THE STATE OF NEW HAMPSHIRE

BEFORE THE

PUBLIC UTILITIES COMMISSION

DG 13-086

NORTHERN UTILITIES, INC.

DIRECT TESTIMONY OF

SAMUEL C. HADAWAY

EXHIBIT SCH-1

Table of Contents

List of Schedules

I. INTRODUCTION AND BACKGROUND

Q. Please state your name and business address.

A. My name is Samuel C. Hadaway. I am a Principal in FINANCO, Inc., Financial Analysis Consultants, 3520 Executive Center Drive, Austin, Texas 78731.

Q. On whose behalf are you testifying?

A. I am testifying on behalf of Northern Utilities, Inc. (hereinafter referred to as "Northern Utilities" or the "Company").

Q. Please state your educational background and describe your professional training and experience.

A. I have a Bachelor's degree in economics from Southern Methodist University, as well as MBA and Ph.D. degrees with concentrations in finance and economics from the University of Texas at Austin ("UT Austin"). I am an owner and full-time employee of FINANCO, Inc. FINANCO provides financial research concerning the cost of capital and financial condition for regulated companies as well as financial modeling and other economic studies in litigation support. In addition to my work at FINANCO, I have served as an adjunct professor in the McCombs School of Business at UT Austin and in what is now the McCoy College of Business at Texas State University. In my prior academic work, I taught economics and finance courses and I conducted research and directed graduate students in the areas of investments and capital market research. I was previously Director of the Economic Research Division at the Public Utility

Commission of Texas where I supervised the Texas Commission's finance, economics, and accounting staff, and served as the Texas Commission's chief financial witness in electric and telephone rate cases. I have taught courses at various utility conferences on cost of capital, capital structure, utility financial condition, and cost allocation and rate design issues. I have made presentations before the New York Society of Security Analysts, the National Rate of Return Analysts Forum, the Society of Utility Regulatory and Financial Analysts, and various other professional and legislative groups. I have served as a vice president and on the board of directors of the Financial Management Association.

A list of my publications and testimony I have given before various regulatory bodies and in state and federal courts is contained in my resume, which is included as Appendix A.

II. PURPOSE AND SUMMARY OF TESTIMONY

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to estimate the market required cost of equity capital for Northern Utilities.

Q. Please define the term "cost of equity capital."

A. The cost of equity capital (sometimes referred to as "cost of equity" or "COE") is the rate of return that equity investors require or expect to receive from their investments in common stocks. Conceptually, COE is no different than the

interest rate on debt or the cost of preferred stock. Equity investors expect a return on their capital commensurate with the risks they take in making the investment and consistent with returns that might be available from other similar investments.

Q. Is COE the same as the allowed rate of return on equity ("ROE")?

A. The terms are often used interchangeably. In regulatory proceedings, however, ROE is the commission-established component that, along with the utility's cost of debt and preferred stock, is used to calculate the utility's overall cost of capital. To establish ROE, regulatory commissions typically consider the quantitative results of various traditional cost of equity models, which I describe below, as well as other relevant economic factors and circumstances.

Q. Have you determined the COE for utilities comparable to Northern Utilities?

A. Yes. I have approached the comparable company issue from two perspectives. Northern Utilities is a wholly-owned gas distribution utility subsidiary of Unitil Corporation. Unitil Corporation has two other principal utility subsidiaries, Unitil Energy, Inc., which provides electric distribution services, and Fitchburg Gas and Electric Light Company, which provides both gas and electric distribution services. Unitil Corporation's common stock is listed on the New York Stock Exchange and, therefore, it trades in the highly competitive national equity market along with the other gas and electric utility holding companies from around the country. Unitil Corporation is viewed by its shareholders and other potential investors as a combination gas and electric utility company. To obtain equity

financing, as Unitil Corporation did in 2012, the Company must provide sound financial results comparable to the results achieved by other similarly situated utilities.

In addition to Unitil Corporation's underlying nature, I also considered the current state of capital markets in the U.S. As I will explain in later in this testimony, current COE estimates from the traditional cost of equity models tend to understate the cost of equity for utilities. The model results are negatively skewed by the government's ongoing intervention in the credit markets. The present, artificially low interest rate environment has driven utility dividend yields to unprecedented and unsustainably low levels. In the traditional "yield plus growth" discounted cash flow ("DCF") format, the model results are currently depressed by low dividend yields. Similarly, risk premium model estimates are directly reduced by the low interest rates that have resulted from the government's monetary policy.

In this context, I have used two comparable groups to estimate Northern Utilities' COE. While I continue to support a larger, more statistically robust group, in my current analysis, I have also included a smaller, gas-only comparable group similar to that often used by the other parties in LDC rate cases. Based on this approach, my DCF analysis offers a relatively wide range of COE estimates. These quantitative estimates of COE should be used within the context of Unitil Corporation's combination utility characteristics and current market conditions to establish a fair ROE for the Company in this case.

Q. Please summarize your COE studies and state your ROE recommendation.

A. For my larger comparable group, which consists of combination gas and electric utilities, the DCF model indicates a COE range of 9.7 percent to 10.0 percent. For the smaller, gas-only group, the DCF analysis indicates a range of 9.3 percent to 9.6 percent. The lower gas-only COE estimates are largely driven by the 50 basis point lower average dividend yield for the gas group. Given the artificially low level of current dividend yields for utilities in general, and especially for gas local distribution companies ("LDCs"), I recommend a balanced approach considering not only the quantitative model results but also other qualitative factors that support a higher ROE range.

I have also performed equity risk premium analyses based on allowed ROEs for electric and gas utilities. For the electric utility group, that analysis indicates a COE range of 9.8 percent to 10.1 percent. For the gas utility group, the risk premium analysis indicates a COE range of 9.7 percent to 9.9 percent. As I will explain later, I discount the lower end of the DCF and equity risk premium results because they are unduly influenced by current, artificially low interest rates caused by the federal government's expansionary monetary policy. Based on the upper portions of my quantitative results and my further review of other economic data and current market conditions, as well as the Company's large projected capital expenditures and financing needs as discussed by Company witnesses Thomas Messiner and Mark Collin, I believe an ROE of 10.0 percent is reasonable. While

the requested ROE is near the top of my combination company quantitative range and slightly above the gas-only range, under current market conditions and economic circumstances, a 10.0 percent ROE is reasonable for establishing the Company's rates.

The Company expects to be in capital markets on a regular basis to raise both debt and equity financing to support its heavy capital expenditure programs. As a result, it is important that the ROE established in this proceeding for the Company demonstrates a strong commitment by the Commission to support the Company's replacement of cast iron and bare steel infrastructure and its gas expansion programs, both of which have strong Commission and public policy support. Investors and lenders will expect to see regulatory support for the Company's capital expenditure and growth programs, in order for the Company to maintain its credit quality. For these reasons, and as is discussed further in my testimony, I believe a 10.0 percent ROE for the Company is reasonable.

Q. Please explain how your analysis is structured.

A. As indicated above, in my DCF analysis, I apply a reference group or comparable company approach. The comparable company method is consistent with traditional *Hope* and *Bluefield* requirements (which I discuss later in my testimony) and it is a conservative approach because Northern Utilities is a smaller company than the publicly listed reference group companies. As such, the Company would likely be viewed by investors as more risky than the larger,

actively-traded utilities. With these issues considered, I began my review with all the combination electric and gas utilities and gas LDCs that are included in the *Value Line Investors Survey* ("Value Line").[1] Value Line is a widely-followed, reputable source of financial data generally used by regulatory economists to estimate the cost of capital. To improve comparability with Northern Utilities, I restricted my combination comparable group to companies with bond ratings of at least triple-B from Standard & Poor's ("S&P") or Baa from Moody's and to companies that receive at least 70 percent of their revenues from domestic regulated utility sales. To keep the gas distribution company group at a minimally reasonable size, the companies included in that group were required to receive at least 60 percent of their revenues from regulated utility sales. I also required all the companies to have consistent data from Value Line and to have had no dividend cuts in the past two years. Additionally, I excluded companies that are currently involved in merger activities. The fundamental characteristics of the 20 combination gas and electric utilities and the eight gas LDCs that comprise my comparable groups are shown in Schedules SCH-1A and SCH-1B.

In my risk premium analysis, I used *Moody's* average public utility bond yields as well as recent and projected Baa utility bond interest rates. These rates provide a conservative basis for the risk premium analysis relative to the implicit Baa bond rating for Northern Utilities. Under current market conditions, I believe this

[1] The list of available combination gas and electric utilities is based on the individual companies' most recent S.E.C. Form 10-Ks for 2012.

combination of DCF and risk premium analyses, with further consideration for more qualitative factors, is the best approach for estimating the cost of equity capital. The data sources and the details of my cost of equity studies are contained in my Schedules SCH-1A through SCH-5B.

Q. In your analysis, did you consider the potential revenue stabilization effect from the Company's existing and proposed cost recovery mechanisms?

A. Yes. I have reviewed all of the Company's cost recovery mechanisms, including its proposed Targeted Infrastructure Replacement Adjustment ("TIRA") Mechanism, and compared them to similar cost recovery and revenue stabilization mechanisms for the utilities in my two reference company groups. As shown in Schedules SCH-1A, pages 2-3, and SCH-1B, page 2, the reference companies consistently have cost recovery and revenue stabilization mechanisms similar to those existing and proposed by Northern Utilities. This comparison shows that such cost recovery mechanisms are typical in the utility industry and are recognized and expected by utility investors. Under these circumstances, no adjustment should be made to Northern Utilities' ROE to account for its cost recovery mechanisms. To do so after using similarly situated utilities, with such mechanisms in place, would double count any revenue stabilization, potentially reducing effects that such mechanisms may provide.

Q. How is the remainder of your testimony organized?

A. The remainder of my testimony is divided into four additional sections. In Section III, I review general capital market costs and conditions and discuss recent developments in the gas utility industry. In Section IV, I review various methods for estimating the cost of equity, including comparable earnings methods, risk premium methods, and DCF methods. In Section V, I present the details of my cost of equity studies and describe the specific results from my various models. In Section VI, I provide a summary table of my results and summarize my conclusions.

III. CAPITAL MARKET FACTORS THAT AFFECT THE COST OF EQUITY

Q. What is the current outlook for the U.S. economy?

A. Improvement for the U.S. economy is expected to remain slow in 2013 and perhaps 2014. While most economists expect growth to be positive, unemployment is expected to remain stubbornly high, remaining above 7 percent during the next two years. New job creation remains a fundamental concern. Based on these conditions, the Fed has announced its intention to keep interest rates at their current, historically low levels until unemployment drops below 6.5 percent.

On March 20, 2013, the Federal Open Market Committee of the Fed issued the following additional policy statement reiterating its commitment to Quantitative Easing 3 ("QE3") and the continuation of "Operation Twist":

Consistent with its statutory mandate, the Committee seeks to foster maximum employment and price stability. The Committee expects that, with appropriate policy accommodation, economic growth will proceed at a moderate pace and the unemployment rate will gradually decline toward levels the Committee judges consistent with its dual mandate. The Committee continues to see downside risks to the economic outlook. The Committee also anticipates that inflation over the medium term likely will run at or below its 2 percent objective.

To support a stronger economic recovery and to help ensure that inflation, over time, is at the rate most consistent with its dual mandate, the Committee decided to continue purchasing additional agency mortgage-backed securities at a pace of $40 billion per month and longer-term Treasury securities at a pace of $45 billion per month. The Committee is maintaining its existing policy of reinvesting principal payments from its holdings of agency debt and agency mortgage-backed securities in agency mortgage-backed securities and of rolling over maturing Treasury securities at auction. Taken together, these actions should maintain downward pressure on longer-term interest rates, support mortgage markets, and help to make broader financial conditions more accommodative.

To support continued progress toward maximum employment and price stability, the Committee expects that a highly accommodative stance of monetary policy will remain appropriate for a considerable time after the asset purchase program ends and the economic recovery strengthens. In particular, the Committee decided to keep the target range for the federal funds rate at 0 to 1/4 percent and currently anticipates that this exceptionally low range for the federal funds rate will be appropriate at least as long as the unemployment rate remains above 6-1/2 percent, inflation between one and two years ahead is projected to be no more than a half percentage point above the Committee's 2 percent longer-run goal, and longer-term inflation expectations continue to be well anchored. In determining how long to maintain a highly accommodative stance of monetary policy, the Committee will also consider other information, including additional measures of labor market conditions, indicators of inflation pressures and inflation expectations, and readings on financial developments.

Q. How have U.S. capital markets performed during the past ten years?

A. Markets have been volatile, with generally declining debt costs. In Schedule SCH-2, page 1, I provide a 10-year review of annual interest rates and rates of inflation. Although corporate interest rates rose somewhat in the 2006-2008 period, during the past decade, interest rates and inflation have generally declined. Inflation, as measured by the Consumer Price Index ("CPI"), fluctuated between a low of zero percent (in 2008) and 4.1 percent in 2007 (caused by the rise in energy costs that occurred during that year). The decade's average annual inflation rate (2.4%) was approximately 100 basis points lower than the longer-term average rate of the past 60 years (*See* Schedule SCH-3). Interest rates generally declined over the period, with the 2012 average utility rate at its lowest level in more than 30 years (*See* Schedules 5A and 5B, page 1).

Q. What has the more recent trend in utility borrowing costs been?

A. In Schedule SCH-2, page 2, I provide the month-by-month interest rate data for the past two years. Those data are summarized below in Table 1.

Table 1
Long-Term Interest Rate Trends

Month	Triple-B Utility Rate	30-Year Treasury Rate	Triple-B Utility Spread
Mar-10	6.22	4.64	1.58
Apr-10	6.19	4.69	1.50
May-10	5.97	4.29	1.68
Jun-10	6.18	4.13	2.05
Jul-10	5.98	3.99	1.99
Aug-10	5.55	3.80	1.75
Sep-10	5.53	3.77	1.76
Oct-10	5.62	3.87	1.75
Nov-10	5.85	4.19	1.66
Dec-10	6.04	4.42	1.62
Jan-11	6.06	4.52	1.54
Feb-11	6.10	4.65	1.45
Mar-11	5.97	4.51	1.46
Apr-11	5.98	4.50	1.48
May-11	5.74	4.29	1.45
Jun-11	5.67	4.23	1.44
Jul-11	5.70	4.27	1.43
Aug-11	5.22	3.65	1.57
Sep-11	5.11	3.18	1.93
Oct-11	5.24	3.13	2.11
Nov-11	4.93	3.02	1.91
Dec-11	5.07	2.98	2.09
Jan-12	5.06	3.03	2.03
Feb-12	5.02	3.11	1.91
Mar-12	5.13	3.28	1.85
Apr-12	5.11	3.18	1.93
May-12	4.97	2.93	2.04
Jun-12	4.91	2.70	2.21
Jul-12	4.85	2.59	2.26
Aug-12	4.88	2.77	2.11
Sep-12	4.81	2.88	1.93
Oct-12	4.54	2.90	1.64
Nov-12	4.42	2.80	1.62
Dec-12	4.56	2.88	1.68
Jan-13	4.66	3.08	1.58
Feb-13	4.74	3.17	1.57
3-Mo Avg	**4.65**	**3.04**	**1.61**
12-Mo Avg	**4.80**	**2.93**	**1.87**

Sources: Mergent Bond Record; www.federalreserve.gov.
Three month average is for December 2012-February 2013.
Twelve month average is for March 2012-February 2013.

The data in Table 1 track the general interest rate decline over the past two years and the slight increase that has occurred since November 2012. The Fed's continuing intervention in the financial markets has kept short-term rates near zero and longer-term U.S. Treasury bond rates near historical lows. While the effects of these monetary policy efforts are not easily captured in financial models for estimating COE (models that assume market equilibrium exists), equity market turbulence and the resulting elevated level of risk aversion indicate that any decline in COE has not been nearly as large as the decline in borrowing costs.

Q. Do the smaller spreads between yields on triple-B utility bonds and U.S. Treasury bonds mean that the markets have fully recovered from the economic turmoil that resulted from the financial crisis?

A. No. Even though the general market has largely recovered, most people have not forgotten that half of their retirement savings had disappeared by early 2009, that housing prices fell precipitously, and that unemployment rates have generally been above 8 percent for the past four years. While markets have stabilized relative to the conditions that existed in 2008-2009, investors remain concerned about high unemployment, large federal deficits, the turmoil in the Mideast, and European as well as domestic economic issues. These factors, combined with sluggish growth in gross domestic product ("GDP"), continue to raise substantial concerns in the equity markets and contribute to heightened investor risk aversion.

Q. **What do interest rate forecasts show for the coming years?**

A. Interest rates are expected to increase moderately from their recent historically low levels. In Schedule SCH-2, page 3, I provide Bloomberg's Forward Curve forecast for U.S. Treasury yields. Table 2 below summarizes the interest rate forecasts:

Table 2
Interest Rate Forecast

	Mar 2013	2013E	2014E	2015E
1-Yr. Treasuries	0.1%	0.3%	0.6%	1.1%
10-Yr. Treasuries	2.0%	2.2%	2.5%	2.8%
30-Yr. Treasuries	3.2%	3.3%	3.5%	3.7%

Bloomberg U.S. Treasury Actives Curve, March 15, 2013.

These data show that long-term Treasury yields are expected to rise gradually over the next three years. In this low interest rate environment, traditional cost of equity estimation models produce low ROE estimates that do not reflect the continuing risk aversion that exists in the equity markets.

Q. How have utility stocks performed since the market low point reached in March 2009?

A. Utility stocks have been affected by both "flight to safety" issues during the periods of extreme market volatility and continue to be affected by government monetary policy. The government's stated intent to keep interest rates low has disrupted normal supply and demand relationships. Under these conditions, dividend-paying stocks have become sought-after by income-seeking investors, pushing up prices and reducing dividend yields. This sentiment is echoed in Value Line's recent review of its Natural Gas Utility Industry group:

> The main attraction of utility equities is their generous levels of dividend income. At the time of this writing, the average yield for the 11 companies in our [gas] group was around 3.7%, considerably higher than the Value Line median of 2.3%. *** When the financial markets are turbulent, which seems to be more common these days, healthy dividend yields tend to act as an anchor, so to speak, in this category.[2]

In this market environment, dividend oriented stocks, like utilities, have become relatively more attractive for income-oriented investors. The resulting performance for utilities has produced lower dividend yields in the DCF model; *i.e.*, the DCF model results, with respect to dividend yields, do not reflect the overall market's volatility and heightened risk aversion. In the basic constant growth version of the model, the results are, therefore, negatively skewed by income-seeking investor behavior. This anomaly makes it more difficult to interpret current DCF cost of equity estimates for utility companies. Similarly, in the equity risk premium models, like the CAPM, artificially low interest rates directly reduce ROE estimates. The currently low dividend yields for utilities produce lower DCF estimates and low interest rates produce lower ROE estimates from equity risk premium models.

Q. What are they key factors currently affecting the gas utility industry's fundamental position?

A. LDCs have seen significant volatility both in terms of fundamental operating characteristics and the effects of the economy. Poor economic conditions coupled

[2] Value Line Investment Survey, Natural Gas Utility Industry at 539 (March 8, 2013).

with a downward trend in usage per customer largely due to energy efficiency improvements have significantly reduced sales growth from existing customers in recent years and increased the difficulty of planning for future load requirements. In addition the industry is faced with large infrastructure investment requirements to maintain safety standards and meet environmental expectations. In this environment, most LDCs have worked closely with all stakeholders to achieve the desired safety and environmental outcomes. As presented in the Testimony of James D. Simpson, infrastructure cost recovery mechanisms are becoming widely used across major portions of the U.S. Finally, some LDC's like Northern Utilities, particularly in the northeastern U.S., are experiencing increasing demand for natural gas and new opportunities to add customers. The increase in demand for natural gas primarily reflects the emergence of shale gas development and substantial new supplies of natural gas in the U.S., which has reduced natural gas prices to historically low levels. To meet this growing demand, LDC's like Northern Utilities are making significant investment to expand their distribution systems to serve new customers at the same time they are investing in infrastructure improvements and replacement. As a result, LDC's facing these investment requirements and opportunities are active and more frequent participants in capital markets and have a heightened need to maintain their credit quality and investment grade access to capital markets.

Q. Do gas utilities continue to face the operating and financial risks that existed prior to the recent financial crisis?

A. Yes. Prior to the recent financial crisis, the greatest consideration for utility investors was the industry's continuing transition to more open market conditions and competition. As a result of FERC initiatives to restructure the natural gas pipeline industry, the nature of the gas supply function has changed significantly over the past several years for LDCs like Northern Utilities. The changes that have taken place have, among other things eliminated the pipeline merchant function, completely unbundled the supply, transportation and storage functions provided by the interstate pipelines and fostered a pipeline rate design (i.e., straight fixed variable) that has decoupled revenues associated with the recovery of fixed costs from throughput. The operating environment for LDCs has become more complex and more competitive, the decision-making timeframe has been shortened and capital needs are increasing – all translating to increased operating and financial risk for these companies.

Q. Does Northern Utilities face energy market and other operating risks that create capital market concerns and affect its cost of capital?

A. Yes. Northern Utilities is dependent on sales volumes for the recovery of its distribution system operating and capital costs and, as such, may be significantly affected by load swings caused by either weather patterns or fluctuating economic conditions. In addition, some of the company's largest customers have

demonstrated fuel-switching and/or system by-pass capabilities, which create further risks of decreased sales and/or transportation volumes. Northern Utilities' business and revenues are highly correlated with the economy, and national, regional and local economic conditions can negatively impact Northern Utilities' growth, operating results and financial conditions. Northern Utilities also has a very high planned capital expenditure program relative to its size, reflecting an aggressive infrastructure replacement program and the Company's customer growth plans. This level of capital expenditures will place many added financial, operational and regulatory stresses and risks on the Company, which will not be overlooked by providers of capital. All these sources of uncertainty and risk impact Northern Utilities' access to required capital and the cost of that capital. As with all regulated and unregulated business entities, Northern Utilities must demonstrate continuing financial health and sound financial performance to maintain access to capital markets on reasonable terms.

Q. How do such concerns affect the cost of equity capital?

A. Equity investors respond to changing risk assessments and financial prospects by changing the price they are willing to pay for a given security. When the risk perceptions increase or financial prospects decline, investors refuse to pay the previously existing market price for a company's shares, and then market supply and demand forces establish a new lower price. The lower market price typically translates into a higher cost of capital through a higher dividend yield requirement

as well as the potential for increased capital gains if prospects improve. In addition to market losses for prior shareholders, the higher cost of capital is transmitted directly to the company by the need to earn a higher cost of capital on existing and new investment just to maintain the stock's new lower price level and the reality that the firm must issue more shares to raise any given amount of capital for future investment. The additional shares also impose additional future dividend requirements and may reduce future earnings per share growth prospects if the proceeds of the share issuance are unable to earn their expected rate of return.

IV. ESTIMATING THE COST OF EQUITY CAPITAL

Q. What is the purpose of this section of your testimony?

A. The purpose of this section is to describe several of the most widely-used methods for estimating the cost of equity and to compare the strengths and weaknesses of those models. The various models provide a concrete link to actual capital market data and assist with defining the various relationships that underlie the COE estimation process.

An example helps to illustrate the COE concept. Assume that an investor buys a share of common stock for $20 per share. If the stock's annual dividend is $.80, the expected dividend yield is 4.0 percent ($.80 / $20 = 4.0%). If the stock price is also expected to increase to $21.20 after one year, this $1.20 expected gain adds an additional 6.0 percent to the expected total rate of return ($1.20 / $20 = 6.0%).

Therefore, buying the stock at $20 per share, the investor expects a total return of 10.0 percent: 4.0 percent dividend yield, plus 6.0 percent price appreciation. In this example, the total expected rate of return at 10.0 percent is the appropriate measure of the cost of equity capital because it is this rate of return that caused the investor to commit the $20 of equity capital in the first place. If the stock were riskier, or if expected returns from other investments were higher, investors would have required a higher rate of return from the stock, which would have resulted in a lower price in market trading.

Each day market rates of return and prices change to reflect new investor expectations and requirements. For example, when interest rates increase, utility stock prices usually fall. This is true, at least in part, because higher interest rates on these alternative investments make utility stocks relatively less attractive, which causes utility stock prices to decline in market trading. This competitive market adjustment process is quick and continuous, so that market prices generally reflect investor expectations and the relative attractiveness of one investment versus another. In this context, to estimate the cost of equity one must apply informed judgment about the relative risk of the company in question and knowledge about the risks and expected rates of return of other available investments.

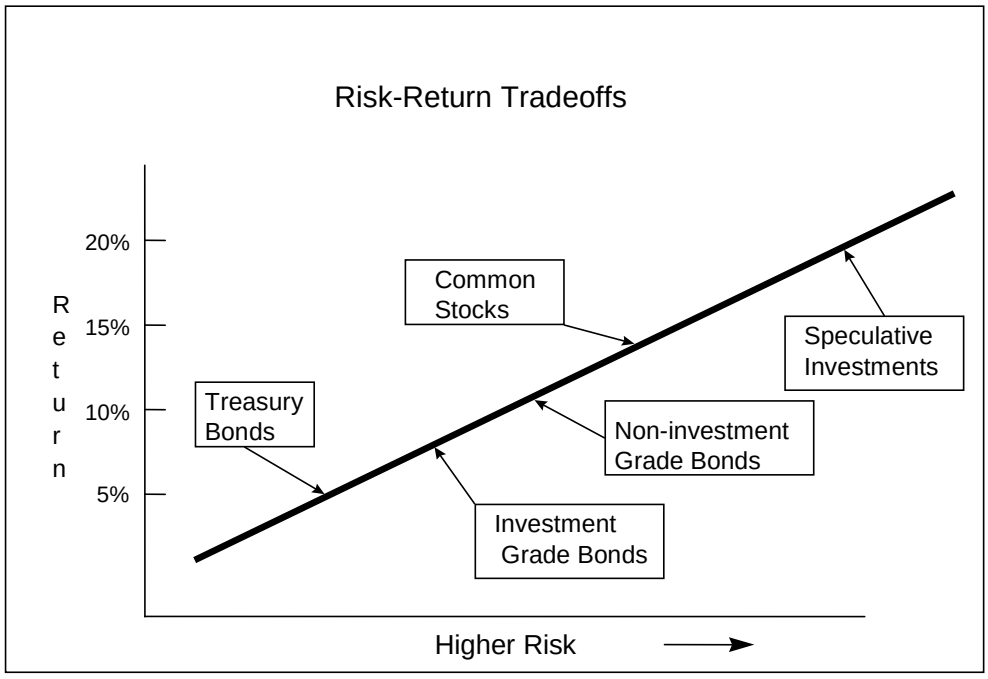
Q. How does the market account for risk differences among the various investments?

A. Risk-return tradeoffs among capital market investments have been the subject of extensive financial research. Literally dozens of textbooks and hundreds of academic articles have addressed the issue. Generally, such research confirms the common sense conclusion that investors will take additional risks only if they expect to receive a higher rate of return. Empirical tests consistently show that low risk securities, such as U.S. Treasury bills, have the lowest returns; that returns from longer-term Treasury bonds and corporate bonds are higher as risks increase; and generally, returns from common stocks and other more risky investments are even higher. These observations provide a sound theoretical foundation for both the DCF and risk premium methods for estimating the cost of equity capital. These models attempt to capture the well-founded risk-return principle and explicitly measure investors' rate of return requirements.

Q. Can you illustrate the capital market risk-return principle that you just described?

A. Yes. Figure 1 below depicts the risk-return relationship that has become widely known as the Capital Market Line (CML). The CML offers a graphical representation of the capital market risk-return principle. The graph is not meant to illustrate the actual expected rate of return for any particular investment, but merely to illustrate in a general way the risk-return relationship.

Figure 1
The Capital Market Line



As a continuum, the CML can be viewed as an available opportunity set for investors. Those investors with low risk tolerance or investment objectives that mandate a low risk profile should invest in assets depicted in the lower left-hand portion of the graph. Investments in this area, such as Treasury bills and short-maturity, high quality corporate commercial paper, offer a high degree of investor certainty. In nominal terms (before considering the potential effects of inflation), such assets are virtually risk-free.

Investment risks increase as one moves up and to the right along the CML. A higher degree of uncertainty exists about the level of investment value at any point

in time and about the level of income payments that may be received. Among these investments, long-term bonds and preferred stocks, which offer priority claims to assets and income payments, are relatively low risk, but they are not risk-free. The market value of long-term bonds, even those issued by the U.S. Treasury, often fluctuates widely when government policies or other factors cause interest rates to change.

Further up the CML continuum, common stocks are exposed to even more risk, depending on the nature of the underlying business and the financial strength of the issuing corporation. Common stock risks include market-wide factors, such as general changes in capital costs, as well as industry and company specific elements that may add further to the volatility of a given company's performance. As I will illustrate in my risk premium analysis, common stocks typically are more volatile (have higher risk) than high quality bond investments, and therefore, they reside above and to the right of bonds on the CML graph. Other more speculative investments, such as stock options and commodity futures contracts, offer even higher risks (and higher potential returns). The CML's depiction of the risk-return tradeoffs available in the capital markets provides a useful perspective for estimating investors' required rates of return.

Q. How is the fair rate of return in the regulatory process related to the estimated cost of equity capital?

A. The regulatory process is guided by fair rate of return principles established in the U.S. Supreme Court cases, *Bluefield Water Works* and *Hope Natural Gas*:

> A public utility is entitled to such rates as will permit it to earn a return on the value of the property which it employs for the convenience of the public equal to that generally being made at the same time and in the same general part of the country on investments in other business undertakings which are attended by corresponding risks and uncertainties; but it has no constitutional right to profits such as are realized or anticipated in highly profitable enterprises or speculative ventures.[3]
>
> * * * * * *
>
> 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.[4]

Based on these principles, the fair rate of return should closely parallel investor opportunity costs as discussed above. If a utility earns its market cost of equity, neither its stockholders nor its customers are disadvantaged.

[3] *Bluefield Water Works & Improvement Company v. Public Service Commission of West Virginia*, 262 U.S. 679, 692-693 (1923).
[4] *Federal Power Commission v. Hope Natural Gas Co*., 320 U.S. 591, 603 (1944).

Q. What specific methods and capital market data are used to evaluate the cost of equity?

A. Techniques for estimating the cost of equity normally fall into three groups: comparable earnings methods, risk premium methods, and DCF methods. The first set of estimation techniques, the comparable earnings methods, has evolved over time. The original comparable earnings methods were based on historical book accounting returns. This approach developed ROE estimates by reviewing accounting returns for unregulated companies thought to have risks similar to those of the regulated company in question. These methods were generally rejected as more market-oriented methods developed because they assume that the unregulated group is earning its actual cost of capital, and that its equity book value is the same as its market value. In most situations these assumptions were not valid and, therefore, accounting-based methods based on historical returns do not generally provide reliable cost of equity estimates.

Market based comparable earnings methods are based on historical stock market returns rather than book accounting returns. While these methods have some merit, they too have been criticized because there can be no assurance that historical market returns actually reflect current or future market requirements or even what investors may have expected *ex ante*. Also, in practical application, earned market returns tend to fluctuate widely from year to year. For these reasons, current cost of equity estimates, based on DCF models and risk premium

analyses, are the most widely accepted methods for estimating the cost of equity capital.

The second set of estimation techniques is grouped under the heading of risk premium methods. These methods typically begin with current interest rates on government or corporate bonds and add an increment to account for the additional risk faced by equity investors. The capital asset pricing model ("CAPM") and arbitrage pricing theory ("APT") model are more sophisticated risk premium approaches. The CAPM and APT model estimate the cost of equity by combining "risk-free" government bond interest rates with explicit risk measures. The CAPM is widely used in academic and corporate cost of capital research, but, due to its required assumptions and sensitivity to the assumptions employed, the CAPM it is less widely accepted among regulators.

In most regulatory jurisdictions a third set of methods, based on the DCF model, are typically the most heavily relied upon. Like the risk premium approach, the DCF model has a sound basis in theory and many argue that it has the additional advantage of simplicity. In essence, the DCF model estimate of ROE is the sum of expected dividend yield plus expected long-term growth or price appreciation. While dividend yields are fairly easy to estimate, estimating long-term growth is much more difficult. As I will discuss in more detail below, the DCF model requires very long-term growth estimates (technically to infinity). For this reason I

recommend a wide variety of data sources for estimating investors' long-term growth expectations.

Q. Of the three estimation methods, which do you believe provides the most reliable results?

A. From my experience, a combination of DCF and risk premium methods provides the most reliable approach. While the caveat about estimating long-term growth must be observed, the DCF model's other inputs are readily obtainable and the model's results typically reflect capital market expectations. The risk premium methods provide a sound parallel approach to the DCF model and further ensure that current market conditions are accurately reflected in the cost of equity estimate.

Q. Please explain the DCF model.

A. The DCF model is predicated on the concept that stock prices represent the present value or discounted value of all future dividends that investors expect to receive. In the most general form, the DCF model is expressed in the following formula:

$$P_0 = D_1/(1+k) + D_2/(1+k)^2 + ... + D_\infty/(1+k)^\infty \qquad (1)$$

where P_0 is today's stock price; D_1, D_2, etc. are all future dividends and k is the discount rate, or the investor's required rate of return on equity. Equation (1) is a routine present value calculation based on the assumption that the stock's price is the present value of all dividends expected to be paid in the future.

Under the additional assumption that dividends are expected to grow at a constant rate "g" and that k is strictly greater than g, equation (1) can be solved for k and rearranged into the simple form:

$$k = D_1/P_0 + g \qquad (2)$$

Equation (2) is the familiar constant growth DCF model for cost of equity estimation, where D_1/P_0 is the expected dividend yield and g is the long-term expected dividend growth rate.

Under circumstances when growth rates are expected to fluctuate or when future growth rates are highly uncertain, the constant growth model may not give reliable results. Although the DCF model itself is still valid [equation (1) is mathematically correct], under such circumstances the simplified form of the model must be modified to capture market expectations accurately.

Recent events and current market conditions in the electric utility industry, as discussed in Section IV, appear to challenge the constant growth assumption of the traditional DCF model. Since the mid-1980s, dividend growth expectations for many electric utilities have fluctuated widely. In fact, many utilities have reduced or eliminated their common dividends over this time period. Some of these companies have reestablished their dividends, producing exceptionally high growth rates. Under these circumstances, long-term growth rate estimates can be highly uncertain, and estimating a reliable "constant" growth rate for some

companies can be extremely problematic. Under these conditions, singular reliance on the constant growth DCF model may not be appropriate.

Q. How can the DCF model be applied when the constant growth assumption is violated?

A. When growth expectations are uncertain, the more general version of the model represented in equation (1) should be solved explicitly over a finite "transition" period while uncertainty prevails. The constant growth version of the model can then be applied after the transition period, under the assumption that more stable conditions will prevail in the future. There are two alternatives for dealing with the non-constant growth transition period.

Under the "terminal price" non-constant growth approach, equation (1) is written in a slightly different form:

$$P_0 = D_1/(1+k) + D_2/(1+k)^2 + ... + P_T/(1+k)^T \qquad (3)$$

where the variables are the same as in equation (1) except that P_T is the estimated stock price at the end of the transition period T. Under the assumption that normal growth resumes after the transition period, the price P_T is then expected to be based on constant growth assumptions. With the terminal price approach, the estimated cost of equity, k, is just the rate of return that investors would expect to earn if they bought the stock at today's market price, held it and received dividends through the transition period (until period T), and then sold it for price P_T. In this

approach, the analyst's task is to estimate the rate of return that investors expect to receive given the current level of market prices they are willing to pay.

Under the "multistage" non-constant growth approach, equation (1) is simply expanded to incorporate two or more growth rate periods, with the assumption that a permanent constant growth rate can be estimated for some point in the future:

$$P_0 = D_0(1+g_1)/(1+k) + ... + D_2(1+g_2)^n/(1+k)^n + \\ + [D_T(1+g_T)^{(T+1)}/(k-g_T)]/(1+k)^T \quad (4)$$

where the variables are the same as in equation (1), but g_1 represents the growth rate for the first period; D_2 is the dividend at the beginning of the second period and g_2 is the growth rate for the second period; and D_T is the dividend at the beginning of the third period and g_T for the period from year T (the end of the transition period) to infinity. The first two growth rates are simply estimates for fluctuating growth over "n" years (typically 5 or 10 years) and g_T is a constant growth rate assumed to prevail forever after year T. The difficult task for analysts in the multistage approach is determining the various growth rates for each period.

Although less convenient for exposition purposes, the non-constant growth models are based on the same valid capital market assumptions as the constant growth version. The non-constant growth approach simply requires more explicit data inputs and more work to solve for the discount rate, k. Fortunately, the required data are available from investment and economic forecasting services, and

computer algorithms can easily produce the required solutions. I apply both constant and non-constant growth DCF analyses in the following section.

Q. Please explain the risk premium methodology.

A. Risk premium methods are based on the assumption that equity securities are riskier than debt and, therefore, that equity investors require a higher rate of return. This basic premise is well supported by legal and economic distinctions between debt and equity securities, and it is widely accepted as a fundamental capital market principle. For example, debt holders' claims to the earnings and assets of the borrower have priority over all claims of equity investors. The contractual interest on mortgage debt must be paid in full before any dividends can be paid to shareholders, and secured mortgage claims must be fully satisfied before any assets can be distributed to shareholders in bankruptcy. Also, the guaranteed, fixed-income nature of interest payments makes year-to-year returns from bonds typically more stable than capital gains and dividend payments on stocks. All these factors demonstrate the more risky position of stockholders and support the equity risk premium concept.

Q. Are risk premium estimates of the cost of equity consistent with other current capital market costs?

A. Yes. The risk premium approach is especially useful because it is founded on current market interest rates, which are directly observable. This feature assures

that risk premium estimates of the cost of equity begin with a sound basis, which is tied directly to current capital market costs.

Q. Is there similar consensus about how risk premium data should be employed?

A. No. In regulatory practice, there is often considerable debate about how risk premium data should be interpreted and used. Since the analyst's basic task is to gauge investors' required returns on long-term investments, some argue that the estimated equity spread should be based on the longest possible time period. Others argue that market relationships between debt and equity from several decades ago are irrelevant and that only recent debt-equity observations should be given any weight in estimating investor requirements. There is no consensus on this issue. Since analysts cannot observe or measure investors' expectations directly, it is not possible to know exactly how such expectations are formed or, therefore, to know exactly what time period is most appropriate in a risk premium analysis.

The important point is to answer the following question: "What rate of return should equity investors reasonably expect relative to returns that are currently available from long-term bonds?" The risk premium studies I discuss in Section V address this question. My risk premium recommendation is based on an intermediate position that avoids some of the problems and concerns that have been expressed about both very long and very short periods of analysis with the risk premium model.

Q. Please summarize your discussion of cost of equity estimation techniques.

A. Because equity investors' required rates of return cannot be observed directly, several methods have developed to assist in the estimation process. The DCF and risk premium methods have become the most widely accepted in regulatory practice. A combination of the DCF model and risk premium methods provides the most reliable cost of equity estimate. While the DCF model does require judgment about future growth rates, the dividend yield is straightforward and the model's results generally reflect capital market expectations. For these reasons, I rely on a combination of DCF and risk premium methods in the cost of equity studies that follow.

V. COST OF EQUITY CAPITAL FOR NORTHERN UTILITIES

Q. What is the purpose of this section of your testimony?

A. The purpose of this section is to present my quantitative studies of the cost of equity capital for Northern Utilities and to discuss the details and results of my analysis.

Q. How are your studies organized?

A. In the first part of my analysis, I apply three versions of the DCF model to the combination gas and electric and gas-only comparable groups discussed previously. In the second part of my analysis, I present my risk premium analyses based on current and projected interest rates.

Q. Please describe your DCF analysis.

A. My DCF analysis is based on three versions of the DCF model. In the first version of the model, I use the constant growth format, with long-term expected growth based on analysts' estimates of five-year utility earnings growth. While I continue to endorse longer-term growth rates based on projected growth in GDP, I provide DCF results with analysts' growth rates because this is the approach is often used by many regulators.

In the second version of the DCF model, for the estimated growth rate, I use the estimated long-term GDP growth rate. In the third version of the DCF model, I use a two-stage growth approach, with stage one based on Value Line's three-to-five-year dividend projections and stage two based on long-term projected GDP growth. The dividend yields in all three of the annual models are from Value Line's projections of dividends for the coming year and stock prices are three-month averages for the months that correspond to the Value Line editions from which the underlying financial data are taken.

Q. Why do you use the long-term GDP growth rate to estimate long-term growth expectations in the DCF model?

A. Growth in nominal GDP (real GDP plus inflation) is the most general measure of growth for the U.S. economy. For long time periods, such as those used in the Morningstar/Ibbotson Associates rate of return data, GDP growth has averaged between 5 percent and 8 percent per year. From this observation, Professors

Brigham and Houston offer the following observation concerning the appropriate long-term growth rate in the DCF Model:

> Expected growth rates vary somewhat among companies, but dividends for mature firms are often expected to grow in the future at about the same rate as nominal gross domestic product (real GDP plus inflation). On this basis, one might expect the dividend of an average, or "normal," company to grow at a rate of 5 to 8 percent a year. (Eugene F. Brigham and Joel F. Houston, *Fundamentals of Financial Management*, 11th Ed. 2007, page 298.)

Other academic research on corporate growth rates offers similar conclusions about GDP growth as well as concerns about the long-term adequacy of analysts' forecasts:

> Our estimated median growth rate is reasonable when compared to the overall economy's growth rate. On average over the sample period, the median growth rate over 10 years for income before extraordinary items is about 10 percent for all firms. ... After deducting the dividend yield (the median yield is 2.5 percent per year), as well as inflation (which averages 4 percent per year over the sample period), the growth in real income before extraordinary items is roughly 3.5 percent per year. This is consistent with the historical growth rate in real gross domestic product, which has averaged about 3.4 percent per year over the period 1950-1998. (Louis K. C. Chan, Jason Karceski, and Josef Lakonishok, "The Level and Persistence of Growth Rates," *The Journal of Finance*, April 2003, p. 649)

> IBES long-term growth estimates are associated with realized growth in the immediate short-term future. Over long horizons, however, there is little forecastability in earnings, and analysts' estimates tend to be overly optimistic. … On the whole, the absence of predictability in growth fits in with the economic intuition that competitive pressures ultimately work to correct excessively high or excessively low profitability growth. (Id., page 683)

These findings support the notion that long-term growth expectations are more closely predicted by broader measures of economic growth than by near-term analysts' estimates. Especially for the very long-term growth rate requirements of the DCF model, the growth in nominal GDP should be considered an important input.

Q. How did you estimate the expected long-run GDP growth rate?

A. I developed my long-term GDP growth forecast from nominal GDP data contained in the St. Louis Federal Reserve Bank data base. That data for the period 1952 through 2012 are summarized in my Schedule SCH-3, page 1. As shown at the bottom of that Schedule, the overall 60-year average for the period was 6.5 percent. The data also show, however, that in the more recent years since 1980, lower inflation has resulted in lower overall nominal GDP growth. For this reason I gave more weight to the more recent years in my GDP forecast. This approach is consistent with the concept that more recent data should have a greater effect on expectations. Based on this approach, my overall forecast for long-term GDP growth is 90 basis points lower than the long-term average, at a level of 5.6 percent.

Q. The DCF model requires an estimate of investors' long-term growth rate expectations. Why do you believe your forecast of GDP growth based on long-term historical data is appropriate?

A. There are at least three reasons. First, most econometric forecasts are derived from

the trending of historical data or the use of weighted averages. This is the approach I have taken in Schedule SCH-3. The long-run historical average GDP growth rate is 6.5 percent, but my estimate of long-term expected growth is only 5.6 percent. My forecast is lower because my forecasting method gives much more weight to the more recent 10- and 20-year periods.

Second, some currently lower GDP growth forecasts likely understate very long growth rate expectations that are required in the DCF model. Many of those forecasts are currently low because they are based on the assumption of permanently low inflation rates, in the range of 2 percent. As shown in Schedule SCH-3, the average long-term inflation rate has been near 3 percent in all but the most recent 10- and 20-year periods.

Finally, the current economic turmoil makes it even more important to consider longer-term economic data in the growth rate estimate. As discussed in the previous section, current near-term forecasts for both real GDP and inflation are severely depressed. To the extent that even the longer-term outlooks of professional economists are also depressed, their forecasts may be understated. Under these circumstances, a longer-term view is even more important. For all these reasons, while I am also presenting other growth rate approaches based on analysts' estimates in this testimony, I believe it is appropriate also to consider long-term GDP growth in estimating the DCF growth rate.

Q. Is there direct evidence that government agency forecasts have been wrong in the past?

A. Yes. A review of historical government forecasts for GDP, and particularly for inflation, is telling. For example, as compared to the currently depressed growth and inflation forecasts coming from government agencies, and repeated by professional economists such as the Blue Chip Consensus, during the late 1970s and 1980s, government forecasts for long-term GDP growth were vastly optimistic. The government growth rate forecasts at that time were overstated because they were based on expectations for permanently high inflation rates.[5] Similarly, today's recession-based forecasts are not at all consistent with historical average inflation rates or with rates that can reasonably be expected for the U.S. economy over the long-term. Essentially all government agency forecasts currently project long-term inflation to remain at 2 percent or less. With estimates for long-term real GDP growth (2.4%-2.8%) also somewhat depressed by recent economic conditions, projected nominal growth in GDP in the range of 4.5 percent is typical. My forecast for long-term nominal GDP growth (5.6%) is higher because it is based on a more balanced view of long-term real growth and a much

[5] In its Annual Energy Outlook 2012, the U.S. Department of Energy, Energy Information Administration ("EIA"), forecasted real GDP growth for 2010-2035 to average 2.5 percent per year and for the GDP price deflator (inflation rate) to increase over this period by only 1.9 percent per year. In combination, these real GDP and inflation forecasts produce a long-term nominal GDP growth rate of only about 4.5 percent. In contrast, in its Annual Report to Congress 1979, EIA projected the 1978-1995 average annual GDP inflation rate to be 6.9 percent. Along with an expected real GDP growth rate of 2.6 percent, this level of inflation produced a projected nominal GDP growth rate of approximately 10 percent. (www.EIA.gov/forecasts/AEO, 2012 forecast Table A20; 1979 forecast, Vol. 3 at 139).

more realistic view of what longer-term inflation will be. Such a longer-term view is required in the DCF model. In this context, use of currently low, near-term government forecasts in the DCF model will significantly understate cost of equity estimates.

Q. Please summarize the results of your DCF analyses.

A. The DCF results for my comparable company groups are presented in Schedules SCH-4A and SCH-4B. For the combination gas and electric utilities in Schedule SCH-4A, the traditional constant growth model in column 1, based on analysts' growth rates, indicates an ROE range of 9.7 percent to 9.8 percent. In the second column of page 1, I recalculate the constant growth results with the growth rate based on long-term forecasted growth in GDP. With the GDP growth rate, the constant growth model indicates an ROE range of 9.9 percent to 10.0 percent. Finally, in the third column of page 1, I present the results from the multistage DCF model. The multistage model indicates an ROE of 9.8 percent. For the combination gas and electric company group, the DCF model indicates an ROE range of 9.7 percent to 10.0 percent.

For the gas LDC group in Schedule SCH-4B, the traditional constant growth model in column 1, based on analysts' growth rates, indicates an ROE range of 9.3 percent to 9.6 percent. In the second column of page 1, I recalculate the constant growth results with the growth rate based on long-term forecasted growth in GDP. With the GDP growth rate, the constant growth model indicates an ROE range of

9.5 percent to 9.6 percent. Finally, in the third column of page 1, I present the results from the multistage DCF model. The multistage model indicates an ROE of 9.4 percent. Thus, for the gas-only group, the DCF model indicates an ROE range of 9.3 percent to 9.6 percent.

Q. What are the results of your equity risk premium studies?

A. The details and results of my equity risk premium studies are shown in Schedules SCH-5A and SCH-5B. For the electric utilities in Schedule SCH-5A, the risk premium results indicate an ROE range of 9.8 percent to 10.1 percent. For the gas distribution utilities in Schedule SCH-5B, the risk premium results indicate an ROE range of 9.7 percent to 9.9 percent. These results confirm my the upper end of my DCF results.

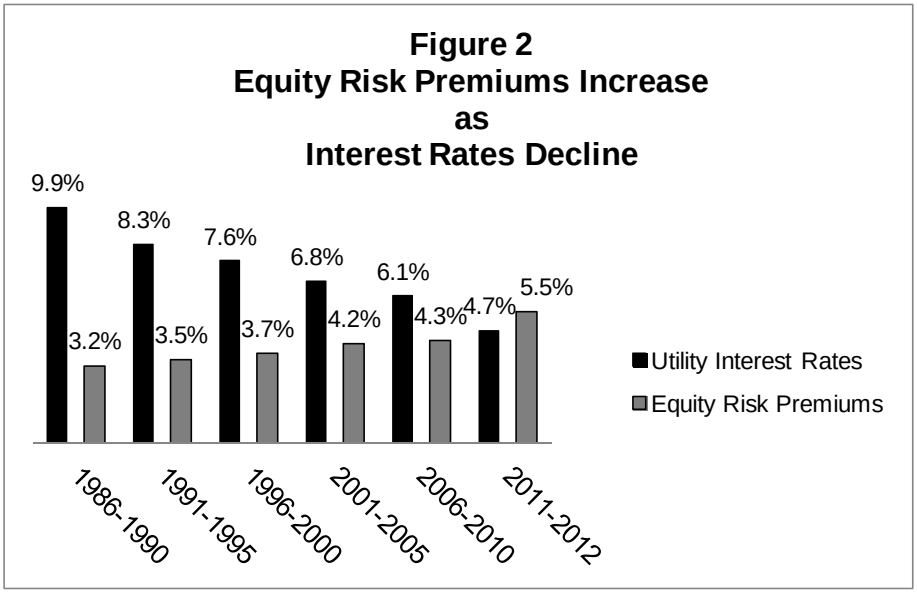
Q. How are your equity risk premium studies structured?

A. My equity risk premium studies are divided into two parts. First, I compare electric utility authorized ROEs for the period 1980-2012 to contemporaneous long-term utility interest rates. The differences between the average authorized ROEs and the average interest rate for the year is the indicated equity risk premium. I then add the indicated equity risk premium to the forecasted and current Baa utility bond interest rate to estimate ROE. Because there is a strong inverse relationship between equity risk premiums and interest rates (when interest rates are high, risk premiums are low and vice versa), further analysis is required to estimate the current equity risk premium level.

The inverse relationship between equity risk premiums and interest rate levels is well documented in numerous, well-respected academic studies. These studies typically use regression analysis or other statistical methods to predict or measure the equity risk premium relationship under varying interest rate conditions. On page 3 of Schedules SCH-5A and SCH-5B, I provide regression analyses of the allowed annual equity risk premiums relative to interest rate levels. The negative and statistically significant regression coefficients confirm the inverse relationship between equity risk premiums and interest rates. This means that when interest rates rise by one percentage point, the cost of equity increases, but by a smaller amount. Similarly, when interest rates decline by one percentage point, the cost of equity declines by less than one percentage point. I use this negative interest rate change coefficient in conjunction with current interest rates to establish the appropriate current equity risk premium.

Q. **Can you illustrate the inverse relationship between equity risk premiums and interest rates without using the statistical analysis described above?**

A. Yes. Statistical analysis is often used, especially in academic research, to substantiate certain economic and financial relationships. For equity risk premium analysis, however, the fundamental issue can be observed by simply averaging the data for various time periods without further statistical analysis. The data in Figure 2 below show average utility bond yields and equity risk premiums for each non-overlapping, five-year period between 1980 and 2010 and for 2011-2012.



Source: Schedule SCH-5A.

These data show that equity risk premiums have consistently increased as interest rates have declined, and that they were lower when interest rates were high. This result is a market-based reflection, which shows that required rates of return in the stock market do not move in lockstep with changes in interest rates. Because utilities must compete with other types of equity investments for capital, the ROE for utilities does not change by as much as the observed changes in interest rates. Arguments that unadjusted, long-term average risk premiums can be used with current, historically low interest rates to estimate COE are mistaken. That approach to equity risk premium analysis will consistently understate the required rate of return.

VI. SUMMARY AND CONCLUSIONS

Q. Please summarize your analysis.

A. My results are summarized in Table 3 below:

Table 3

Summary of Cost of Equity Estimates	
Combination Gas and Electric DCF Analysis	Indicated Cost
Constant Growth (Analysts' Growth)	9.7%-9.8%
Constant Growth (GDP Growth)	9.9%-10.0%
Multistage Growth Model	9.8%
DCF Range	9.7%-10.0%
Gas Distribution Company DCF Analysis	Indicated Cost
Constant Growth (Analysts' Growth)	9.3%-9.6%
Constant Growth (GDP Growth)	9.5%-9.6%
Multistage Growth Model	9.4%
DCF Range	9.3%-9.6%
Electric Utility Equity Risk Premium Analysis	Indicated Cost
Projected Utility Debt Yield + Equity Risk Premium Equity Risk Premium ROE (5.11% + 4.94%)	10.1%
Current Utility Debt Yield + Equity Risk Premium Equity Risk Premium ROE (4.65% + 5.14%)	9.8%
Gas Distribution Equity Risk Premium Analysis	Indicated Cost
Projected Utility Debt Yield + Equity Risk Premium Equity Risk Premium ROE (5.11% + 4.80%)	9.9%
Current Utility Debt Yield + Equity Risk Premium Equity Risk Premium ROE (4.65% + 5.00%)	9.7 %
Northern Utilities Requested Cost of Equity	10.0%

Q. How should these results be interpreted to determine the fair cost of equity for Northern Utilities?

A. The recent market turmoil and the continuing effects on capital market conditions make it difficult to strictly interpret quantitative model estimates for the cost of

equity. For this reason, it is important to consider the effect of current market conditions, including the government's continuing efforts to stimulate the economy, in estimates of the cost of equity. While interest rates and rate spreads have stabilized relative to the levels reached in late 2008, the relatively poor performance of utility stocks, as compared to the broader market averages, shows that the cost of equity for utilities has not declined in lockstep with the interest rate drop. Under these conditions, use of a lower DCF range or equity risk premium estimates based strictly on historical risk premium relationships likely understate the cost of equity. From this perspective, I estimate the fair and reasonable cost of equity capital for Northern Utilities to be 10.0 percent.

Q. Why have you recommended an ROE of 10.0 percent for the Company, which is at the higher end of the range identified in Table 3?

A. It is important to emphasize that in authorizing an ROE for Northern Utilities in this proceeding, the Commission will be communicating with and signaling to potential investors in Northern Utilities its regulatory support for the Company's capital expenditure and growth programs, which have been previously ordered and approved by the Commission. As I mentioned previously, Northern Utilities' capital expenditure program is very large for a company of its size and it is likely to need to access the capital markets on a regular basis to finance this level of expenditures. As a result, it is critical for the Company to maintain its credit quality and investment grade access to capital. The Commission should send a

supportive message to investors by setting the ROE at a reasonable level to encourage ongoing investment in the Company at a reasonable cost.

Finally, it is my understanding that the Company is proposing a multi-year rate plan as part of its filing in this rate case. This means that the Company will be committing to retain the ROE established in this proceeding for several years. As I have noted previously in this testimony, we presently are in a period of artificially low interest rates due to the Government's ongoing intervention in the credit markets. Therefore, the ROE set in this case will be established at or near the bottom of these historically and unusually low rates. By committing to a long term rate plan, the Company is in effect locking in the ROE at the bottom of this cycle and is assuming the risk of rising rates, for both equity and debt, during the period of its rate plan. This is another reason why I recommend an ROE at the higher end of the range described above.

Q. Does this conclude your direct testimony?

A. Yes.

SAMUEL C. HADAWAY

FINANCO, Inc.
Financial Analysis Consultants

3520 Executive Center Drive, Suite 124
Austin, Texas 78731
(512) 346-9317

SUMMARY OF QUALIFICATIONS

- Principal, Financial Analysis Consultants (FINANCO, Inc.).
- Ph.D. in Finance and Economics.
- Extensive expert witness testimony in court and before regulatory agencies.
- Management of professional research staff in academic and regulatory organizations.
- Professional presentations before executive development groups, the National Rate of Return Analysts' Forum, and the New York Society of Security Analysts.
- Financial Management Association, previously Vice President for Practitioner Services.

EDUCATION

The University of Texas at Austin **Ph.D., Finance and Econometrics** **January 1975**	Dissertation: *An Evaluation of the Original and Recent Variants of the Capital Asset Pricing Model.*
The University of Texas at Austin **MBA, Finance** **June 1973**	Thesis: *The Pricing of Risk on the New York Stock Exchange.*
Southern Methodist University **BA, Economics** **June 1969**	Honors program. Departmental distinction.

OTHER EXPERIENCE

University of Texas at Austin **Adjunct Associate Professor** **1985-1988, 2004-Present**	Corporate Financial Management, Investments, and Integrative Finance Cases.
Texas State University San Marcos **Associate Professor of Finance** **1983-1984, 2003-2004**	Graduate and undergraduate courses in Financial Management, Managerial Economics, and Investment Analysis.
Public Utility Commission of Texas **Chief Economist and Director of Economic Research Division** **August 1980-August 1983**	Lead financial witness. Supervised Commission staff in research and testimony on rate of return, financial condition, and economic analysis.
Assistant Professor of Finance **Texas Tech University** **July 1978-July 1980** **University of Alabama** **January 1975-June 1978**	Member of graduate faculty. Conducted Ph.D. seminars and directed doctoral dissertations in capital market theory**.** Served as consultant to industry, church and governmental organizations.

FINANCIAL AND ECONOMIC TESTIMONY IN REGULATORY PROCEEDINGS (Client in parenthesis)

Cost of Money Testimony

- Maine Public Utilities Commission, Docket No. 2013-00133, April 1, 2013 (Northern Utilities, Inc.)
- Arkansas Public Service Commission, Docket No. 13-028-U, March 1, 2013, (Entergy-Arkansas)
- Louisiana Public Service Commission, Docket No. U-32707, February 15, 2013 (Entergy Gulf States Louisiana).
- Louisiana Public Service Commission, Docket No. U-32708, February 15, 2013 (Entergy Louisiana).
- Washington Utilities and Transportation Commission, Docket UE-130043, January 11, 2013 (PacifiCorp).
- Louisiana Public Service Commission, Docket No. U-32425, October 5, 2012 (Entergy Gulf States Louisiana).
- Maryland Public Service Commission, Case No. 9299, July 27, 2012 (Baltimore Gas and Electric Company).
- Kansas Corporation Commission, Docket No. 12-KCPE-764-RTS, April 20, 2012 (Kansas City Power & Light Company).
- Oregon Public Utility Commission, Docket No. UE 246, March 1, 2012 (PacifiCorp).
- Missouri Public Service Commission, Case No. ER-2012-0174, February 27, 2012 (Kansas City Power & Light Company).
- Missouri Public Service Commission, Case No. ER-2012-0175, February 27, 2012 (KCP&L Greater Missouri Operations Company).
- Utah Public Service Commission, Docket No. 11-035-200, February 15, 2012 (Rocky Mountain Power/PacifiCorp).
- Texas Public Utility Commission, Docket No. 40094, February 1, 2012, (El Paso Electric Company).
- Oregon Public Utility Commission, Docket No. UG 221, December 30, 2011 (NW Natural Gas Company).
- Wyoming Public Service Commission, Docket No. 20000-405-ER-11, December 9, 2011 (Rocky Mountain Power dba/PacifiCorp).
- Texas Public Utility Commission, Docket No. 39896, November 28, 2011, (Entergy Texas, Inc.)
- Idaho Public Utilities Commission, Case No. PAC-E-111-12, May 27, 2011 (Rocky Mountain Power/PacifiCorp).
- Maine Public Utilities Commission, Docket No. 2011-92, May 5, 2011 (Northern Utilities, Inc.)
- New Hampshire Public Utilities Commission, Docket No. DG 11-069, May 4, 2011(Northern Utilities, Inc.)
- Arizona Corporation Commission, Docket No. G-04204A-11-0158, April 8, 2011 (UNS Gas, Inc.)
- Utah Public Service Commission, Docket No. 10-035-124, January 24, 2011 (Rocky Mountain Power/PacifiCorp).
- Massachusetts Department of Public Utilities, D.P.U. 11.01 (Electric) and D.P.U. 11.02 (Gas), January 14, 2011, (Fitchburg Gas and Electric Light Company d/b/a/ Unitil)
- Wyoming Public Service Commission, Docket No. 20000-384-ER-10, November 22, 2010 (Rocky Mountain Power dba/PacifiCorp).
- Illinois Commerce Commission, Docket No. 10-0467, July 28, 2010 (Commonwealth Edison Company).
- Missouri Public Service Commission, Case No. ER-2010-0355, June 4, 2010 (Kansas City Power & Light Company).
- Missouri Public Service Commission, Case No. ER-2010-0356, June 4, 2010 (KCP&L Greater Missouri Operations Company).

- Idaho Public Utilities Commission, Case No. PAC-E-10-07, May 28, 2010 (Rocky Mountain Power/PacifiCorp).
- Washington Utilities and Transportation Commission, Docket UE-100749, May 4, 2010 (PacifiCorp).
- New Hampshire Public Utilities Commission, Docket No. DE 10-055, April 15, 2010 (Unitil Energy Systems)
- Oregon Public Utility Commission, Docket No. UE-217, March 1, 2010 (PacifiCorp).
- Texas Public Utility Commission, Docket No. 37744, December 30, 2009,(Entergy Texas, Inc.)
- Kansas Corporation Commission, Docket No. 10-KCPE-415-RTS, December 17, 2009 (Kansas City Power & Light Company).
- Texas Public Utility Commission, Docket No. 37690, December 9, 2009,(El Paso Electric Company).
- California Public Utilities Commission, Application No. 09-11-015, November 20, 2009 (PacifiCorp).
- Federal Energy Regulatory Commission, Docket No. ER10-230-000, November 6, 2009 (Kansas City Power & Light Company and KCP&L Greater Missouri Operations Company).
- Wyoming Public Service Commission, Docket No. 20000-352-ER-09, October 2, 2009 (Rocky Mountain Power dba/PacifiCorp).
- Arkansas Public Service Commission, Docket No. 09-084-U, September 4, 2009, (Entergy-Arkansas)
- Texas Public Utility Commission, Docket No. 37364, August 28, 2009,(American Electric Power-SWEPCO)
- Utah Public Service Commission, Docket No. 09-035-23, June 23, 2009 (Rocky Mountain Power/PacifiCorp).
- New Mexico Public Regulation Commission, Case No. 09-00171-UT, May 2009, (El Paso Electric Company).
- Oregon Public Utility Commission, Docket No. UE-207, April 2, 2009 (PacifiCorp).
- Arkansas Public Service Commission, Docket No. 09-008-U, February 19, 2009 (American Electric Power-SWEPCO).
- Washington Utilities and Transportation Commission, Docket UE-090205, February 9, 2009 (PacifiCorp).
- Idaho Public Utilities Commission, Case No. PAC-E-08-07, September 19, 2008 (Rocky Mountain Power/PacifiCorp).
- Missouri Public Service Commission, Case No. ER-2009-089, September 5, 2008 (Kansas City Power & Light Company).
- Kansas Corporation Commission, Docket No. 09-KCPE-246-RTS, September 5, 2008 (Kansas City Power & Light Company).
- Missouri Public Service Commission, Case No. ER-2009-090, September 5, 2008 (Aquila, Inc. dba/KCP&L Greater Missouri Operations Company).
- Utah Public Service Commission, Docket No. 08-035-38, July 17, 2008 (Rocky Mountain Power/PacifiCorp).
- Wyoming Public Service Commission, Docket No. 20000-333-ER-08, July 2008 (Rocky Mountain Power dba/PacifiCorp).
- Texas Public Utility Commission, Docket No. 35717, June 27, 2008, (Oncor Electric Delivery Company LLC).
- Washington Utilities and Transportation Commission, Docket UG-080546, March 28, 2008 (NW Natural).
- Washington Utilities and Transportation Commission, Docket UE-080220, February 6, 2008 (PacifiCorp).
- Utah Public Service Commission, Docket No. 07-035-93, December 17, 2007 (PacifiCorp).
- Illinois Commerce Commission, Docket No. 07-0566, October 17, 2007 (Commonwealth Edison Company).

- Texas Public Utility Commission, Docket No. 34800, September 26, 2007, (Entergy Gulf States, Inc.)
- Texas Public Utility Commission, Docket No. 34040, August 28, 2007, (Oncor/TXU Electric Delivery Company)
- Massachusetts Department of Public Utilities, D.P.U. 07-71, August 17, 2007, (Fitchburg Gas and Electric Light Company d/b/a/ Unitil)
- Arizona Corporation Commission, Docket No. E-01933A-07-0402, July 2, 2007, (Tucson Electric Power Company).
- Wyoming Public Service Commission, Docket No. 20000-277-ER-07, June 29, 2007 (Rocky Mountain Power dba/PacifiCorp).
- Idaho Public Utilities Commission, Case No. PAC-E-05-1, June 8, 2007 (Rocky Mountain Power dba/PacifiCorp).
- Kansas Corporation Commission, Docket No. 07-KCPE-905-RTS, March 1, 2007 (Kansas City Power & Light Company).
- New Mexico Public Regulation Commission, Case No. 07-00077-UT, February 21, 2007, (Public Service Company of New Mexico).
- Missouri Public Service Commission, Case No. ER-2006-0291, February 1, 2007 (Kansas City Power & Light Company).
- Texas PUC Docket Nos. 33734, January 22, 2007 (Electric Transmission Texas, LLC).
- Texas PUC Docket Nos. 33309 and 33310, November 2006, (AEP Texas Central Company and AEP Texas North Company).
- Louisiana Public Service Commission, Docket No. U-23327, October 2006 and January 2005 (Southwestern Electric Power Company, American Electric Power Company)
- Missouri Public Service Commission, Case No. ER-2007-0004, July 3, 2006 (Aquila, Inc.).
- New Mexico Public Regulation Commission, Case No. 06-00258-UT, June 30, 2006 (El Paso Electric Company).
- New Mexico Public Regulation Commission, Case No. 06-00210-UT, May 30, 2006 (Public Service Company of New Mexico).
- Texas Public Utility Commission, Docket No. 32093, April 14, 2006 (CenterPoint Energy-Houston Electric, LLC).
- Utah Public Service Commission, Docket No. 06-035-21, March 7, 2006 (PacifiCorp).
- Oregon Public Utility Commission, Case No. UE-179, February 23, 2006 (PacifiCorp).
- Kansas Corporation Commission, Docket No. 06-KCPE-828-RTS, January 31, 2006 (Kansas City Power & Light Company).
- Missouri Public Service Commission, Case No. ER-2006-0314, January 27, 2006 (Kansas City Power & Light Company).
- California Public Utilities Commission, Docket No. 05-11-022, November 29, 2005 (PacifiCorp).
- Texas Public Utility Commission, Docket No. 31994, November 5, 2005 (Texas-New Mexico Power Company).
- New Hampshire Public Utilities Commission, Docket No. DE 05-178, November 4, 2005 (Unitil Energy Systems).
- Wyoming Public Service Commission, Docket No. 20000-ER-05-230, October 14, 2005 (PacifiCorp).
- Minnesota Public Utilities Commission, Docket. No. G-008/GR-05-1380, October 2005 (CenterPoint Energy Minnegasco).
- Texas Railroad Commission, Gas Utilities Division No. 9625, September 2005 (CenterPoint Energy Entex).
- Illinois Commerce Commission, Docket No. 05-0597, August 31, 2005 (Commonwealth Edison Company).

- Washington Utilities and Transportation Commission, Docket ,UE-050684/General Rate Case, May 2005 (PacifiCorp).
- Missouri Public Service Commission, Case No. ER-2005-0436, May 2005 (Aquila, Inc.).
- Idaho Public Utilities Commission, Case No. PAC-E-05-1, January 14, 2005 (PacifiCorp).
- Arkansas Public Service Commission, Docket No. 04-121-U, December 3, 2004 (CenterPoint Energy Arkla).
- Oregon Public Utility Commission, Case No. UE-170, November 12, 2004 (PacifiCorp).
- Texas Public Utility Commission, Docket No. 29206, November 8, 2004 (Texas-New Mexico Power Company).
- Texas Railroad Commission, Gas Utilities Division Nos. 9533 and 9534, October 13, 2004 (CenterPoint Energy Entex).
- Texas Public Utility Commission, Docket No. 29526, August 18 and September 2, 2004 (CenterPoint Energy Houston Electric).
- Utah Public Service Commission, Docket No. 04-2035-, August 4, 2004 (PacifiCorp).
- Oklahoma Corporation Commission, Cause No. PUD-200400187, July 2, 2004, (CenterPoint Energy Arkla).
- Minnesota Public Utilities Commission, Docket No. G-008/GR-04-901, July 2004, (CenterPoint Energy Minnegasco).
- Washington Utilities and Transportation Commission, Docket ,UE-032065/General Rate Case, December 2003 (PacifiCorp).
- Washington Utilities and Transportation Commission, Docket ,UG-031885, November 2003 (Northwest Natural Gas Company.).
- Wyoming Public Service Commission, Docket No. 20000-ER-03-198, May 2003 (PacifiCorp).
- Public Service Commission of Utah, Docket No. 03-2035-02, May 2003 (PacifiCorp).
- Public Utility Commission of Oregon, Case. UE-147, March 2003 (PacifiCorp).
- Wyoming Public Service Commission, Docket No. 20000-ER-00-162, May 2002 (PacifiCorp).
- Public Utility Commission of Oregon, UG-152, November 2002 (Northwest Natural).
- Massachusetts Department of Telecommunications and Energy, D.T.E. 02-24/24, May 2002 (Fitchburg Gas and Electric Light Company).
- New Hampshire Public Utilities Commission, Docket No. DE 01-247, January 2002 (Unitil Corporation).
- Washington Utilities and Transportation Commission, Docket UE-011569,70,UG-011571, November 2001 (Puget Sound Energy, Inc.).
- California Public Utilities Commission, Docket No. 01-03-026, September and December 2001 (PacifiCorp).
- New Mexico Public Regulation Commission, Docket No. 3643, July 2001 (Texas-New Mexico Power Company).
- Texas Natural Resources Conservation Commission, Docket No. 2001-1074/5-URC, May 2001 (AquaSource Utility, Inc.).
- Massachusetts Department of Telecommunications and Energy, Docket No. 99-118, May 2001 (Fitchburg Gas and Electric Light Company).
- Public Service Commission of Utah, Docket No. 01-035-01, January 2001 (PacifiCorp)
- Federal Energy Regulatory Commission, Docket No. ER-01-651, January 2001 (Southwestern Electric Power Company).
- Wyoming Public Service Commission, Docket No. 20000-ER-00-162, December 2000 (PacifiCorp).
- Public Utility Commission of Oregon, Case. UE-116, November 2000, (PacifiCorp)

- Public Utility Commission of Texas, Docket No. 22344, September 2000, (AEP Texas Companies, Entergy Gulf States, Inc., Reliant Energy HL&P, Texas-New Mexico Power Company, TXU Electric Company)
- Public Utility Commission of Oregon, Case UE-111, August 2000, (PacifiCorp)
- Texas Public Utility Commission, Docket Nos. 22352,3,4, March 2000 (Central Power and Light Co., Southwestern Electric Power Co., West Texas Utilities Co.).
- Texas Public Utility Commission, Docket No. 22355, March 2000 (Reliant Energy, Inc.).
- Texas Public Utility Commission, Docket No. 22349, March 2000 (Texas-New Mexico Power Co.).
- Texas Public Utility Commission, Docket No. 22350, March 2000 (TXU Electric).
- Washington Utilities and Transportation Commission, Docket UE-991831, November 1999 (PacifiCorp).
- Public Service Commission of Utah, Docket No. 99-035-10, September 1999 (PacifiCorp)
- Louisiana Public Service Commission Docket No. U-23029, August 1999 (Southwestern Electric Power Company)
- Wyoming Public Service Commission, Docket No. 2000-ER-99-145, July 1999, January 2000 (PacifiCorp, dba Pacific Power and Light Company).
- Texas PUC Docket No. 20150, March 1999 (Entergy Gulf States, Inc.)
- Federal Energy Regulatory Commission Docket No. ER-98-3177-00, May and December 1998 (Southwestern Electric Power Company).
- Public Service Commission of Utah, Docket No. 97-035-01, June 1998 (PacifiCorp, dba Utah Power and Light Company).
- Massachusetts Dept. of Telecommunications and Energy, Docket No. DTE 98-51, May 1998, (Fitchburg Gas and Electric Light Company, a subsidiary of Unitil Corp.)
- Texas PUC, Docket No. 18490, March 1998, (Texas Utilities Electric Company)
- Texas PUC Docket No. 17751, March 1998 and July 1997 (Texas-New Mexico Power Company).
- Federal Energy Regulatory Commission Docket No. RP-97, February 1998 and May 1997 (Koch Gateway Pipeline Company).
- Federal Energy Regulatory Commission Docket No. ER-97-4468-000, December 1997 (Puget Sound Power & Light).
- Oklahoma Corporation Commission, Cause No. PUD 960000214, August 1997 (Public Service Company of Oklahoma).
- Oregon Public Utility Commission Docket No. UE-94, April 1996, (PacifiCorp).
- Texas PUC Docket No. 15643, May and September 1996, (Central Power and Light and West Texas Utilities Company).
- Federal Energy Regulatory Commission Docket No. ER-96, April 1996 (Puget Sound Power & Light).
- Federal Energy Regulatory Commission Docket No. ER96, February 1996, (Central and South West Corporation).
- Washington Utilities & Transportation Commission Docket No. UE-951270, November 1995 (Puget Sound Power & Light).
- Texas PUC Docket No. 14965, November 1995, (Central Power and Light).
- Texas PUC Docket No. 13369, February 1995 (West Texas Utilities).
- Texas PUC Docket No. 12065, July and December 1994, (Houston Lighting & Power).
- Texas PUC, Docket No. 12820, July and November 1994, (Central Power and Light).
- Texas PUC Docket No. 12900, March 1994, and New Mexico PUC Case No. 2531, August 1993, (TNP Enterprises).
- Texas PUC, Docket No. 12815, March 1994, (Pedernales Electric Cooperative).
- Florida Public Service Commission, Docket No. 930987-EI, December 1993, (TECO Energy).

- Iowa Department of Commerce, Docket No. RPU-93-9, December 1993, (US West Communications).
- Texas PUC Dkt. No. 11735, May and September 1993, (Texas Utilities Electric Company)
- Oklahoma Corporation Commission, Cause No. PUD 001342, October 1992 (Public Service Company of Oklahoma).
- Texas PUC Dkt. No. 9983, November 1991, (Southwest Texas Telephone Company).
- Texas PUC Dkt. No. 9850, November 1990, Houston Lighting & Power Company).
- Texas PUC Dkt. Nos. 8480/8482, January 1989; City of Austin Dkt. No. 1, August 1988 and July 1987, (City of Austin Electric Department).
- Missouri Public Service Commission Case No. ER-90-101, July 1990 (UtiliCorp).
- Texas PUC Dkt. No. 9945, December 1990; Texas PUC Dkt. No. 9165, November 1989, (El Paso Electric Company).
- Texas PUC Dkt. No. 9427, July 1990, (Lower Colorado River Authority Association of Wholesale Customers).
- Oregon Public Utility Commission, March 1990, (Pacific Power & Light Company).
- Utah Public Service Commission, November 1989, (Utah Power & Light Company).
- Texas PUC Dkt. No. 5610, September 1988, (GTE Southwest).
- Iowa State Utilities Board, September 1988, (Northwestern Bell Telephone Company).
- Texas Water Commission, Dkt. Nos. RC-022 and RC-023, November 1986, (City of Houston Water Department).
- Pennsylvania PUC Dkt. Nos. R-842770 and R-842771, May 1985, (Bethlehem Steel).

Capital Structure Testimony:

- Federal Energy Regulatory Commission Docket No. RP-97, May 1997 (Koch Gateway Pipeline Company).
- Illinois Commerce Commission Dkt. No. 93-0252 Remand, July 1996, (Sprint).
- California PUC (Appl. No. 92-05-004) April 1993 and May 1993, (Pacific Telesis).
- Montana PSC, Dkt. No. 90.12.86, November 1991, (US West Communications).
- Massachusetts PUC Dkt. No. 86-33, June 1987, (New England Telephone Company).
- Maine PUC Dkt. No. 85-159, February 1987, (New England Telephone Company).
- New Hampshire PUC Dkt. No. 85-181, September 1986, (New England Telephone Company).
- Maine PUC Dkt. No. 83-213, March 1984, (New England Telephone Company).

Regulatory Policy and Other Regulatory Issues:

- Texas PUC Docket No.31056, September 16, 2005, (AEP Texas Central Company).
- New Hampshire PUC Docket No. DE 03-086, May 2003, (Unitil Corporation).
- Texas PUC Docket No. 26194, May 2003 (El Paso Electric Company)
- Texas PUC Docket No. 22622, June 15, 2001 (TXU Electric)
- Texas PUC Docket No. 20125, November 1999 (Entergy Gulf States, Inc.)
- Texas PUC Docket No. 21112, July 1999 and New Mexico Public Regulation Commission Case No. 3103, July 1999 (Texas-New Mexico Power Company)
- Texas PUC Docket No. 20292, May 1999 (Central Power and Light Co.)
- Texas PUC Docket No. 20150, November 1998 (Entergy Gulf States, Inc.)
- New Mexico PUC Case No. 2769, May 1997, (Texas-New Mexico Power Company).
- Texas PUC Dkt. No. 15296, September 1996, (City of College Station, Texas).
- Texas PUC Dkt. No. 14965 Competitive Issues Phase, August 1996 (Central Power and Light Company).
- Texas PUC Dkt. No. 12456, May 1994, (Texas Utilities Electric Company).
- Texas PUC, Dkt. No. 12700/12701 and Federal Energy Regulatory Commission, Docket No. EC94-000, January 1994, (El Paso Electric Company).

- Florida Public Service Commission Generic Purchased Power Proceedings, October 1993 (TECO Energy).
- Texas PUC, Docket No. 11248, December 1992 (Barbara Faskins).
- Texas PUC Dkt. No. 10894, January and June 1992, (Gulf States Utilities Company).
- State Corporation Commission of Kansas, Dkt. No. 175,456-U, August 1991, (UtiliCorp United).
- Texas PUC Dkt. No. 9561, May 1990; Texas PUC Dkt. Nos. 6668/8646, July 1989 and February 1990, (Central Power and Light Company).
- Texas PUC Dkt. No. 9300, April 1990 and June 1990, (Texas Utilities Electric Co.).
- Texas PUC Dkt. No. 10200, August 1991, (Texas-New Mexico Power Company).
- Texas PUC Dkt. No. 7289, May 1987, (West Texas Utilities Company).
- Texas PUC Dkt. No. 7195, January 1987, (North Star Steel Texas).
- New Mexico PSC Case No. 1916, April 1986, (Public Service Company of New Mexico).
- Texas PUC Dkt. No. 6525, March 1986, (North Star Steel Texas).
- Texas PUC Dkt. No. 6375, November 1985, (Valley Industrial Council).
- Texas PUC Dkt. No. 6220, April 1985, (North Star Steel Texas).
- Texas PUC Dkt. No. 5940, March 1985, (West Texas Municipal Power Agency).
- Texas PUC Dkt. No. 5820, October 1984, (North Star Steel Texas).
- Texas PUC Dkt. No. 5779, September 1984, (Texas Industrial Energy Consumers).
- Texas PUC Dkt. No. 5560, April 1984, (North Star Steel Texas).
- Arizona PSC Dkt. No. U-1345-83-155, January 1984 and May 1984 (Arizona Public Service Company Shareholders Association).

Insurance Rate Testimony:

- Texas Department of Insurance, Docket No. 2673, January 2008, (Texas Land Title Association).
- Texas Department of Insurance, Docket No. 2601, December 2006, (Texas Land Title Association).
- Texas Department of Insurance, Docket No. 2394, November 1999, (Texas Title Insurance Agents).
- Senate Interim Committee on Title Insurance of the Texas Legislature, February 6, 1998
- Texas Department of Insurance, Docket No. 2279, October 1997, (Texas Title Insurance Agents).
- Texas Department of Insurance, January 1996, (Independent Metropolitan Title Insurance Agents of Texas).
- Texas Insurance Board, January 1992, (Texas Land Title Association).
- Texas Insurance Board, December 1990, (Texas Land Title Association).
- Texas Insurance Board, November 1989, (Texas Land Title Association).
- Texas Insurance Board, December 1987, (Texas Land Title Association).

Testimony On Behalf Of Texas PUC Staff:

- Texland Electric Cooperative, Dkt. No. 3896, February 1983
- El Paso Electric Company, Dkt. No. 4620, September 1982.
- Southwestern Bell Telephone Company, Dkt. No. 4545, August 1982.
- Central Power and Light Company, Dkt. No. 4400, May 1982.
- Texas-New Mexico Power Company, Dkt. 4240, March 1982.
- Texas Power and Light Company, Dkt. No. 3780, May 1981.
- General Telephone Company of the Southwest, Dkt. No. 3690, April 1981.
- Mid-South Electric Cooperative, Dkt. No. 3656, March 1981.

- West Texas Utilities Company, Dkt. No. 3473, December 1980.
- Houston Lighting & Power Company, Dkt. No. 3320, September 1980.

ECONOMIC ANALYSIS AND TESTIMONY

Antitrust Litigation:

- Marginal Cost Analysis of Concrete Production/Predatory Pricing (Stiles)
- Analysis of Lost Business Opportunity due to denial of Waste Disposal Site Permit (Browning-Ferris Industries, Inc.).
- Analysis of Electric Power Transmission Costs in Purchased Power Dispute, 1995, (City of College Station, Texas).

Contract Litigation:

- Analysis of Cogeneration Contract/Economic Viability Issues(Texas-New Mexico Power Company)
- Definition of Electric Sales/Franchise Fee Contract Dispute (Reliant Energy HL&P)
- Analysis of Purchased Power Agreement/Breach of Contract (Texas-New Mexico Power Company)
- Regulatory Commission Provisions in Franchise Fee Ordinance Dispute (Central Power & Light Company)
- Analysis of Economic Damages resulting from attempted Acquisition of Highway Construction Company (Dillingham Construction Corporation).
- Analysis of Economic Damages due to Contract Interference in Acquisition of Electric Utility Cooperative (PacifiCorp).
- Analysis of Economic Damages due to Patent Infringement of Boiler Cleaning Process (Dowell-Schlumberger/The Dow Chemical Company).
- Analysis of Lost Profits in Highway Construction Dispute, Jones Bros., Plaintiff, v. Flour Daniel, Balfour Beatty, Lambrecht, and Lone Star Infrastructure, LLC, Defendants, 53rd Judicial District Court of Travis County, Texas, Cause No. GN204386, 2005, (Flour, et al)
- Analysis of Lost Profits in Insurance Dispute, Nickelson v. International Shipbreaking Ltd., LLC, et al, 332nd District Court, Hidalgo County, Texas, Cause No. C-482-01-F, 2005, (Great American Insurance Company).
- Analysis of Lost Profits and Other Economic Damages due to Patent Infringement, Climb Tech, Guthrie, & Schwartz Design, Plaintiffs, v. Verble, Hagler, Reeves, Valcor Industries, Inc., Defendants, U.S. District Court, Western District, Austin, Texas, Civil Action No. 1:05-cv-864-LY, 2008, (Verble, Hagler, et al).

Lender Liability/Securities Litigation:

- ERISA Valuation of Retail Drug Store Chain (Sommers Drug Stores Company).
- Analysis of Lost Business Opportunities in Failed Businesses where Lenders Refused to Extend or Foreclosed Loans (FirstCity Bank Texas, McAllen State Bank, General Electric Credit Corporation).
- Usury and Punitive Damages Analysis based on Property Valuation in Failed Real Estate Venture, 1995, (Tomen America, Inc.).

Personal Injury/Wrongful Death/Lost Earnings Capacity Litigation:

- Analysis of Lost Earnings Capacity and Punitive Damages due to Industrial Accident (Worsham, Forsythe and Wooldridge).
- Analysis of Lost Earnings Capacity due to Improper Termination (Lloyd Gosselink, Ryan & Fowler).

- Present Value Analysis of Lost Earnings and Future Medical Costs due to Medical Malpractice (Sierra Medical Center).
- Present Value Analysis of Life Care Plan, U.S. District Court, Eastern District of Texas, Texarkana Division, Chisum v. Ford Motor Company, Civil Action No. 5:05-cv-0045, 2005, (Ford Motor Company).
- Analysis of Lost Earnings Capacity due to Industrial Accident, 122nd District Court, Galveston County, Texas, Trevino v. BP Products North America, Inc., Cause No. 05-cv-0341, 2006, (BP Products North America, Inc.

Product Warranty/Liability Litigation:

- Analysis of Lost Profits due to Equipment Failure in Cogeneration Facility (WF Energy/Travelers Insurance Company).
- Analysis of Economic Damages due to Grain Elevator Explosion (Degesch Chemical Company).
- Analysis of Economic Damages due to failure of Plastic Pipe Water Lines (Western Plastics, Inc.)
- Analysis of Rail Car Repair and Maintenance Costs in Product Warranty Dispute (Youngstown Steel Door Company).
- Analysis of Lost Profits due to Equipment Failure in Electric Power Plant, Houston Casualty Co., Comision Federal de Electricidad, and Seguros Comercial America S.A. de C.V. (Plaintiffs) v. Siemens Power Corporation, et al, District Court of Dallas County Texas, Cause No. DV-99-02749, 2005, (Siemens).
- Analysis of Lost Profits due to Manufacturing Parts Failure, Sanijet Corp. (Plaintiff) v. Lexor International, Inc., U.S. District Court, Northern Division of Texas, Dallas, Texas, Case No. 3:06-cv-1258-B ECF (Lexor International)

Property Tax Litigation:

- Evaluation of Electric Utility Distribution System (Jasper-Newton Electric Cooperative).
- Evaluations of Electric Utility Generating Plants (West Texas Utilities Company).

Valuations of Closely Held Businesses in Litigation Support and Federal Estate Tax Planning.

PROFESSIONAL PRESENTATIONS

"Fundamentals of Financial Management and Reporting for Non-Financial Managers," Austin Energy, July 2000.
"Fundamentals of Finance and Accounting," the IC^2 Institute, University of Texas at Austin, December 1996 and 1997.
"Fundamentals of Financial Analysis and Project Evaluation," Central and South West Companies, April, May, and June 1997.
"Fundamentals of Financial Management and Valuation," West Texas Utilities Company, November 1995.
"Financial Modeling: Testing the Reasonableness of Regulatory Results," University of Texas Center for Legal and Regulatory Studies Conference, June 1991.
"Estimating the Cost of Equity Capital," University of Texas at Austin Utilities Conference, June 1989, June 1990.
"Regulation: The Bottom Line," Texas Society of Certified Public Accountants, Annual Utilities Conference, Austin, Texas, April 1990.
"Alternative Treatments of Large Plant Additions -- Modeling the Alternatives," University of Texas at Dallas Public Utilities Conference, July 1989.

"Industrial Customer Electrical Requirements," Edison Electric Institute Financial Conference, Scottsdale, Arizona, October 1988.
"Acquisitions and Consolidations in the Electric Power Industry," Conference on Emerging Issues of Competition in the Electric Utility Industry, University of Texas at Austin, May 1988.
"The General Fund Transfer - Is It A Tax? Is It A Dividend Payout? Is It Fair?" The Texas Public Power Association Annual Meeting, Austin, May 1984.
"Avoiding 'Rate Shock' - Preoperational Phase-In Through CWIP in Rate Base," Edison Electric Institute, Finance Committee Annual Meeting, May 1983.
"A Cost-Benefit Analysis of Alternative Bond Ratings Among Electric Utility Companies in Texas," (with B.L. Heidebrecht and J.L. Nash), Texas Senate Subcommittee on Consumer Affairs, December 1982.
"Texas PUC Rate of Return and Construction Work in Progress Methods," New York Society of Security Analysts, New York, August 1982.
"In Support of Debt Service Requirements as a Guide to Setting Rates of Return for Subsidiaries," Financial Forum, National Society of Rate of Return Analysts, Washington, D.C., May 1982.

PUBLICATIONS

"Institutional Constraints on Public Fund Performance," (with B.L. Hadaway) *Journal of Portfolio Management*, Winter 1989.
"Implications of Savings and Loan Conversions in a Deregulated World," (with B.L. Hadaway) *Journal of Bank Research*, Spring 1984.
"Regulatory Treatment of Construction Work in Progress," abstract, (with B.L. Heidebrecht and J. L. Nash), *Rate & Regulation Review*, Edison Electric Institute, December 20, 1982.
"Financial Integrity and Market-to-Book Ratios in an Efficient Market," (with W. L. Beedles), *Gas Pricing & Ratemaking*, December 7, 1982.
"An Analysis of the Performance Characteristics of Converted Savings and Loan Associations," (with B.L. Hadaway) *Journal of Financial Research*, Fall 1981.
"Inflation Protection from Multi-Asset Sector Investments: A Long-Run Examination of Correlation Relationships with Inflation Rates," (with B.L. Hadaway), *Review of Business and Economic Research*, Spring 1981.
"Converting to a Stock Company-Association Characteristics Before and After Conversion," (with B.L. Hadaway), *Federal Home Loan Bank Board Journal*, October 1980.
"A Large-Sample Comparative Test for Seasonality in Individual Common Stocks," (with D.P. Rochester), *Journal of Economics and Business*, Fall 1980.
"Diversification Possibilities in Agricultural Land Investments," *Appraisal Journal*, October 1978.
"Further Evidence on Seasonality in Common Stocks," (with D.P. Rochester), *Journal of Financial and Quantitative Analysis*, March 1978.