. On grounds of consistency alone, the yields on long-term Treasury bonds match more closely with common stock returns. Of course, if the yield curve is expected to be relatively flat, the choice of an appropriate government security becomes academic.

An alternative procedure is to employ market forecasts of rates on government securities in the form of yields on interest rate futures contracts which have become available in recent years, as proxies for the expected yields on long-term government securities.

2. MARKET RISK PREMIUM

For the market risk premium, a range of 6.0% to 7.0% should be used. The lower part of the range, 6.0%, is consistent with a simple annual DCF analysis applied to the market as a whole. Excluding high-growth stocks, the dividend yield on the aggregate market is currently 3.8% (Value Line Screen II average dividend yield on dividend-paying stocks 4/95), and the projected growth for the Value Line common stocks is in the range of about 9.0% to 10.5% as of April 1995. Adding the two components together produces an expected return on the aggregate equity market in the range of 12.8% to 14.3%, with a midpoint of 13.6%, or a risk premium of approximately 6% over long-term U.S. Treasury bonds which were yielding 7.5% as of April 1995.

The upper part of the range, 7.0%, is obtained from the seminal Ibbotson-Sinquefield study of historical stock and bond returns from 1926 to 1994. The study shows that stocks have outperformed long-term government securities by 7.0% over long time periods.

The danger with relying on annual risk premiums measured over a short time period involves the distinction between expected and realized return. The historical risk premium approach fundamentally assumes that average realized return is an appropriate surrogate for expected return, or in other words, that investor expectations are realized.

Realized returns can be substantially different from prospective returns anticipated by investors, especially when measured over short time periods. Risk premiums measured over short time periods should thus be ignored, since they are heavily dependent on short term market movements. Long-term results (1926-1994) should be relied upon, since periods of such length are long enough to smooth out short-term aberrations, and to encompass several business and interest rate cycles.

One major issue relating to the use of realized returns is whether to use the ordinary average (arithmetic mean) or the geometric mean return. Only arithmetic means are correct for forecasting purposes and for estimating the cost of capital.

The use of the arithmetic mean appears counter-intuitive at first glance, because we commonly use the geometric mean return to measure the average annual achieved return over some time period. For example, the long-term performance of a portfolio is frequently assessed using the geometric mean return.

Performance appraisal is one thing, but cost of capital estimation is another matter entirely. In estimating the cost of capital, the goal is to obtain the rate of return that investors expect, that is, a target rate of return. On average, investors expect to achieve their target return. This target expected return is in effect an arithmetic average. The achieved or retrospective return is the geometric average. In statistical parlance, the arithmetic average not the geometric mean, is the unbiased measure of the expected value of repeated observations of a random variable.

In capital markets, where returns are a probability distribution, the arithmetic mean takes uncertainty into account. It is the correct method for estimating discount rates and the cost of capital.

Index Companies
Investment Characteristics

Ticker	Company Name	Safety Rank	Fin'l Strgth	Beta	PC Plus S&P Bond Rating	Current Div	Current EPS	5-Yr Div Growth	Market Cap.	Debt % Capital	Market to Book	Price to Earnings	VL 8/12/94 Interest Coverage
AWK	AMER. WATER WKS	2	A =3	0.70		1.14	2.27	8.0	839.7	61	1.28	11.8	2.3
WTR	AQUARION CO.	3	B =6	0.75	A =8	1.62	1.85	2.0	155.1	51	1.40	12.8	2.9
CWT	CALIF. WATER	1	A =3	0.50	AA- =6	2.02	2.70	4.5	179.2	50	1.44	11.7	3.3
CONW	CONSUMERS WATER	3	B =6	0.55		1.18	1.12	4.0	140.7	56	1.45	15.6	2.1
PSC	PHILA. SUBURBAN	3	B+ =5	0.65		1.15	1.34	2.0	201.0	50	1.48	13.2	2.9
UWR	UNITED WATER	3	B+ =5	0.70		0.92	1.15	3.5	260.3	54	1.29	11.2	2.6
	Averages	2.5	4.67	0.64	7	1.34	1.74	4.0	296.0	54	1.39	12.7	2.7
													VL 9/30/94
ATG	ATLANTA GAS LT	2	B+ =5	0.65	A- =9	2.08	2.32	5.5	752.0	41	1.53	13	3.1
BGC	BAY STATE GAS	2	B++ =4	0.55	A =8	1.46	1.95	5.5	309.0	46	1.44	11.9	2.5
BU	BROOKLYN UNION	1	A =3	0.50	A =8	1.40	2.00	3.0	1020.4	49	1.42	11	2.5
IEI	INDIANA ENERGY	1	A =3	0.65		1.08	1.45	6.0	460.4	39	1.78	14.1	3.7
LG	LACLEDE GAS	1	A =3	0.50	AA- =6	1.24	1.44	3.0	311.7	46	1.64	13.9	3.1
NWNG	NW NATURAL GAS	2	B++ =4	0.55	A =8	1.78	2.57	2.0	388.7	47	1.5	11.5	3.1
PGL	PEOPLES ENERGY	2	A =3	0.75		1.84	2.04	4.5	893.9	46	1.42	12.6	3.2
WGL	WASHINGTON GAS	1	A =3	0.70	AA- =6	2.25	2.64	3.5	700.2	42	1.53	12.8	4.2
	Averages	1.5	3.5	0.61	7.5	1.64	2.05	4.1	604.5	44.5	1.5	12.6	3.2

Source: Value Screen 1/95
Compustat and Value Line 8/94

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EXHIBIT (RAM-8)

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Southern States Utilities Relative Ranking
S&P Water Utility Benchmarks

	1992	*1993*	*1994* *	
Short Term Debt	0	0	0	
Long Term Debt	98,723	109,417	105,010	
Current Maturities - LTD	8,489	1,196	2,049	
Total Debt	*107,212*	*110,613*	*107,059*	*TDEBT*
Common Equity	76,477	77,506	78,177	*TEQ*
Total Capital	*183,689*	*188,119*	*185,236*	*TCAP*
Pre-Tax Income	-3,622	1,324	1,204	
Net Interest Expense	7,078	8,169	9,676	
(AFUDC Equity)	739	193	227	
Income Avail.for Interest	*2,717*	*9,300*	*10,653*	*IAFI*
Gross Interest Expense	7,817	8,362	9,903	*GINT*
(AFUDC Debt)	739	193	227	
Net Interest Expense	*7,078*	*8,169*	*9,676*	*NINT*
Net Income	-2,206	1,030	903	*NETINC*
Depreciation/Amort.	6,260	8,181	7,125	
(Extraordinaries - A.T.)	223	-38	9	
(AFUDC - Debt & Equity)	1,478	386	454	
Funds Flow From Oper.	*2,353*	*8,863*	*7,565*	*FFO*
(Common & Pref.Dividends)	0	0	0	
Net Cash Flow	*2,353*	*8,863*	*7,565*	*NCF*
Capital Outlays (Net of CIAC)	*25,322*	*15,414*	*20,668*	*CAPX*

FFO/TOTAL DEBT	2.20%	8.01%	7.07%	*BB-* **
FFO INTEREST COVERAGE	1.3	2.1	1.8	*BBB-*
PRETAX INT.COVERAGE	0.3	1.1	1.1	*BB*
TTL DEBT/TTL CAPITAL	58.37%	58.80%	57.80%	*BBB*
NCF/CAPITAL OUTLAYS	9.29%	57.50%	36.60%	*BB+*
Nominal ROAE	//////////	1.34%	1.16%	//////////
CapX/Avg.TTL Capital	//////////	8.29%	11.07%	//////////

* 1994 data excludes extraordinary gain on sale of Venice Gardens assets.

** Ratings based on Standard & Poor's 1994 water industry benchmarks, exclusive of business position assessment.

EXHIBIT ____ (RAM-9)

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S&P UTILITY BENCHMARKS

FFO/TOTAL DEBT

	AA			A			BBB			BB		
	above	ave	below	above	ave	below	above	ave	below	above	ave	below
water	19	25		15	21	27	10	15	20	7	9	12
electric	26	32		19	25	34	14	19	29	11	13	20
g. dist.	27	33		20	26	32	15	20	27	12	14	18
g. pipes	32	37		25	30	34	19	24	29	16	18	20

FFO INTEREST COVERAGE

	AA			A			BBB			BB		
	above	ave	below	above	ave	below	above	ave	below	above	ave	below
water	3.00	3.50		2.50	3.25	4.00	1.50	2.25	3.00	1.00	1.25	1.75
electric	4.00	4.50		3.25	4.00	5.00	2.25	3.00	4.00	1.75	2.00	2.75
g. dist.	4.25	4.75		3.50	4.25	4.75	2.50	3.25	3.75	2.00	2.25	2.50
g. pipes	4.50	5.00		3.75	4.50	5.00	2.75	3.50	4.00	2.25	2.50	2.75

PRETAX INTEREST COVERAGE

	AA			A			BBB			BB		
	above	ave	below	above	ave	below	above	ave	below	above	ave	below
water	2.75	3.25		2.25	3.00	3.75	1.25	2.00	2.75	0.75	1.00	1.50
electric	3.50	4.00		2.75	3.50	4.50	1.75	2.50	3.50	1.25	1.75	2.50
g. dist.	3.75	4.25		3.00	3.75	4.25	2.00	2.75	3.25	1.50	2.00	2.25
g. pipes	4.00	4.50		3.25	4.00	4.50	2.25	3.00	3.50	1.75	2.25	2.50

TOTAL DEBT / TOTAL CAPITAL

	AA			A			BBB			BB		
	above	ave	below	above	ave	below	above	ave	below	above	ave	below
water	52	48		56	52	48	64	59	54	70	65	60
electric	47	42		52	47	41	59	54	48	65	60	54
g. dist.	46	41		51	46	42	58	53	49	64	59	55
g. pipes	44	39		49	44	41	56	51	48	62	57	54

NCF / CAPITAL SPENDING

	AA			A			BBB			BB		
	above	ave	below	above	ave	below	above	ave	below	above	ave	below
water	75	95		60	75	90	35	50	65	20	30	40
electric	90	110		70	85	105	45	60	80	30	40	60
g. dist.	95	115		75	90	100	50	65	75	35	45	55
g. pipes	105	125		80	95	105	60	70	80	40	50	60

EXHIBIT (RAM-1C)

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COST OF TOTAL CAPITAL FOR THE AVERAGE FWU AT 40% COMMON EQUITY RATIO

Type of Capital	Weight	Cost	Weighted Cost	Tax Factor	Overall Return
Debt	60.00%	8.80%	5.28%	1.00	5.28%
Equity	40.00%	11.34%	4.53%	1.52	6.89%
	100.00%		9.81%		12.17%
			INTEREST COVERAGE		2.30

EXHIBIT (RAM-11)

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ADJUSTMENT	BASIS POINTS
ADD CAPM	40
CORRECT DCF ERROR	10
ALLOW FOR WATER-GAS PREMIUM	15
ALLOW FOR MARKETABILITY PREMIUM	50
TOTAL ADJUSTMENTS	115