THE STATE OF NEW HAMPSHIRE

BEFORE THE

PUBLIC UTILITIES COMMISSION

DG 11-069

NORTHERN UTILITIES, INC.

DIRECT TESTIMONY OF

SAMUEL C. HADAWAY

EXHIBIT SCH-1

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I. INTRODUCTION

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. ("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 ("Texas 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, 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. SUMMARY OF TESTIMONY

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to estimate the market required rate of return on equity ("ROE") for Northern Utilities.

Q. Please state your ROE recommendation and summarize the results of your cost of equity studies.

A. My quantitative analysis and my review of current economic conditions indicate that the cost of equity for Northern Utilities is 10.5 percent. My discounted cash flow ("DCF") analysis indicates an ROE range of 9.9 percent to 10.5 percent. My risk premium analysis indicates a range of 10.4 percent to 10.6 percent. Based on

these quantitative results and my further review of other economic data discussed in my testimony, I recommend an ROE of 10.5 percent.

Q. How is your analysis structured?

A. In my DCF analysis, I apply a comparable company approach to estimate the cost of equity for Northern Utilities. The comparable company approach is consistent with traditional *Hope* and *Bluefield* requirements (which I discuss later on in my testimony) and it is a conservative approach because Northern Utilities is a relatively small company, which as a stand-alone entity might be viewed by investors as more risky than larger, actively- traded utilities. I began my review with all natural gas local distribution companies ("LDCs") and combination electric and gas utilities 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 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 65 percent of their revenues from domestic regulated utility sales. I also required the companies to have consistent data from Value Line and to have had no dividend cuts in the past two years. I also excluded companies that are currently involved in merger activities. The fundamental characteristics of the five

[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 2010.

natural gas LDCs and the 17 combination gas and electric utilities that comprise my comparable group are shown in Schedule SCH-1.

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 combination of approaches is the most reliable method 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-1 through SCH-5.

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 purpose of this section of your testimony?

A. The purpose of this section is to review recent capital market costs and conditions as well as industry and Northern Utilities-specific factors that should be reflected in the cost of capital.

Q. Please summarize the capital costs and inflation rates that have been seen in the U.S. economy over the past decade.

A. In Schedule SCH-2, page 1, I provide a review of annual interest rates and rates of inflation for the past ten years. During that time, inflation and fixed income market costs have declined and, generally, have been lower than rates that prevailed in the previous decade. Inflation, as measured by the Consumer Price Index (CPI), was essentially zero percent in 2008; it increased to 2.8 percent in 2009, and was up 1.4 percent in 2010. Over the past decade, the CPI has increased by an average of 2.4 percent per year. This average rate has been considerably lower than the long-run average increases in the CPI, which have been in the range of 3.5 percent to 4.0 percent per year.

Q. How has recent market turbulence affected the cost of equity for utilities?

A. During the past two and one-half years, capital markets in the U.S. have been more volatile than at any time since the 1930s. Extremely large daily swings in the stock market and unprecedented corporate interest rate spreads in the debt markets during late 2008 and early 2009 resulted in near chaos. The S&P 500 and the Dow Jones Industrial Average declined by over 50 percent from their November 2007 highs to the low point in March 2009. In this environment, many large financial institutions such as the Federal National Mortgage Association, Wachovia, Bear Sterns, and Merrill Lynch were unable to survive as independent institutions.

Lehman Brothers was forced to file for bankruptcy. Other surviving institutions such as Citigroup, Goldman Sachs, American International Group, Morgan Stanley were provided multibillion dollar capital infusions by the federal government.

The federal government initially enacted emergency legislation (the $700 billion Troubled Asset Relief Program) in October 2008. As part of that effort, federal deposit insurance was increased, billions of dollars were lent to financial institutions, and hundreds of billions of dollars in illiquid securities were purchased. In November 2008, the Federal Reserve System (Fed) pledged to pump an additional $800 billion into ailing credit markets - $600 billion to purchase federal government agency mortgage securities and, with support from the U.S. Treasury, up to $200 billion in financing to investors buying securities tied to student loans, car loans, credit card debt and small business loans was provided. In early 2009, President Obama also signed an additional $789 billion economic package. These efforts all reflect the heightened economic and financial uncertainties that were generated by the financial crisis.

Q. Has the government continued its efforts to stimulate the economy?

A. Yes. After the Fed reduced the overnight Federal Funds rate for banks to virtually zero in late 2008, the Fed's traditional monetary policy options became limited. In early 2009, the Fed's less traditional program of directly purchasing debt securities was expanded to $1.8 trillion. On November 3, 2010, the Fed further extended these activities its additional Quantitative Easing plan (dubbed QE2) for repurchases of an additional $600 billion of long-term government bonds. All

these programs have artificially depressed interest rates with the hope of providing liquidity and further stimulus to the economy.

While the government's unprecedented monetary expansion has undoubtedly helped to stabilize the economy, and has resulted in record low interest rates, the pace of economic recovery has been slow. The drop in the nation's unemployment rate to 8.9 percent in February 2011 (relative to a 10.1 percent peak in November 2009) was welcomed. However, by historical standards, the unemployment rate remains extremely high. The Federal Reserve Open Market Committee has repeatedly reaffirmed its QE2 bond-purchase program, stating that the program will continue through June 2011:

> To promote a stronger pace of economic recovery and to help ensure that inflation, over time, is at levels consistent with its mandate, the Committee decided today to continue expanding its holdings of securities as announced in November. In particular, the Committee is maintaining its existing policy of reinvesting principal payments from its securities holdings and intends to purchase $600 billion of longer-term Treasury securities by the end of the second quarter of 2011. (Federal Reserve System, Federal Open Market Committee news release, January 26, 2011, www.federalreserve.gov, monetary policy tab, FOMC Statement.)

While low levels of inflation along with the government's aggressive monetary policies have produced the desired low level of interest rates, continuing economic uncertainties have caused more risky equity markets to remain volatile.

Q. Can you illustrate fluctuations in long-term interest rates that have occurred during the past two and one-half years?

A. Yes. I provide the most recent data, through March 31, 2011, in Schedule SCH-2, page 2. Table 1 below summarizes the results.

Table 1
Long-Term Interest Rate Trends

Month	Triple-B Utility Rate	30-Year Treasury Rate	Triple-B Utility Spread
Jan-08	6.35	4.33	2.02
Feb-08	6.60	4.52	2.08
Mar-08	6.68	4.39	2.29
Apr-08	6.81	4.44	2.37
May-08	6.79	4.60	2.19
Jun-08	6.93	4.69	2.24
Jul-08	6.97	4.57	2.40
Aug-08	6.98	4.50	2.48
Sep-08	7.15	4.27	2.88
Oct-08	8.58	4.17	4.41
Nov-08	8.98	4.00	4.98
Dec-08	8.11	2.87	5.24
Jan-09	7.90	3.13	4.77
Feb-09	7.74	3.59	4.15
Mar-09	8.00	3.64	4.36
Apr-09	8.03	3.76	4.27
May-09	7.76	4.23	3.53
Jun-09	7.31	4.52	2.79
Jul-09	6.87	4.41	2.46
Aug-09	6.36	4.37	1.99
Sep-09	6.12	4.19	1.93
Oct-09	6.14	4.19	1.95
Nov-09	6.18	4.31	1.87
Dec-09	6.26	4.49	1.77
Jan-10	6.16	4.60	1.56
Feb-10	6.25	4.62	1.63
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
3-Mo Avg	**6.04**	**4.56**	**1.48**
12-Mo Avg	**5.92**	**4.24**	**1.68**

Sources: Mergent Bond Record (Utility Rates); www.federalreserve.gov (Treasury Rates).

Three month average is for January 2010-March 2011.

Twelve month average is for April 2010-March 2011.

The data in Table 1 vividly illustrate the uptrend in interest rates that has occurred since late summer 2010 and the market turmoil that has occurred over the past two years. Since their lowest levels reached in August and September 2010, both utility interest rates and yields on long-term Treasury bonds have increased by about 50 basis points. Over the past two years, interest rates have shown the widest fluctuations in recent history. The Federal Reserve's continuing efforts to reduce borrowing costs for banks (the Fed Funds rate) and lower rates on U.S. Treasury bonds have now extended to high quality corporate borrowers as well. While the effects of market turbulence may not be easily captured in financial models for estimating the rate of return, equity market turbulence and the resulting elevated level of risk aversion should be considered explicitly in estimates of the cost of equity capital.

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. While markets have stabilized considerably from the conditions that existed in late 2008, investors remain concerned about high unemployment, large federal deficits, the Mideast turmoil and skyrocketing oil prices, and the potential for further fallout from foreclosures and other effects of the financial crisis. These factors continue to cause a high level of market volatility and contribute to heighten investor risk aversion.

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

A. In Schedule SCH-2, page 3, I provide S&P's most recent interest rate forecast from its *Trends & Projections* publication for March 2011. Table 2 below summarizes the interest rate forecasts:

Table 2
Standard & Poor's Interest Rate Forecast

	Mar. 2011 Average	Average 2011 Est.	Average 2012 Est.
Treasury Bills	0.1%	0.3%	2.2%
10-Yr. T-Bonds	3.4%	3.8%	4.5%
30-Yr. T-Bonds	4.5%	4.9%	5.5%
Aaa Corporate Bonds	5.1%	5.5%	6.1%

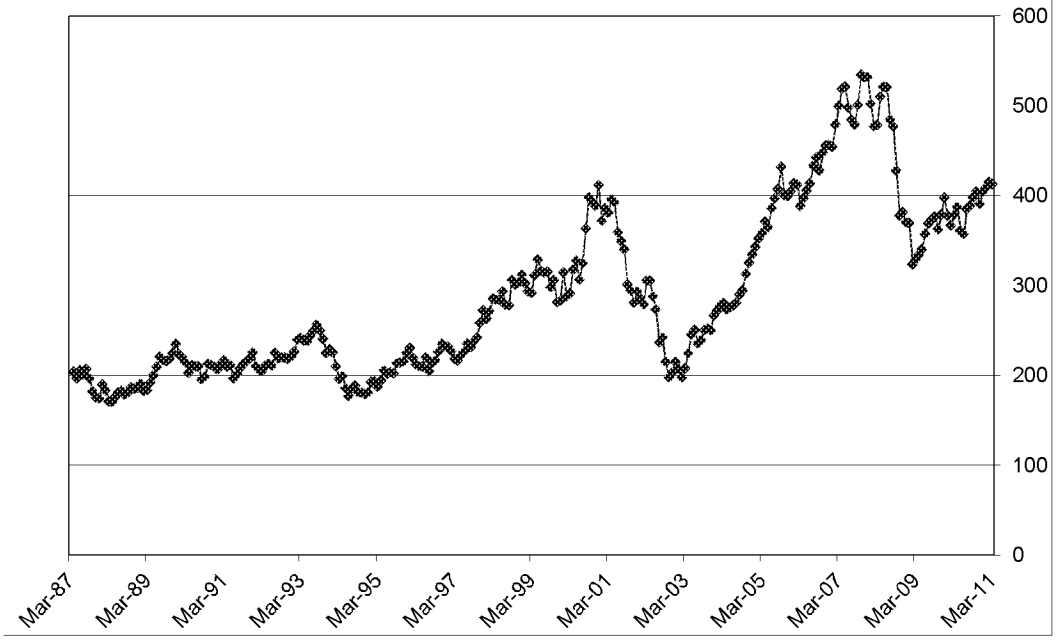
Sources: www.federalreserve.gov, (Current Rates). Standard & Poor's *Trends & Projections*, March 2011, page 8 (Projected Rates).

These data show that, during 2011, average long-term Treasury interest rates are expected to increase by 40 basis points relative to their March 2011 levels and that rates will rise substantially more during 2012. Yields on all the other bonds shown in the table are expected to increase by similar amounts. Such expectations for large increases in fixed income yields indicate that the expected rates of return for utilities, which have to compete with such investments for required capital, are increasing as well.

Q. How have utility stocks performed during the past several years?

A. Utility stock prices have been volatile and, recently, their performance relative to the overall market recovery has been poor. The wider fluctuations in more recent years are vividly illustrated in the following Graph 1, which shows DJUA prices over the past 25 years.

Graph 1
Dow Jones Utility Average
1987-2011

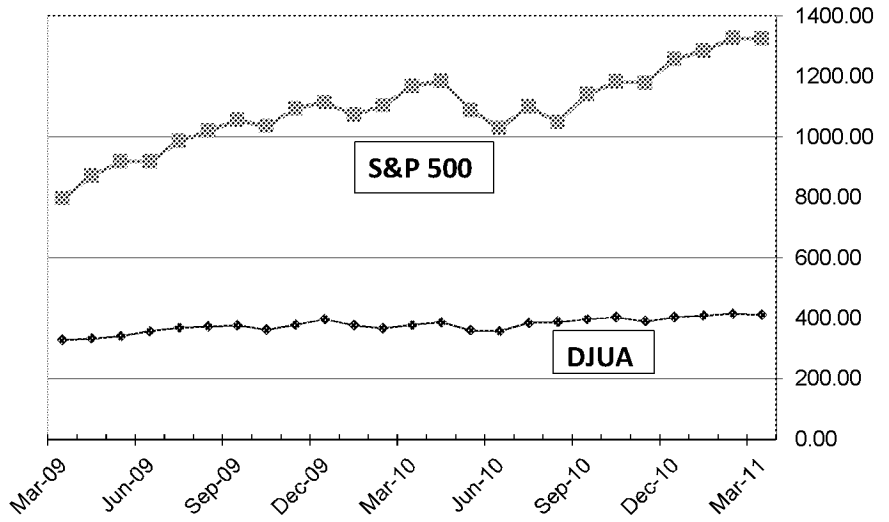


Over past ten years, utility stocks have fluctuated far more widely than was previously the case. In this environment, investors' return expectations and requirements for providing capital to the utility industry have increased relative to the longer-term, traditional view of the utility industry. Increased market volatility for utility shares increase investor risk aversion and causes investors to require a higher rate of return.

Q. How have utility stocks performed relative to the overall market recovery experienced during the past year?

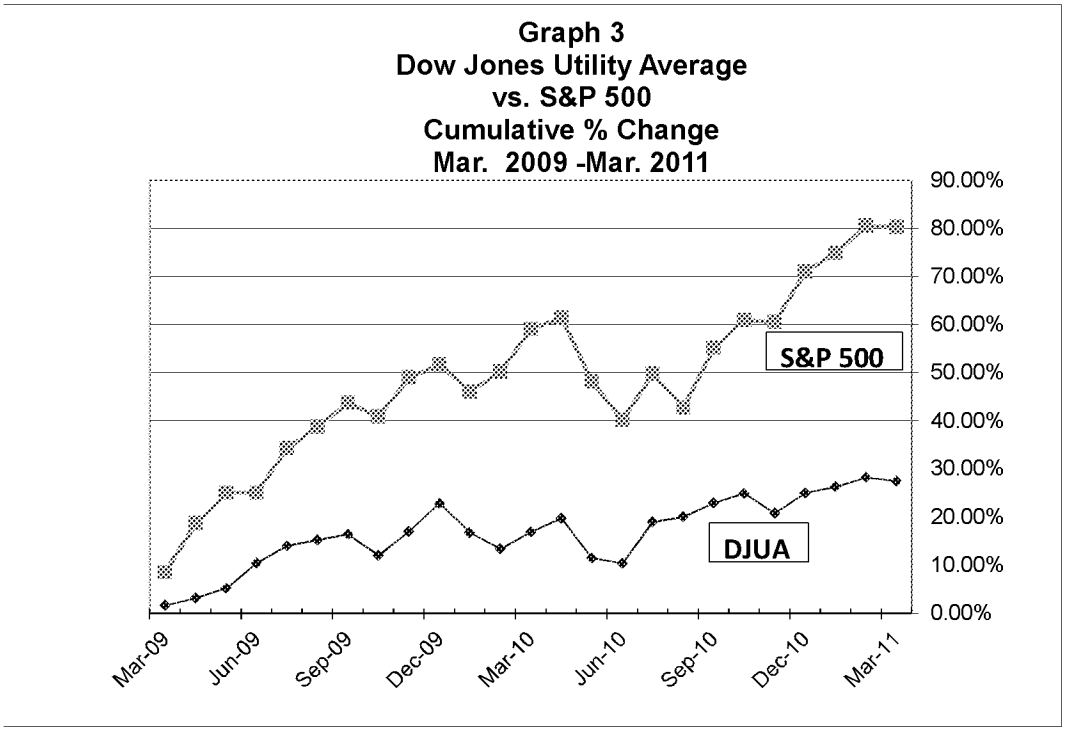
A. Utility stock prices have lagged far behind the overall market. Graph 2 shows the monthly levels for the DJUA versus the broader market S&P 500 Index since the market lows that occurred in February and March of 2009.

Graph 2
Dow Jones Utility Average
vs. S&P 500
Mar. 2009 - Mar. 2011



While the S&P 500 has increased significantly since March 2009, utility prices have remained relatively flat. This result is a further indication that the cost of equity for utility companies has not declined to the same extent as interest rates have fallen or to the same extent that the cost of equity may have come down for the broader equity market. The relatively lower prices for utility shares indicate that the cost of capital for utilities is higher.

Graph 3 further illustrates this result by showing the cumulative percentage change in the two equity indexes since the March 2009 lows.



While the S&P 500 has recovered over 80 percent (80.36%) from its March 2009 low, utility stock prices have increased by less than 28 percent (27.50%). This almost 3-to-1 better performance for the overall market relative to utilities again points out the market difficulties that utilities face and the continuing relatively higher cost of equity for utility companies.

Q. What is the industry's current fundamental position?

A. The natural gas utility industry has seen significant volatility both in terms of fundamental operating characteristics and the effects of the economy. The economic crisis significantly reduced sales volumes and increased the difficulty of planning for future load requirements. S&P, in its most recent *Gas Utility Industry Survey*, reflects the ongoing market volatility and expected lower end-use demand:

Standard & Poor's Industry Surveys

> Prior to the September 2009 low, natural gas prices had declined precipitously from a peak of $13.37 on July 1, 2008. Prior to that peak, prices had risen quickly from a pre-spike low of $5.20 per MMBtu. Prices have been extremely volatile since the September 2009 low, reaching $3.695 per MMBtu on September 25, 2009, falling to $2.23 on October 2, rising to $5.06 on October 22, falling to $2.35 on November 13, and then rising to the January 7, 2010, high.
>
> Price movements in 2010 have been somewhat slower since the April 1 low, but were still volatile. Prices rebounded 41%, reaching $5.21 on June 21, before a longer choppy 40% retreat to $3.13 on October 22, followed quickly by a 30% rebound to $4.07 on November 23. (Standard & Poor's *Industry Surveys*, Natural Gas Distribution, January 13, 2011, page 1.)
>
> Lower space-heating requirements for residential and commercial customers should offset customer growth, according to the EIA [U.S. Energy Information Administration]. A 2.8% decline in residential demand, a 2.0% drop in commercial demand, and a 0.4% decrease in electric power demand, partly offset by a 1.1% increase in industrial demand, should drive the 0.7% drop in end-use demand that the EIA expects in 2011. The EIA expects more normal winter weather to hurt residential and commercial demand and continued improvements in economic activity to help industrial demand. (Id., page 3)

Value Line also expects the industry's performance to be relatively poor:

Value Line Investment Survey

> Stocks in the Natural Gas Utility Industry generally posted a good performance over the past few months. However, this run was less impressive when compared to the stock market rally of late. Consequently, this group remains ranked in the bottom half of our Industry spectrum. Regardless, the companies herein have been operating amid tough market conditions in recent months. The weakness in the housing market continues to weigh on results. These utilities continue to work to offset these pressures via numerous business strategies. However, near-term prospects will likely continue to be uninspiring until the economic recovery is further along. (*Value Line Investment Survey,* Natural Gas Utility, March 11, 2011, page 546.)

Credit market gyrations and the volatility of utility shares demonstrate the increased uncertainties that utility investors face. These uncertainties translate into a relatively higher cost of capital for utilities than was traditionally the case.

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 and the decision-making timeframe has been shortened – all translating to increased 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. Providers of capital are also increasingly concerned that commodity prices and economic conditions will result in continuing volume reductions, which may leave portions of expected distribution company cost recovery in doubt. All these sources of uncertainty 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 in order to access capital markets on reasonable terms.

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

A. As I discussed previously, equity investors respond to changing assessments of risk 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 securities, 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 present a general definition of the cost of equity and to compare the strengths and weaknesses of several of the most widely-used methods for estimating the cost of equity. The various models provide a concrete link to actual capital market data and assist with defining the various relationships that underlie the ROE estimation process.

Q. Please define the term "cost of equity capital" and provide an overview of the cost estimation process.

A. The cost of equity capital is the rate of return that equity investors require on their capital. In concept, the cost of equity is no different than the cost of debt or the cost of preferred stock. The cost of equity is the rate of return that common stockholders require, just as interest on bonds and dividends on preferred stock are the returns that investors in those securities require. Equity investors expect a return on their capital commensurate with the risks they take and consistent with returns that might be available from other similar investments. Unlike returns from debt and preferred stocks, however, the required equity return is not directly

observable. Therefore, it must be estimated or inferred from capital market data and stock market trading activity.

An example helps to illustrate the cost of equity concept. Assume that an investor buys a share of common stock for $20 per share. If the stock's annual dividend is $1.00, the expected dividend yield is 5.0 percent ($1.00 / $20 = 5.0%). 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 11.0 percent: 5.0 percent dividend yield, plus 6.0 percent price appreciation. In this example, the total expected rate of return at 11.0 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 initial purchase 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 on bonds and savings accounts rise, 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?

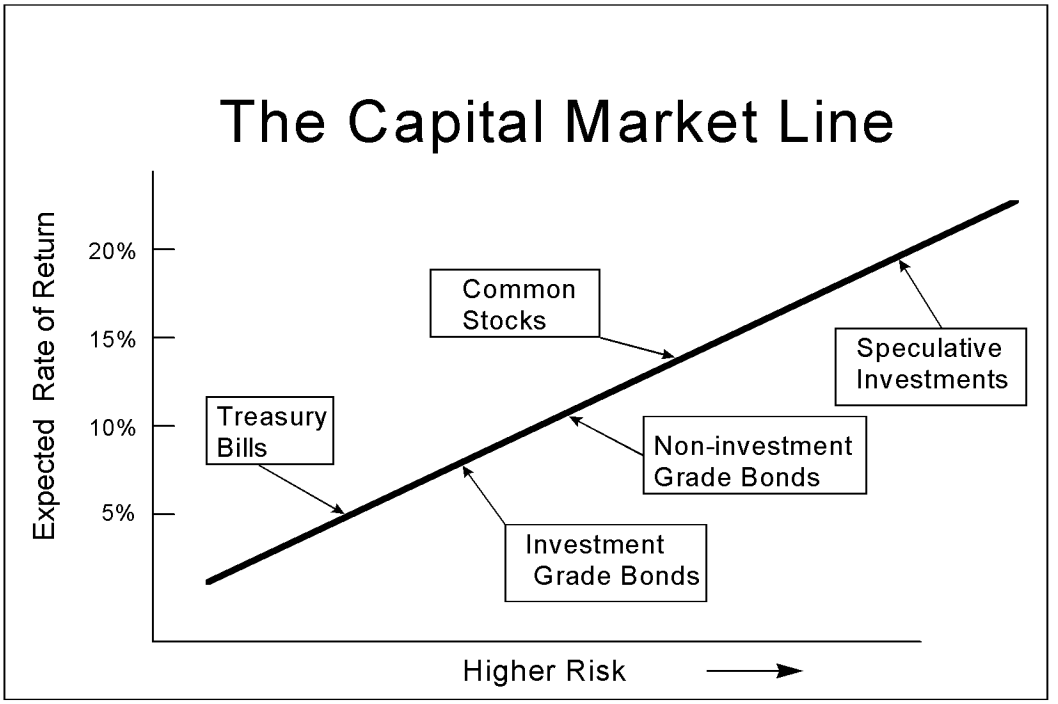
A. Risk-return tradeoffs among capital market investments have been the subject of extensive financial research. Literally dozens of textbooks and hundreds of academic articles have addressed the issue. Generally, such research confirms the common sense conclusion that investors will take additional 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. The following graph 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.

Risk-Return Tradeoffs



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. *Bluefield Water Works & Improvement Company v. Public Service Commission of West Virginia*, 262 U.S. 679, 692-693 (1923).

* * * * * *

> From the investor or company point of view, it is important that there be enough revenue not only for operating expenses, but also for the capital costs of the business. These include service on the debt and dividends on the stock. By that standard the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks. That return, moreover, should be sufficient to assure confidence in the financial integrity of the enterprise, so as to maintain its credit and to attract capital. *Federal Power Commission v. Hope Natural Gas Co.*, 320 U.S. 591, 603 (1944).

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.

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:

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

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, almost half of the electric utilities in the U.S. 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 have become highly uncertain, and estimating a reliable "constant" growth rate for some companies is virtually impossible. 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:

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

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:

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

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 22-company comparable group discussed previously. In the second part of my analysis, I present my risk premium analysis and review projected economic conditions and projected capital costs for the coming year.

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 use longer-term growth rate estimates based on growth in GDP, I also provide

DCF results with analysts' growth rates because this is the approach that has traditionally been 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 growth in GDP. 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 from the three-month average 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 economic growth in 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 1950 through 2010 are summarized in my Schedule SCH-3. As shown at the bottom of

that schedule, the overall 60-year average for the period was 6.7 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 5.8 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 6.7 percent, but my estimate of long-term expected growth is only 5.8 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 over 3 percent in all but the most recent 20 years.

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. Please summarize the results of your DCF analyses.

A. The DCF results for my comparable company group are presented in Schedule SCH-4. As shown in the first column of page 1 of that schedule, the traditional constant growth model indicates an ROE range of 9.9 percent to 10.2 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 10.3 percent to 10.5 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 10.0 percent. The results from the DCF model, therefore, indicate a reasonable ROE range of 9.9 percent to 10.5 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 Schedule SCH-5. These studies indicate an ROE range of 10.4 percent to 10.6 percent. These results confirm my DCF results, which continue to demonstrate the equity

market risk aversion that is reflected in continuing volatility and relatively low stock prices for utility shares.

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 1980-2010 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 Schedule SCH-5, 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.

VI. SUMMARY OF CONCLUSIONS

Q. Please summarize your analysis.

A. My results are summarized in Table 4 below:

Table 4

Summary of Cost of Equity Estimates	
DCF Analysis	Indicated Cost
Constant Growth (Analysts' Growth)	9.9%-10.2%
Constant Growth (GDP Growth)	10.3%-10.5%
Multistage Growth Model	10.0%
DCF Range	9.9%-10.5%
Equity Risk Premium Analysis	Indicated Cost
Projected Utility Debt Yield + Equity Risk Premium Equity Risk Premium ROE (6.38% + 4.22%)	10.60%
Current Utility Debt Yield + Equity Risk Premium Equity Risk Premium ROE (6.04% + 4.36%)	10.40%
Northern Utilities Cost of Equity	10.5%

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 understates the cost of equity. From this perspective, I estimate the fair and reasonable cost of equity capital for Northern Utilities to be 10.5 percent.

Q. Does this conclude your direct testimony?

A. Yes.