BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF SOUTH DAKOTA

IN RE:	)	
MIDAMERICAN ENERGY COMPANY	)	
	)	**DOCKET NO. NG14-XX**
	)	

DIRECT TESTIMONY
OF
JAMES H. VANDER WEIDE

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I. INTRODUCTION AND PURPOSE

Q. Please state your name, title, and business address.

A. My name is James H. Vander Weide. I am President of Financial Strategy Associates, a firm that provides strategic and financial consulting services to business clients. My business address is 3606 Stoneybrook Drive, Durham, North Carolina 27705.

Q. Please describe your educational background and prior academic experience.

A. I graduated from Cornell University with a Bachelor's Degree in Economics and from Northwestern University with a Ph.D. in Finance. After joining the faculty of the School of Business at Duke University, I was named Assistant Professor, Associate Professor, Professor, and then Research Professor. I have published research in the areas of finance and economics and taught courses in these fields at Duke for more than thirty-five years. I am now retired from my teaching duties at Duke. A summary of my research, teaching, and other professional experience is presented in Appendix 1.

Q. Have you previously testified on financial or economic issues?

A. Yes. As an expert on financial and economic theory and practice, I have participated in more than four hundred regulatory and legal proceedings before the public service commissions of forty-five states and four Canadian provinces, the Federal Energy Regulatory Commission, the National Energy Board (Canada), the Federal Communications Commission, the Canadian Radio-Television and Telecommunications Commission, the U.S. Congress, the National Telecommunications and Information Administration, the insurance commissions of five states, the Iowa State Board of Tax Review, the National Association of Securities Dealers, and the North Carolina Property Tax Commission. In addition, I have prepared expert testimony in proceedings before the

U.S. District Court for the District of Nebraska; the U.S. District Court for the District of New Hampshire; the U.S. District Court for the District of Northern Illinois; the U.S. District Court for the Eastern District of North Carolina; the Montana Second Judicial District Court, Silver Bow County; the U.S. District Court for the Northern District of California; the Superior Court, North Carolina; the U.S. Bankruptcy Court for the Southern District of West Virginia; the U. S. District Court for the Eastern District of Michigan; and the Supreme Court of the State of New York.

Q. What is the purpose of your testimony in this proceeding?

A. I have been asked by MidAmerican Energy Company ("MidAmerican" or "the Company") to prepare an independent appraisal of the cost of equity for the Company's regulated natural gas operations in South Dakota and to recommend to the South Dakota Public Utilities Commission ("the Commission") a rate of return on equity for the Company's natural gas operations that is fair, that allows the Company to attract capital on reasonable terms, and that allows the Company to maintain their financial integrity.

II. SUMMARY OF TESTIMONY

Q. How do you estimate the cost of equity for the Company's natural gas operations?

A. I estimate the cost of equity for the Company's natural gas operations by applying several standard cost of equity methods to market data for a group of natural gas utilities of comparable risk.

Q. Why do you apply your cost of equity methods to a group of comparable risk companies rather than solely to the Company?

A. I apply my cost of equity methods to a group of comparable risk companies because: (1) the Company is not publicly-traded; and (2) standard cost of equity methods such as the discounted cash flow ("DCF"), risk premium, and capital asset pricing model

("CAPM") require inputs of quantities that are not easily measured. Since these inputs can only be estimated, there is naturally some degree of uncertainty surrounding the estimate of the cost of equity for each company. However, the uncertainty in the estimate of the cost of equity for an individual company can be greatly reduced by applying cost of equity methods to a large sample of comparable companies. Intuitively, unusually high estimates for some individual companies are offset by unusually low estimates for other individual companies. Thus, financial economists invariably apply cost of equity methods to one or more groups of comparable companies. In utility regulation, the practice of using comparable companies, called the comparable company approach, is further supported by the United States Supreme Court standard that the utility should be allowed to earn a return on its investment that is commensurate with returns being earned on other investments of the same risk.

Q. What cost of equity do you find for the comparable companies in this proceeding?

A. On the basis of my studies, I find that the cost of equity for the comparable natural gas utilities is 10.6 percent. This conclusion is based on my application of standard cost of equity estimation techniques, including the DCF model, the ex ante risk premium approach, the ex post risk premium approach, and the CAPM, to a group of companies of comparable risk.

Q. Based on your cost of equity studies, what allowed rate of return on equity do you recommend for the Company's natural gas utility operations?

A. I conservatively recommend that the Company be allowed to earn a rate of return on equity of 10.6 percent on its natural gas utility operations in South Dakota. My recommended allowed rate of return on equity is conservative because it does not reflect

the higher financial risk implicit in the Company's rate making capital structure compared to the average financial risk of the proxy companies' market value capital structures. As I discuss below, the financial risk of the proxy companies depends on the market values of the debt and equity in the companies' capital structures.

Q. Do you have exhibits accompanying your testimony?

A. Yes. I have prepared or supervised the preparation of nine schedules and five appendices that accompany my testimony.

III. ECONOMIC AND LEGAL PRINCIPLES

Q. What is the economic definition of the cost of capital?

A. Economists define the cost of capital as the return investors expect to receive on alternative investments of comparable risk.

Q. What role does the cost of capital play in the allocation of capital in the capital markets?

A. The cost of capital is a hurdle rate, or cut-off rate, for investment in a company or project. If investors do not expect to earn a return on their investment in a company or project that is at least as large as the return they expect to receive on other investments of comparable risk, rational investors will not invest in the company or project.

Q. Do all investors have the same position in the firm?

A. No. Debt investors have a fixed claim on a firm's assets and income that must be paid prior to any payment to the firm's equity investors. Since the firm's equity investors have only a residual claim on the firm's assets and income, equity investments are riskier than debt investments. Thus, the cost of equity exceeds the cost of debt.

Q. What is the overall or average cost of capital?

A. The overall or average cost of capital is a weighted average of the cost of debt and cost of equity, where the weights are the percentages of debt and equity in a firm's capital structure.

Q. Can you illustrate the calculation of the overall or weighted average cost of capital?

A. Yes. Assume that the cost of debt is 7 percent, the cost of equity is 13 percent, and the percentages of debt and equity in the firm's capital structure are 50 percent and 50 percent, respectively. Then the weighted average cost of capital is expressed by 0.50 times 7 percent plus 0.50 times 13 percent, or 10.0 percent.

Q. How do economists define the cost of equity?

A. Economists define the cost of equity as the return investors expect to receive on alternative equity investments of comparable risk. Since the return on an equity investment of comparable risk is not a contractual return, the cost of equity is more difficult to measure than the cost of debt. However, as I have already noted, there is agreement among economists that the cost of equity is greater than the cost of debt. There is also agreement among economists that the cost of equity, like the cost of debt, is both forward looking and market based.

Q. How do economists measure the percentages of debt and equity in a firm's capital structure?

A. Economists measure the percentages of debt and equity in a firm's capital structure by first calculating the market value of the firm's debt and the market value of its equity. Economists then calculate the percentage of debt by the ratio of the market value of debt to the combined market value of debt and equity, and the percentage of equity by the ratio of the market value of equity to the combined market values of debt and equity. For

example, if a firm's debt has a market value of $25 million and its equity has a market value of $75 million, then its total market capitalization is $100 million, and its capital structure contains 25 percent debt and 75 percent equity.

Q. Why do economists measure a firm's capital structure in terms of the market values of its debt and equity?

A. Economists measure a firm's capital structure in terms of the market values of its debt and equity because: (1) the weighted average cost of capital is defined as the return investors expect to earn on a portfolio of the company's debt and equity securities; (2) investors measure the expected return and risk on their portfolios using market value weights, not book value weights; and (3) market values are the best measures of the amounts of debt and equity investors have invested in the company on a going forward basis.

Q. Why do investors measure the expected return and risk on their investment portfolios using market value weights rather than book value weights?

A. Investors measure the expected return and risk on their investment portfolios using market value weights because: (1) the expected return on a portfolio is calculated by comparing the expected value of the portfolio at the end of the investment period to its current value; (2) the risk of a portfolio is calculated by examining the variability of the return on the portfolio around its expected value; and (3) market values are the best measure of the current value of the portfolio. From the investor's point of view, the historical cost, or book value of their investment, is generally a poor indicator of the portfolio's current value.

Q. Is the economic definition of the weighted average cost of capital consistent with regulators' traditional definition of the average cost of capital?

A. No. The economic definition of the weighted average cost of capital is based on the market costs of debt and equity, the market value percentages of debt and equity in a company's capital structure, and the future expected risk of investing in the company. In contrast, regulators have traditionally defined the weighted average cost of capital using the embedded cost of debt and the book values of debt and equity in a company's capital structure.

Q. Will investors have an opportunity to earn a fair return on the value of their equity investment in the company if regulators calculate the weighted average cost of capital using the book value of equity in the company's capital structure?

A. No. Investors will only have an opportunity to earn a fair return on the value of their equity investment if regulators either calculate the weighted average cost of capital using the market value of equity in the company's capital structure or adjust the cost of equity for the difference in the financial risk reflected in the market value capital structures of the proxy companies and the financial risk reflected in the company's ratemaking capital structure.

Q. Are the economic principles regarding the fair return for capital recognized in any United States Supreme court cases?

A. Yes. These economic principles, relating to the supply of and demand for capital, are recognized in two United States Supreme Court cases: (1) *Bluefield Water Works and Improvement Co. v. Public Service Comm'n*.; and (2) *Federal Power Comm'n v. Hope Natural Gas Co*. In the *Bluefield Water Works* case, the Court stated:

> A public utility is entitled to such rates as will permit it to earn a return upon 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; but it has no constitutional right to profits such as are realized or anticipated in highly profitable enterprises or speculative ventures. The return should be reasonably 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 the money necessary for the proper discharge of its public duties. [*Bluefield Water Works and Improvement Co. v. Public Service Comm'n.* 262 U.S. 679, 692 (1923).]

The Court clearly recognizes here that: (1) a regulated firm cannot remain financially sound unless the return it is allowed to earn on the value of its property is at least equal to the cost of capital (the principle relating to the demand for capital); and (2) a regulated firm will not be able to attract capital if it does not offer investors an opportunity to earn a return on their investment equal to the return they expect to earn on other investments of the same risk (the principle relating to the supply of capital).

In the *Hope Natural Gas* case, the Court reiterates the financial soundness and capital attraction principles of the *Bluefield* case:

> 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 to attract capital. [*Federal Power Comm'n v. Hope Natural Gas Co*., 320 U.S. 591, 603 (1944).]

The Court clearly recognizes that the fair rate of return on equity should be: (1) comparable to returns investors expect to earn on other investments of similar risk; (2) sufficient to assure confidence in the company's financial integrity; and (3) adequate to maintain and support the company's credit and to attract capital.

IV. BUSINESS AND FINANCIAL RISKS

Q. How do investors estimate the expected rate of return on specific investments, such as an investment in MidAmerican's natural gas utility operations?

A. Investors estimate the expected rate of return in several steps. First, they estimate the amount of their investment in the company. Second, they estimate the timing and amounts of the cash flows they expect to receive from their investment over the life of the investment. Third, they determine the return, or discount rate, that equates the present value of the expected cash receipts from their investment in the company to the current value of their investment in the company.

Q. Are the returns on investment opportunities, such as an investment in MidAmerican's natural gas utility operations, known with certainty at the time the investment is made?

A. No. As discussed above, the return on an investment in MidAmerican's natural gas utility operations depends on the Company' expected future cash flows over the life of the Company's investments. Because the Company's expected future cash flows are uncertain at the time investments are made, the returns on investments are also uncertain.

Q. You mention that investors require a return on investment that is equal to the return they expect to receive on other investments of similar risk. Does the required return on an investment depend on the risk of that investment?

A. Yes. Since investors are averse to risk, they require a higher rate of return on investments with greater risk.

Q. What fundamental risk do investors face when they invest in natural gas utilities?

A. Investors face the fundamental risk that their realized, or actual, return on investment, will be less than their required return on investment.

Q. How do investors measure investment risk?

A. Investors generally measure investment risk by estimating the probability, or likelihood, of earning less than the required return on investment. For investments with potential returns distributed symmetrically about the expected, or mean, return, investors can also measure investment risk by estimating the variance, or volatility, of the potential return on investment.

Q. Do investors distinguish between business and financial risk?

A. Yes. Business risk is the underlying risk that investors will earn less than their required return on investment when the investment is financed entirely with equity. Financial risk is the additional risk of earning less than the required return when the investment is financed with both fixed-cost debt and equity.

Q. What are the primary determinants of a natural gas utility's business risk?

A. The business risk of investing in natural gas utility companies such as the Company is caused by: (1) demand uncertainty; (2) operating expense uncertainty; (3) investment cost uncertainty; (4) high operating leverage; and (5) regulatory uncertainty.

Q. What causes the demand for natural gas utility services to be uncertain?

A. Natural gas utilities experience demand uncertainty in both the short run and the long run. Short-run demand uncertainty is caused by the strong dependence of gas demand on the state of the economy and weather patterns. Long-run demand uncertainty is caused by: (a) the sensitivity of demand to changes in rates; (b) the efforts of customers to conserve energy; and (c) the potential development of new energy efficient technologies and appliances.

Q. How does short-run demand uncertainty affect a natural gas utility's business risk?

A. Short-run demand uncertainty affects a natural gas utility's business risk through its impact on the variability of the company's revenues and its return on investment. The greater the short-run uncertainty in demand the greater is the uncertainty in the company's yearly revenues and return on investment.

Q. How does long-run demand uncertainty affect a natural gas utility's business risk?

A. Long-run demand uncertainty affects a natural gas utility's business risk through its impact on the utility's revenues over the life of its plant investments. Long-run demand uncertainty creates greater risk for gas utilities because investments in gas utility infrastructure are long-lived. If demand turns out to be less than expected over the life of the investment, the utility may not be able to generate sufficient revenues over the life of the investment to cover its operating expenses and earn a fair return on its investment.

Q. Does the Company experience demand uncertainty?

A. Yes. The Company experiences demand uncertainty in both the short run and the long run. The Company experiences short-run demand uncertainty as a result of economic cycles, such as the recent recession, when fewer homes are built, fewer new businesses are started, and factories are running at less than full capacity; and as a result of weather patterns, such as unusually warm winters and cool summers. The Company experiences long-run demand uncertainty when it invests in major long-lived plant additions or replacements that are expected to remain in service over the next thirty or forty years. If future actual demand turns out to be less than forecast demand, the Company may not generate sufficient revenues to recover its investment and earn a fair return on investment.

Q. Why are a natural gas utility's operating expenses uncertain?

A. Factors that may create operating expense uncertainty for natural gas utilities include variability in: (1) purchased gas costs; (2) pipeline capacity costs; (3) employee-related costs such as salaries and wages, pensions, and insurance; (4) maintenance and materials costs; (5) customer billing and accounting expenses; and (6) bad debt expenses.

Q. Does the Company experience operating expense uncertainty?

A. Yes. The Company experiences both the typical operating expense uncertainty associated with its existing operations and the operating expense uncertainty associated with the future operations of major plant additions.

Q. Why are natural gas utility investment costs uncertain?

A. Gas utility operations require large investments in the storage and distribution facilities required to deliver natural gas to customers. The future amounts of required investments in storage and distribution facilities are uncertain as a result of uncertainty regarding: (a) long-run demand; (b) costs of complying with environmental, health, and safety laws and regulations; (c) costs to maintain and replace aging plant and equipment; and; (d) costs required to assure adequate natural gas supply to meet forecasted demand. Furthermore, the risk of investing in utility facilities is increased by the irreversible nature of utilities' investments in utility plant and equipment. For example, if a utility decides to invest in a new distribution plant to serve a new neighborhood, and, as a result of a changing economy, fewer housing units are built in the neighborhood, the utility may not be able earn a fair return on equity, including both a return of and a return on capital.

Q. You note above that high operating leverage contributes to the business risk of gas utilities. What is operating leverage?

A. Operating leverage is the increased sensitivity of a company's earnings to sales variability that arises when some of the company's costs are fixed.

Q. How do economists measure operating leverage?

A. Economists typically measure operating leverage by the ratio of a company's fixed expenses to its operating margin (revenues minus variable expenses).

Q. What is the difference between fixed and variable expenses?

A. Fixed expenses are expenses that do not vary with output, and variable expenses are expenses that vary directly with output. For natural gas utilities, fixed expenses include the fixed component of operating and maintenance costs, depreciation and amortization, and taxes.

Q. Do natural gas utilities experience high operating leverage?

A. Yes. As noted above, operating leverage increases when a firm's commitment to fixed costs rises in relation to its operating margin on sales. The relatively high degree of fixed costs in the natural gas utility business arises primarily from: (1) the average natural gas utility's large investment in fixed plant and equipment; and (2) the relative "fixity" of a natural gas utility's operating and maintenance costs. High operating leverage causes the average natural gas utility's operating income to be highly sensitive to demand and revenue fluctuations.

Q. How does operating leverage affect a company's business risk?

A. Operating leverage affects a company's business risk through its impact on the variability of the company's profits or income. Generally speaking, the higher a company's operating leverage, the higher is the variability of the company's operating profits.

Q. Does regulation create uncertainty for natural gas utilities?

A. Yes. Investors' perceptions of the business and financial risks of natural gas utilities are strongly influenced by their views of the quality of regulation. Investors are aware that regulators in some jurisdictions have been unwilling at times to set rates that allow companies an opportunity to recover their cost of service in a timely manner and earn a fair and reasonable return on investment. As a result of the perceived increase in regulatory risk, investors will demand a higher rate of return for natural gas utilities operating in those jurisdictions. On the other hand, if investors perceive that regulators will provide a reasonable opportunity for the company to maintain its financial integrity and earn a fair rate of return on its investment, investors will view regulatory risk as minimal.

Q. You note that financial leverage increases the risk of investing in utilities such as the Company. How do economists measure financial leverage?

A. Economists generally measure financial leverage by the percentages of debt and equity in a company's market value capital structure. Companies with a high percentage of debt compared to equity are considered to have high financial leverage.

Q. Why does financial leverage affect the risk of investing in a utility's stock?

A. High debt leverage is a source of additional risk to utility stock investors because it increases the percentage of the firm's costs that are fixed, and the presence of higher fixed costs increases the variability of the equity investors' return on investment.

Q. Can the risks facing utilities such as the Company be distinguished from the risks of investing in companies in other industries?

A. Yes. The risks of investing in utilities such as the Company can be distinguished from the risks of investing in companies in many other industries in several ways. First, the risks

of investing in utilities are increased because of the greater capital intensity of the utility business and because most investments in utility plant and equipment are largely irreversible once they are made. Second, unlike returns in competitive industries, the returns from investments in utilities such as the Company are largely asymmetric. That is, there is little opportunity for the utility to earn more than its required return, but a significant chance that the utility will earn less than its required return.

V. COST OF EQUITY ESTIMATION METHODS

Q. What methods do you use to estimate the cost of equity for the Company's natural gas operations?

A. I use several generally accepted methods for estimating the cost of equity for the Company's natural gas operations. These are the DCF, the ex ante risk premium, the ex post risk premium, and the CAPM. The DCF method assumes that the current market price of a firm's stock is equal to the discounted value of all expected future cash flows. The ex ante risk premium method assumes that an investor's expectations regarding the equity risk premium can be estimated from data on the DCF expected rate of return on equity compared to the interest rate on long-term bonds. The ex post risk premium method assumes that an investor's expectations regarding the equity-debt return differential are influenced by the historical record of comparable returns on stock and bond investments. The cost of equity under both risk premium methods is then equal to the expected interest rate on bond investments plus the expected risk premium. The CAPM assumes that the investor's required rate of return on equity is equal to an expected risk-free rate of interest plus the product of a company-specific risk factor, beta, and the expected risk premium on the market portfolio.

A. DISCOUNTED CASH FLOW METHOD

Q. Please describe the DCF model.

A. The DCF model is based on the assumption that investors value an asset because they expect to receive a sequence of cash flows from owning the asset. Thus, investors value an investment in a bond because they expect to receive a sequence of semi-annual coupon payments over the life of the bond and a terminal payment equal to the bond's face value at the time the bond matures. Likewise, investors value an investment in a firm's stock because they expect to receive a sequence of dividend payments and, perhaps, expect to sell the stock at a higher price sometime in the future.

A second fundamental principle of the DCF method is that investors value a dollar received in the future less than a dollar received today. A future dollar is valued less than a current dollar because investors could invest a current dollar in an interest earning account and increase their wealth. This principle is called the time value of money.

Applying the two fundamental DCF principles noted above to an investment in a bond leads to the conclusion that investors value their investment in the bond on the basis of the present value of the bond's future cash flows. Thus, the price of the bond should be equal to:

EQUATION 1

$$P_B = \frac{C}{(1+i)} + \frac{C}{(1+i)^2} + \ldots + \frac{C+F}{(1+i)^n}$$

where:

P_B = Bond price;

C	=	Cash value of the coupon payment (assumed for notational convenience to occur annually rather than semi-annually);
F	=	Face value of the bond;
i	=	The rate of interest the investor could earn by investing his money in an alternative bond of equal risk; and
n	=	The number of periods before the bond matures.

Applying these same principles to an investment in a firm's stock suggests that the price of the stock should be equal to:

EQUATION 2

$$P_s = \frac{D_1}{(1+k)} + \frac{D_2}{(1+k)^2} + \cdots + \frac{D_n + P_n}{(1+k)^n}$$

where:

P_S	=	Current price of the firm's stock;
$D_1, D_2 \ldots D_n$	=	Expected annual dividend per share on the firm's stock;
P_n	=	Price per share of stock at the time the investor expects to sell the stock; and
k	=	Return the investor expects to earn on alternative investments of the same risk, i.e., the investor's required rate of return.

Equation (2) is frequently called the annual discounted cash flow model of stock valuation. Assuming that dividends grow at a constant annual rate, g, this equation can be solved for k, the cost of equity. The resulting cost of equity equation is $k = D_1/P_s + g$, where k is the cost of equity, D_1 is the expected next period annual dividend, P_s is the current price of the stock, and g is the constant annual growth rate in earnings, dividends, and book value per share. The term D_1/P_s is called the expected dividend yield component of the annual DCF model, and the term g is called the expected growth component of the annual DCF model.

Q. Are you recommending that the annual DCF model be used to estimate the cost of equity for MidAmerican's natural gas utility operations?

A. No. The DCF model assumes that a company's stock price is equal to the present discounted value of all expected future dividends. The annual DCF model is only a correct expression of the present value of future dividends if dividends are paid annually at the end of each year. Since the companies in my comparable group all pay dividends quarterly, the current market price that investors are willing to pay reflects the expected quarterly receipt of dividends. Therefore, a quarterly DCF model should be used to estimate the cost of equity for these firms. The quarterly DCF model differs from the annual DCF model in that it expresses a company's stock price as the present value of a quarterly stream of dividend payments. A complete analysis of the implications of the quarterly payment of dividends on the DCF model is provided in Appendix 2. For the reasons cited there, I employed the quarterly DCF model throughout my calculations, even though the results of the quarterly DCF model for my companies are approximately equal to the results of a properly applied annual DCF model.

Q. Please describe the quarterly DCF model you use.

A. The quarterly DCF model I use is described on Schedule 1 and in Appendix 2. The quarterly DCF equation shows that the cost of equity is: the sum of the future expected dividend yield and the growth rate, where the dividend in the dividend yield is the equivalent future value of the four quarterly dividends at the end of the year, and the growth rate is the expected growth in dividends or earnings per share.

Q. How do you estimate the quarterly dividend payments in your quarterly DCF model?

A. The quarterly DCF model requires an estimate of the dividends, d_1, d_2, d_3, and d_4, investors expect to receive over the next four quarters. I estimate the next four quarterly dividends by multiplying the previous four quarterly dividends by (1 + g), where *g* is the expected growth rate.

Q. Can you illustrate how you estimate the next four quarterly dividends with data for a specific company?

A. Yes. In the case of AGL Resources, the first natural gas utility shown in Schedule 1, each of the last four quarterly dividends are equal to 0.47, 0.47, 0.47, and 0.49 and the growth rate is 4.0 percent. Thus dividends, d_1, d_2, d_3, and d_4 are equal to 0.489, 0.489, 0.489, and 0.510 [0.47 x (1 + .04) = .489 and 0.49 x (1 + 0.04) = 0.510]. (As noted previously, the logic underlying this procedure is described in Appendix 2.)

Q. How do you estimate the growth component of the quarterly DCF model?

A. I use the analysts' estimates of future earnings per share (EPS) growth reported by I/B/E/S Thomson Reuters.

Q. What are the analysts' estimates of future EPS growth?

A. As part of their research, financial analysts working at Wall Street firms periodically estimate EPS growth for each firm they follow. The EPS forecasts for each firm are then published. Investors who are contemplating purchasing or selling shares in individual companies review the forecasts. These estimates represent three to five-year forecasts of EPS growth.

Q. What is I/B/E/S?

A. I/B/E/S is a division of Thomson Reuters that reports analysts' EPS growth forecasts for a broad group of companies. The forecasts are expressed in terms of a mean forecast and

a standard deviation of forecast for each firm. Investors use the mean forecast as an estimate of future firm performance.

Q. Why do you use the I/B/E/S growth estimates?

A. The I/B/E/S growth rates: (1) are widely circulated in the financial community, (2) include the projections of reputable financial analysts who develop estimates of future EPS growth, (3) are reported on a timely basis to investors, and (4) are widely used by institutional and other investors.

Q. Why do you rely on analysts' projections of future EPS growth in estimating the investors' expected growth rate rather than looking at past historical growth rates?

A. I rely on analysts' projections of future EPS growth because there is considerable empirical evidence that investors use analysts' forecasts to estimate future earnings growth.

Q. Have you performed any studies concerning the use of analysts' forecasts as an estimate of investors' expected growth rate, g?

A. Yes. I prepared a study with Willard T. Carleton, Professor Emeritus of Finance at the University of Arizona, which is described in a paper entitled "Investor Growth Expectations and Stock Prices: the Analysts versus History," published in the Spring 1988 edition of *The Journal of Portfolio Management*.

Q. Please summarize the results of your study.

A. First, we performed a correlation analysis to identify the historically-oriented growth rates which best described a firm's stock price. Then we did a regression study comparing the historical growth rates with the average I/B/E/S analysts' forecasts. In every case, the regression equations containing the average of analysts' forecasts

statistically outperformed the regression equations containing the historical growth estimates. These results are consistent with those found by Cragg and Malkiel, the early major research in this area (John G. Cragg and Burton G. Malkiel, *Expectations and the Structure of Share Prices*, University of Chicago Press, 1982). These results are also consistent with the hypothesis that investors use analysts' forecasts, rather than historically-oriented or sustainable growth calculations, in making stock buy and sell decisions. They provide overwhelming evidence that the analysts' forecasts of future growth are superior to historically-oriented or sustainable growth measures in predicting a firm's stock price.

Q. Has your study been updated to include more recent data?

A. Yes. Researchers at State Street Financial Advisors updated my study using data through year-end 2003. Their results continue to confirm that analysts' growth forecasts are superior to historically-oriented growth measures in predicting a firm's stock price.

Q. What price do you use in your DCF model?

A. I use a simple average of the monthly high and low stock prices for each firm for the three-month period ending April 2014. These high and low stock prices were obtained from Thomson Reuters.

Q. Why do you use the three-month average stock price in applying the DCF method?

A. I use the three-month average stock price in applying the DCF method because stock prices fluctuate daily, while financial analysts' forecasts for a given company are generally changed less frequently, often on a quarterly basis. Thus, to match the stock price with an earnings forecast, it is appropriate to average stock prices over a three-month period.

Q. Do you include an allowance for flotation costs in your DCF analysis?

A. Yes. I include a 5 percent allowance for flotation costs in my DCF calculations.

Q. Please explain your inclusion of flotation costs.

A. All firms that have sold securities in the capital markets have incurred some level of flotation costs, including underwriters' commissions, legal fees, printing expense, etc. These costs are withheld from the proceeds of the stock sale or are paid separately, and must be recovered over the life of the equity issue. Costs vary depending upon the size of the issue, the type of registration method used and other factors, but in general these costs range between three percent and five percent of the proceeds from the issue [see Lee, Inmoo, Scott Lochhead, Jay Ritter, and Quanshui Zhao, "The Costs of Raising Capital," The Journal of Financial Research, Vol. XIX No 1 (Spring 1996), 59-74, and Clifford W. Smith, "Alternative Methods for Raising Capital," Journal of Financial Economics 5 (1977) 273-307]. In addition to these costs, for large equity issues (in relation to outstanding equity shares), there is likely to be a decline in price associated with the sale of shares to the public. On average, the decline due to market pressure has been estimated at two percent to three percent [see Richard H. Pettway, "The Effects of New Equity Sales upon Utility Share Prices," Public Utilities Fortnightly, May 10, 1984, 35—39]. Thus, the total flotation cost, including both issuance expense and market pressure, could range anywhere from five percent to eight percent of the proceeds of an equity issue. I believe a combined five percent allowance for flotation costs is a conservative estimate that should be used in applying the DCF model in these proceedings. A complete explanation of the need for flotation costs is contained in Appendix 3.

Q. How do you apply the DCF approach to estimate the required return on equity for MidAmerican's natural gas utility operations?

A. I apply the DCF approach to the Value Line natural gas utilities shown in Schedule 1.

Q. How do you select your natural gas utility company group?

A. I select all the natural gas utilities followed by Value Line that: (1) paid dividends during every quarter of the last two years; (2) did not decrease dividends during any quarter of the past two years; (3) have an I/B/E/S long-term growth forecast; and (4) are not the subject of a merger offer that has not been completed. In addition, each of the utilities included in my comparable group has an investment grade bond rating and a Value Line Safety Rank of 1, 2, or 3.

Q. Why do you eliminate companies that have either decreased or eliminated their dividend in the past two years?

A. The DCF model requires the assumption that dividends will grow at a constant rate into the indefinite future. If a company has either decreased or eliminated its dividend in recent years, an assumption that the company's dividend will grow at the same rate into the indefinite future is questionable.

Q. Why do you eliminate companies that are the subject of a merger offer that has not been completed?

A. A merger announcement can sometimes have a significant impact on a company's stock price because of anticipated merger-related cost savings and new market opportunities. Analysts' growth forecasts, on the other hand, are necessarily related to companies as they currently exist, and do not reflect investors' views of the potential cost savings and new market opportunities associated with mergers. The use of a stock price that includes

the value of potential mergers in conjunction with growth forecasts that do not include the growth enhancing prospects of potential mergers produces DCF results that tend to distort a company's cost of equity.

Q. Please summarize the results of your application of the DCF model to your natural gas utility group.

A. As shown on Schedule 1, I obtain an average DCF result of 9.6 percent for my natural gas utility group.

B. RISK PREMIUM METHOD

Q. Please describe the risk premium method of estimating the cost of equity.

A. The risk premium method is based on the principle that investors expect to earn a return on an equity investment that reflects a "premium" over the interest rate they expect to earn on an investment in bonds. This equity risk premium compensates equity investors for the additional risk they bear in making equity investments versus bond investments.

Q. Does the risk premium approach specify what debt instrument should be used to estimate the interest rate component in the methodology?

A. No. The risk premium approach can be implemented using virtually any debt instrument. However, the risk premium approach does require that the debt instrument used to estimate the risk premium be the same as the debt instrument used to calculate the interest rate component of the risk premium approach. For example, if the risk premium on equity is calculated by comparing the returns on stocks to the interest rate on A-rated utility bonds, then the interest rate on A-rated utility bonds must be used to estimate the interest rate component of the risk premium approach.

Q. Does the risk premium approach require that the same companies be used to estimate the stock return as are used to estimate the bond return?

A. No. For example, many analysts apply the risk premium approach by comparing the return on a portfolio of stocks to the income return on Treasury securities such as long-term Treasury bonds. Clearly, in this widely accepted application of the risk premium approach, the same companies are not used to estimate the stock return as are used to estimate the bond return, since the U.S. government is not a company.

Q. How do you measure the required risk premium on an equity investment in your group of publicly-traded gas utilities?

A. I use two methods to estimate the required risk premium on an equity investment in gas utilities. The first is called the ex ante risk premium method and the second is called the ex post risk premium method.

1. Ex Ante Risk Premium Method

Q. Please describe your ex ante risk premium approach for measuring the required risk premium on an equity investment in natural gas utilities.

A. My ex ante risk premium method is based on studies of the DCF expected return on a group of natural gas utilities compared to the interest rate on Moody's A-rated utility bonds. Specifically, for each month in my study period, I calculate the risk premium using the equation,

$$RP_{PROXY} = DCF_{PROXY} - I_A$$

where:

RP_{PROXY}	=	the required risk premium on an equity investment in the proxy group of companies,
DCF_{PROXY}	=	average DCF estimated cost of equity on a portfolio of proxy companies; and
I_A	=	the yield to maturity on an investment in A-rated utility bonds.

I then perform a regression analysis to determine if there is a relationship between the calculated risk premium and interest rates. Finally, I use the results of the regression analysis to estimate the investors' required risk premium. To estimate the cost of equity, I then add the required risk premium to the forecasted interest rate on A-rated utility bonds. As noted above, one could use the yield to maturity on other debt investments to measure the interest rate component of the risk premium approach as long as one uses the yield on the same debt investment to measure the expected risk premium component of the risk premium approach. I choose to use the yield on A-rated utility bonds because it is a frequently-used benchmark for utility bond yields. A detailed description of my ex ante risk premium studies is contained in Appendix 4, and the underlying DCF results and interest rates are displayed in Schedule 2.

Q. What costs of equity do you obtain from your ex ante risk premium method?

A. As discussed above, to estimate the cost of equity using the ex ante risk premium method, one may add the estimated risk premium over the yield on A-rated utility bonds to the forecasted yield to maturity on A-rated utility bonds. I obtain the expected yield to maturity on A-rated utility bonds, 6.43 percent, by averaging the most recent forecast data from Value Line and the U.S. Energy Information Administration ("EIA"). My analyses produce an estimated risk premium over the yield on A-rated utility bonds equal

to 4.83 percent. Adding an estimated risk premium of 4.83 percent to the expected 6.43 percent yield to maturity on A-rated utility bonds produces a cost of equity estimate of 11.3 percent using the ex ante risk premium method.

Q. How do you obtain the expected yield on A-rated utility bonds?

A. I obtain the expected yield to maturity on A-rated utility bonds, 6.4 percent, by averaging forecast data from Value Line and the EIA. Value Line Selection & Opinion (February 21, 2014) projects a AAA-rated Corporate bond yield equal to 6.0 percent. The April 2014 average spread between A-rated utility bonds and Aaa-rated Corporate bonds is 17 basis points (A-rated utility, 4.41 percent, less Aaa-rated Corporate, 4.24 percent, equals 17 basis points). Adding 17 basis points to the 6.0 percent Value Line AAA Corporate bond yield forecast equals a forecast yield of 6.17 percent for the A-rated utility bonds.

The EIA forecasts an AA-rated utility bond yield equal to 6.58 percent. The average spread between AA-rated utility and A-rated utility bonds at April 2014 is 11 basis points (4.41 percent less 4.30 percent). Adding 11 basis points to EIA's 6.58 percent AA-utility bond yield forecast equals a forecast yield for A-rated utility bonds equal to 6.69 percent. The average of the forecasts (6.2 percent using Value Line data and 6.7 percent using EIA data) is 6.4 percent.

Q. Why do you use a forecasted yield to maturity on A-rated utility bonds rather than a current yield to maturity?

A. I use a forecasted yield to maturity on A-rated utility bonds rather than a current yield to maturity because the fair rate of return standard requires that a company have an opportunity to earn its required return on its investment during the forward-looking

period during which rates will be in effect. In addition, because current interest rates are depressed as a result of the Federal Reserve's extraordinary efforts to keep interest rates low in order to stimulate the economy, current interest rates at this time are a poor indicator of expected future interest rates. Economists project that future interest rates will be higher than current interest rates as the Federal Reserve allows interest rates to rise in order to prevent inflation. Thus, the use of forecasted interest rates is consistent with the fair rate of return standard, whereas the use of current interest rates at this time is not.

2. Ex Post Risk Premium Method

Q. Please describe your ex post risk premium method for measuring the required risk premium on an equity investment in natural gas utilities.

A. I first perform a study of the comparable returns received by bond and stock investors over the seventy-seven years of my study. I estimate the returns on stock and bond portfolios, using stock price and dividend yield data on the S&P 500 and bond yield data on Moody's A-rated Utility Bonds. My study consists of making an investment of one dollar in the S&P 500 and Moody's A-rated utility bonds at the beginning of 1937, and reinvesting the principal plus return each year to 2014. The return associated with each stock portfolio is the sum of the annual dividend yield and capital gain (or loss) which accrued to this portfolio during the year(s) in which it was held. The return associated with the bond portfolio, on the other hand, is the sum of the annual coupon yield and capital gain (or loss) which accrued to the bond portfolio during the year(s) in which it was held. The resulting annual returns on the stock and bond portfolios purchased in each year between 1937 and 2014 are shown on Schedule 3. The average annual return on an

investment in the S&P 500 stock portfolio is 11.3 percent, while the average annual return on an investment in the Moody's A-rated utility bond portfolio is 6.6 percent. The risk premium on the S&P 500 stock portfolio is, therefore, 4.7 percent.

I also conduct a second study using stock data on the S&P Utilities rather than the S&P 500. As shown on Schedule 4, the average annual return on the S&P Utility stock portfolio is 10.5 percent per year. Thus, the return on the S&P Utility stock portfolio exceeds the return on the Moody's A-rated utility bond portfolio by 3.9 percent.

Q. Why is it appropriate to perform your ex post risk premium analysis using both the S&P 500 and the S&P Utilities stock indices?

A. I perform my ex post risk premium analysis on both the S&P 500 and the S&P Utilities because I believe natural gas companies today face risks that are somewhere in between the average risk of the S&P Utilities and the S&P 500 over the years 1937 to 2014. Thus, I use the average of the two historically-based risk premiums as my estimate of the required risk premium for the Company in my ex post risk premium method.

Q. Would your study provide a different risk premium if you started with a different time period?

A. Yes. The risk premium results vary somewhat depending on the historical time period chosen. My policy is to go back as far in history as I could get reliable data. I thought it would be most meaningful to begin after the passage and implementation of the Public Utility Holding Company Act of 1935. This Act significantly changed the structure of the public utility industry. Because the Public Utility Holding Company Act of 1935 was not implemented until the beginning of 1937, I felt that numbers taken from before this date would not be comparable to those taken after. (The repeal of the 1935 Act has not

materially impacted the structure of the public utility industry; thus, the Act's repeal does not have any impact on my choice of time period.)

Q. Why is it necessary to examine the yield from debt investments in order to determine the investors' required rate of return on equity capital?

A. As previously explained, investors expect to earn a return on their equity investment that exceeds currently available bond yields because the return on equity, as a residual return, is less certain than the yield on bonds; and investors must be compensated for this uncertainty. Investors' expectations concerning the amount by which the return on equity will exceed the bond yield may be influenced by historical differences in returns to bond and stock investors. Thus, we can estimate investors' expected returns from an equity investment from information about past differences between returns on stocks and bonds. In interpreting this information, investors would also recognize that risk premiums increase when interest rates are low.

Q. What conclusions do you draw from your ex post risk premium analyses about the required return on an equity investment in natural gas utilities?

A. My studies provide evidence that investors today require an equity return of at least 3.9 to 4.7 percentage points above the expected yield on A-rated utility bonds. As discussed above, the expected yield on A-rated utility bonds is 6.4 percent. Adding a 3.9 to 4.7 percentage point risk premium to a yield of 6.4 percent on A-rated utility bonds, I obtain an expected return on equity in the range 10.3 percent to 11.1 percent, with a midpoint estimate equal to 10.7 percent. Adding a twenty-one basis point allowance for flotation costs, I obtain an estimate of 10.9 percent as the ex post risk premium cost of

equity. (I determine the flotation cost allowance by calculating the difference in my DCF results with and without a flotation cost allowance.)

C. CAPITAL ASSET PRICING MODEL

Q. What is the CAPM?

A. The CAPM is an equilibrium model of the security markets in which the expected or required return on a given security is equal to the risk-free rate of interest, plus the company equity "beta," times the market risk premium:

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

The risk-free rate in this equation is the expected rate of return on a risk-free government security, the equity beta is a measure of the company's risk relative to the market as a whole, and the market risk premium is the premium investors require to invest in the market basket of all securities compared to the risk-free security.

Q. How do you use the CAPM to estimate the cost of equity for your proxy companies?

A. The CAPM requires an estimate of the risk-free rate, the company-specific risk factor or beta, and the expected return on the market portfolio. For my estimate of the risk-free rate, I use a forecasted yield to maturity on 20-year Treasury bonds of 4.57 percent, obtained using data from Value Line and EIA. For my estimate of the company-specific risk, or beta, I use the average 0.77 Value Line beta for my group of natural gas utilities. For my estimate of the expected risk premium on the market portfolio, I use two approaches. First, I estimate the risk premium on the market portfolio using historical risk premium data reported by Ibbotson® SBBI® 2014 Yearbook for the years 1926 through 2013. Second, I estimate the risk premium on the market portfolio from the difference

between the DCF cost of equity for the S&P 500 and the forecasted yield to maturity on 20-year Treasury bonds.

Q. How do you obtain the forecasted yield to maturity on 20-year Treasury bonds?

A. As noted above, I use data from Value Line and EIA to obtain a forecasted yield to maturity on 20-year Treasury bonds. Value Line forecasts a yield on 10-year Treasury notes equal to 4.3 percent. The current spread between the average April 2014 yield on 10-year Treasury notes (2.71 percent) and 20-year Treasury bonds (3.12 percent) is 41 basis points. Adding 41 basis points to Value Line's 4.3 percent forecasted yield on 10-year Treasury notes produces a forecasted yield of 4.71 percent for 20-year Treasury bonds (see Value Line Investment Survey, Selection & Opinion, February 21, 2014). EIA forecasts a yield of 4.16 percent on 10-year Treasury notes. Adding the 41 basis point spread between 10-year Treasury notes and 20-year Treasury bonds to the EIA forecast of 4.16 percent for 10-year Treasury notes produces an EIA forecast for 20-year Treasury bonds equal to 4.57 percent. The average of the forecasts is 4.64 percent (4.71 percent using Value Line data and 4.57 percent using EIA data).

1. Historical CAPM

Q. How do you estimate the expected risk premium on the market portfolio using historical risk premium data reported by Ibbotson® SBBI®?

A. I estimate the expected risk premium on the market portfolio by calculating the difference between the arithmetic mean total return on the S&P 500 from 1926 to 2014 (12.05 percent) and the average income return on 20-year U.S. Treasury bonds over the same period (5.08 percent). Thus, my historical risk premium method produces a risk premium of 7.0 percent (12.05 – 5.08 = 7.0).

Q. Why do you recommend that the risk premium on the market portfolio be estimated using the arithmetic mean return on the S&P 500?

A. As explained in Ibbotson® SBBI®, the arithmetic mean return is the best approach for calculating the return investors expect to receive in the future:

> The equity risk premium data presented in this book are arithmetic average risk premia as opposed to geometric average risk premia. The arithmetic average equity risk premium can be demonstrated to be most appropriate when discounting future cash flows. For use as the expected equity risk premium in either the CAPM or the building block approach, the arithmetic mean or the simple difference of the arithmetic means of stock market returns and riskless rates is the relevant number. This is because both the CAPM and the building block approach are additive models, in which the cost of capital is the sum of its parts. The geometric average is more appropriate for reporting past performance, since it represents the compound average return. [Ibbotson® SBBI® 2013 Valuation Yearbook at 56.]

A discussion of the importance of using arithmetic mean returns in the context of CAPM or risk premium studies is contained in Schedule 5.

Q. Why do you recommend that the risk premium on the market portfolio be measured using the income return on 20-year Treasury bonds rather than the total return on these bonds?

A. As discussed above, the CAPM requires an estimate of the risk-free rate of interest. When Treasury bonds are issued, the income return on the bond is risk free, but the total return, which includes both income and capital gains or losses, is not. Thus, the income return should be used in the CAPM because it is only the income return that is risk free.

Q. What CAPM result do you obtain when you estimate the expected risk premium on the market portfolio from the arithmetic mean difference between the return on the market and the yield on 20-year Treasury bonds?

A. Using a risk-free rate equal to 4.64 percent, a gas utility beta equal to 0.77, a risk premium on the market portfolio equal to 7.0 percent, and a flotation cost allowance equal to 20 basis points, I obtain an historical CAPM estimate of the cost of equity equal to 10.2 percent for my gas utility group (4.64 + 0.77 x 7.0 + 0.20 = 10.2) (see Schedule 6).

Q. Is there any evidence from the finance literature that the application of the historical CAPM may underestimate the cost of equity?

A. Yes. There is substantial evidence that: (1) the historical CAPM tends to underestimate the cost of equity for companies whose equity beta is less than 1.0; and (2) the CAPM is less reliable the further the estimated beta is from 1.0.

Q. What is the evidence that the CAPM tends to underestimate the cost of equity for companies with betas less than 1.0 and is less reliable the further the estimated beta is from 1.0?

A. The original evidence that the unadjusted CAPM tends to underestimate the cost of equity for companies whose equity beta is less than 1.0 and is less reliable the further the estimated beta is from 1.0 was presented in a paper by Black, Jensen, and Scholes, "The Capital Asset Pricing Model: Some Empirical Tests." Numerous subsequent papers have validated the Black, Jensen, and Scholes findings, including those by Litzenberger and Ramaswamy (1979), Banz (1981), Fama and French (1992), Fama and French (2004), Fama and MacBeth (1973), and Jegadeesh and Titman (1993).[1]

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[1] Fischer Black, Michael C. Jensen, and Myron Scholes, "The Capital Asset Pricing Model: Some Empirical Tests," in *Studies in the Theory of Capital Markets*, M. Jensen, ed. New York: Praeger, 1972; Eugene Fama and James MacBeth, "Risk, Return, and Equilibrium: Empirical Tests," *Journal of Political Economy* 81 (1973), pp. 607-36; Robert Litzenberger and Krishna Ramaswamy, "The Effect of Personal Taxes and Dividends on Capital Asset Prices: Theory and Empirical Evidence," *Journal of Financial Economics* 7 (1979), pp. 163-95.; Rolf Banz, "The Relationship between Return and Market Value of Common Stocks," *Journal of Financial Economics* (March 1981), pp. 3-18; Eugene F. Fama and Kenneth R. French, "The Cross-Section of Expected Returns," *Journal of Finance* (June 1992),

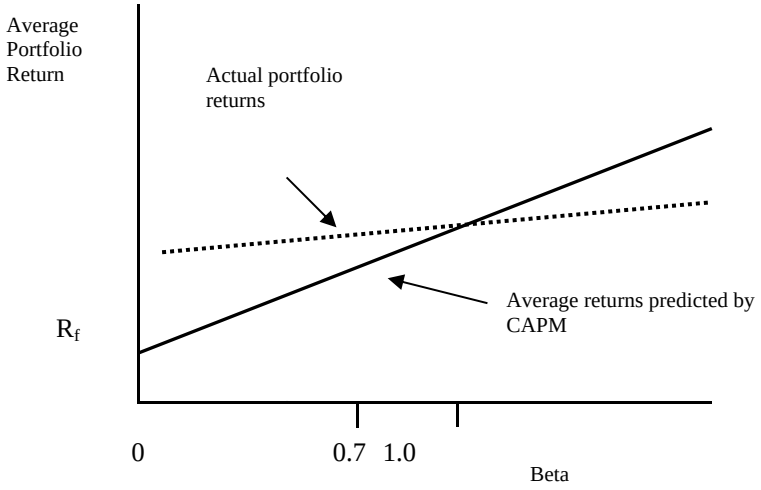
Q. Can you briefly summarize these articles?

A. Yes. The CAPM conjectures that security returns increase with increases in security betas in line with the equation:

$$ER_i = R_f + \beta_i \left[ER_m - R_f \right],$$

where ER_i is the expected return on security or portfolio i, R_f is the risk-free rate, $ER_m - R_f$ is the expected risk premium on the market portfolio, and β_i is a measure of the risk of investing in security or portfolio i (see Figure 1 below).

FIGURE 1
AVERAGE RETURNS COMPARED TO BETA
FOR PORTFOLIOS FORMED ON PRIOR BETA



Financial scholars have studied the relationship between estimated portfolio betas and the achieved returns on the underlying portfolio of securities to test whether the CAPM correctly predicts achieved returns in the marketplace. They find that the relationship between returns and betas is inconsistent with the relationship posited by the CAPM. As described in Fama and French (1992) and Fama and French (2004), the actual

47:2, pp. 427-465; Eugene F. Fama and Kenneth R. French, "The Capital Asset Pricing Model: Theory and Evidence," *The Journal of Economic Perspectives* (Summer 2004), 18:3, pp. 25 – 46; Narasimhan Jegadeesh and Sheridan Titman, "Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency," *The Journal of Finance*, Vol. 48, No. 1. (Mar., 1993), pp. 65-91.

relationship between portfolio betas and returns is shown by the dotted line in Figure 1 above. Although financial scholars disagree on the reasons why the return/beta relationship looks more like the dotted line in Figure 2 than the straight line, they generally agree that the dotted line lies above the straight line for portfolios with betas less than 1.0 and below the straight line for portfolios with betas greater than 1.0. Thus, in practice, scholars generally agree that the CAPM underestimates portfolio returns for companies with betas less than 1.0, and overestimates portfolio returns for portfolios with betas greater than 1.0.

Q. Do you have additional evidence that the CAPM tends to underestimate the cost of equity for utilities with average betas less than 1.0?

A. Yes. As shown in Schedule 7, over the period 1937 to 2014, investors in the S&P Utilities Stock Index have earned a risk premium over the yield on long-term Treasury bonds equal to 5.21 percent, while investors in the S&P 500 have earned a risk premium over the yield on long-term Treasury bonds equal to 6.00 percent. According to the CAPM, investors in utility stocks should expect to earn a risk premium over the yield on long-term Treasury securities equal to the average utility beta times the expected risk premium on the S&P 500. Thus, the ratio of the risk premium on the utility portfolio to the risk premium on the S&P 500 should equal the utility beta. However, the average natural gas utility beta at the time of my studies is approximately 0.77, whereas the historical ratio of the utility risk premium to the S&P 500 risk premium is 0.87 (5.21 ÷ 6.00 = 0.87). In short, the current 0.77 measured beta for gas utilities significantly underestimates the cost of equity for the utilities, providing further support for the conclusion that the CAPM underestimates the cost of equity for utilities at this time.

Q. Can you adjust for the tendency of the CAPM to underestimate the cost of equity for companies with betas significantly less than 1.0?

A. Yes. I can implement the CAPM using the 0.87 beta I discuss above, which I obtain by comparing the historical returns on utilities to historical returns on the S&P 500.

Q. What CAPM result do you obtain when you use a beta equal to 0.87 rather than an natural gas utility beta equal to 0.77?

A. I obtain a CAPM result equal to 10.9 percent using a risk free rate equal to 4.64 percent, a beta equal to 0.87, the historical market risk premium equal to 7.0 percent, and a flotation cost allowance of 20 basis points (4.64 + 0.87 x 7.0+ 0.20= 10.9). (*See* Schedule 8.)

2. DCF-Based CAPM

Q. How does your DCF-Based CAPM differ from your historical CAPM?

A. As noted above, my DCF-based CAPM differs from my historical CAPM only in the method I use to estimate the risk premium on the market portfolio. In the historical CAPM, I use historical risk premium data to estimate the risk premium on the market portfolio. In the DCF-based CAPM, I estimate the risk premium on the market portfolio from the difference between the DCF cost of equity for the S&P 500 and the forecasted yield to maturity on 20-year Treasury bonds.

Q. What risk premium do you obtain when you calculate the difference between the DCF-return on the S&P 500 and the risk-free rate?

A. Using this method, I obtain a risk premium on the market portfolio equal to 7.7 percent (see Schedule 9).

Q. What CAPM result do you obtain when you estimate the expected return on the market portfolio by applying the DCF model to the S&P 500?

A. Using a risk-free rate of 4.64 percent, an gas utility beta of 0.77, a risk premium on the market portfolio of 7.7 percent, and a flotation cost allowance of 20 basis points, I obtain a CAPM result of 10.8 percent for my gas utility group.

Q. What conclusions do you draw from your review of the CAPM literature and the evidence that utility betas are significantly less than the historical ratio of the utility risk premium to the S&P 500 risk premium?

A. I conclude that the CAPM underestimates the cost of equity for companies with betas significantly less than 1.0 and is less reliable the further the estimated beta is from 1.0.

VI. CONCLUSION REGARDING THE FAIR RATE OF RETURN ON EQUITY

Q. What is the fair rate of return on equity?

A. As discussed above, the fair rate of return on equity is a forward-looking return on equity that provides the regulated company with an opportunity to earn a return on its investment over the period in which rates are in effect that is commensurate with returns that investors expect to earn on other investments of similar risk. Because the fair rate of return is a forward-looking return, the estimate of the fair return requires consideration of investors' expectations for a reasonably long period into the future.

Q. Based on your application of several cost of equity methods to your proxy company group, what is your conclusion regarding the cost of equity for your comparable natural gas utilities?

A. Based on my application of several cost of equity methods, I conclude that the cost of equity for my comparable natural gas utilities is in the range 9.6 percent to 11.3 percent, with an average equal to 10.6 percent (see TABLE 1).

TABLE 1
COST OF EQUITY MODEL RESULTS

MODEL	GAS UTILITIES
Discounted Cash Flow	9.6%
Ex Ante Risk Premium	11.3%
Ex Post Risk Premium	10.9%
CAPM – Historical	10.2%
CAPM - DCF Based	10.8%
Average	10.6%

Q. Does your 10.6 percent cost of equity conclusion for your proxy natural gas utilities depend on the percentages of debt and equity in the proxy companies' average capital structure?

A. Yes. My 10.6 percent cost of equity conclusion reflects the comparable companies' financial risk as measured by their average market value capital structure. The average market value capital structure for the comparable natural gas utility group has approximately sixty-eight percent equity.

Q. What capital structure is the Company recommending in this proceeding for the purpose of rate making?

A. The Company is recommending that a capital structure containing approximately 49 percent long-term debt and 51.0 percent common equity be used for rate making purposes in this proceeding.

Q. How does the financial risk reflected in the Company's recommended rate making capital structure in this proceeding compare to the financial risk reflected in the cost of equity estimates for your proxy companies?

A. Although the Company's recommended capital structure contains an appropriate mix of debt and equity and is a reasonable capital structure for rate making purposes in this proceeding, because this recommended rate making capital structure has more debt and

less equity than the market value capital structures of the comparable companies, the recommended rate making capital structure has greater financial risk than is reflected in my cost of equity estimates for the proxy companies.

Q. Based on your cost of equity analyses and your assessment of the financial risk reflected in the Company's rate making capital structures compared to the financial risk reflected in the cost of equity estimates for the proxy companies, what is your opinion regarding the reasonableness of your recommended 10.6 percent allowed rate of return on equity for the Company's natural gas operations?

A. I conclude that my recommended 10.6 percent allowed rate of return on equity for the Company's natural gas operations is conservative because it does not reflect the higher financial risk implicit in the Company's rate making capital structure compared to the average financial risk implicit in my cost of equity estimates for the proxy natural gas utilities.

Q. Does this conclude your pre-filed direct testimony?

A. Yes, it does.