Before the
Tennessee Regulatory Authority

Docket No. 11-_____

Petition of Piedmont Natural Gas Company, Inc. for an Adjustment to its Rates, Approval of Changes to Its Rate Design, Amortization of Certain Deferred Assets, Approval of New Depreciation Rates, Approval of Revised Tariffs and Service Regulations, and Approval of a New Energy Efficiency Program and GTI Funding.

Testimony and Exhibit
of
Donald A. Murry, Ph.D.

On Behalf Of
Piedmont Natural Gas Company, Inc.

Piedmont Natural Gas

September 2, 2011

DIRECT TESTIMONY

OF DONALD A. MURRY, Ph.D.

ON BEHALF OF

PIEDMONT NATURAL GAS COMPANY

AUGUST 2011

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DIRECT TESTIMONY
OF DONALD A. MURRY, Ph.D.
FOR PIEDMONT NATURAL GAS COMPANY
IN TENNESSE REGULATORY AUTHORITY CASE NO. _____

I. INTRODUCTION

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

A. My name is Donald A. Murry. My business address is 5555 North Grand Blvd., Oklahoma City, Oklahoma 73112.

Q. BY WHOM ARE YOU EMPLOYED?

A. I am an Economist with C. H. Guernsey & Company. I am also a Professor Emeritus of Economics on the faculty of the University of Oklahoma.

Q. WHAT IS YOUR EDUCATIONAL BACKGROUND?

A. I have a B. S. in Business Administration and an M.A. and a Ph.D. in Economics from the University of Missouri - Columbia.

Q. PLEASE DESCRIBE YOUR PROFESSIONAL BACKGROUND.

A. From 1964 to 1974, I was an Assistant and Associate Professor and Director of Research on the faculty of the University of Missouri - St. Louis. For the period 1974-98, I was a Professor of Economics at the University of Oklahoma, and since 1998, I have been Professor Emeritus at the University of Oklahoma. Until 1978, I also served as Director of the Center for Economic and Management Research. In each of these positions, I directed and performed academic and applied research projects related to energy and regulatory policy. During this

time, I also served on several state and national committees associated with energy policy and regulatory matters and published and presented a number of papers in the field of regulatory economics in the energy industries.

Q. PLEASE DESCRIBE YOUR REGULATORY EXPERIENCE.

A. Since 1964, I have consulted for a number of private and public utilities, state and federal agencies, and other industrial clients regarding energy and regulatory matters in the United States, Canada and other countries. In 1971-72, I served as Chief of the Economic Studies Division, Office of Economics of the Federal Power Commission. From 1978 to early 1981, I was Vice President and Corporate Economist for Stone & Webster Management Consultants, Inc. I am now an economist with C. H. Guernsey & Company. In all of these positions I have directed and performed a wide variety of applied research projects and conducted other projects related to regulatory matters. Recently, I have assisted both private and public companies and government officials in areas related to the regulatory, financial and competitive issues associated with the restructuring of the utility industry in the United States and other countries.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE OR BEEN AN EXPERT WITNESS IN PROCEEDINGS BEFORE REGULATORY BODIES?

A. Yes, I have appeared before the U.S. District Court-Western District of Louisiana, U.S. District Court-Western District of Oklahoma, District Court-Fourth Judicial District of Texas, U.S. Senate Select Committee on Small Business, Federal Power Commission, Federal Energy Regulatory Commission, Interstate Commerce Commission, Alabama Public Service Commission, Regulatory

Commission of Alaska, Arkansas Public Service Commission, Colorado Public Utilities Commission, Florida Public Service Commission, Georgia Public Service Commission, Illinois Commerce Commission, Iowa Commerce Commission, Kansas Corporation Commission, Kentucky Public Service Commission, Louisiana Public Service Commission, Maryland Public Service Commission, Mississippi Public Service Commission, Missouri Public Service Commission, Nebraska Public Service Commission, New Mexico Public Service Commission, New York Public Service Commission, Power Authority of the State of New York, Nevada Public Service Commission, North Carolina Utilities Commission, Oklahoma Corporation Commission, South Carolina Public Service Commission, Tennessee Public Service Commission, Tennessee Regulatory Authority, the Public Utility Commission of Texas, the Railroad Commission of Texas, the State Corporation Commission of Virginia and the Public Service Commission of Wyoming.

Q. WHAT IS THE NATURE OF YOUR TESTIMONY IN THIS CASE?

A. Piedmont Natural Gas retained me to analyze its current cost of capital and to recommend a rate of return on common equity for this proceeding. Throughout this testimony I also refer to Piedmont as the "Company".

II. SUMMARY OF FINDINGS AND RECOMMENDATIONS

Q. PLEASE SUMMARIZE YOUR FINDINGS AND RECOMMENDATIONS IN THIS MATTER.

A. I am recommending an allowed return on common equity of 11.25 percent for Piedmont in this proceeding. I am recommending a corresponding return on total

capital of 8.86 percent for Piedmont in this proceeding. To reach this recommendation, I studied the recent volatile credit and equities markets, a number of current financial statistics, current and forecasted gas distribution utilities' common stock earnings, and market-based measures of returns on common stock.

I recognized the proposed capital structure of 41.42 percent long-term debt, 5.87 percent short-term debt and 52.71 percent common stock as appropriate for Piedmont in this proceeding. I also adopted the weighted average cost of long-term debt of 6.05 percent and the cost of short-term debt of 1.59 percent.

My analysis of current and forecasted economic conditions revealed that despite the Federal Reserve's efforts to stimulate the economy with low short-term interest rates, basic economic and financial conditions are likely to dominate the long-term corporate yields. As a consequence, analysts were generally forecasting a significant rise in interest rates even in the near-term. This increase in rates is surely a result of increased investor uncertainty, including concerns about international developments and prospective inflationary pressures. Since gas distribution utility equity investors are likely to view the long-term debt securities as alternative, competitive investments, these increases are a determining environment for setting the allowed return for Piedmont in this proceeding. In this market environment, the range of estimates for the cost of common equity for Piedmont is very broad.

As a measure of investors' expectations, *Value Line* estimates that the common equity return for Piedmont will be 12.0 percent in 2011, and the average

common equity return for the comparable gas distribution utilities will be 10.8 percent. Moreover, *Value Line* predicts that the common equity returns into the 2014-16 period will be slightly higher. *Value Line* predicts that Piedmont will earn 12.5 percent by the 2014-16 period and the average that the comparable gas distribution utilities will earn during that period is 11.2 percent. Although surely affected by the use of data taken from very volatile financial markets, I applied two market-based measures of the cost of common stock, i.e., the Discounted Cash Flow (DCF) and Capital Asset Pricing Model (CAPM) analyses. I applied these methods to the common stock of Piedmont and to each of a group of comparable gas distribution utilities. The DCF and CAPM measures of the cost of common equity for Piedmont and the comparable companies range above and below the current returns. The most useful DCF measures of the cost of common equity, although requiring interpretation because of its marginal cost nature and the influence of volatile market conditions on the relevant data, were 8.29 percent for Piedmont and an average of 9.68 percent for the comparable utilities. The most relevant CAPM results, although reflecting a low-bias in the methodology, were 10.40 percent for Piedmont and 10.46 percent for the average of the comparable companies.

As verification that my recommended allowed return is reasonable, i.e., sufficient but not excessive, I compared the After-Tax Interest Coverage at my recommended allowed return level to the current coverages for the comparable gas utilities. I determined that my recommended allowed return placed Piedmont within the range of coverages of these companies.

III. METHODOLOGY

Q. HOW DID YOU PROCEED WITH YOUR ANALYSIS AND RECOMMENDATION OF A RETURN FOR PIEDMONT?

A. I reviewed the current and prospective economic circumstances and the federal policies in response to these conditions, and in turn, the investors' interpretations and responses to this economic environment. These all directly influence the current and near-term cost of debt and equity securities. The U.S. economic recovery from the recession and the threats to investors were of special interest during this analysis. I studied the returns to industrial and utility equities in the current markets. These are very important benchmarks under the current market conditions. I also noted the returns earned and expected by Piedmont in these markets.

In my study of the returns to specific companies, I reviewed the published financial characteristics for Piedmont and a group of comparable gas distribution utilities that would be readily available to potential investors. In order to put the current returns into the context of current market conditions, I studied the financial and business risks faced by gas distribution utilities, especially noting the similarity of risks of the comparable gas distribution utilities that I studied and Piedmont.

I applied the generally accepted DCF and CAPM methods to Piedmont and the comparable companies to develop a market-based measure of the cost of common equity. However, the recent volatile markets, emerging inflationary pressures and government policies have restricted the use of these market

methods for interpreting the costs of common equity. Therefore, I necessarily reviewed the results in the context of these market phenomena and took into account the likely cost of common equity during the period when the rates set in this proceeding are likely to be in effect. Taken in the context of the current economic environment, this analysis of the current and anticipated market returns, and my analysis of the market measures of the cost of common equity, I determined the appropriate return for Piedmont in this proceeding.

Finally, I evaluated the adequacy of my recommended allowed return on common equity for Piedmont by comparing the After-Tax Interest Coverage ratio at my recommended return with the After-Tax Interest Coverages of the comparable gas distribution utilities. From this comparison, I concluded that my recommendation was reasonable. That is, it is sufficient to attract and maintain capital, but not excessive.

Q. WHAT CRITERIA DID YOU USE WHEN YOU IDENTIFIED A GROUP OF COMPARABLE GAS DISTRIBUTION UTILITIES FOR YOUR ANALYSIS OF THE COST OF CAPITAL OF PIEDMONT?

A. In order to select a group of comparable gas distribution companies for analysis, I first selected publicly traded companies recognized as gas distribution utilities by investors. I started with a group of companies identified as gas distribution companies by *Value Line*. From this group, I excluded all companies actively involved in a merger. The common stock of a company involved in a merger will be impacted by the investors' evaluation of how the merger will affect their investment rather than the efficiency of its utility operations. It is the latter that

this analysis evaluates. This means that companies involved in a merger are not a good standard for determining utility costs of capital in current markets. The size of a company may affect its costs of operations and the market cost of capital. Consequently, I excluded gas distribution utilities with a total capitalization of less than $1.3 billion. I also was careful to select gas distribution companies that are primarily in the gas distribution business.

Q. IN ADDITION TO REPRESENTING COMPANIES THAT ARE PUBLICLY TRADED, WERE THERE OTHER REASONS THAT YOU SELECTED A GROUP OF COMPARABLE COMPANIES FOR STUDY FROM *VALUE LINE?*

A. Yes. *Value Line,* in addition to being a respected source of financial information, is readily available to investors; in fact, it is even available to investors in many libraries. Therefore, it can potentially influence their investment decisions. An additional, significant reason for selecting *Value Line* is that it is in the business of selling information, and it is independent from the investment community. *Value Line* does not underwrite securities and therefore does not have a conflict of interest in data provided to investors for their investment decisions.

Q. WHAT GAS DISTRIBUTION UTILITIES DID YOU CHOOSE AS COMPARABLE TO PIEDMONT FOR YOUR ANALYSIS?

A. Applying the criteria to the *Value Line* sampling frame, I selected the following gas distribution utilities: Atmos Energy Corporation, New Jersey Resources, Northwest Natural Gas, South Jersey Industries, Southwest Gas, and WGL

Holdings. For analytical purposes in this case, these companies are comparable to Piedmont.

Q. ARE YOU SPONSORING ANY EXHIBITS WITH YOUR TESTIMONY?

A. Yes. I am sponsoring Exhibit No.___, which consists of Schedules DAM-1 through DAM-25.

Q. DID EITHER YOU OR SOMEONE UNDER YOUR DIRECT SUPERVISION PREPARE THIS EXHIBIT?

A. Yes.

IV. THE CURRENT ECONOMIC ENVIRONMENT

Q. HOW HAS THE RECENT ECONOMIC SITUATION INFLUENCED YOUR ANALYSIS?

A. Although the economy has shown signs of recovery, at this time, it also has threatened a secondary slide thereby prolonging the recession, In spite of expansionary monetary and fiscal policies, indicators such as stubborn high unemployment figures and very low economic growth suggest, at best, a slow recovery. The Federal Reserve's maintenance of low short-term interest rates, including its program to support government bond prices, has lowered rates on U.S. Treasury debt instruments. However, these policies and the level of the national debt, which has become a politically contentious issue, unquestionably contain a threat of future inflationary pressures. The uncertain outlook for economic recovery, future Federal Reserve policies, prospects of rising costs resulting from some evolving regulations and programs, and even international developments are among the uncertainties that are influencing investors.

The performance of the U.S. and foreign securities markets in response to these economic and financial events reveal that investors perceive them as an investment risk, and this inevitably leads to rising capital costs. For the purpose of this proceeding, which is to set rates for a period measured in years, such factors as anticipated inflation and rising interest rates are important considerations for longer-term equity investors. They are undoubtedly significant influences.

Q. YOU MENTIONED THE UNCERTAINTY OF THE ECONOMIC RECOVERY AND HOW IT AFFECTS INVESTORS. PLEASE EXPLAIN HOW THIS AFFECTED YOUR ANALYSIS.

A. Although, at this time, the economy has shown some signs of recovery, many investors undoubtedly still view the rate of recovery as very uncertain. The threat of a stalled recovery and even a secondary dip remain a significant risk to common stock equity investors. The persistently high unemployment levels and large trade deficits demonstrate the uncertain timing and speed of an economic recovery. At the time of this testimony the unemployment rate has stubbornly remained above nine percent. Taking a longer-term view that probably reflects the information available to and influencing investors, Schedule DAM-1 shows that *Value Line Investor's Service* predicts that the unemployment level will still be 7.2 percent by the 2014-16 period. This predicted unemployment level is significantly above commonly accepted and historically natural levels of

unemployment that many analysts would consider a measure for a healthy economy.[1]

Q. YOU ALSO MENTIONED THE RISKS TO EQUITY INVESTORS OF EVENTS IN THE WORLD ECONOMY. WHAT INTERNATIONAL FACTORS ARE LIKELY TO AFFECT THE PERCEPTIONS OF RISKS OF INVESTORS IN U.S. COMMON STOCK EQUITIES?

A. Recent international economic events, which knowledgeable investors in domestic securities consider, include such factors as the threats of potential default of sovereign debt in such countries as Ireland, Portugal, Italy and Spain, the impact of the Greek Collapse on the European Economy, the political unrest in the oil producing nations of the Middle East, an increase in interest rates by the central banks of U.S. trading partners and an announced lowering of China's economic growth estimates.

Q. HOW DOES THE THREAT OF SOVEREIGN DEBT DEFAULT AFFECT THE COST OF U.S. COMMON STOCK?

A. Probably because of the fear of potential inflation from the level of debt and the increased borrowing costs from a decline in the bond ratings of U.S. debt, investors perceive the uncertain consequences as a market risk. That also leads to market volatility. For example, the Dow Jones Industrial Average fell over 140 points in one day on the news that Standard & Poor's lowered its outlook on U.S.

[1] For example, the Congressional Budget Office (CBO) noted, "In CBO's most recent forecast, the natural rate was estimated at 5.0 percent, both currently and for the 10-year projection period through 2017. Brauer, David, "The Natural Rate of Unemployment," *Working Paper Series 2007-06*, Congressional Budget Office, Washington DC, April 2007, p.2.

government debt to "negative" from "stable".[2] More recently, at least in the trading sessions immediately following the signing of legislation to increase the U.S. Treasury debt ceiling, the New York stock exchange was very volatile, and markets reacted around the world when S&P downgraded the U.S. debt. Furthermore, as a measure of the interconnection of the current world financial markets, for example, the world stock markets and the U.S. markets all moved wildly at the time of Greece's recent debt crisis. The threat of further European nations facing possible sovereign debt default was at least a factor in the single-day 4.3 percent decline in the Dow Jones Industrial Average on August 4. The markets have also responded to sovereign debt default concerns in, at least, Italy, Portugal and Spain. Obviously, investors are very sensitive to the threat of sovereign debt default and related international events.

Q. YOU MENTIONED THE CONTENTIOUS POLICY ISSUES RELATED TO THE LEVEL OF U.S. TREASURY DEBT. DO THESE INFLUENCE THE COST OF COMMON EQUITIES IN THE U. S.?

A. The uncertainty of the eventual policies and their economic effects is a risk to common equity investors. Of course, the level of debt relative to the level of economic activity is one measure of the likelihood that broad policies will emerge that could affect the rate of economic recovery, and investors respond negatively to this potential risk. The recent bond rating downgrade in U.S. debt will surely increase the market interest rates on U.S. Treasury instruments. This is likely to increase the cost of private debt to the U.S. and cost of common equities in the

[2] *The Wall Street Journal,* April 19, 2011, p. C1.

U.S. Schedule DAM-2 shows that the pressure from sovereign debt on the prices of U.S. securities is likely to continue, and it is growing at a faster rate than some of the America's key trading partners. Also, this chart shows that the U.S. Treasury securities will be under greater pressure from sovereign debt than some of the rapidly growing, developing nations.

Q. YOU NOTED THE VOLATILITY OF THE FINANCIAL MARKETS RECENTLY. WHY IS VOLATILITY IMPORTANT?

A. Market volatility is a measure of investors' changing perceptions of market risk. It reflects investors' uncertainty regarding the prospects of earning anticipated returns. If investors' perceptions of risks are rapidly changing, this is a very relevant factor when determining returns of equivalent risks to the firms, such as Piedmont, that are subject to regulation.

Q. DOES A MEASURE DEMONSTRATING THE LEVEL OF MARKET VOLATILITY AS A RISK MEASURE EXIST?

A. Yes. The Volatility Index (VIX), which is often called the "fear index", shows the high level of market volatility and investor anxiety in recent markets.[3] Since it is a measure of the cost of market hedges, one can view it as similar to the cost of market insurance. When the cost of the market hedge increases, that is a measure of the changing value of market risk perceived by investors.

[3] Robert Whaley, the developer of the VIX described the index as follows:
"The VIX is a forward-looking index of the expected return volatility of the S&P 500 Index over the next 30 days and is implied from the prices of the S&P 500 index options, which are predominantly used by the market as a means of insuring the value of stock options. High levels of VIX reflect investor anxiety regarding a potential drop in the stock market, just as flood insurance premiums reflect homeowner anxiety about possible inclement weather." See, "Understanding VIX," *Journal of Portfolio Management,* Spring 2009, pp. 98-105.

Q. WHAT HAS BEEN THIS MEASURE OF RISK DURING RECENT MARKETS?

A. I have illustrated the recent increase in the VIX in Schedule DAM-3. Obviously, the VIX increased with the earlier financial crisis, again in 2010, and then, again very recently. In fact, with the single-day market adjustment on August 4, the VIX increased approximately 30 percent.

Q. YOU MENTIONED THAT FEDERAL RESERVE POLICIES MAY BE A RISK TO INVESTORS. HOW ARE THE FEDERAL RESERVE POLICIES A RISK TO INVESTORS IN U.S. COMMON STOCKS?

A. The Federal Reserve policies have supported extremely low short-term money market, shorter-term securities and U.S. Treasury rates. A change in policy that raises rates, for example, could expose investors to market losses on fixed income securities. The Federal Reserve's policies have included purchasing U.S. Treasury securities and mortgages to provide liquidity. A program to purchase Treasury Bonds supports the price of those securities and lowers their market rate of interest, but the ending of that program may create a higher rate environment. In addition to announcing that it will respond to stimulate the economy as it deems necessary, the Federal Reserve announced earlier that it was prepared to respond to market influences, such as increasing inflationary levels, by raising interest rates when merited.

Q. WHEN YOU INDICATED THAT LONGER-TERM CONSIDERATIONS WERE IMPORTANT TO YOUR ANALYSIS OF THE COST OF CAPITAL IN THIS PROCEEDING, WHAT FACTORS DID YOU HAVE IN MIND?

A. The policy responses to the economic recession and the recent financial crisis have resulted in expanding budget deficits and an increased national debt. The rising debt levels are the seeds of potential longer term inflation, and, ironically, a recovering economy could exacerbate the attempts to maintain stable prices. For example, Warren Buffet recently wrote in describing the debt/inflation potential, "An increase in federal debt can be financed in three ways: borrowing from foreigners, borrowing from our own citizens or, through a roundabout process, printing money."[4] After identifying a probable maximum absorption of $400 billion in Treasury debt internationally and perhaps as much as $500 billion domestically, Mr. Buffet stated, "Even with these heroic assumptions, the Treasury will be obliged to find another $900 billion to finance the remainder of the $1.8 trillion of debt it is issuing. The Washington printing presses will need to work overtime."[5]

Q. WITH THE SLOW ECONOMIC RECOVERY AND RECENT STABLE PRICES ARE YOU AWARE OF EVIDENCE THAT INVESTORS ARE CONCERNED ABOUT THE PROSPECTS OF LONGER-TERM INFLATIONARY PRESSURES?

A. One clear piece of evidence that many investors have inflationary expectations is the market price of gold. Gold, which pays no return other than capital gains from holding the asset, is a very common inflation hedge. Any casual viewer of television is aware of the advertisements promoting gold as a hedge against the

[4] Buffet, Warren, "The Greenback Effect", *The New York Times* http://www.nytimes.com/2009/08/19/opinion/19buffet.html?
[5] *Ibid.*

value of the dollar. Schedule DAM-4 shows the recent, dramatic increase in the commodity market price of gold.

Q. IN ADDITION TO INVESTORS DRIVING UP THE PRICE OF COMMODITIES AS INFLATIONARY HEDGES, ARE YOU AWARE OF OTHER ACTIONS BY INVESTORS IN RESPONSE TO THE PROSPECTS OF LONGER-TERM INFLATION?

A. Yes. Investors have driven the prices of Treasury Inflation Protected Securities to premium levels. This is surely because they serve as an effective hedge against inflation. As another indicator of investor response, consistent with his earlier comments about the prospects of financing the national debt by printing money, Warren Buffet has been adjusting Berkshire Hathaway's portfolio for higher inflation.[6]

Q. IN ADDITION TO THESE MARKET INDICATORS, HAVE FINANCIAL ANALYSTS ALSO PREDICTED THAT INFLATIONARY PRESSURES WILL INCREASE?

A. Yes. As Schedule DAM-5 illustrates, *Value Line* recognizes the recent stable price levels; however, it is now forecasting an inflation rate that will reach 3.1 percent in 2011. Significantly, this *Value Line* inflation rate prediction has increased in recent months showing a rising concern for broad inflation in the U.S. economy. The 2.5 to 3.1 percent inflation rate projected for 2011 by the Federal Reserve is approaching, or maybe even above, a critical policy threshold;

[6] "Buffet Preps His Portfolio for Inflation", http://finance.yahoo.com/news/Buffet-Preps-His-Portfolio-fool-9186.

it could trigger a shift in Federal Reserve policy.[7] As Vice Chairman Donald L. Kohn of the Federal Reserve recently stated, "Central banks have widely chosen to target inflation rates near 2 percent."[8]

Q. ARE YOU AWARE OF ANY EVIDENCE THAT THE FEDERAL RESERVE MAY ALTER ITS RECENT LOW-INTEREST RATE MONETARY POLICIES?

A. Approximately a year ago, the President of the Kansas City Federal Reserve, Thomas M. Hoenig, dissented from the Federal Reserve's maintenance of near-zero, short-term interest rates.[9] The *Wall Street Journal,* in referencing a speech by Mr. Hoenig, reported, "The U.S. economy is recovering and the Federal Reserve needs to raise interest rates, lest it leave in place a policy that will only fuel future financial imbalances."

Q. HAVE THESE MARKET INFLUENCES AFFECTED THE FORECASTS OF CORPORATE BOND RATES?

A. Yes. Schedule DAM-6 shows that a recent *Value Line* forecast for AAA corporate bond rates for 2014-16 is 6.50 percent or 1.60 percent higher than the average rate for 2010, and this is likely to be conservative because it is a forecast made before the recent downgrade in U.S. debt. Perhaps most relevant to this analysis, as an apparent departure from recent monetary policy to maintain low interest rates to stimulate the economy, *Value Line* is forecasting a significant increase in corporate bond rates. In light of the forecasted increase in the rate of inflation, this

[7] CNNMoney.com, "Bond Yields up on Bernanke's Inflation Concerns," April 27, 2011.
[8] Vice Chairman Donald L. Kohn, Board of Governors of the Federal Reserve System, Cornelson Distinguished Lecture, Davidson College, North Carolina, March 24, 2010.
[9] Federal Reserve Press Release, August 10. 2010, page 1 of 2.

predicted increase in long-term interest rates could presage a change in the underlying influences on Federal Reserve policy.

Q. SHOULD ONE EXPECT THE ECONOMIC RECOVERY, INFLATIONARY PRESSURES AND EXPECTATIONS OF RISING INTEREST RATES TO AFFECT THE VALUATION OF COMMON STOCKS?

A. Yes. As the economy shows signs of recovery, but with the low returns on many alternative investments, common equity investors are probably attracted to industrial common equities. Common equities are also relatively attractive to investors who anticipate inflationary growth and rising interest rates. In contrast, all things equal, when investors anticipate rising interest rates, they will shy away from investments with relatively fixed returns, and many investors will consider regulated utility common stocks as instruments with relatively fixed returns. As Schedule DAM-7 illustrates, by comparing the S&P 500 Index and the Dow Jones utility index performance since August 2010, investors decidedly preferred industrials to utilities when the economy was showing signs of recovery. While the S&P 500 Index grew by over 20 percent, the Dow Jones Utility Index grew by less than five percent. On the downside, the utilities index did not fall as precipitously as did the industrial index during the recent market turmoil.

Q. HOW DO THE ECONOMIC AND MARKET CONDITIONS AFFECT THE RISKS OF GAS DISTRIBUTION UTILITIES?

A. Utilities are challenged with attracting and maintaining capital in these changing markets. Rising interest rates raise the cost of acquiring debt capital and attracting equity. In particular, gas distribution equities will become relatively higher cost.

That is, despite the recent low short-term rates, the threat of increasing interest rates in the longer-term heightens the risk that holders of common equities with relatively fixed returns will not achieve their anticipated returns.

Q. PLEASE SUMMARIZE THE IMPACT OF THE RECENT ECONOMIC ENVIRONMENT ON YOUR ANALYSIS AND YOUR RECOMMENDATIONS IN THIS PROCEEDING?

A. The economic recession, recovery and market volatility in the U.S. economy and global events dominate the considerations of the cost of capital for longer-term capital commitments. Presently, this is the inescapable environment for setting the rate of return on equity for utility service. Capital needs and increasing operating costs are also specific factors affecting utility cost of capital considerations. The longer-term risks of inflation and uncertainty about rising interest rates and risks to common equity investors are undoubtedly important to prospective longer-term equity investors. Rising inflation and interest rates erode margins and adversely affect the cost of debt and equity throughout the gas utility industry. Volatility is a risk to investors committing their funds to common equity investors. Despite the low short-term rates resulting from monetary policies, accelerating inflation, market volatility and increasing interest rates heighten the risk for holders of common equity in companies such as Piedmont in the longer-term.

V. ALLOWED RETURN STANDARD

Q. WHAT STANDARD DID YOU USE TO DETERMINE THE APPROPRIATE ALLOWED RETURN FOR PIEDMONT IN THIS PROCEEDING?

A. Throughout my analysis, I applied a standard for a recommended allowed return that was consistent with my understanding of the concept of a "fair rate of return" on invested capital. In this context, I used the term "fair rate of return" to characterize a return that meets the standards set by the United States Supreme Court decision in *Bluefield Water Works and Improvement Company vs. Public Service Commission, 262 U.S. 679 (1923) ("Bluefield")*, as further modified in *Federal Power Commission vs. Hope Natural Gas Company, 320 U.S. 591 (1944) ("Hope")*. As an economist, I believe that a rate of return is "fair" if it provides earnings to investors similar to returns on alternative investments in companies of equivalent risk. That is, a return should be sufficient to compensate investors for assumed risk and to attract capital and to operate successfully.

Q. AS AN ECONOMIST, HOW DO YOU INTERPRET THE SO-CALLED *HOPE* STANDARD?

A. In simple economic terms, the fair rate of return is a return that will attract and maintain capital which is consistent with the common concept of "opportunity cost." The return must be equivalent to returns on alternative, similar-type investments in the eyes of prospective and current investors. As stated, the return, taking into account the risk exposure to investors' funds, must be equivalent to these alternative investments.

Q. FROM A PRACTICAL STANDPOINT ARE YOU AWARE OF ANY PROBLEMS REGARDING THE APPLICATION OF THE *HOPE* STANDARD WHEN SETTING ALLOWED RETURNS IN A REGULATORY PROCEEDING?

A. Assessing the level of risk and applying it differentially among utilities to set allowed returns which reflect equivalent risk seems difficult. This is probably because of the problems in measuring risk. For example, in a study that I conducted with colleagues, we found extremely strong statistical evidence that risk differentials could not account for differentials among allowed returns in most recent electric and gas regulatory decisions, which is empirical evidence that this is a practical problem when applying the *Hope* standard.[10]

Q. DID YOU CONSIDER ANY ECONOMIC CHARACTERISTICS OF THE GAS DISTRIBUTION INDUSTRY IN DETERMINING THE COST OF CAPITAL STANDARD THAT YOU APPLIED IN THIS PROCEEDING?

A. Yes. I considered that this standard is based, at least in part, on the recognition that an economic rationale for regulation is the utility market structure. That is, due to economies of scale, a single supplier is likely to supply the relevant natural gas market.

VI. CAPITAL STRUCTURE

Q. WHAT CAPITAL STRUCTURE DID YOU DETERMINE IS APPROPRIATE FOR PIEDMONT IN THIS PROCEEDING?

A. I recognized the proposed capital structure for Piedmont in Schedule DAM-8 as appropriate for this proceeding. The relevant Long-Term Debt is $774.072 million, or 41.42 percent, the Short-Term Debt is $109.677 million or 5.87 percent and the Common Stock Equity is $985.020 million or 52.71 percent.

[10] "Allowed ROEs During Economic Crisis Often Fail the Equal Return for Equivalent Risk Standard," *IAEE Energy Forum,* Michael Knapp and Zhen Zhu, International Association for Energy Economists, Second Quarter 2011, pp. 27-29.

Q. DID YOU COMPARE THIS CAPITAL STRUCTURE OF PIEDMONT WITH THE CAPITAL STRUCTURES OF OTHER GAS DISTRIBUTION UTILITIES?

A. Yes. Since investors will perceive the level of common equity as a risk factor, I compared the common equity ratio proposed by Piedmont for ratemaking of 51.28 percent with the common stock equity ratios of the comparable companies that I used in my analysis. As I show in Schedule DAM-9, according to *Value Line,* which defined common equity to account for some outstanding short-term debt, the average common equity ratio of the comparable gas distribution utilities is currently 58.8 percent. Notably, *Value Line* has reported a current common equity for Piedmont Natural Gas of 58.0 percent.

Q. WHAT DID YOU CONCLUDE FROM YOUR COMPARISON OF THE COMMON EQUITY RATIOS OF THESE COMPARABLE GAS DISTRIBUTION UTILITIES AND THE PROPOSED COMMON EQUITY RATIO IN THIS PROCEEDING?

A. Obviously, the common equity ratio proposed by Piedmont in this proceeding is comparable to the common equities of the comparable gas distribution companies.

VII. COST OF DEBT

Q. WHAT IS PIEDMONT'S COST OF SHORT-TERM DEBT THAT IS APPROPRIATE FOR YOUR CALCULATIONS IN THIS PROCEEDING?

A. The relevant cost of short-term debt is 1.59 percent. This is, of course, from an historical perspective, a very low cost of short-term debt from a period before the

down grade in U.S. debt and is reflective of the Federal Reserve policies discussed previously.

Q. WHAT IS PIEDMONT'S COST OF LONG-TERM DEBT THAT IS APPROPRIATE FOR RATEMAKING IN THIS PROCEEDING?

A. The embedded cost of long-term debt that is appropriate for Piedmont in this proceeding is 6.05 percent.

VIII. FINANCIAL RISK

Q. YOU USED THE TERM FINANCIAL RISK. PLEASE EXPLAIN WHAT YOU MEAN BY "FINANCIAL RISK"

A. Since the payment of interest on debt takes precedence over returns to common stock, investors in common equities necessarily assume the risk that sufficient funds will not be available for them to achieve their anticipated returns from dividends and capital gains because of the precedent payments to debt. A straight-forward measure of financial risk is the common equity ratio. In order to select a group of comparable companies with similar financial risks, I considered the common equity ratios of the gas distribution utilities that I selected for analysis.

Q. DID YOU REVIEW OTHER MEASURES OF FINANCIAL RISK?

A. Yes. I reviewed published measures of financial risk that investors are likely to consider when making an investment decision, such as bond ratings and *Value Line's* financial strength rating.

Q. WHAT DID THOSE STUDIES SHOW?

A. I compared Standard & Poor's bond ratings for Piedmont with the bond ratings for the comparable companies. As I illustrated in Schedule DAM-10, Piedmont

has an A bond rating. This S&P rating is within the range of bond ratings of the comparable gas distribution companies. I also compared the *Value Line* "Financial Strength" measure for Piedmont to that of comparable gas distribution companies. Again, Piedmont's Financial Strength measure of B++ is within the range of the comparable gas distributors.

IX. BUSINESS RISK

Q. WHEN YOU USED THE TERM "BUSINESS RISK", WHAT DID YOU MEAN BY THAT TERM?

A. Business risk is the exposure of investors' anticipated returns to the uncertainties of a company's day-to-day business activities. In the recent and near-term economic environment, this includes the uncertainty of the many factors discussed previously, such as the rate of economic recovery, monetary and fiscal policies, and international economic events. Of course, business risk includes factors affecting all gas distribution utilities as well as business risk factors unique to Piedmont and its service territory.

Q. WHAT MEASURES OF BUSINESS RISK DID YOU REVIEW IN YOUR ANALYSIS THAT MIGHT BE READILY AVAILABLE TO INVESTORS?

A. Two measures that reflect business risk that are generally available to investors are the *Value Line* rankings of "Safety" and "Timeliness." *Value Line* defines its "Safety" ranking as a measurement of the potential risk associated with individual common stocks, and it defines "Timeliness" as a measure of a stock's probable performance in the forthcoming year relative to the overall market. Both of these measures would necessarily incorporate business risk factors.

Q. HOW DO *VALUE LINE'S* SAFETY AND TIMELINESS RANKINGS FOR PIEDMONT COMPARE TO THOSE FOR THE COMPARABLE GAS DISTRIBUTION UTIIITIES?

A. Piedmont's *Value Line* Safety ranking is "2". That is within the range of similar rankings of the comparable gas distribution utilities. The average Safety ranking for the comparable companies is slightly higher at 1.7. *Value Line* ranks Piedmont a "3" for Timeliness, which is higher than the average for the comparable utilities. The average for the comparable group is "3.5" because New Jersey Resources, Northwest Natural Gas and WGL Holdings are ranked a "4" for Timeliness. Notably, all of the other comparable gas distribution utilities are ranked a "3" by *Value Line,* which is equivalent to the average for the market as a whole. This indicates that *Value Line* expects the common stock of this group of gas distribution utilities to perform somewhat more poorly than the overall market. I have illustrated these comparisons of Safety and Timeliness rankings in Schedule DAM-11.

Q. FROM YOUR COMPARISON OF RISK MEASURES BETWEEN PIEDMONT AND EACH OF THE COMPARABLE GAS DISTRIBUTION UTILITIES, DID YOU REACH A DETERMINATION REGARDING PIEDMONT'S RELATIVE RISK?

A. Yes. I concluded that, consistent with the *Hope* standard discussed previously, Piedmont's financial and business risks were, in general terms, consistent with the investment risks of the comparable gas distribution utilities.

X. FINANCIAL STATISTICS

Q. DID YOU REVIEW OTHER FINANCIAL STATISTICS DURING YOUR STUDY OF THE COST OF CAPITAL OF PIEDMONT?

A. Yes. I reviewed and compared some key financial statistics for these gas distribution utilities that will be readily available to investors and could influence them. For example, statistics that I considered included recent and expected common stock earnings, dividend payout ratios, and price earnings (P/E) ratios.

Q. YOU MENTIONED THAT YOU COMPARED THE RECENT COMMON STOCK EARNINGS. WHAT ARE THE RECENT COMMON STOCK EARNINGS OF PIEDMONT AND THE COMPARABLE GAS DISTRIBUTION UTILITIES?

A. According to *Value Line,* Piedmont's return on common stock equity for 2010 was 11.6 percent. This return is within the range of returns for the same period for the comparable companies. The 2010 average for the comparable companies was 11.1 percent. I show this comparison of common equity returns in Schedule DAM-12.

Q. WHEN YOU COMPARED THE COMMON STOCK DIVIDENDS OF PIEDMONT AND THE COMPARABLE COMPANIES THAT YOU STUDIED, WHAT DID YOU DETERMINE?

A. As Schedule DAM-13 shows, in recent years *Value Line* reported a slower growth rate in dividends for Piedmont than the average for the comparable gas distribution utilities. As Schedule DAM-14 shows, Piedmont had a significantly higher dividend payout over the same period than the comparable companies.

Q. YOU ALSO STUDIED THE COMMON STOCK PRICE-EARNINGS RATIOS OF PIEDMONT AND THE COMPARABLE GAS DISTRIBUTION UTILITIES. WHAT DID THIS STUDY SHOW?

A. Piedmont's price-earnings ratio is slightly higher than the average for the comparable gas distribution utilities. This means that if all other things are equal, the market has valued Piedmont's common stock relatively favorably. I show these P\E ratios in Schedule DAM-15.

XI. COST OF COMMON STOCK

Q. PLEASE EXPLAIN THE METHODOLOGIES THAT YOU USED TO ESTIMATE THE COST OF COMMON STOCK EQUITY?

A. I used two generally accepted market-based methods for estimating the cost of common stock equity. These are the Discounted Cash Flow analysis, which is probably the most commonly referenced method in regulatory proceedings, and the Capital Asset Pricing Model. In addition to these market-based measures of the cost of common equity, I also noted the anticipated returns by the comparable companies in the current economic environment. I applied each of the market-based methods to estimate the costs of common stock for Piedmont and for each of the comparable gas distribution utilities and then compared them to the published expected returns. In addition, because of the recent, current and expected economic environment, I interpreted these methods in a broad context. I recognized the general economic and financial environment and how this can influence these methods for estimating the cost of common equity. Also, to assist

in interpreting the results using these methods, I reviewed their theoretical and computational strengths and weaknesses, including the underlying assumptions.

Q. ARE THESE MARKET-BASED METHODS FOR ESTIMATING THE COST OF CAPITAL AFFECTED BY THE RECENT ECONOMIC CONDITIONS AND THE FINANCIAL TURMOIL?

A. Yes. The financial data from the recent financial crisis and recession and the accompanying market volatility are not consistent with data from more normal periods. As a consequence, the results of market-based measures are difficult to interpret. Academics, for example, have recently recognized that the current market limits the most careful financial analysis. In describing this, one author of a paper on the subject, Roger Grabowski, summarized:

> The current economic environment has created challenges in estimating the cost of equity capital ("COEC") and in estimating the appropriate overall cost of capital (i.e., the weighted average cost of capital or "WACC"). Since late 2008, new complications have arisen in estimating the cost of capital. Traditional methods typically employed in estimating the COEC and the WACC are subject to significant estimation and data input problems.[11]

After discussing several impacts of the financial markets upon the market-based measures of the cost of capital, Grabowski suggested that an analyst should "...always test the resulting cost of capital estimates for reasonableness and not simply apply data or formulas by rote."[12] Although this is undoubtedly good advice at any time, under the circumstances of the many unusual influences on the

[11] Grabowski, Roger J., "Cost of Capital Estimation in the Current Distressed Environment," *The Journal of Applied Research in Accounting and Finance*, pp. 31-40.
[12] *Ibid.*

market-generated data in recent markets, this advice is critically important at this time.

XII. DISCOUNTED CASH FLOW METHOD

Q. PLEASE DEFINE AND EXPLAIN THE DCF METHODOLOGY FOR MEASURING THE COST OF COMMON EQUITY.

A. The following formula expresses the DCF calculation of an investor's required rate of return:

$$K = \frac{D}{P} + g$$

Where: K = cost of common equity
D = dividend per share
P = price per share and
g = rate of growth of dividends, or alternatively, common stock earnings.

In this expression, "K" is the capitalization rate required to convert the stream of future returns into a current value. "D" is the current level of dividends paid to the common stock holders. "P" is the valuation of the common stock by the investors reflected by recent market prices. Consequently, the ratio "$\frac{D}{P}$" is the current dividend yield on an investment in the company's common stock. The "g" is the growth rate anticipated by the investor. This version of the Dividend DCF model is the most general.

XIII. ANALYTICAL CONSIDERATIONS OF THE DCF METHOD

Q. WHAT ARE SOME OF THE IMPORTANT CONCEPTUAL CONCERNS ABOUT USE OF THE DCF METHODOLOGY FOR DETERMINING THE COST OF CAPITAL?

A. Conceptually, for the purposes of setting rates for the future, one must recognize that the DCF method calculates the marginal cost of common stock. This puts a limit on the application and effectiveness of the DCF's results. As a marginal cost calculation, the DCF produces an estimate of the minimal return necessary to attract or maintain investment funds to a company's common stock and may not be realistic in a practical setting.

Q. YOU CALLED THE DCF "A MARGINAL COST CALCULATION." WHY IS THAT DISTINCTION IMPORTANT?

A. As an estimate of the marginal cost of common equity, the DCF estimates the return necessary to attract capital at the margin based on the information provided at a point in time. Obviously, this estimate, even if it reflects realistic investor expectations of future returns, provides no margin or cushion for changing markets. This is especially important during periods of volatile markets. In those instances, this method is likely to provide inadequate estimates of the cost of common equity that is necessary to attract investors' funds. In a period of rising rates, which, as I stated earlier, is very likely in the near-term, the DCF estimates may fall short of the level that will attract investment.

Q. ARE YOU AWARE IF REGULATORY COMMISSIONS RECOGNIZE THESE CONCEPTUAL LIMITATIONS OF THE DCF?

A. Yes. Regulatory commissions have recognized the difficulties of relying on the raw, unadjusted, marginal-cost DCF calculations. In at least one instance in a less volatile period, a regulatory commission clearly recognized that the assumptions

underlying the DCF model rarely, if ever, hold true.[13] For example, the Indiana Regulatory Commission stated that an "...unadjusted DCF result is almost always well below what any informed financial analyst would regard as defensible and therefore requires an upward adjustment based largely on the expert witness' judgment."[14] In fact, regulatory adjustments to DCF calculations for such factors as "market pressure" resulting from the price suppression from new issues, cost of "flotation", and market-to-book differentials have been rather common practice.

Q. AS YOU USED THE CURRENT MARKET DATA IN YOUR DCF ANALYSIS, WHAT FACTORS DID YOU CONSIDER ESPECIALLY IMPORTANT?

A. The most important strength of the DCF method is that it is theoretically sound. It is consistent with the principle of setting a return equal to returns of equivalent risk at the margin, but this cost of capital level is not necessarily sufficient to assure that a return at this level will attract and maintain capital even in the near term. The volatility of the financial markets is, among other things, indicative of investors' difficulty in evaluating risk accurately.

Any DCF analysis may have conceptual or data problems, but because of the recent financial markets, the likelihood of producing misleading results is heightened. For example, now investors will not be looking to the period prior to

[13] Phillips, Charles F., Jr. and Robert G. Brown, *Chapter 9: The Rate of Return,* The Regulation of Public Utilities: Theory and Practice, (1993: Public Utility Reports, Arlington, VA) p. 423.
[14] *Ibid, In re Indiana Michigan Power Company,* 116 PUR4th 1, 17 (Ind. 1990).

the financial crisis for guidance. Investors will be most concerned about the current and future risk exposure of their invested capital and the future returns.[15]

XIV. DATA USED IN DCF ANALYSIS

Q. WHAT GROWTH RATE DATA DID YOU USE IN YOUR DCF ANALYSIS?

A. As I illustrated in Schedule DAM-16, I reviewed primarily both earnings per share and dividend per share growth rate information. I studied both the recent historical and forecasted growth rates.

Q. EXPLAIN THE RELATIONSHIP BETWEEN EARNINGS PER SHARE AND DIVIDEND GROWTH RATES?

A. Of course, earnings must be sufficient to support the dividend policies of the companies. Historically, many factors influence the boards of directors in determining common stock dividends, but dividends have been relatively stable when compared to earnings. In general, dividend policies are comparatively stable for utilities.

Q. WHAT WAS THE SOURCE OF THE COMMON STOCK PRICE DATA THAT YOU USED IN YOUR DCF ANALYSIS?

A. I used *YAHOO! Finance* as the source of market price information. I obtained current prices for a recent two-week period and the high and low share prices for a 52-week period. The current market prices reflect current market valuations.

[15] For some time academic analysts have recognized the importance of using forecasted growth rates in DCF analyses. For example, see Vander Weide, James H. and Willard T. Carleton, "Investor Growth Expectations: Analysts vs. History," *The Journal of Portfolio Management*, Spring 1988, pp. 78-82. Also see Timme, Stephen G. and Peter C. Eisemann, "On the Use of Consensus Forecasts of Growth in the Constant Growth Model: The Case of Electric Utilities," *Financial Management*, Winter 1989, pp. 23-35. For a broader assessment, see Gordon, David A., Myron J. Gordon, and Lawrence I. Gould, "Choice among methods of estimating share yield," *Journal of Portfolio Management;* Spring 1989, Volume 15, Number 3, pages 50-55.

The longer time period recognizes the changing market conditions over time and helps determine a reasonable allowed return to be used to develop rates expected to be in place for a period.

XV. DCF CALCULATIONS

Q. PLEASE EXPLAIN YOUR DCF CALCULATIONS.

A. I applied the DCF calculations as representative of current markets, but I interpreted these results in the context of the economic recovery period. In one application, I took a relatively long-term outlook by reviewing the combined historical and forecasted dividend growth rates and the common stock prices for the past year. Looking at more current DCF results, I used these longer-term growth rates and market prices from a recent two-week period. Both of these DCF methods produced inordinately low estimates for both Piedmont and the comparable companies and are of limited value when setting an allowed return in this proceeding. Reviewing the high DCF results for Piedmont at current market prices showed an inordinately low result for Piedmont of 7.79 percent. This does not provide a credible differential with the forecasted long-term corporate bond rate discussed previously, and it is an example of the unrealistic measures of the market cost of capital produced by the DCF analysis during periods of market stress. For example, by comparison, the Baa bond yields, which are strongly influenced by the recent Federal Reserve policies to maintain low interest rates, are currently 6.03 percent. The average DCF result for the comparable companies using this method was 8.75 percent. These results are not effective measures of the risk differentials of the securities and credible estimates of the returns to be

recovered over the near-term. The longer-term analysis produced only slightly higher results. I show these calculations in Schedules DAM-17 and DAM-18.

Q. WHAT DID YOUR DCF ANALYSIS SHOW FOR THESE SAME COMPANIES USING FORECASTED EARNINGS PER SHARE GROWTH RATES?

A. My DCF calculations in this analysis that were based on the projected, or forecasted, earnings per share growth rates provided somewhat more meaningful estimates when compared to market rates. However, even these returns are relatively close to the forecasted interest rates and are not consistent with the market measures of risk and volatility in the equities markets. The Piedmont result ranged between 6.72 percent and 8.53 percent using current prices. It ranged between 6.59 percent and 9.15 percent taking a longer view of the market. I show these very disparate calculations in Schedules DAM-19 and DAM-20.

XVI. CAPITAL ASSET PRICING MODEL

Q. CAN YOU BRIEFLY EXPLAIN THE CAPITAL ASSET PRICING MODEL?

A. The Capital Asset Pricing Model, or CAPM, is a risk premium method, which means it is a method for measuring the risk differential, or premium, between a given investment and the market as a whole. It recognizes an investor's ability to diversify his portfolio by combining securities of various risks into that portfolio, and through diversification of his investments, reducing his total risk. However, some risk is non-diversifiable, e.g., market risk, and investors remain exposed to that risk. The theoretical expression of the CAPM model is:

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

Where: K = the required return.
R_F = the risk-free rate.
R_M = the required overall market return; and
β = beta, a measure of a given security's risk relative to that of the overall market.

To elaborate on these definitions, the "risk-free rate" is the known benchmark rate of a particular security. Analysts may use a variety of rates, such as rates of Treasury securities and corporate bonds, for this benchmark rate. The overall market return is the return on all of the investment alternatives available to investors that they may combine into a portfolio. The beta represents the relative volatility of the analyzed security to the market return. In this above expression, the value of market risk is the differential between the market return and the benchmark rate. By estimating the risk differential between an individual security and the market as a whole, an analyst theoretically can measure the relative cost of that security compared to the market as a whole.[16]

Q. IN YOUR OPINION, HOW IS THE CAPM METHOD USEFUL TO AN ANALYST ESTIMATING THE COST OF COMMON EQUITY IN A RATE PROCEEDING?

A. Because it is a risk premium method, the CAPM provides a longer-term perspective, and a relatively stable estimate of the cost of common equity under normal market conditions. It normally is less sensitive to the current market conditions than the DCF model, for example. A current measure of debt costs is a

[16] Perold, Andre F., "The Capital Asset Pricing Model," *Journal of Economic Perspectives,* Volume 18, Number 3, Summer 2004, pp. 3-24.

basis for estimating the cost of a common stock using a risk differential between the two. Assuming that the measurement of the differentials in market risk is accurate, the CAPM links the incremental cost of capital of an individual company with the risk differential between that company and the market as a whole.

XVII. ANALYTICAL CONSIDERATIONS FOR THE CAPM

Q. WHAT PRACTICAL, ANALYTICAL PROBLEMS MAY AFFECT THE CAPM ESTIMATE OF THE COST OF COMMON EQUITY?

A. Analytically, the larger problem with the CAPM presently is the effect of the current, volatile financial market on the data used in the analysis. Also, for many years, analysts have concluded that the CAPM underestimates the cost of capital for companies with betas less than one.[17] This is important in this analysis because all of the gas distribution utilities that I used in my cost of capital study have betas equal to less than one. Additionally, a number of academic studies have reported a size bias of the CAPM methodology that results in lower estimated cost of capital than the true market cost.[18] Although analysts have recognized the presence of these measurement biases for some time, with familiarity, analysts can adjust for these recognized measurement biases.

Q. WHAT ARE THE DATA PROBLEMS ASSOCIATED WITH THE CURRENT MARKETS THAT AFFECT YOUR CAPM ANALYSIS?

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[17] Liztenberger, Robert, Krishna Ramaswamy, and Howard Sosin, "On the CAPM Approach to the Estimation of A Public Utility's Cost of Equity Capital," *Journal of Finance,* Volume XXXV, Number 2, May 1980, pp. 369-387.

[18] Fama, Eugene F. and Kenneth R. French, "The Capital Asset Pricing Model: Theory and Evidence," *Journal of Economic Perspectives,* Volume 18, Number 3, Summer 2004, pp. 24-46.

A. In the current volatile markets and with the resulting data generated by them, the CAPM results require special interpretation. Unless an analyst recognizes the limits of the data generated by the recent and current markets, the typical application of the CAPM methodology is flawed as a measure of the cost of capital in a rate proceeding. The CAPM will produce low-biased results that cannot represent the market cost of common equity. In short, the CAPM will under price market risk, and an analyst is not likely to be able to determine the impact of this problem on the resulting estimates.

Q. CAN YOU EXPLAIN THESE ANALYTICAL PROBLEMS?

A. Any CAPM analysis of the cost of a security is very sensitive to the level of beta used in the analysis. Analysts have recognized for some time that the estimated beta is a single, market-based measure of risk; consequently, the CAPM may not incorporate all investor risks. When this is a familiar bias of the CAPM results, analysts can recognize and compensate for it more easily. Now with the market volatility, international developments and the effects of the associated federal monetary policy, the common CAPM method has become seriously flawed for the purposes of determining the rate of return in a rate proceeding.

Q. HOW HAS THE FEDERAL MONETARY POLICY AFFECTED THE COMMON CAPM METHODOLOGY?

A. In the current markets, the Federal Reserve's policies of holding U.S. Treasury rates at historically low levels makes the interpretation of the benchmark rate, usually called the "risk free rate", problematical. For example, the Federal Reserve has purchased U.S. Treasury securities during the financial crisis to

finance the deficit and hold down interest rates. Also, the Federal Reserve has maintained short-term rates at near zero levels to provide liquidity to the banking system. When government policies dominate the cost of these securities, they cannot represent the valuations placed on them by private and willing market participants. With the administered lower benchmark rate, the CAPM result is artificially low.

Q. HAVE OTHER ANALYSTS NOTICED THIS METHODOLOGICAL PROBLEM WITH THE CAPM?

A. Yes. For example, Roger Grabowski recognized that low interest rates on U.S. Treasury securities resulting from the stimulative Federal Reserve policies would result in a CAPM methodology producing "unreasonably low" estimates of the cost of equity capital:

> U.S. Treasury bond ("T-bond") yields, the typical benchmark used in either the Capital Asset Pricing Model ("CAPM") or the Build-up methods of estimating COEC, were temporarily low for several months, resulting in unreasonably low estimates of COEC as of the important valuation date, December 31, 2008.[19]

Q. ARE THERE ANY OTHER PROBLEMS THAT CONCERN YOU ABOUT USING THE CAPM AS A MEASURE OF THE COST OF COMMON EQUITY IN THE CURRENT MARKETS?

A. A third data element needed for the CAPM calculation that the Federal Reserve's interest rate policies have altered is the risk premium. As I explained, monetary policies set the rates for the Treasury securities. This problem enters the common CAPM calculation also through the estimate of the equity risk premium. Not

[19] Grabowski, *op. cit.*

surprisingly, in recent markets the commonly measured equity risk premium will understate the risk-reward differential contained in the equity risk premium. Mr. Grabowski recognized this problem with the equity risk premium also. He stated,

> ...the expected equity risk premium ("ERP"), the rate of return expected on a diversified portfolio of common stocks in excess of the rate of return on an investment in T-bonds, has likely increased as the broad stock market level has declined.[20]

Further, Ibbotson Associates calculated its Equity Risk Premium that was available for this analysis using AAA-rate Treasury bonds. At the time of this testimony, it is uncertain what adjustments analysts will need to make in light of the S&P downgrade of U. S. debt.

Q. CAN YOU BRIEFLY SUMMARIZE YOUR CONCLUSIONS REGARDING THE USE OF THE CAPM METHODOLOGY FOR MEASURING THE COST OF CAPITAL IN THE CURRENT MARKETS?

A. If the beta and equity risk premium are flawed measures of market risks and the selection of a benchmark rate is problematical, the CAPM results are flawed and negatively biased. In light of the analytical problems of the beta, the benchmark rate and the equity risk premium, one should interpret the CAPM results very carefully. At minimum, where possible an analyst should evaluate the CAPM results and compensate them for the inherent biases. For example, one necessary adjustment is to compensate for the small firm bias of the CAPM when appropriate.

Q. WHAT DID YOU MEAN WHEN YOU SAID THAT THE CAPM METHOD REQUIRES AN ADJUSTMENT FOR THE SMALL FIRM BIAS?

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[20] *Ibid.*

A. Although repeated studies showed that the CAPM method possesses a bias that understates the expected returns of small companies, this remained only an empirical observation without a clear remedy. However, Ibbotson Associates, which is the common source of data for the risk premium used in CAPM analyses, has developed an adjustment for this bias. Ibbotson Associates discusses the problem as follows:

> One of the most remarkable discoveries of modern finance is that of the relationship between firm size and return. The relationship cuts across the entire size spectrum but is most evident among smaller companies, which have higher returns on average than larger ones. Many studies have looked at the effect of firm size on return. [21]

To account for this empirical bias against smaller companies, Ibbotson Associates has prescribed quantitative adjustments to the CAPM. It publishes this in the same data source used by many analysts to estimate the risk premium in their CAPM analyses.

Q. DID YOU APPLY THE ADJUSTMENT RECOMMENDED BY IBBOTSON ASSOCIATES IN YOUR ANALYSIS?

A. Yes. In my CAPM analysis, I followed the method recommended by Ibbotson Associates to compensate for this inherent data bias.

Q. GAS DISTRIBUTION UTILITIES ARE RELATIVELY LARGE COMPANIES. DOES THE SIZE BIAS APPLY TO SUCH COMPANIES?

A. Yes. It does. Gas distribution utilities--although seemingly sizable companies--when compared to the largest companies traded on the New York Stock Exchange, are relatively small.

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[21] "Chapter 7: Firm Size and Return", *Stocks, Bonds, Bills, and Inflation: 2008 Yearbook Valuation Edition*, Ibbotson Associates', edited by James Harrington, p. 129.

Q. DOES THE SIZE BIAS ADJUSTMENT FOR THE CAPM MEASURED BY IBBOTSON APPLY TO REGULATED UTILITIES?

A. Yes. Ibbotson calculated a measured adjustment specifically for traditional regulated utilities. In fact, the example calculation by Ibbotson used a utility to demonstrate the correct manner to apply this adjustment.

Q. TO YOUR KNOWLEDGE, HAVE ANY REGULATORY COMMISSIONS ACCEPTED THIS SIZE ADJUSTMENT TO THE CAPM IN RATE PROCEEDINGS WHEN DETERMINING THE COST OF COMMON EQUITY?

A. Yes. For example, I personally have applied the Ibbotson size adjustment to CAPM analyses in a number of jurisdictions. It corrects for an inescapable bias. Also, the Minnesota Public Utilities Commission has noted that company size is a consideration when determining the allowed return. The commission stated:

> ...the Commission concurs with the Administrative Law Judge in his conclusion that, whatever the merits and applicability of the Ibbotson study, for purposes of this case, it is reasonable to accept its principal conclusion – that size of a firm is a factor in determining risk and return.[22]

Q. WHAT WERE THE RESULTS OF YOUR CAPM ANALYSIS?

A. As I stated previously, I used two different CAPM analyses based on slightly different assumptions. Because of the current market conditions, and especially the influence of Federal Reserve policies on government bond rates, these two methods provide different information regarding the cost of common equities of gas distribution companies. One of these methods recognized the risk associated

[22] *In the Matter of the Petition of Interstate Power and Light Company for Authority to Increase its Electric Rates in Minnesota,* Docket No. E-001/GR-03-767, p. 12.

with the size of a company, and I applied a method recommended by Ibbotson Associates size adjustment. In this instance, I used a long-term Treasury Bond Yield as the benchmark, "Risk Free Rate"; however, this bond rate is currently influenced by Federal Reserve policy actions. Although the results required interpretation, this CAPM method resulted in an estimated cost of common equity for Piedmont of 9.83 percent. I show this result in Schedule DAM-21.

Q. WHAT WERE THE RESULTS PRODUCED BY YOUR SECOND CAPM METHOD?

A. The other CAPM method was a traditional method that does not require any recognition of the size bias of the CAPM, but I introduced a corporate bond rate as the benchmark rate in this method. For Piedmont, this method produced an estimated cost of common equity of 10.20 percent for Piedmont and an average of 10.33 percent for the comparable distribution utilities. This method used a market return, which is an average of the total returns of Large Company and Ibbotson Small Company Stocks. I show the results of this CAPM analysis in Schedule DAM-22.

XVIII. RETURNS ON ALTERNATIVE INVESTMENTS

Q. YOU SAID THAT YOU CONSIDERED THE MARKET RETURNS OF PIEDMONT AND THE COMPARABLE COMPANIES. WHAT WAS THE PURPOSE OF THIS ANALYSIS?

A. As I stated previously, I used the *Hope* and *Bluefield* principle, which to an economist is consistent with the basic concept of opportunity cost. That is, in order to attract and maintain capital, a return must be at least equal to the level of

the most attractive alternative investment that is available to the investor, taking into account such factors as business and financial risk. In that context, I considered the current and expected returns anticipated by investors on close, proximate investments for Piedmont common stock; these are the common stock investments in the other gas distribution utilities.

Q. WHAT DID YOUR CONSIDERATION OF RETURNS ON ALTERNATIVE INVESTMENTS REVEAL?

A. Schedule DAM-23 shows the range of expected returns on common equity of the comparable gas distribution utilities reported by *Value Line.* These are returns on common equity that investors would consider as close alternative investments to Piedmont's common equity; of course, investors in similar gas distribution utilities possess some similar risk exposure as investors in Piedmont's common stock. These return values range from a low of 9.0 percent to a high of 14.5 percent for 2011; the average of these common equity returns is 10.8 percent. As this schedule also shows, the average forecasted returns for the comparable companies for the period 2014-16 is slightly higher at 11.2 percent.

XIX. SUMMARY OF COST OF EQUITIES

Q. PLEASE SUMMARIZE THE RESULTS FROM YOUR VARIOUS ANALYSES OF THE COST OF PIEDMONT'S COMMON STOCK?

A. I show a summary of the relevant DCF, CAPM and market return results in Schedule DAM-24. As I noted, the relevant higher-end DCF results ranged from 8.41 percent to 9.15 percent for Piedmont and 9.37 percent to 9.78 percent for the comparable gas distribution companies. Although as a marginal cost measure they

do not attain the standard to attract and maintain capital, when compensated for this methodological limitation, they are useful for assessing the current market cost of capital. The CAPM results least affected by the Federal Reserve's monetary policy was 10.20 percent for Piedmont and an average of 10.33 percent for the comparable companies. Perhaps as a reflection of investors' perceptions of risk, the range of alternative expected returns for investments in gas distribution utilities is currently very broad. These expected returns on common equity ranged from 9.0 percent to 17.5 percent. Notably, *Value Line* predicts that the average future common equity returns for the comparable gas distribution companies will be 11.2 percent.

XX. RECOMMENDED ALLOWED RETURN

Q. FOLLOWING YOUR ANALYSIS, WHAT FACTORS WERE IMPORTANT IN RECOMMENDING YOUR ALLOWED RETURN?

A. The volatile debt and common equity markets exhibit the market risks perceived by common equity investors at this time. The slow economic recovery, and even the fear of a secondary dip, and international events dominate economic forecasts and investors' expectations. Although the Federal Reserve has continued to maintain low short-term rates to stimulate the economic recovery, the fear of inflation grows. Standard & Poor's downgrade of U.S. debt will raise the yields on U.S. securities and overtime the cost of debt throughout the economy. In fact, the control of the federal deficit is now a significant political and economic issue, and investors are wary of the consequences of the market risks. The forecasted growth in long-term interest rates of over two percent is significant, and, of

course, long-term interest rates are relevant competitive rates for allowed returns of any regulated utility, including Piedmont.

The average forecasted return on common equity is 11.2 percent for investments in comparable gas distribution utilities. The CAPM results that are most relevant and least influenced by short-term monetary policy are 10.20 and 10.33 percent. However, even this result was influenced by both Federal Reserve policies and the low betas for the gas distribution companies and a virtually independent risk premium given the recent market conditions. The comparable companies' DCF result, which is a marginal cost of common equity measure rather than an average cost measure, is 9.68 percent.

Q. WHAT IS YOUR RECOMMENDED RATE OF RETURN ON COMMON EQUITY FOR PIEDMONT IN THIS PROCEEDING?

A. Taking into account the economic conditions and forecasted inflation and growth in interest rates, I am recommending an allowed return for Piedmont of 11.25 percent in this proceeding. With the continued market volatility, threats of inflation and interest rate increases, and the level of returns on alternative investments required by investors, this level of return may prove to be barely adequate over the period, measured in years, that one should expect the rates in this proceeding to remain in effect.

Q. WHAT RETURN ON TOTAL CAPITAL ARE YOU RECOMMENDING FOR PIEDMONT IN THIS PROCEEDING?

A. Based on the relevant capital structure, the cost of long-term and short-term debt, and my recommended allowed return, the appropriate total cost of capital in this

proceeding is 8.53 percent. The calculation of this range of allowed total costs is shown in Schedule DAM-25.

XXI. INTEREST COVERAGE RATIOS

Q. YOU EXPLAINED THAT YOU VERIFIED THAT YOUR RECOMMENDATION WAS SUFFICIENT TO ATTRACT AND MAINTAIN CAPITAL. HOW DID YOU DETERMINE THIS?

A. In order to verify that my recommended allowed return would be sufficient to attract and maintain capital in the current markets, I calculated the After-Tax Interest Coverage ratio at that level. Then, I compared this after-tax coverage to the similar coverage ratios for the comparable companies.

Q. WHY IS THE INTEREST COVERAGE LEVEL A MEASURE OF WHETHER YOUR RECOMMENDED ALLOWED RETURN IS REASONABLE?

A. The After-Tax Interest Coverage ratio indicates the level of funds available to meet the interest payment obligations of a company's debt component of its permanent capital. The higher the ratio, the more secure the interest payments. The lower the ratio, the greater the likelihood that a utility will fail to have sufficient funds to meet its interest obligations and provide adequate returns to its common stockholders. For example, an interest coverage ratio for Piedmont, which is higher than the lowest coverages of the comparable gas distribution utilities, indicates that the recommended allowed return should be sufficient to attract and maintain capital as proscribed in the regulatory standard. An interest coverage ratio for Piedmont, which is lower than the coverages for the

comparable companies, will indicate that my recommended return is not excessive.

Q. WHAT WERE THE RESULTS OF YOUR ANALYSIS OF THE AFTER-TAX INTEREST COVERAGE RATIOS?

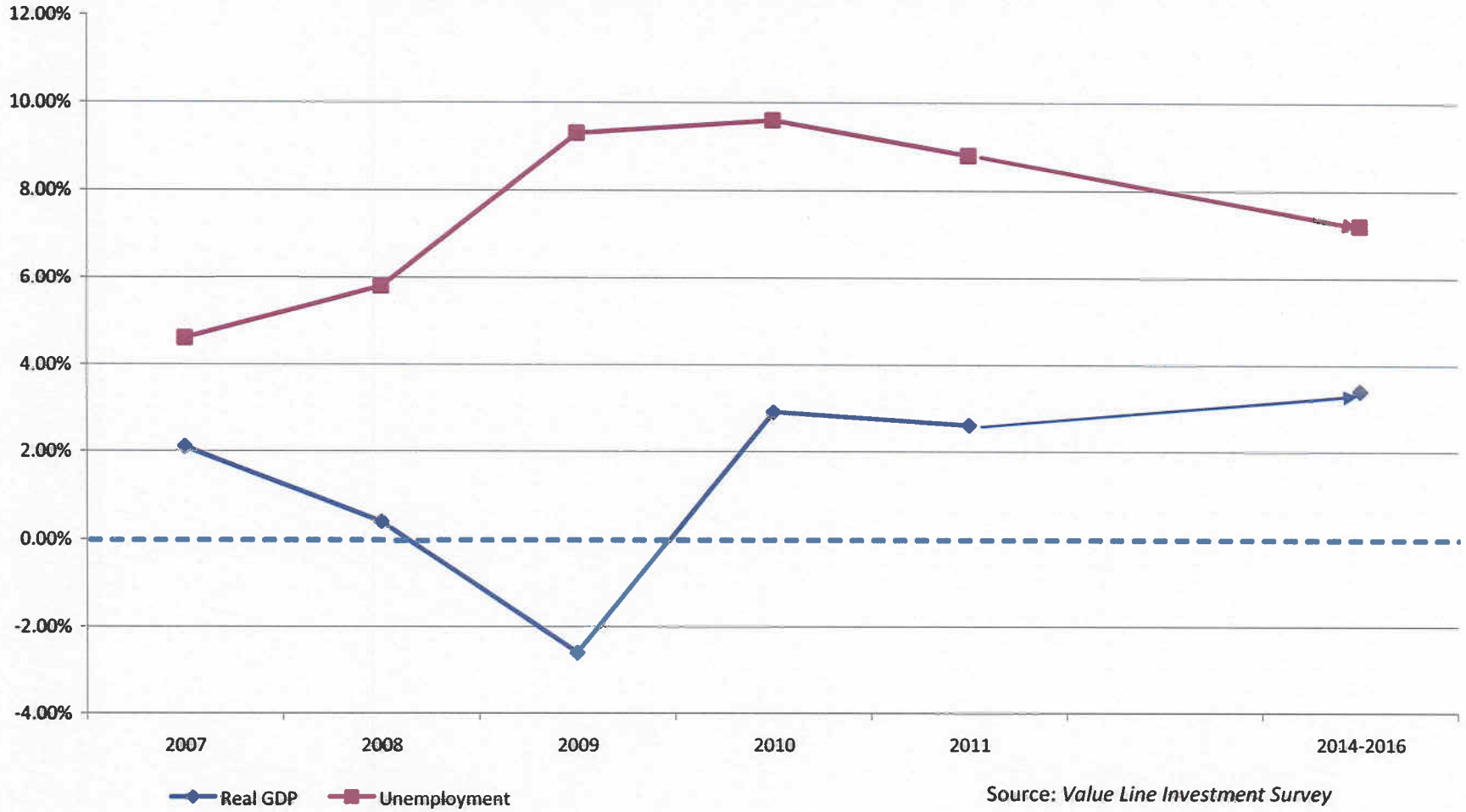
A. As Schedule DAM-26 shows, my recommended allowed return of 11.25 percent on common equity results in an After Tax Interest Coverage for Piedmont of 3.28 times. This is well within the range of the similar coverages for these comparable gas distribution utilities and is consistent with the recent industry standards. Consequently, my recommendation should be sufficient to attract and maintain capital and is clearly not excessive.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY AT THIS TIME?

A. Yes, it does.

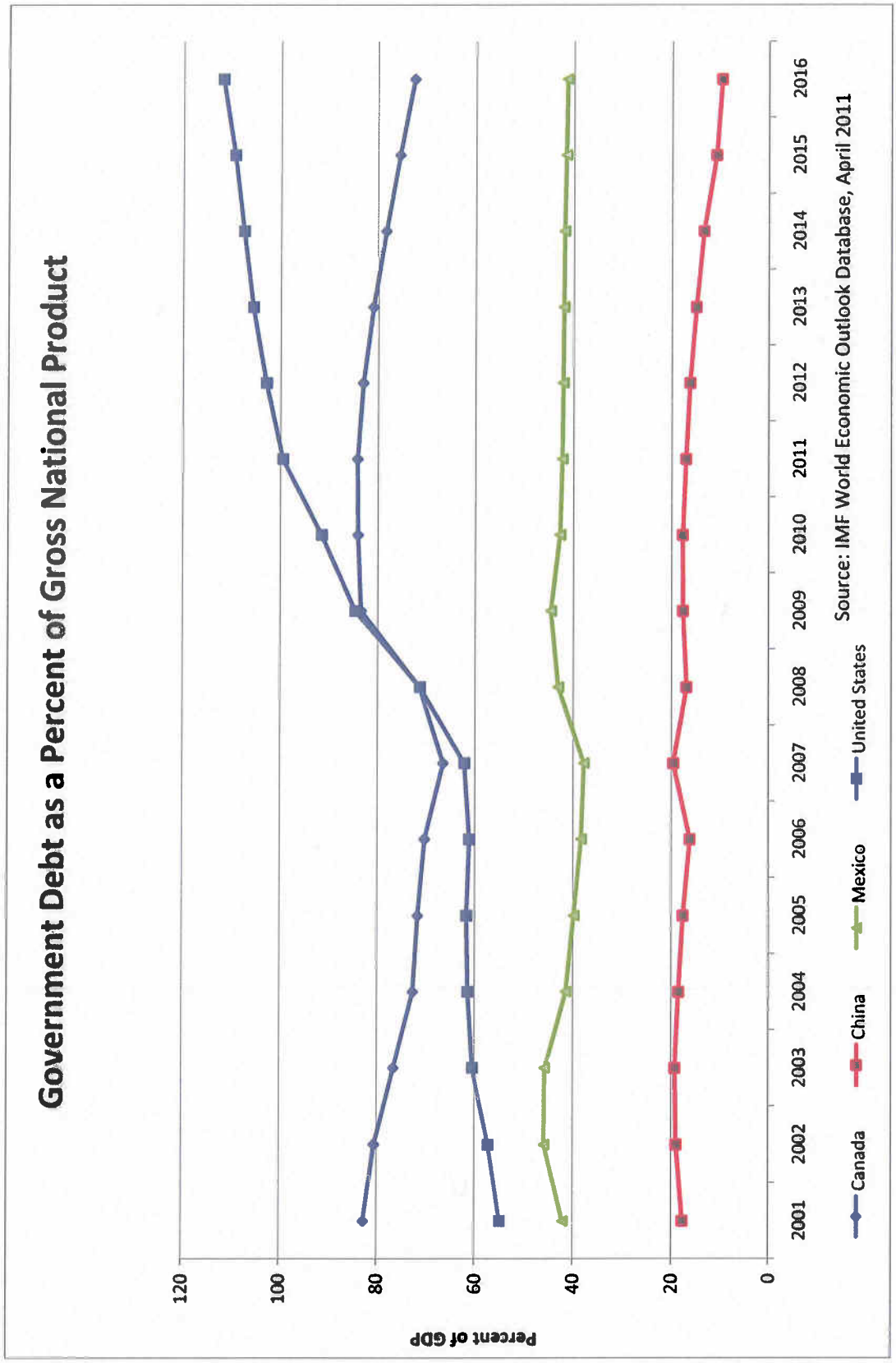
EXHIBIT__(DAM)

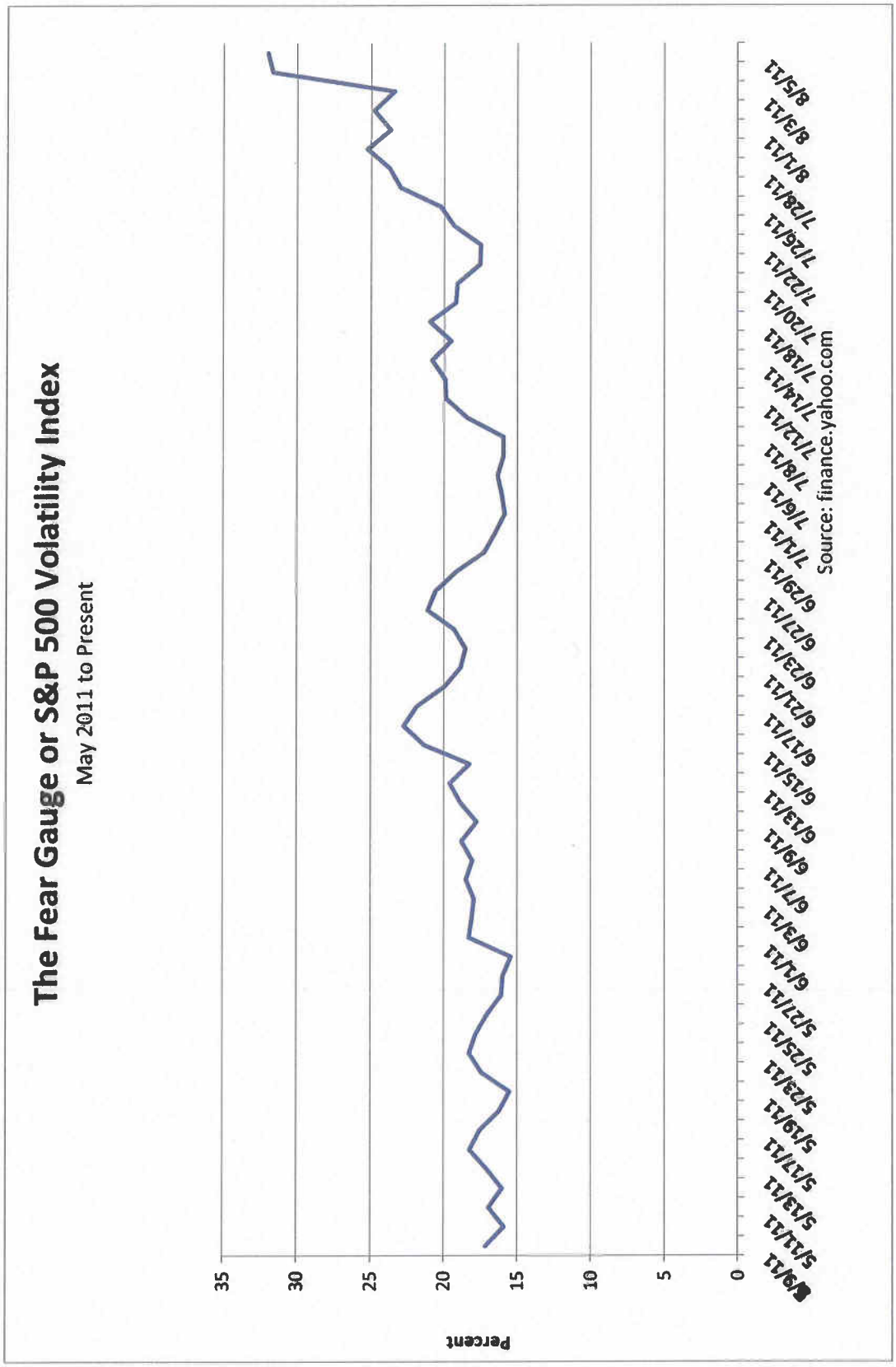
Comparison of GDP Growth and Unemployment



Source: *Value Line Investment Survey*

Schedule DAM-1


Government Debt as a Percent of Gross National Product
Percent of GDP
120
100
80
60
40
20
0
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
Canada
China
Mexico
United States
Source: IMF World Economic Outlook Database, April 2011

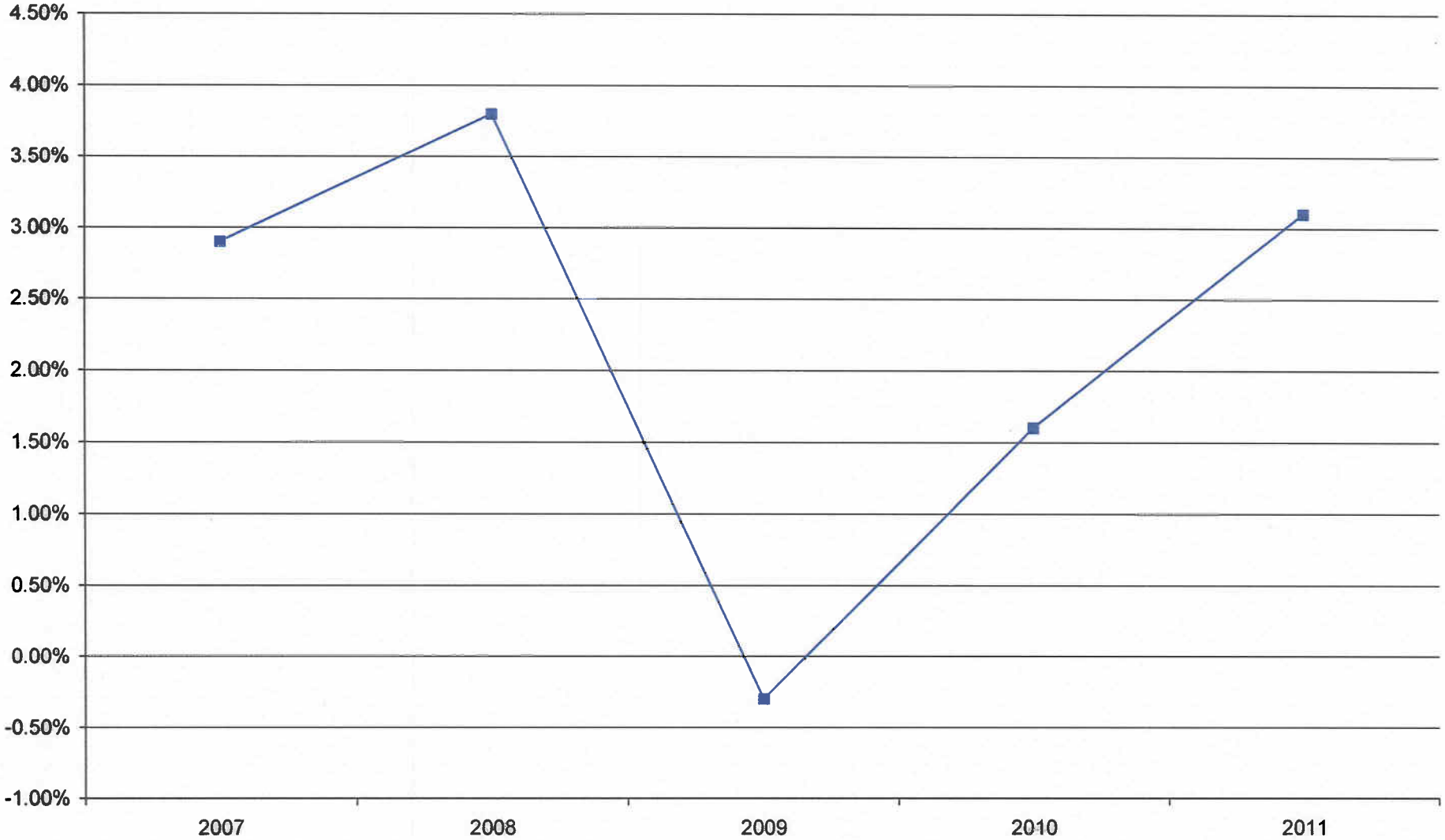

The Fear Gauge or S&P 500 Volatility Index
May 2011 to Present
Percent
35
30
25
20
15
10
5
0
5/9/11
5/11/11
5/13/11
5/17/11
5/19/11
5/23/11
5/25/11
5/27/11
6/1/11
6/3/11
6/7/11
6/9/11
6/13/11
6/15/11
6/17/11
6/21/11
6/23/11
6/27/11
6/29/11
7/1/11
7/6/11
7/8/11
7/12/11
7/14/11
7/18/11
7/20/11
7/22/11
7/26/11
7/28/11
8/1/11
8/3/11
8/5/11
Source: finance.yahoo.com

One Year Gold Chart

Source: www.goldprice.org

Schedule DAM-4

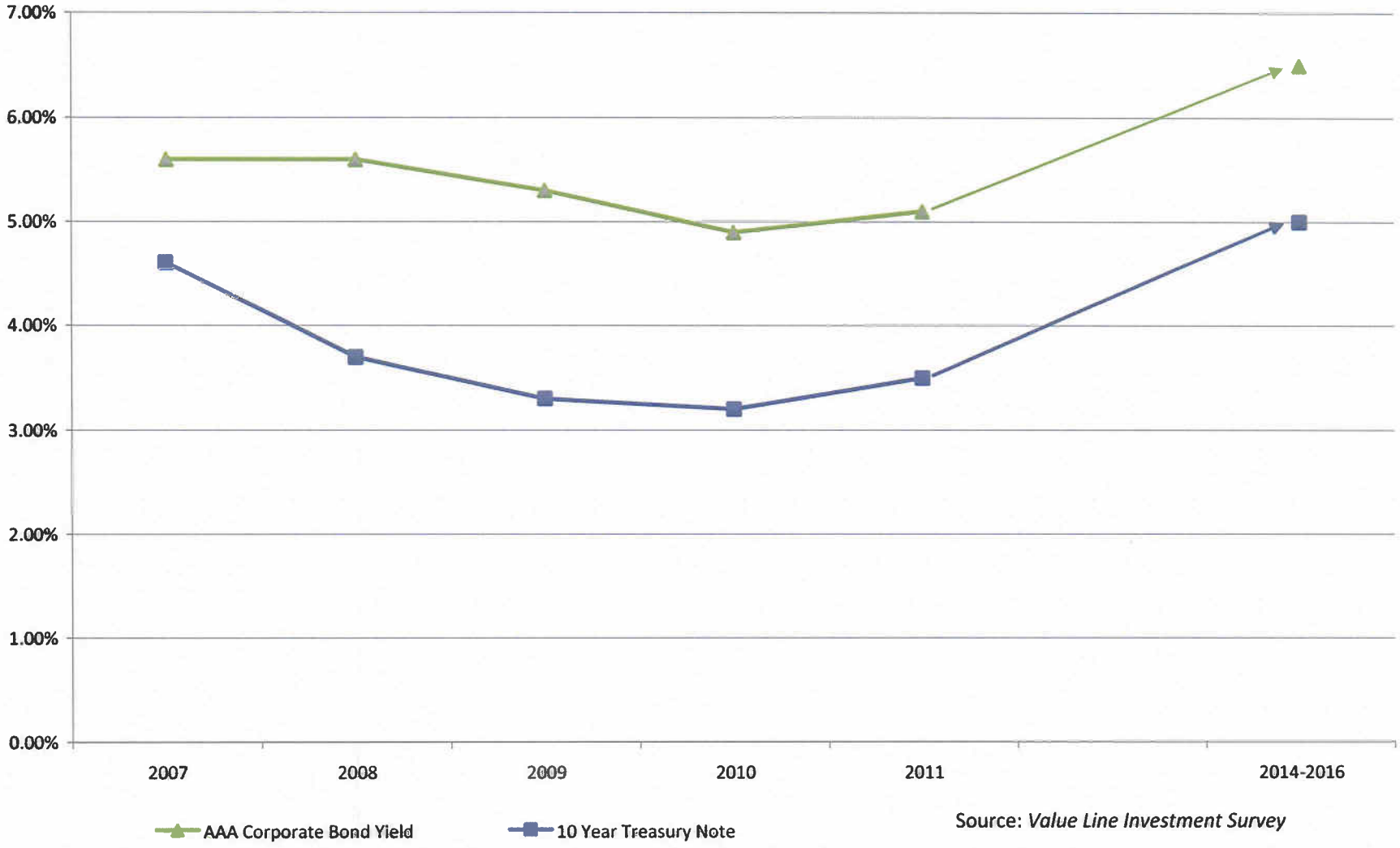
Consumer Price Index



Source: *Value Line Investment Survey*

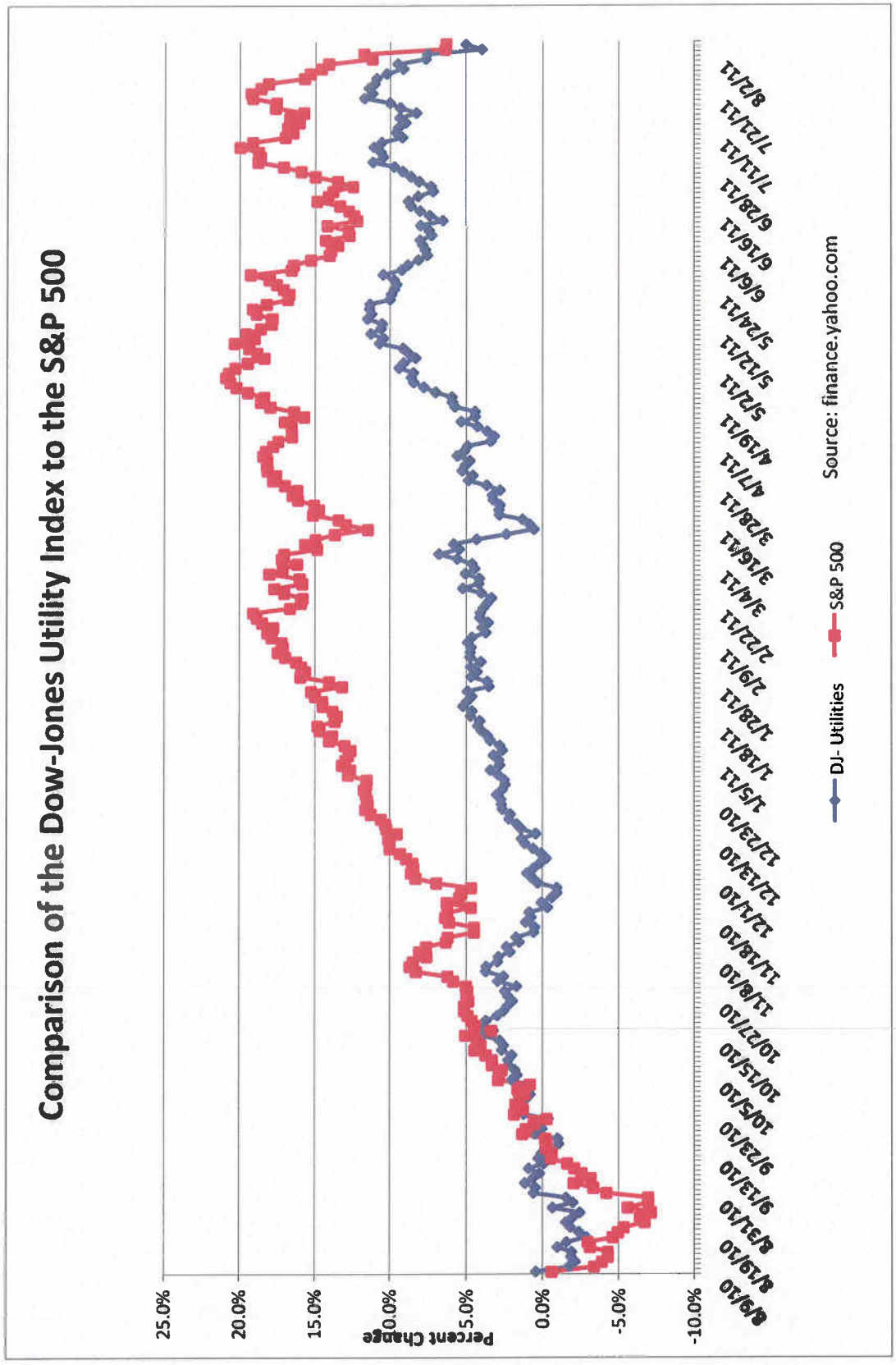
Schedule DAM-5

Comparison of Bond Yields



Source: *Value Line Investment Survey*

Schedule DAM-6


Comparison of the Dow-Jones Utility Index to the S&P 500
Percent Change
25.0%
20.0%
15.0%
10.0%
5.0%
0.0%
-5.0%
-10.0%
6/9/10
8/19/10
8/31/10
9/13/10
9/23/10
10/5/10
10/15/10
10/27/10
11/8/10
11/18/10
12/1/10
12/13/10
12/23/10
1/5/11
1/18/11
1/28/11
2/9/11
2/22/11
3/4/11
3/16/11
3/28/11
4/7/11
4/19/11
5/2/11
5/12/11
5/24/11
6/6/11
6/16/11
6/28/11
7/11/11
7/21/11
8/2/11
DJ- Utilities
S&P 500
Source: finance.yahoo.com

Schedule DAM-8

Piedmont Natural Gas

Proposed Capital Structure

(in millions)

Item	Amount	Proportion
Long Term Debt	$774,072	41.4%
Short Term Debt	$109,667	5.9%
Common Equity	$985,020	52.7%
Total	$1,868,759	100.0%

Source: Piedmont Natural Gas Work Papers

Piedmont Natural Gas

Comparable Gas Distribution Companies

Comparison of Common Equity Ratios

Company	2007	2008	2009	2010	2011E	Forecast '14-'16
Piedmont Natural Gas	51.6%	52.8%	55.9%	59.0%	58.0%	59.5%
Atmos Energy Corp.	48.0%	49.2%	50.1%	54.6%	55.0%	51.0%
New Jersey Resources	62.7%	61.5%	60.2%	62.8%	63.0%	66.0%
Northwest Natural Gas	53.7%	55.1%	52.3%	53.5%	57.0%	67.0%
South Jersey Industries	57.3%	60.8%	63.5%	62.6%	60.5%	62.0%
Southwest Gas	41.9%	44.7%	46.5%	50.9%	53.0%	55.0%
WGL Holdings	60.3%	62.4%	65.0%	65.0%	64.0%	66.0%
Comparable Companies' Averages	54.0%	55.6%	56.3%	58.2%	58.8%	61.2%

Source: *Value Line Investment Survey*

Schedule DAM-9

Piedmont Natural Gas

Comparable Gas Distribution Companies

Comparison of Financial Strength and Bond Ratings

Company	Value Line Financial Strength	S&P Rating
Piedmont Natural Gas	B++	A
Atmos Energy Corp.	B+	BBB+
New Jersey Resources	A	A
Northwest Natural Gas	A	A+
South Jersey Industries	B++	BBB+
Southwest Gas	B	BBB+
WGL Holdings	A	A+

Sources: *Value Line Investment Survey*
www.standardandpoors.com

Piedmont Natural Gas

Comparable Gas Distribution Companies

Comparison of Value Line's Safety and Timeliness Rank

	Safety Rank	Timeliness Rank
Piedmont Natural Gas	2	3
Atmos Energy Corp.	2	3
New Jersey Resources	1	4
Northwest Natural Gas	1	4
South Jersey Industries	2	3
Southwest Gas	3	3
WGL Holdings	1	4
Comparable Companies' Average	1.7	3.5

Source: *Value Line Investment Survey*

Piedmont Natural Gas

Comparable Gas Distribution Companies

Comparison of Returns on Common Equity

	2007	2008	2009	2010	2011E
Piedmont Natural Gas	11.9%	12.4%	13.2%	11.6%	12.0%
Atmos Energy Corp.	8.7%	8.8%	8.3%	9.2%	9.0%
New Jersey Resources	10.1%	15.7%	14.6%	14.1%	14.5%
Northwest Natural Gas	12.5%	10.9%	11.4%	10.5%	9.0%
South Jersey Industries	12.8%	13.1%	13.1%	14.2%	14.5%
Southwest Gas	8.5%	5.9%	7.9%	8.9%	8.5%
WGL Holdings	10.4%	11.6%	11.6%	9.9%	9.0%
Comparable Companies' Averages	10.5%	11.0%	11.2%	11.1%	10.8%

Source: *Value Line Investment Survey*

Schedule DAM-12

Piedmont Natural Gas

Comparable Gas Distribution Companies

Comparison of Expected Dividends

	2007	2008	2009	2010E	2011E	Projected 5-Year Growth Rate
Piedmont Natural Gas	0.99	1.03	1.07	1.11	1.15	3.5%
Atmos Energy Corp.	1.28	1.30	1.32	1.34	1.36	2.0%
New Jersey Resources	1.01	1.11	1.24	1.36	1.44	4.5%
Northwest Natural Gas	1.44	1.52	1.60	1.68	1.74	3.5%
South Jersey Industries	1.01	1.11	1.22	1.36	1.48	8.5%
Southwest Gas	0.86	0.90	0.95	1.00	1.06	4.5%
WGL Holdings	1.37	1.41	1.47	1.50	1.55	2.5%
Comparable Companies' Averages	1.16	1.23	1.30	1.37	1.44	4.3%

Source: *Value Line Investment Survey*

Schedule DAM-13

Piedmont Natural Gas

Comparable Gas Distribution Companies

Comparison of Dividend Payout Ratios

	2007	2008	2009	2010	2011E	Forecast '14-'16
Piedmont Natural Gas	70.0%	69.0%	64.0%	72.0%	72.0%	69.0%
Atmos Energy Corp.	65.0%	65.0%	68.0%	62.0%	59.0%	53.0%
New Jersey Resources	64.0%	40.0%	50.0%	52.0%	54.0%	50.0%
Northwest Natural Gas	52.0%	59.0%	56.0%	61.0%	74.0%	56.0%
South Jersey Industries	48.0%	49.0%	51.0%	50.0%	48.0%	49.0%
Southwest Gas	44.0%	63.0%	48.0%	44.0%	45.0%	42.0%
WGL Holdings	66.0%	57.0%	57.0%	67.0%	74.0%	64.0%
Comparable Companies' Averages	56.5%	55.5%	55.0%	56.0%	59.0%	52.3%

Source: *Value Line Investment Survey*

Schedule DAM-14

Piedmont Natural Gas

Comparable Gas Distribution Companies

Comparison of Average Annual Price-Earnings Ratios

Company	2006	2007	2008	2009	2010
Piedmont Natural Gas	19.2	18.7	18.2	15.4	17.1
Atmos Energy Corp.	13.5	15.9	13.6	12.5	13.2
New Jersey Resources	16.1	21.6	12.3	14.9	15.0
Northwest Natural Gas	15.9	16.7	18.1	15.2	17.9
South Jersey Industries	11.9	17.2	15.9	15.0	16.8
Southwest Gas	15.9	17.3	20.3	12.2	14.0
WGL Holdings	15.5	15.6	13.7	12.6	15.1
Comparable Companies' Averages	14.8	17.4	15.7	13.7	15.3

Source: *Value Line Investment Survey*

Schedule DAM-15

Piedmont Natural Gas

Comparable Gas Distribution Companies

Discounted Cash Flow Growth Rate Summary

	Value Line						Projections		
	2006 TO 2015 Estimate			Five Year Historical			Value Line		YAHOO!
	EPS	DPS	Book Value	EPS	DPS	Book Value	EPS	DPS	EPS
Piedmont Natural Gas	4.0%	3.6%	2.8%	5.0%	4.5%	3.5%	3.0%	3.5%	4.8%
Atmos Energy	4.1%	1.6%	4.3%	4.0%	1.5%	5.0%	5.0%	2.0%	3.4%
New Jersey Resources	7.1%	5.8%	6.5%	8.5%	7.5%	10.0%	4.0%	4.5%	2.9%
Northwest Natural Gas	3.9%	3.6%	5.2%	9.5%	3.5%	4.0%	4.5%	3.5%	3.7%
South Jersey Industries	7.8%	8.9%	6.5%	9.5%	8.5%	8.0%	9.0%	8.5%	7.5%
Southwest Gas	6.3%	4.6%	5.4%	6.0%	2.0%	5.0%	8.0%	4.5%	2.8%
WGL Holdings	2.9%	2.7%	4.1%	2.5%	2.5%	5.0%	1.5%	2.5%	4.0%
Comparable Companies' Averages	5.34%	4.53%	5.34%	6.67%	4.25%	6.17%	5.33%	4.25%	4.04%

Sources:
Value Line Investment Survey
Yahoo! Finance

Schedule DAM-16

Piedmont Natural Gas

Comparable Gas Distribution Companies

Earnings Growth Rate DCF Using Current Share Prices

	Share Prices		Current	Current Yields		2005-2007	2014-2016	Growth	Cost of Capital	
	Low	High	Dividend	Low	High	EPS	EPS	Rate	Low	High
Piedmont Natural Gas	30.42	30.95	1.15	3.72%	3.78%	1.33	1.90	4.01%	7.73%	7.79%
Atmos Energy	33.56	34.00	1.36	4.00%	4.05%	1.89	2.70	4.06%	8.06%	8.12%
New Jersey Resources	45.28	45.90	1.44	3.14%	3.18%	1.73	3.20	7.07%	10.21%	10.25%
Northwest Natural Gas	45.62	46.16	1.74	3.77%	3.81%	2.41	3.40	3.91%	7.68%	7.73%
South Jersey Industries	54.03	54.75	1.48	2.70%	2.74%	2.09	4.10	7.79%	10.50%	10.53%
Southwest Gas	38.81	39.31	1.06	2.70%	2.73%	1.73	3.00	6.33%	9.03%	9.06%
WGL Holdings	39.17	39.73	1.55	3.90%	3.96%	2.05	2.65	2.87%	6.78%	6.83%
Comparable Companies' Averages	42.74	43.31	1.44	3.37%	3.41%	1.98	3.18	5.34%	8.71%	8.75%

Sources:
Value Line Investment Survey
Yahoo! Finance

Schedule DAM-17

Piedmont Natural Gas

Comparable Gas Distribution Companies

Earnings Growth Rate DCF Using 52-Week Share Prices

	Share Prices		2011	52 Week Yields		2005-2007	2014-2016	Growth	Cost of Capital	
	Low	High	Dividend	Low	High	EPS	EPS	Rate	Low	High
Piedmont Natural Gas	26.15	32.00	1.15	3.59%	4.40%	1.33	1.90	4.01%	7.61%	8.41%
Atmos Energy	28.01	35.25	1.36	3.86%	4.86%	1.89	2.70	4.06%	7.92%	8.92%
New Jersey Resources	36.09	46.60	1.44	3.09%	3.99%	1.73	3.20	7.07%	10.16%	11.06%
Northwest Natural Gas	43.57	50.86	1.74	3.42%	3.99%	2.41	3.40	3.91%	7.34%	7.91%
South Jersey Industries	44.55	58.03	1.48	2.55%	3.32%	2.09	4.10	7.79%	10.34%	11.12%
Southwest Gas	30.11	40.59	1.06	2.61%	3.52%	1.73	3.00	6.33%	8.94%	9.85%
WGL Holdings	34.69	40.44	1.55	3.83%	4.47%	2.05	2.65	2.87%	6.71%	7.34%
Comparable Companies' Averages	36.17	45.30	1.44	3.23%	4.02%	1.98	3.18	5.34%	8.57%	9.37%

Sources:
Value Line Investment Survey
Yahoo! Finance

Schedule DAM-18

Piedmont Natural Gas

Comparable Gas Distribution Companies

Projected Growth Rate DCF Using Current Share Prices

	Share Prices		Current	Current Yields		EPS Estimates		Cost of Capital	
	Low	High	Dividend	Low	High	Value Line	YAHOO!	Low	High
Piedmont Natural Gas	30.42	30.95	1.15	3.72%	3.78%	3.00%	4.75%	6.72%	8.53%
Atmos Energy	33.56	34.00	1.36	4.00%	4.05%	5.00%	3.35%	7.35%	9.05%
New Jersey Resources	45.28	45.90	1.44	3.14%	3.18%	4.00%	2.88%	6.02%	7.18%
Northwest Natural Gas	45.62	46.16	1.74	3.77%	3.81%	4.50%	3.67%	7.44%	8.31%
South Jersey Industries	54.03	54.75	1.48	2.70%	2.74%	9.00%	7.50%	10.20%	11.74%
Southwest Gas	38.81	39.31	1.06	2.70%	2.73%	8.00%	2.80%	5.50%	10.73%
WGL Holdings	39.17	39.73	1.55	3.90%	3.96%	1.50%	4.03%	5.40%	7.99%
Comparable Companies' Averages	42.74	43.31	1.44	3.37%	3.41%	5.33%	4.04%	6.98%	9.17%

Sources:
Value Line Investment Survey
Yahoo! Finance

Schedule DAM-19

Piedmont Natural Gas

Comparable Gas Distribution Companies

Projected Growth Rate DCF Using 52-Week Share Prices

	Share Prices		2011	52 Week Yields		EPS Estimates		Cost of Capital	
	Low	High	Dividend	Low	High	Value Line	YAHOO!	Low	High
Piedmont Natural Gas	26.15	32.00	1.15	3.59%	4.40%	3.00%	4.75%	6.59%	9.15%
Atmos Energy	28.01	35.25	1.36	3.86%	4.86%	5.00%	3.35%	7.21%	9.86%
New Jersey Resources	36.09	46.60	1.44	3.09%	3.99%	4.00%	2.88%	5.97%	7.99%
Northwest Natural Gas	43.57	50.86	1.74	3.42%	3.99%	4.50%	3.67%	7.09%	8.49%
South Jersey Industries	44.55	58.03	1.48	2.55%	3.32%	9.00%	7.50%	10.05%	12.32%
Southwest Gas	30.11	40.59	1.06	2.61%	3.52%	8.00%	2.80%	5.41%	11.52%
WGL Holdings	34.69	40.44	1.55	3.83%	4.47%	1.50%	4.03%	5.33%	8.50%
Comparable Companies' Averages	36.17	45.30	1.44	3.23%	4.02%	5.33%	4.04%	6.84%	9.78%

Sources:
Value Line Investment Survey
Yahoo! Finance

Schedule DAM-20

Piedmont Natural Gas

Comparable Gas Distribution Companies

Size Adjusted Capital Asset Pricing Model

	Risk Free Return	Beta	Equity Risk Premium	Adjusted Equity Risk Premium	Size Premium	Cost of Equity
Piedmont Natural Gas	4.27%	0.65	6.70%	4.36%	1.20%	9.83%
Atmos Energy	4.27%	0.70	6.70%	4.69%	1.20%	10.16%
New Jersey Resources	4.27%	0.65	6.70%	4.36%	1.20%	9.83%
Northwest Natural Gas	4.27%	0.60	6.70%	4.02%	1.98%	10.27%
South Jersey Industries	4.27%	0.65	6.70%	4.36%	1.98%	10.61%
Southwest Gas	4.27%	0.75	6.70%	5.03%	1.20%	10.50%
WGL Holdings	4.27%	0.65	6.70%	4.36%	1.20%	9.83%
Comparable Companies' Average	4.27%	0.67	6.70%	4.47%	1.46%	10.20%

Sources :
Value Line Investment Survey
Ibbotson Associates 2011 SBBI Yearbook: Valuation Edition
Federal Reserve Statistical Release

Schedule DAM-21

Piedmont Natural Gas

Comparable Gas Distribution Companies

Historical Capital Asset Pricing Model

	Market Total Returns	Long-Term Corporate Bonds Return	Risk Premium	Beta	Adjusted Risk Premium	Aaa Corporate Bonds Return	Cost of Equity
Piedmont Natural Gas	14.30%	6.20%	8.10%	0.65	5.27%	4.93%	10.20%
Atmos Energy	14.30%	6.20%	8.10%	0.70	5.67%	4.93%	10.60%
New Jersey Resources	14.30%	6.20%	8.10%	0.65	5.27%	4.93%	10.20%
Northwest Natural Gas	14.30%	6.20%	8.10%	0.60	4.86%	4.93%	9.79%
South Jersey Industries	14.30%	6.20%	8.10%	0.65	5.27%	4.93%	10.20%
Southwest Gas	14.30%	6.20%	8.10%	0.75	6.08%	4.93%	11.01%
WGL Holdings	14.30%	6.20%	8.10%	0.65	5.27%	4.93%	10.20%
Comparable Companies' Average	14.30%	6.20%	8.10%	0.67	5.40%	4.93%	10.33%

Sources :
Value Line Investment Survey
Ibbotson Associates 2011 SBBI Yearbook: Valuation Edition
Federal Reserve Statistical Release

Schedule DAM-22

Piedmont Natural Gas

Comparable Gas Distribution Companies

Comparison of Returns on Common Equity

	2011	2014-16
Piedmont Natural Gas	12.0%	12.5%
Atmos Energy	9.0%	9.0%
New Jersey Resources	14.5%	13.5%
Northwest Natural Gas	9.0%	10.0%
South Jersey Industries	14.5%	15.5%
Southwest Gas	8.5%	9.0%
WGL Holdings	9.0%	10.0%
Comparable Companies' Average	10.8%	11.2%

Source:
Value Line Investment Survey

Piedmont Natural Gas

Comparable Gas Distribution Companies

Summary of Financial Analysis

Method	Piedmont Natural Gas		Comparable Gas Companies	
	Low	High	Low	High
Capital Asset Pricing Model	9.83%	10.20%	10.20%	10.33%
Forecasted ROE's	12.00%	12.50%	9.00%	17.50%
Earnings Growth DCF Analysis	7.61%	8.41%	8.57%	9.37%
Projected Growth DCF Analysis	6.59%	9.15%	6.84%	9.78%

Piedmont Natural Gas

Proposed Cost of Capital

(in millions)

Item	Amount	Share	Embedded Cost	Weighted Average Cost
Long Term Debt	$774,072	41.4%	6.05%	2.51%
Short Term Debt	$109,667	5.9%	1.59%	0.09%
Common Equity	$985,020	52.7%	11.25%	5.93%
Total	$1,868,759	100%		8.53%

Source: Piedmont Natural Gas Work Papers

Schedule DAM-25

Piedmont Natural Gas

Comparable Gas Distribution Companies

Comparison of After-Tax Times Interest Earned Ratios

Piedmont Natural Gas	@11.25% ROE	3.28
Atmos Energy Corp.		2.82
New Jersey Resources		9.75
Northwest Natural Gas		2.73
South Jersey Industries		4.98
Southwest Gas		2.44
WGL Holdings		4.01
Comparable Companies' Average		4.45

Source : Value Line Investment Survey