UG-__ – Return on Equity

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I. Introduction

Q. Please state your name, occupation, 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. My qualifications appear at the end of my direct testimony.

Q. On whose behalf are you testifying?

A. I am testifying on behalf of Northwest Natural Gas Company (hereinafter NW Natural or the company).

II. Purpose and Summary of Testimony

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to estimate NW Natural's market required rate of return on equity (ROE).

Q. Please outline and describe the testimony you will present.

A. My testimony is divided into six sections. In Section III, I review various methods for estimating the cost of equity. In this section, I discuss comparable earnings methods, risk premium methods, and discounted cash flow (DCF) methods. In Section IV, I review general capital market costs and conditions and discuss recent developments in the gas utility industry that may affect the cost of capital. In Section V, I present the details of my cost of equity studies. In Section VI, I provide a brief summary table from my analyses and a statement of my conclusions.

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

A. My ROE recommendation is based on the multi-stage and constant growth versions of the DCF model and is confirmed by my risk premium analysis and my review of economic conditions expected to prevail over the next 12 to 18 months. I apply the multi-stage and constant growth DCF models to a conservative sample from *Value Line's* natural gas local distribution (LDC) industry. To be included in the DCF comparable group, companies were required to have at least an investment grade bond rating, to have at least 70% of revenues from regulated gas sales, and to have a consistent dividend record with no recent dividend reductions. I test my DCF results by comparing them to my risk premium analysis, which is based on *Moody's* single-A cost of utility. This is the appropriate basis for the risk premium analysis, since NW Natural's senior debt is rated single-A by both Moody's and Standard & Poor's (S&P). I also present S&P's forecasts for economic growth and for expected interest rates through 2004. S&P forecasts indicate improving economic conditions and rising interest rates. Under current economic, market, and natural gas industry conditions, I believe this combination approach is the most appropriate for estimating the fair cost of equity capital. The data sources and the details of my rate of return analysis are contained in *Exhibit No. ___ (SCH-2)*, and in my work papers, which are being filed with this testimony.

My quantitative DCF results indicate an ROE range of 10.2% to 11.3%. These results are based on historically low dividend yields for the LDCs and

relatively pessimistic analysts' growth forecasts. My risk premium analysis indicates an ROE of 10.8% and is also based on historically low utility interest rates. Because these data appear to represent historic lows in the economic cycle, especially with respect to interest rates and other capital market costs, I do not believe they should be the sole basis for setting NW Natural's rates in the present case. The combination of my quantitative results and my review of the current economic, market, and industry conditions shows that an ROE estimate of 11.0% should be used by the Company in its cost of service calculations. This estimate, slightly above the mid-point of my DCF and risk premium range, is consistent with capital market trends and projections and is a reasonable estimate of capital market costs that can be expected while the rates from this case are in effect. Given the quantitative results of my analysis, and the higher capital market costs expected to prevail as the economy improves, I believe that an 11.0% ROE is a conservative estimate of NW Natural's cost of equity capital.

III. Estimating the Cost of Equity

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. Estimating the cost of equity is fundamentally a matter of informed judgment. 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 profit or rate of return that equity investors expect to receive. In concept it 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 expect, just as interest on bonds and dividends on preferred stock are the returns that investors in those securities expect. 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 equity return is not directly observable in advance and, therefore, it must be estimated or inferred from capital market data and 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 expected dividend during the coming year is $1.00, the expected dividend yield is 5.0% ($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% to the expected total rate of return ($1.20 / $20 = 6.25%). Therefore, buying the stock at $20 per share, the investor expects a total return of 11.0%: 5.0% dividend yield, plus 6.0% price appreciation. In this example, the total expected rate of return at 11.0% 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

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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 risk and expected rate of return characteristics of other available investments as well.

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

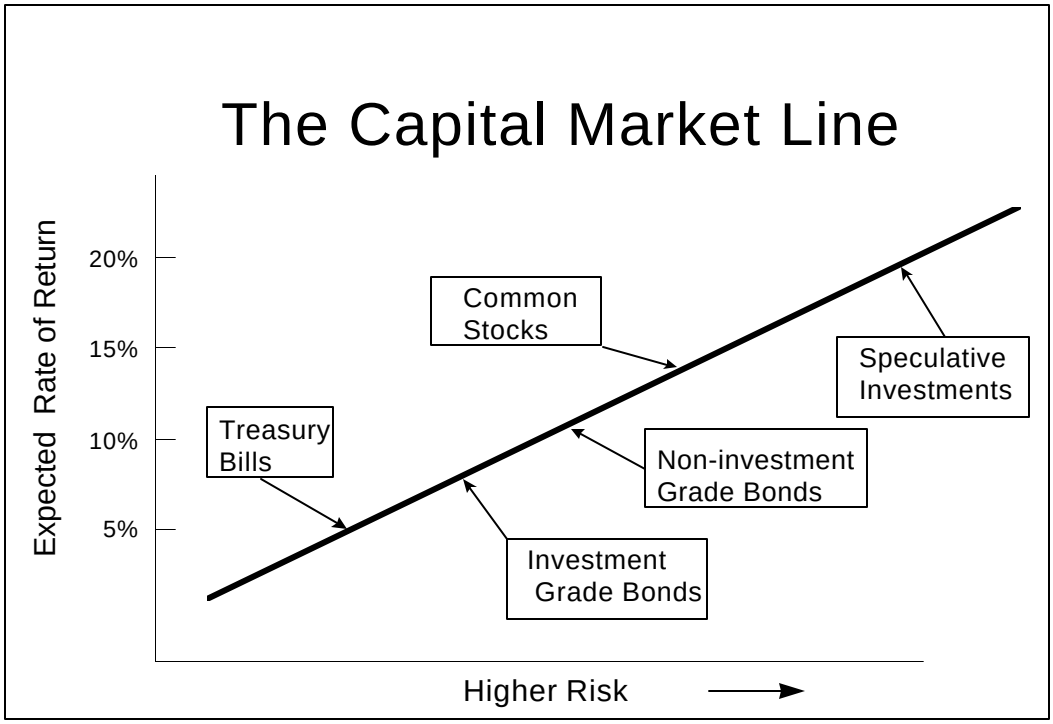
A. Risk-return tradeoffs among capital market investments have been the subject of extensive financial research. Literally dozens of textbooks and hundreds of academic articles have addressed the issue. Generally, such research confirms the common sense conclusion that investors will take additional risks only if they expect to receive a higher rate of return. Empirical tests consistently show that returns from low risk securities, such as U.S. Treasury bills, are the lowest; that returns from longer-term Treasury bonds and corporate bonds are increasingly 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 methods 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.

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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.

Farther 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 Waterworks* 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

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> 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 Waterworks & 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 should be 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. Comparable earnings methods have evolved over time. The original comparable earnings methods were based on 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 generally have been rejected 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 are not valid and, therefore, accounting-based methods generally do not provide reliable cost of equity estimates.

More recent comparable earnings methods are based on historical stock market returns rather than book accounting returns. While this approach has some merit, it too has been criticized because there can be no assurance that historical returns actually reflect current or future market requirements. Also, in practical application, earned market returns tend to fluctuate widely from year to year. For these reasons, a current cost of equity estimate (based on the DCF model or a risk premium analysis) is usually required.

The second set of estimation techniques is grouped under the heading of risk premium methods. These methods begin with currently observable market returns, such as yields on government or corporate bonds, and add an increment to account for the additional equity risk. The capital asset pricing model (CAPM) and arbitrage pricing theory (APT) model are more sophisticated risk premium approaches. The CAPM and APT methods estimate the cost of equity directly by combining the "risk-free" government bond rate with explicit risk measures to determine the risk premium required by the market. Although these methods are widely used in academic cost of capital research, their additional data requirements and their potentially questionable underlying assumptions have detracted from their use in most regulatory jurisdictions. Also, recent anomalies in the market for U.S. Treasury securities, which are used as a proxy for the

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CAPM "risk-free rate," have raised further questions about that model's current applicability. The straightforward bond yield plus risk premium approach provides a useful parallel for the DCF model, however, and it assures consistency with other capital market data in estimates of the cost of equity.

The DCF model is the most widely used approach in regulatory proceedings. Like the risk premium method, the DCF model has a sound basis in theory, and many argue that it has the additional advantage of simplicity. I will describe the DCF model in detail below, but in essence its estimate of ROE is simply the sum of the expected dividend yield and the expected long-term dividend (or price) growth rate. While dividend yields are readily available, long-term growth estimates are more difficult to obtain. Because the constant growth DCF model requires very long-term growth estimates (technically to infinity), some argue that its application is subjective and that more explicit multistage growth DCF models are preferred. In the final analysis, ROE estimates are subjective and should be based on sound, informed judgment. To accomplish this task, I apply several versions of the DCF and risk premium models, which results in an ROE range that I believe brackets the fair cost of equity capital.

Q. Please explain the DCF model.

A. The DCF model is predicated on the concept, or in fact the definition, that a stock's price represents the present value of all future cash flows expected from the stock. In the most general form, the 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 expected 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 with the difficult data requirement of estimating all future dividends.[1]

Under the additional assumption that dividends are expected to grow at a constant rate "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 be questionable, and explicit changing growth estimates may be required. Although the DCF model itself is still valid [equation (1) is mathematically correct], under the assumption of fluctuating growth the simplified form of the model must be modified to capture market expectations accurately.

Q. How is the DCF model applied when the growth rates fluctuate?

A. When growth rates are expected to fluctuate, the more general version of the model represented in equation (1) should be solved explicitly over a finite

[1] As a practical matter, the present value of dividends expected in the very distant future is typically insignificant, and operationally the DCF model can be reasonably estimated by discounting a finite dividend stream, or with the assumption that the stock will be sold for some estimated price in the foreseeable future.

"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 nonconstant growth transition period.

Under the "Market Price" version of the DCF model, 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 Market Price at the end of the transition period T. Under the assumption that constant growth resumes after the transition period, the price P_T is then expected to be based on constant growth assumptions. As with the general form of the DCF model in equation (1), in the Market Price approach the current stock price (P_0) is the present value of expected cash inflows, but the cash flows are comprised of dividends and an ultimate selling price for the stock. The estimated cost of equity, k, is just the rate of return that investors would expect if they bought the stock at today's price, held it and received dividends through the transition period (until period T), and then sold it for price P_T.

Under the "Multistage" growth DCF approach, equation (1) is 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:

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

where the variables are the same as in equation (1), but g_1 represents the growth rate for the first period, g_2 for a second period, and g_T for the period from year T (the end of the transition period) to infinity. The first two growth rates are estimates of 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.

Although less convenient for exposition purposes, the nonconstant growth models are based on the same valid capital market assumptions as the constant growth version. The nonconstant growth approach simply requires more explicit data inputs and more work to solve for the discount rate, k. Fortunately, the required data are generally available from investment and economic forecasting services, and computer algorithms can easily produce the required solutions. Both constant and nonconstant growth DCF analyses are presented 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 have priority over all claims of equity investors. The contractual interest on mortgage debt generally 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 on debt makes year-to-year returns from bonds typically more stable than capital gains and dividend payments on stocks. All these factors support the proposition that stockholders are exposed to more risk and that shareholders should reasonably expect a positive equity risk premium.

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 recent debt-equity observations should be given more weight in estimating investor requirements. There is no consensus on this issue. Since analysts cannot observe or measure investors' actual

expectations, it is not possible to know exactly how such expectations are formed or, therefore, exactly what time period is most appropriate in a risk premium analysis.

The important question to answer is the following: "What rate of return should equity investors reasonably expect relative to returns currently available from long-term bonds?" The risk premium studies and analyses 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. Estimating the cost of equity is a controversial issue in utility ratemaking. Because actual investor requirements are not directly observable, analysts have developed several methods to assist in the process. The comparable earnings method is the oldest but perhaps least reliable. Its use of accounting rates of return, or even historical market returns, may or may not reflect current investor requirements. Differences in accounting methods among companies and issues of comparability also detract from this approach.

The DCF and market-based risk premium methods are more widely accepted in regulatory practice. I believe that a combination of the DCF model and a review of risk premium data provides the most reliable approach. While the DCF model requires judgment about future growth rates, the dividend yield portion of the model is straightforward, and the model's results are generally

consistent with actual capital market behavior. For these reasons, I rely principally upon the DCF model, and I test the reasonableness of the DCF results by comparing to market-based risk premiums.

IV. Fundamental Factors That Affect the Cost of Equity Capital

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 Company-specific factors that should be reflected in the cost of equity estimate.

Q. What has been the recent experience in the U.S. capital markets?

A. *Exhibit No. ___ (SCH-2, page 1)* provides a review of annual interest rates and rates of inflation in the U.S. economy over the past ten years. During that period, inflation and capital market costs have been relatively stable and lower than prevailed in the previous decade. Inflation, as measured by the Consumer Price Index, in most years has remained at historically low levels not seen consistently since the early 1960s. Through the first half of 2003, the uneven pace of economic recovery kept consumer price increases in check and resulted in interest rates below the low rates that occurred in 1998 and early 1999. Since mid-year, interest rates have increased by about one-quarter to one-half percent, and most estimates for 2004 are for more rapid economic growth and further interest rate increases.

Exhibit No. ___ (SCH-2, page 2) provides a summary of Moody's Average Utility and Single-A Utility Bond Yields. For the most recent three months ended September 2003, Moody's Average Utility Rate and the Single-A

Utility Rate were 6.60%. This rate compares to the lowest recent Single-A Utility Rate of 6.21%, which occurred in June of this year.

Exhibit No. ___ (SCH-2, page 3) provides S&P's *Economic Trends & Projections* through 2004. The data show clear expectations for improved economic growth, with the growth rate for real Gross Domestic Product (GDP) projected at over 4.0% per year. This GDP growth rate compares to a rate of less than 2% in 2001 and only 2.4% for 2002. Consistent with these improving economic conditions, S&P also forecasts that the unemployment rate will fall below 6% and that interest rates on government and corporate bonds will rise an additional one-half to three-quarters percent from current levels. The 10-year Treasury Bond is projected to increase from its current level of 4.25% to 4.9% by the fourth quarter of 2004. Long-term Treasury Bonds and Corporate Bonds are projected to increase by a similar amount. These increasing interest rate trends offer important perspective for judging the cost capital in the present case.

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

A. *Exhibit No. ___ (SCH-__, page 4)* contains a chart showing the movement of the Dow Jones Utility Average since the beginning of 2002. During that time, the Average touched a high of 310 in April 2002, and then dropped to below 180 by October 2002. Since then, the Average has trended upward, with the current level of 252 (October 24, 2003) about 19% below the April 2002 high, but about 40% above the October 2002 low.

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Q. How has the natural gas industry changed from the past?

A. 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 15 years for local distribution companies (LDCs). 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; increased the LDCs' risk of bypass by individual customers located close to the pipelines' facilities; and fostered a pipeline rate design (*i.e.*, straight fixed variable) that has decoupled pipeline (but not LDCs') revenues associated with the recovery of fixed costs from throughput.

Q. How have these changes affected natural gas distribution companies?

A. The LDC operating environment has become more complex and more competitive, and the decision-making timeframe has been shortened - all translating into increased risk for these companies. As the complexity and competitiveness of the natural gas industry increase, these risks can be expected to increase further. In addition to the continuing effects of industry unbundling and restructuring, LDCs continue to face direct competition from alternate energy sources. LDCs recently have also experienced the negative effects on industrial demand of a slowing economy as well as warmer-than-normal weather conditions, both of which have negatively affected cash flow. Although some improvement is expected as the economy strengthens, financial results for most companies are not robust.

Q. Is NW Natural affected by these same market uncertainties and concerns?

A. Yes. To varying extents, all utilities are affected by market uncertainties and the changes affecting the energy industry. In the state of Washington, NW Natural faces continuing risk from industrial bypass; risk of loss of customers or deliveries in economically sensitive industries such as paper and computer chip manufacturing; risk of margin loss due to customers' migrations from firm to interruptible or from sales to transportation service; and the risk of significant swings in earnings due to the Company's continuing sensitivity to weather.

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

A. As I discussed previously in Section III, 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 market supply and demand forces then 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 issue more shares to raise any given amount of capital for future investment. The additional shares also impose additional future dividend requirements and reduce future earnings per share growth prospects.

Q. How have regulatory commissions responded to these changing market and industry conditions?

A. On balance, allowed rates of return have changed very little over the past five years. The following table summarizes the gas utility ROEs allowed by state regulatory commissions since 1999.

Authorized Gas Utility Equity Returns

	1999	2000	2001	2002	2003
1st Quarter	10.82%	10.71%	11.16%	10.67%	11.38%
2nd Quarter	10.82%	11.08%	10.75%	11.64%	11.36%
3rd Quarter	none	11.33%	none	11.50%	10.61%
4th Quarter	10.33%	12.50%	10.65%	10.78%	
Full Year	10.66%	11.39%	10.95%	11.03%	11.12%
Average Utility Debt Cost	7.55%	8.14%	7.72%	7.50%	6.66%
Indicated Risk Premium	3.11%	3.25%	3.23%	3.53%	4.46%

Source: *Regulatory Focus*, Regulatory Research Associates, Inc., Major Rate Case Decisions, October 8, 2003.

Although long-term interest rates, through the first half of 2003, had declined to their lowest levels since the 1960s, allowed equity returns have not changed significantly since 1999, and generally have remained near eleven percent. Equity risk premiums (the difference between allowed equity returns and utility interest rates) have ranged from 3.11% and 4.46%. As discussed previously, for the three months ended September 2003, Moody's Average Utility interest rate was 6.60%. At the low end of the risk premium range, which occurred in 1999, the indicated cost of equity based on recent utility debt costs is about 9.7% (6.60% + 3.11% = 9.71%). At the high end of the risk premium range, which

generally occurs with the lower interest rates, the indicated ROE is about 11.1% (6.60% + 4.46% = 11.06%).

V. Cost of Equity Capital for NW Natural

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 NW Natural and to discuss the details and results of my analyses.

Q. How are your studies organized?

A. In the first part of my analysis, I apply the multi-stage and constant growth DCF models to a comparable company group of natural gas distribution utilities. For inclusion in the group, I required each company to have at least an investment grade bond rating (triple-B or higher), to have at least seventy percent of its revenues from regulated gas utility sales, and to have a consistent dividend payment record with no recent dividend reductions or eliminations. Application of the minimum seventy percent regulated gas revenues filter results in a group *average* percentage of revenues from regulated gas utility sales of eighty-seven percent, which helps to assure that non-regulated activities are not a significant influence for the group. The results of my DCF analyses are shown in *Exhibit No. ___ (SCH-4)*. The DCF models indicate an ROE range of 10.2% to 11.3%.

In the second part of my analysis, I develop and review risk premium estimates of the cost of equity. I present my risk premium study in *Exhibit No. ___ (SCH-5)*. That analysis, which is based on allowed regulatory ROEs relative to contemporaneous utility debt costs, indicates a cost of equity of 10.8%.

Given current market and utility industry conditions, I believe the risk premium approach adds perspective for judging investor requirements. Based on the results of my DCF and risk premium studies, and with consideration for current market, industry, and company-specific factors appropriate for the present case, I recommend a cost of equity of 11.0%.

A. Discounted Cash Flow Analysis.

Q. What stock prices are used in your DCF analyses?

A. My analysis is based on stock prices from the most recent three months available (July - September 2003). Although in theory either average or "spot" (one-day) stock prices can be used in a DCF analysis, a reasonably current price consistent with present market conditions and with the other data employed in the analysis is most appropriate. Since the cost of equity is a current and forward-looking concept, the important issue is that the price should be representative of current market conditions and not unduly influenced by unusual or special circumstances.

To ensure that my DCF analyses are not skewed by unrepresentative initial stock prices, I calculate, in *Exhibit No. ___ (SCH-3),* the average of high and low prices for each of the three months ending September 2003 for each company in my comparable groups. I then compare the three-month average price for each company to their spot prices from the September 19, 2003 edition of *Value Line* (which is also the source of other data used in my DCF analysis). As shown in column 6 of *Exhibit No. ___ (SCH-3),* the average of the three-month stock prices is $0.41 per share lower than the *Value Line* spot prices. Given recent volatility in U.S. equities markets, a three-month average provides a

reasonable element of stability without a significant impact on the DCF results. I believe a three-month average stock price provides a reasonable balance between spot prices and longer-term averages used by some regulatory commissions.

Q. Please summarize the results of your comparable company DCF analyses.

A. I apply three versions of the DCF Model to estimate ROE. The constant growth version of the Model indicates that an ROE of 10.3% to 10.4% is appropriate. The nonconstant growth Market Price Model indicates that an ROE range of 11.0% to 11.3% is appropriate. The most conservative Two-Stage Growth Model indicates that an ROE range of 10.2% to 10.3% is appropriate. As discussed previously, based on expected further increases in market interest rates and other capital market costs, it is my judgment that the fair cost of equity should be set slightly above the midpoint of the DCF range at 11.0%.

B. Risk Premium Analysis.

Q. How is your risk premium study structured?

A. In my risk premium analysis, I compare authorized gas utility ROEs to contemporaneous long-term interest rates on utility bonds. The equity risk premium then is measured by the difference between the average authorized ROE and the average debt cost for each year. I present this calculation for the period, 1980-September 2003, in *Exhibit No. ___ (SCH-5).* The data show that risk premiums are smaller when interest rates are high and larger when interest rates are low. For example, in the early 1980s when utility interest rates exceeded fifteen percent, allowed equity risk premiums were generally less than two

percent. In more recent years, with lower interest rates, allowed regulatory risk premiums have generally been in the three- to four-percent range.

The inverse relationship between risk premiums and interest rate levels is well documented in numerous, well-respected academic studies.[2] These studies typically use regression analysis or other statistical methods to predict or measure the risk premium relationship under varying interest rate conditions. In *Exhibit No. ___ (SCH-5)*, I present a regression analysis of the allowed annual equity risk premiums relative to interest rate levels. The regression coefficient of –42.9% confirms the inverse relationship between risk premiums and interest rates and indicates that risk premiums expand and contract by about fifty-seven percent of the change in interest rates. This means that when interest rates rise by one percentage point, the cost of equity increases by only 0.57%, because the risk premium declines by about 0.43%. Similarly, when interest rates decline by one percentage point, the cost of equity declines by only 0.57%. I use the –42.9% interest rate change coefficient in conjunction with current interest rates to establish the appropriate current equity risk premium. This calculation is shown in the lower portion of my *Exhibit No. ___ (SCH-5)*. When the resulting risk premium of 4.19% is added to the recent single-A utility debt cost of 6.60%, the indicated ROE is 10.8%.

[2] See, for example, Robert S. Harris and Felicia C. Marston, "Estimating Shareholder Risk Premia Using Analysts' Growth Forecasts," Financial Management, Summer 1992.

Q. How do the results of your risk premium studies compare to levels found in other risk premium studies?

A. My risk premium estimate is lower than those often found in other risk premium studies. For example, as discussed previously on page 24, the risk premium indicated by allowed rates of return for gas utilities through the first 9 months of this year is 4.46%. Risk premiums from the most widely followed data published by Ibbotson Associates,[3] are even higher. For the period 1926-2002, the indicated arithmetic mean risk premium for common stocks versus long-term corporate bonds is six percent. Under the more conservative assumption of geometric mean compounding, the Ibbotson risk premium is 4.3%. Ibbotson argues extensively for the arithmetic mean approach as the appropriate basis for estimating the cost of equity. Even with the more conservative geometric mean risk premium, Ibbotson's data indicate a current single-A cost of equity of 11.5% (6.60% debt cost + 4.9% risk premium = 11.5%).

The Harris and Marston (H&M) study noted above also provides specific equity risk premium estimates. Using analysts' growth estimates to estimate equity returns, H&M found equity risk premiums of 6.47% relative to U.S. Government bonds and 5.13% relative to yields on corporate debt. H&M's equity risk premium relative to corporate debt indicates a current single-A cost of equity of 11.6% (6.60% debt cost + 5.13% risk premium = 11.63%).

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[3] Ibbotson Associates, *Stocks, Bonds, Bills and Inflation 2002 Yearbook.*

VI. Conclusion

Q. Please summarize the results of your cost of equity analysis.

A. The following table summarizes my results:

Summary of Cost of Equity Estimates

DCF Analysis	Indicated Cost
Constant Growth Model	11.3% - 12.1%
Multistage Growth Models	
Market Price Model	13.4% - 14.9%
Two-Stage Growth Model	11.2% - 11.7%
Judgment of DCF Range	11.2% - 12.1%
Risk Premium Analysis	
Utility Debt + Risk Premium	
Risk Premium Analysis (7.07% + 3.90%)	11.0%
Ibbotson Risk Premium Analysis	
Risk Premium (7.07% + 4.9%)	12.0%
Harris-Marston Risk Premium	
Risk Premium (7.07% + 5.13%)	12.2%
NW Natural Fair Cost of Equity Capital	11.0%

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

A. Based on my quantitative DCF and risk premium results and my review of current and projected economic conditions, I estimate the fair cost of equity capital for NW Natural at 11.0%.

VII. Qualifications

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

A. I have an economics degree from Southern Methodist University and MBA and Ph.D. degrees in finance from the University of Texas at Austin (UT Austin). I have served as an adjunct professor in the Graduate School of Business at UT Austin. I have taught economics and finance courses, and I have conducted research and directed graduate students writing in these areas. I was previously Director of the Economic Research Division at the Public Utility Commission of Texas, where I supervised the Commission's finance, economics, and accounting staff and served as the Commission's chief financial witness in electric and telephone rate cases. I have taught courses in 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 *Exhibit No. ___ (SCH-6)*.

Q. Does this conclude your direct testimony?

A. Yes, it does.

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