Carolina Water Service, Inc. of North Carolina
Docket No. W-354, Sub 344

BEFORE THE

NORTH CAROLINA UTILITIES COMMISSION

DIRECT TESTIMONY

OF

PAULINE M. AHERN, CRRA
PARTNER
SUSSEX ECONOMIC ADVISORS, LLC

ON BEHALF OF

CAROLINA WATER SERVICE, INC. OF NORTH CAROLINA

AUGUST 21, 2015

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Introduction

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

A. My name is Pauline M. Ahern. I am a Partner with Sussex Economic Advisors, LLC. My business address is 161 Worcester Road, Suite 503, Framingham, MA 01701. My mailing address is 3000 Atrium Way, Suite 241, Mount Laurel, NJ 08054.

Q. PLEASE SUMMARIZE YOUR PROFESSIONAL EXPERIENCE AND EDUCATIONAL BACKGROUND.

A. I have offered expert testimony on behalf of investor-owned utilities before twenty-nine state regulatory commissions in the United States as well as one provincial regulatory commission in Canada on rate of return issues, including but not limited to common equity cost rate, fair rate of return, capital structure issues, relative investment risk and credit quality issues. I am a graduate of Clark University, Worcester, MA, where I received a Bachelor of Arts degree with honors in Economics. I have also received a Master of Business Administration with high honors and a concentration in finance from Rutgers University.

On behalf of the American Gas Association ("A.G.A."), I calculate the A.G.A. Gas Index, which serves as the

benchmark against which the performance of the American Gas Index Fund ("AGIF") is measured monthly. The A.G.A. Gas Index and AGIF are a market capitalization weighted index and mutual fund, respectively, comprised of the common stocks of the publicly traded corporate members of the A.G.A.

I am a member of the Society of Utility and Regulatory Financial Analysts ("SURFA") where I serve on its Board of Directors, having served two terms as President, from 2006 – 2008 and 2008 – 2010. Previously, I held the position of Secretary/Treasurer from 2004 – 2006. In 1992, I was awarded the professional designation "Certified Rate of Return Analyst" ("CRRA") by SURFA, which is based upon education, experience and the successful completion of a comprehensive written examination.

I am also an associate member of the National Association of Water Companies, serving on its Finance/Accounting/Taxation and Rates and Regulation Committees; a member of the American Finance and Financial Management Associations; a member of Edison Electric Institute's Cost of Capital Working Group; and, a member of A.G.A.'s State Affairs Committee.

Purpose

Q. WHAT IS THE PURPOSE OF YOUR DIRECT TESTIMONY?

A. The purpose of my direct testimony is to provide testimony on behalf of Carolina Water Service Inc., of North Carolina ("CWSNC" or "the Company") relative to the appropriate overall rate of return, including capital structure ratios, long-term debt cost rate and the investor-required common equity cost rate which CWSNC should be afforded the opportunity to earn on its sewer jurisdictional rate base.

Q. HAVE YOU PREPARED EXHIBITS WHICH SUPPORT YOUR RECOMMENDED COMMON EQUITY COST RATE?

A. Yes. They have been marked for identification as Ahern Direct Exhibits 1 through 10.

Q. WHAT IS YOUR RECOMMENDED OVERALL RATE OF RETURN?

A. I recommend that the North Carolina Utilities Commission ("the NCUC" or "the Commission") authorize the Company the opportunity to earn an overall rate of return of 8.54% based upon the consolidated capital structure of Utilities, Inc. ("UI" or "the Parent") at December 31, 2014, which consisted of 48.99% long-term debt and 51.01% common equity, at a long-term debt cost rate of 6.60% and my recommended

common equity cost rate of 10.40%. A common equity cost rate of 10.40% results in an overall rate of return of 8.54% when applied to the common equity ratio of 51.01% as will be discussed below and as summarized on page 1 of Ahern Direct Exhibit 1.

Summary

Q. PLEASE SUMMARIZE YOUR RECOMMENDED COMMON EQUITY COST RATE.

A. My recommended common equity cost rate of 10.40% is summarized on page 3 of Ahern Direct Exhibit 1. Because CWSNC's common stock is not publicly traded, a market-based common equity cost rate cannot be directly observed for the Company. Consequently, I have assessed the market-based common equity cost rates of companies of relatively similar, but not necessarily identical, risk, i.e., a proxy group, for insight into a recommended common equity cost rate applicable to CWSNC. Using companies of relatively similar risk as proxies is consistent with the principle of fair rate of return established in the *Hope*[1] and *Bluefield*[2] cases, adding reliability to the informed expert judgment necessary to arrive at a recommended common

[1] *Federal Power Commission v. Hope Natural Gas Co.*, 320 U.S. 591 (1944).

[2] *Bluefield Water Works Improvement Co. v. Public Serv. Comm'n*, 262 U.S. 679 (1922).

equity cost rate. However, no proxy group can be selected to be identical in risk to CWSNC. Therefore, the proxy group's results must be adjusted, if necessary, to reflect the unique relative investment (financial and / or business) risk of the Company.

My recommendation results from the application of market-based cost of common equity models, the Discounted Cash Flow ("DCF") approach, the Risk Premium Model ("RPM") and the Capital Asset Pricing Model ("CAPM"), to the market data of the proxy group of eight water companies whose selection will be discussed below. In addition, I also applied the DCF, RPM and CAPM to the market data of domestic, non-price regulated companies comparable in total risk to the eight water companies.

The results derived from each are as follows:

Discounted Cash Flow Model	8.52%
Risk Premium Model	10.74
Capital Asset Pricing Model	9.41
Cost of Equity Models Applied to	
Comparable Risk, Non-Price	
Regulated Companies	10.63%
Indicated Common Equity	
Cost Rate	10.02%
Business Risk Adjustment	0.40%
Indicated Common Equity Cost Rate	10.42%
Recommended Common Equity Cost Rate	10.40%

After reviewing the cost rates based upon these models, I conclude that a common equity cost rate of 10.02% is indicated before any adjustment for CWSNC's greater business risk relative to the proxy group of eight water companies as I discuss in more detail below. Thus, the indicated common equity cost rate based upon the eight water companies needs to be adjusted upward by 0.40% to reflect CWSNC's greater business risk. After adjustment, the common equity cost rate is 10.42%, which when rounded to 10.40%, is my recommended common equity cost rate. A common equity cost rate of 10.40% is, in my opinion, reasonable, if not conservative, for CWSNC

General Principles

Q. WHAT GENERAL PRINCIPLES HAVE YOU CONSIDERED IN ARRIVING AT YOUR RECOMMENDED COMMON EQUITY COST RATE OF 10.40%?

A. In unregulated industries, the competition of the marketplace is the principal determinant of the price of products or services. For regulated public utilities, regulation must act as a substitute for marketplace competition. Assuring that the utility can fulfill its obligations to the public while providing safe and reliable service at all times requires a level of earnings sufficient to maintain the integrity of presently invested capital as well as permitting the attraction of needed new capital at a reasonable cost in competition with other firms of comparable risk. This is consistent with the fair rate of return standards established by the U.S. Supreme Court in the *Hope* and *Bluefield* cases. Consequently, marketplace data must be relied upon in assessing a common equity cost rate appropriate for ratemaking purposes. Therefore, my recommended common equity cost rate is based upon marketplace data for a proxy group of utilities as similar in risk as possible to CWSNC, based upon selection criteria that will be discussed subsequently. The use of the market data for a proxy group

adds reliability to the informed expert judgment used in arriving at a recommended common equity cost rate. Also, the use of multiple common equity cost rate models adds reliability when arriving at a recommended common equity cost rate.

Business Risk

Q. PLEASE DEFINE BUSINESS RISK AND EXPLAIN WHY IT IS IMPORTANT TO THE DETERMINATION OF A FAIR RATE OF RETURN.

A. Business risk is important to the determination of a fair rate of return because the greater the level of risk, the greater the rate of return investors demand, consistent with the basic financial principle of risk and return. Business risk is the riskiness of a company's common stock without the use of debt and/or preferred capital. Examples of the general business risks faced by all utilities, i.e., electric, natural gas distribution and water utilities, include, but are not limited to, the quality of management, the regulatory environment, customer mix and concentration of customers, service territory economic growth, capital intensity and size, all of which have a direct bearing on earnings. An individual utility may face different levels of one or more particular risks.

Q. WHAT BUSINESS RISKS DOES THE WATER UTILITY

INDUSTRY IN GENERAL FACE TODAY?

A. Water is essential to life and unlike electricity or natural gas, water is the only utility product which is intended for customers to ingest. Consequently, water quality is of paramount importance to the health and well-being of customers and is therefore subject to additional and increasingly strict health and safety regulations. Beyond health and safety concerns, water utility customers also have significant aesthetic concerns regarding the water delivered to them and regulators pay close attention to these concerns because of the strong feelings they arouse in consumers. Also, unlike many electric and natural gas utilities, water utilities serve a production function in addition to the delivery functions served by electric and gas utilities.

Water utilities obtain supply from wells, aquifers, surface water reservoirs or streams and rivers. Throughout the years, well supplies and aquifers have been environmentally threatened, with historically minor purification treatment giving way to major well rehabilitation, extensive treatment or replacement. Simultaneously, safe drinking water quality standards have tightened considerably, requiring multiple treatments prior to water delivery. Supply availability is also limited by drought, water

source overuse, runoff, threatened species and habitat protection, and other operational, political and environmental factors. In addition, the United States Environmental Protection Agency ("EPA"), as well as individual state and local environmental agencies, is continually monitoring potential contaminants in the water supply and promulgating or expanding regulations when necessary. Increasingly stringent environmental standards necessitate additional capital investment in the distribution and treatment of water, exacerbating the pressure on water utilities' free cash flows through increased capital expenditures for infrastructure, repair and replacement. In the course of procuring water supplies and treating water so that it complies with Safe Drinking Water Act ("SDWA") standards, water utilities have an ever-increasing responsibility to be stewards of the environment from which supplies are drawn, in order to preserve and protect essential natural resources of the United States.

Water utilities are typically vertically engaged in the entire process of acquisition, supply, production, treatment and distribution of water. In contrast, electric and natural gas companies, where transmission and distribution is often separate from generation, do not always produce the

electricity or natural gas which they transmit and distribute. Hence, water utilities require significant capital investment not only in distribution and transmission systems but also in sources of supply (wells), production (treatment facilities), and storage. Significant capital investment is necessary both to serve additional customers and to replace aging systems, creating a major risk facing the water utility industry.

Value Line Investment Survey ("*Value Line*")[3] observes the following about the water utility industry:

> The industry continues to face the same problems that have existed for years. Chronic under-investment in the infrastructure of water utilities in the past has resulted in most domestic investor owned and municipal systems being antiquated and in great need of repair.
>
> To bring these water systems up to par, companies are increasing their capital budgets. Since these expenditures can't be financed entirely with internal funds, the difference must be made up by issuing new debt and equity.
>
> * * * *
>
> No stock in the industry is ranked to outperform the market in the year ahead. Moreover, the recent strength in the price of most of these stocks has significantly reduced their long-term appeal.
>
> * * * *

[3] *Value Line Investment Survey*, January 16, 2015 p 1779.

> Almost no utilities generate a sufficient amount of funds internally to cover the rising capital budgets. Therefore, there should be a fair amount of new debt and equity issued in the years ahead. Since no regulated utility currently has subpar finances, as of now, we don't foresee a major deterioration in the group's balance sheet. However, most will likely be in worse shape by the end of the decade.
>
> * * *
>
> Most state commissions realize that huge sums are required to mostly replace aging pipelines networks. Therefore, they have been relatively reasonable when it comes to allowing the companies to increase their customers [sic] bills to recoup their investment.
>
> * * *
>
> Investors should understand that a harsh regulatory environment is one of the major risks that any kind of utility faces.
>
> As we mentioned earlier, these stocks have been on a remarkable run the past few months. The sharp increases in the price of the equities has removed much of the previous appeal that this group offered. Indeed, almost every water stock seems to be fully valued for both the long and short term.

In addition, because the water utility industry is more capital-intensive than the electric, combination electric and gas or natural gas utilities, the investment required to produce a dollar of revenue is greater. For example, as shown on page 1 of Ahern Direct Exhibit 2, it took $3.91 of net utility plant on average to produce $1.00 in operating

revenues in 2013 for the water utility industry as a whole. For CWSNC specifically, it took a much greater $5.39 of net utility plant to produce $1.00 in operating revenues in 2013. In contrast, for the electric, combination electric and gas and natural gas utility industries, on average it took only $2.67, $2.18 and $1.30, respectively, to produce $1.00 in operating revenues in 2013. As financing needs have increased and will continue to increase, the competition for capital from traditional sources has increased and will also continue to increase, making the need to maintain financial integrity and the ability to attract needed new capital increasingly important.

Q. WHY IS THERE AN INCREASED NEED FOR FINANCING?

A. There are a number of challenges facing the water utility industry. The National Association of Regulatory Commissioners ("NARUC") has highlighted the challenges facing the water utility industry stemming from its capital intensity. NARUC's Board of Directors adopted the following resolution in July 2013.[4]

> **WHEREAS**, There is both a constitutional basis and judicial precedent allowing investor owned public water and wastewater utilities

[4] "Resolution Supporting Consideration of Regulatory Policies Deemed as 'Best Practices'", Sponsored by the Committee on Water. Adopted by the NARUC Board of Directors, July 2013.

the opportunity to earn a rate of return that is reasonably sufficient to assure confidence in the financial soundness of the utility and its ability to provide quality service; *and*

WHEREAS, Through the *Resolution Supporting Consideration of Regulatory Policies Deemed as "Best Practices"* (2005), the National Association of Regulatory Utility Commissioners (NARUC) has previously recognized the role of innovative regulatory policies and mechanisms in the ability for public water and wastewater utilities to address significant infrastructure investment challenges facing water and wastewater system operators; *and*

* * *

WHEREAS, Recent analysis shows that as compared to other regulated utility sectors, significant and widespread discrepancies continue to be observed between commission authorized returns on equity and observed actual returns on equity among regulated water and wastewater utilities; *and*

WHEREAS, The extent of such discrepancies suggests the existence of challenges unique to the regulation of water and wastewater utilities; *and*

* * *

WHEREAS, Deficient returns present a clear challenge to the ability of the water and wastewater industry to attract the capital necessary to address future infrastructure investment requirements necessary to provide safe and reliable service, which could exceed one trillion dollars over a 20-year period; *and*

WHEREAS, The NARUC Committee on Water recognizes the critical role of the implementation and the effective use of sound regulatory practice [sic] and the innovative

> regulatory policies identified in the *Resolution Supporting Consideration of Regulatory Policies Deemed as "Best Practices"*; and
>
> * * *
>
> **RESOLVED**, That the Board of Directors of the National Association of Regulatory Utility Commissioners, convened at its 2013 Summer Meeting in Denver, Colorado, identifies the implementation and effective use of sound regulatory practice [sic] and the innovative regulatory policies identified in the *Resolution Supporting Consideration of Regulatory Policies Deemed as "Best Practices"* (2005) as a critical component of a water and/or wastewater utility's reasonable ability to earn its authorized return; and *be it further*
>
> **RESOLVED**, That NARUC recommends that economic regulators carefully consider and implement appropriate ratemaking measures as needed so that water and wastewater utilities have a reasonable opportunity to earn their authorized returns within their jurisdictions…

Q. PLEASE CONTINUE YOUR DISCUSSION OF BUSINESS RISKS.

A. Coupled with its capital-intensive nature, the water utility industry also experiences lower relative depreciation rates as well. Given that depreciation is one of the principal sources of internal cash flows for all utilities, lower depreciation rates mean that water utility depreciation as a source of internally-generated cash is far less than for electric, combination electric and gas or natural gas. Water

utility assets have longer lives and, hence, longer capital recovery periods. As such, water utilities face greater risk due to inflation which results in a higher replacement cost per dollar of net plant than for other types of utilities. As shown on page 2 of Ahern Direct Exhibit 2, water utilities experienced an average depreciation rate of 3.0% for 2013, with CWSNC experiencing a lower rate of 2.5%. In contrast, in 2013, the electric, combination electric and gas and natural gas utilities experienced average depreciation rates of 3.4%, 3.4% and 4.0%, respectively. Low depreciation rates signify that the pressure on cash flows remains significantly greater for water utilities than for other types of utilities.

Not only is the water utility industry historically capital intensive, it is expected to incur significant capital expenditure needs over the next 20 years.

In 2011, the EPA stated the following:[5]

> The survey estimated a total national infrastructure need of $384.2 billion for the 20-year period from January 2011 through December 2030.
>
> * * *
>
> The large magnitude of the national need

[5] "Fact Sheet: "EPA's 2011 Drinking Water Infrastructure Needs Survey and Assessment," United States Environmental Protection Agency, Office of Water, April 2013.

> reflects the challenges confronting water systems as they deal with an infrastructure network that has aged considerably since these systems were constructed, in many cases, 50 to 100 years ago.
>
> * * *
>
> With $247.5 billion in needs over the next 20 years, transmission and distribution projects represent the largest category of need. This result is consistent with the fact that transmission and distribution mains account for most of the nation's water infrastructure. The other categories, in descending order of need are: treatment, storage, source and a miscellaneous category of needs called "other".

Q. FROM WHERE WILL THE NECESSARY CAPITAL TO FUND THIS LEVEL OF INFRASTRUCTURE REPLACEMENT BE RAISED?

A. The question of the source of this necessary capital highlights the importance of capital attraction. Water utility capital expenditures as large as those projected by the EPA will require significant financing. The three sources typically used for financing are debt, equity (common and preferred) and cash flow. All three are intricately linked to the opportunity to earn a sufficient rate of return as well as the ability to achieve that return. Consistent with *Hope* and *Bluefield*, the return must be sufficient enough to maintain credit quality as well as enable the attraction of necessary new capital, be it debt or equity capital. If unable to raise

debt or equity capital, the utility must turn to either retained earnings or free cash flow [operating cash flow (funds from operations) minus capital expenditures], both of which are directly linked to earning a sufficient rate of return. The level of free cash flows represents the financial flexibility of a company or a company's ability to meet the needs of its debt and equity holders. As noted above, even *Value Line*[6] notes as much when it states: "Almost no utilities generate a sufficient amount of funds internally to cover the rising capital budgets. Therefore, there should be a fair amount of new debt and equity issued in the years ahead." If either retained earnings or free cash flows are inadequate, it will be nearly impossible for the utility to attract the necessary new capital, on reasonable terms, to invest in needed new infrastructure. It is thus clear that an insufficient rate of return can be financially devastating for utilities and for their customers.

In view of the foregoing, the water utility industry's high degree of capital intensity and low depreciation rates, coupled with the need for substantial infrastructure capital spending, makes the need to maintain financial integrity and the ability to attract needed new capital increasingly important in order for water utilities to be able to successfully

[6] *Value Line* 1779

meet the challenges they face.

Q. DOES A COMPANY'S SIZE HAVE A BEARING ON BUSINESS RISK?

A. Yes. Lack of sufficient company size is a significant element of business risk for which investors expect to be compensated through higher returns on their investment. Smaller companies are simply less able to cope with significant events that affect sales, revenues and earnings. For example, smaller companies face more risk exposure to business cycles and economic conditions, both nationally and locally. Additionally, the loss of revenues from a few larger customers would have a greater effect on a small company than on a much bigger company with a larger, more diverse, customer base.

Further evidence of the risk effects of size includes the fact that investors demand higher returns to compensate for the lack of marketability and liquidity of the securities of smaller firms. Moreover, it is a basic financial principle that it is the use of funds invested and not the source of those funds that gives rise to the risk of any investment.[7] Consistent with the financial principle of risk and return discussed above, such increased risk due to small size must

[7] Richard A. Brealey and Stewart C. Myers, Principles of Corporate Finance (McGraw-Hill Book Company, 1996) 204-205, 229.

be taken into account in the allowed rate of return on common equity.

Q. PLEASE DISCUSS HOW CWSNC'S SIZE INCREASES ITS BUSINESS RISK RELATIVE TO THE PROXY GROUP.

A. CWSNC is smaller than the average company in the proxy group of eight water companies based upon estimated market capitalization, providing water and wastewater service to 20,094 (water) and 12,343 (wastewater) customers in 31 counties throughout North Carolina. I will discuss this in greater detail below. For now, as shown on Ahern Direct Exhibit 10, page 1, CWSNC's estimated market capitalization of $127.613 million is lower than the average market capitalization of the proxy water group, $2.356 billion at February 27, 2015. Consequently, CWSNC has greater relative business risk because, all else being equal, size has a bearing on risk.

Since investors demand an increased return in compensation for assuming greater risk, CWSNC's greater relative business risk must be reflected in the cost of common equity derived from the market data of the less business risky proxy companies in the proxy group.

Financial Risk

Q. PLEASE DEFINE FINANCIAL RISK AND EXPLAIN WHY IT IS IMPORTANT TO THE DETERMINATION OF A FAIR RATE OF RETURN.

A. Financial risk is the additional risk created by the introduction of senior capital, i.e., debt and preferred stock, into the capital structure. The higher the proportion of senior capital in the capital structure, the higher the financial risk which must be factored into the common equity cost rate, consistent with the previously mentioned basic financial principle of risk and return, i.e., investors demand a higher common equity return as compensation for bearing higher investment risk.

Q. CAN THE COMBINED BUSINESS RISKS, I.E., INVESTMENT RISK OF AN ENTERPRISE, BE PROXIED BY BOND AND CREDIT RATINGS?

A. Yes. Similar bond/issuer credit (bond/credit) ratings reflect and are representative of similar combined business and financial risks, i.e., total risk faced by bond investors. Although specific business or financial risks may differ between companies, the same bond/credit rating indicates that the combined risks are similar, albeit not necessarily equal, as the purpose of the bond/credit rating process is to

assess credit quality or credit risk and not common equity risk. Risk distinctions within Standard & Poor's ("S&P") bond/issuer rating categories are recognized by a plus or minus, i.e., within the A category, an S&P rating can be at +, A, or A-. Similarly, risk distinctions for Moody's ratings are distinguished by numerical rating gradations, i.e., within the A category, a Moody's rating can be A1, A2 and A3. As shown on Ahern Direct Exhibit 6, page 4, the average S&P long-term issuer rating of the eight water companies is A and the average Moody's long-term issuer rating is A2/A3.

Proxy Group

Q. PLEASE EXPLAIN HOW YOU CHOSE THE PROXY GROUP OF EIGHT WATER COMPANIES.

A. I chose the proxy group by selecting those companies which meet the following criteria: 1) they are included in the *Value Line's* standard edition (January 16, 2015; 2) they have 70% or greater of 2013 total operating income derived from and 70% or greater of 2013 total assets devoted to regulated water operations; 3) at the time of the preparation of this testimony, they had not publicly announced that they were involved in any major merger or acquisition activity, i.e., one publicly-traded utility merging with or acquiring another; 4) they have not cut or omitted their common dividends

during the five years ending 2014 or through the time of the preparation of this testimony; 5) they have a *Value Line* adjusted beta; and 6) they have *Value Line*, Reuters, Zacks or Yahoo! Finance, consensus five-year earnings per share ("EPS") growth rate projections. The following eight companies met these criteria: American States Water Co., American Water Works Co., Inc., Aqua America, Inc., California Water Service Corp., Connecticut Water Service, Inc., Middlesex Water Co., SJW Corp. and York Water Co.[8]

Q. HAVE YOU REVIEWED FINANCIAL DATA FOR THE PROXY GROUP?

A. Yes. Page 1 of Ahern Direct Exhibit 3 contains comparative capitalization and financial statistics for the eight proxy group water companies for the years 2009-2013.

As shown on page 1, during the five-year period ending 2013, the historically achieved average earnings rate on book common equity for the group averaged 9.09%. The average common equity ratio based upon permanent capital (excluding short-term debt) was 50.28%, and the average dividend payout ratio was 61.54%.

Total debt outstanding as a percent of EBITDA for the years 2009-2013 ranged between 3.65 and 5.40 times,

[8] I no longer include Artesian Resources, Inc. in my water proxy group because of a continued lack of forecasted data and Artesian Resources, Inc. is not included in *Value Line*'s Standard Edition

averaging 4.43 times, while funds from operations relative to total debt range between 16.76% to 22.91%, averaging 19.50%.

Capital Structure Ratios and Long-Term Debt Cost Rate

Q. WHAT CAPITAL STRUCTURE RATIOS AND LONG-TERM DEBT COST RATE DO YOU RECOMMEND FOR USE IN DETERMINING THE OVERALL COST OF CAPITAL FOR CWSNC AND WHY?

A. I recommend that the actual consolidated capital structure ratios and embedded long-term debt cost rate of UI at December 31, 2014 be use to establish an allowed overall rate of return for CWSNC. These ratios, as well as corresponding cost rates, are shown on page 1 of Ahern Direct Exhibit 1. They consist of 48.99% long-term debt, at an embedded cost rate of 6.60%, and 51.01% common equity at my recommended common equity cost rate of 10.40%.

Q. ARE THE CONSOLIDATED PARENT CAPITAL STRUCTURE RATIOS AT DECEMBER 31, 2014 APPROPRIATE FOR RATEMAKING PURPOSES?

A. Yes. The Company's current capital structure contains 100% common equity, which is not appropriate for ratemaking purposes. Because there is no income tax

shield resulting from interest expense deduction for tax purposes, a common equity ratio of 100% would result in an unreasonably high revenue cost of capital, and consequently, higher than necessary rates for customers.

UI's capital structure ratios at December 31, 2014 are reasonable to use for ratemaking purposes for CWSNC because they are consistent if not conservative, compared with the capital structure ratios maintained, on average, by the proxy group of eight water companies upon whose market data I relied in deriving my recommended common equity cost rate of 10.40%.

Q. HOW DOES UI'S LONG-TERM DEBT RATIO OF 48.99% AT DECEMBER 31, 2014 COMPARE WITH THE LONG-TERM DEBT RATIO MAINTAINED, ON AVERAGE, BY THE PROXY GROUP?

A. UI's long-term debt ratio of 48.99% at December 31, 2014 is similar to the long-term debt ratio based upon permanent (excluding short-term debt) capital of 49.52% for the five years ending 2013 and 46.24% for 2013 as shown on page 1 of Ahern Direct Exhibit 3 and detailed by the individual proxy group companies on page 2. However, as this case progresses, I recommend that the Commission set rates for CWSNC based upon the most recently available actual

capital structure of UI.

Common Equity Cost Rate Models

Q. ARE THE COST OF COMMON EQUITY MODELS YOU USE MARKET-BASED MODELS?

A. Yes. It is important to use market-based models because the cost of common equity is a function of investors' perception of risk, which is embodied in the market prices they pay. The DCF model is market-based in that market prices are utilized in developing the dividend yield component of the model. The RPM is market-based in that the bond/issuer ratings and expected bond yields used in the application of the RPM reflect the market's assessment of bond/credit risk. Also, market prices are used in the development of the returns and equity risk premiums used in the Predictive Risk Premium Model ("PRPM"). In addition, the use of betas to determine the equity risk premium also reflects the market's assessment of market/systematic risk as betas are derived from regression analyses of market prices. The CAPM is market-based for many of the same reasons that the RPM is market-based i.e., the use of expected bond (U.S. Treasury bond) yields and betas.

Discounted Cash Flow Model ("DCF")

Q. WHAT IS THE THEORETICAL BASIS OF THE DCF MODEL?

A. The theoretical basis of the DCF model is that the present value of an expected future stream of net cash flows during the investment holding period can be determined by discounting those cash flows at the cost of capital, or the investors' capitalization rate. DCF theory indicates that an investor buys a stock for an expected total return rate, which is derived from cash flows received in the form of dividends plus appreciation in market price (the expected growth rate). Mathematically, the dividend yield on market price plus a growth rate equals the capitalization rate, i.e., the total common equity return rate expected by investors.

Q. WHICH VERSION OF THE DCF MODEL DO YOU USE?

A. I utilize the single-stage constant growth DCF model because, in my experience, it is the most widely utilized version of the DCF in public utility rate regulation. In my opinion, it is widely utilized because utilities are generally in the mature stage of their lifecycles and not transitioning from one growth stage to another.

Q. PLEASE DESCRIBE THE DIVIDEND YIELD YOU USED IN YOUR APPLICATION OF THE DCF MODEL.

A. The unadjusted dividend yields are based upon a recent (February 27, 2015) indicated dividend divided by the average of closing market prices for the 60 days ending February 27, 2015 as shown in Column [1] on page 1 of Ahern Direct Exhibit 4.

Q. PLEASE EXPLAIN THE ADJUSTED DIVIDEND YIELD SHOWN ON PAGE 1 OF AHERN DIRECT EXHIBIT 4, COLUMN [7].

A. Because dividends are paid periodically (quarterly), as opposed to continuously (daily), an adjustment must be made to the dividend yield. This is often referred to as the discrete, or the Gordon Periodic, version of the DCF model.

DCF theory calls for the use of the full growth rate, or D_1, in calculating the dividend yield component of the model. However, since the various companies in the proxy group increase their quarterly dividend at various times during the year, a reasonable assumption is to reflect one-half the annual dividend growth rate in the dividend yield component, or $D_{1/2}$. This is a conservative approach, which does not overstate the dividend yield that should be representative of the next twelve-month period. Therefore, the actual average dividend yields in Column [1] on page 1 of Ahern Direct Exhibit 4 have been adjusted upward to reflect one-half the

average projected growth rate shown in Column [6].

Q. PLEASE EXPLAIN THE BASIS OF THE GROWTH RATES OF THE PROXY GROUP THAT YOU USE IN YOUR APPLICATION OF THE DCF MODEL.

A. Ahern Direct Exhibit 5 shows that on average approximately 48% of the common shares of the eight water companies are held by individuals as opposed to institutional investors. Institutional investors tend to have more extensive informational resources than most individual investors. Individual investors, with more limited resources, are therefore likely to place great significance on the opinions expressed by financial information services, such as *Value Line*, Reuters, Zacks and Yahoo! Finance, which are easily accessible and/or available on the Internet and through public libraries. Investors realize that analysts have significant insight into the dynamics of the industries and individual companies they analyze, as well as an entity's historical and future abilities to effectively manage the effects of changing laws and regulations and ever changing economic and market conditions.

Security analysts' earnings expectations have a more significant, but not sole, influence on market prices than dividend expectations and market price appreciation or the

"growth" experienced by investors.[9] Moreover, over the long run, there can be no growth in dividends per share without growth in EPS. Thus, the use of earnings growth rates in a DCF analysis provides a better matching between investors' market price appreciation expectations and the growth rate component of the DCF.

Q. PLEASE SUMMARIZE YOUR DCF MODEL RESULTS.

A. As shown on page 1 of Ahern Direct Exhibit 4, the average result of the application of the single-stage DCF model is 8.84% while the median result is 8.52%. In arriving at a conclusion of a DCF-indicated common equity cost rate for the proxy group, I have relied upon the median result of the DCF, due to the wide range of DCF results as well as continuing volatile capital market conditions in light of the continued slow recovery of the economy, and to not give undue weight to outliers on either the high or the low side. In my opinion, the median is a more accurate and reliable measure of central tendency, and provides recognition of all the DCF results.

The Risk Premium Model ("RPM")

[9] Roger A. Morin, New Regulatory Finance (Public Utility Reports, Inc., 2006) 298-303.

Q. PLEASE DESCRIBE THE THEORETICAL BASIS OF THE RPM.

A. The RPM is based upon the basic financial principle of risk and return, namely, that investors require greater returns for bearing greater risk. The RPM recognizes that common equity capital has greater investment risk than debt capital, as common equity shareholders are last in line in any claim on an entity's assets and earnings, with debt holders being first in line. Therefore, investors require higher returns from investment in common stocks than from investment in bonds to compensate them for bearing the additional risk.

While the investor required common equity return cannot be directly determined or observed, it is possible to directly observe bond returns and yields. According to RPM theory, one can assess a common equity risk premium over bonds, either historically or prospectively, and then use that premium to derive a cost rate of common equity. In summary, according to RPM theory, the cost of common equity equals the expected cost rate for long-term debt capital plus a risk premium over that cost rate to compensate common shareholders for the added risk of being unsecured and last-in-line for any claim on a corporation's assets and earnings.

Q. PLEASE EXPLAIN HOW YOU DERIVED YOUR INDICATED COST OF COMMON EQUITY BASED UPON THE RPM.

A. I relied upon the results of the application of two risk premium methods. The first method is the Predictive Risk Premium Model (PRPM), while the second method is a risk premium model using an adjusted total market approach.

Q. PLEASE EXPLAIN THE PRPM.

A. The PRPM, published in the *Journal of Regulatory Economics (JRE)*[10] and *The Electricity Journal (TEJ)*,[11] was developed from the work of Robert F. Engle who shared the Nobel Prize in Economics in 2003 "for methods of analyzing economic time series with time-varying volatility ("ARCH")"[12] with "ARCH" standing for autoregressive conditional heteroskedasticity. In other words, the volatility of stock returns and equity risk premiums changes over time and is related from one period to the next. Engle discovered that the volatility in market prices, returns, and equity risk

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10 "A New Approach for Estimating the Equity Risk Premium for Public Utilities", Pauline M. Ahern, Frank J. Hanley and Richard A. Michelfelder, Ph.D. The Journal of Regulatory Economics (December 2011), 40:261-278.

11 "Comparative Evaluation of the Predictive Risk Premium Model™, the Discounted Cash Flow Model and the Capital Asset Pricing Model", Pauline M. Ahern, Richard A. Michelfelder, Ph.D., Rutgers University, Dylan W. D'Ascendis, and Frank J. Hanley, The Electricity Journal (May, 2013).

12 www.nobelprize.org

premiums also clusters over time, making them highly predictable and available to predict future levels of risk and risk premiums. In other words, the predicted equity risk premium is generated by the prediction of volatility (risk). The PRPM estimates the risk / return relationship directly by analyzing the actual results of investor behavior rather than using subjective judgment as to the inputs required for the application of other cost of common equity models. Thus, the PRPM is not based upon an estimate of investor behavior, but rather upon the evaluation of the actual results of that behavior, i.e., the variance of historical equity risk premiums.

The inputs to the model are the historical returns on the common shares of each utility in the proxy group minus the historical monthly yield on long-term U.S. Treasury securities through February 2015. Using a generalized form of ARCH, known as GARCH, each water utility's projected equity risk premium was determined using Eviews© statistical software. The forecasted 30-year U.S. Treasury Bond (Note) yield of 3.61% is based upon the consensus forecast for the six quarters ending with the second quarter 2016, derived from the March 1, 2015 *Blue Chip Financial Forecasts (Blue Chip)*, was averaged with the long-range

forecasts for 2016-2020 and 2021-2025 from the December 1, 2014 *Blue Chip* (shown on pages 9 and 10 of Ahern Direct Exhibit 6) as discussed below. The risk-free rate of 3.61% was then added to each company's PRPM-derived equity risk premium to arrive at a PRPM-derived cost of common equity as shown on page 2 of Ahern Direct Exhibit 6 which presents the average and median results for each proxy company. As shown on page 2, the average PRPM indicated common equity cost rate is 12.31% and the median is 11.81% for the eight water companies. Consistent with my use of the median DCF results, I rely upon the median PRPM results of 11.81%.

Q. PLEASE EXPLAIN THE ADJUSTED TOTAL MARKET APPROACH RPM.

A. The adjusted total market approach RPM adds a prospective public utility bond yield to an equity risk premium which is derived from a beta-adjusted total market equity risk premium and an equity risk premium based upon the S&P Utilities Index.

Q. PLEASE EXPLAIN THE BASIS OF THE ADJUSTED PROSPECTIVE BOND YIELD OF 4.88% APPLICABLE TO THE EIGHT WATER COMPANIES SHOWN ON PAGE 3 OF AHERN DIRECT EXHIBIT 6.

A. The first step in the adjusted total market approach RPM analysis is to determine the expected bond yield. Because both ratemaking and the cost of capital, including common equity cost rate, are prospective in nature, a prospective yield on long-term debt similarly rated to the proxy group is essential. Hence, I rely on a consensus forecast of about 50 economists of the expected yield on Aaa rated corporate bonds for the six calendar quarters ending with the second calendar quarter of 2016 as derived from the March 1, 2015 *Blue Chip* averaged with the long-range forecasts for 2016-2020 and 2021-2025 from the December 1, 2014 *Blue Chip* (shown on pages 9 and 10 of Ahern Direct Exhibit 6). As shown on Line No. 1 of page 3, the average expected yield on Moody's Aaa rated corporate bonds is 4.65%. An adjustment of 0.10% is necessary to adjust that average Aaa corporate bond yield to be equivalent to a Moody's A rated public utility bond, as shown on Line No. 2 and explained in Note 2 resulting in an expected bond yield applicable to a Moody's A rated public utility bond of 4.75% as shown on Line No. 3.

Since the eight water companies' average Moody's issuer rating is A2/A3, an adjustment of 0.13% is necessary to make the prospective bond yield applicable to the proxy

group's average A2/A3 long-term issuer rating, as detailed in Note 3 on page 3 of Ahern Direct Exhibit 6. Therefore, the adjusted prospective bond yield is 4.88% for the eight water companies as shown on Line No. 5.

Q. PLEASE EXPLAIN THE METHOD OF ESTIMATING THE EQUITY RISK PREMIUM IN THE ADJUSTED TOTAL MARKET APPROACH.

A. I evaluated the results of market equity risk premium studies based upon Ibbotson Associates' data and *Value Line's* forecasted total annual market return in excess of the prospective yield on Moody's Aaa corporate bonds, as well as two different studies of the equity risk premium for public utilities with Moody's A rated bonds as detailed on pages 8 and 11 of Ahern Direct Exhibit 6. As shown on Line No. 3, page 7 of Ahern Direct Exhibit 6, the average equity risk premium is 4.79% applicable to the eight water companies. This estimate is the result of an average of a beta-derived equity risk premium as well as the average public utility equity risk premium relative to bonds rated A by Moody's based upon holding period returns.

Q. PLEASE EXPLAIN THE BASIS OF THE BETA-DERIVED EQUITY RISK PREMIUM.

A. The basis of the beta-derived equity risk premium applicable

to the proxy group is shown on page 8 of Ahern Direct Exhibit 6. The beta-determined equity risk premium is relevant because betas are derived from the market prices of common stocks over a recent five-year period. Beta is a measure of relative risk to the market as a whole and a logical means by which to allocate an entity's/proxy group's share of the total market's equity risk premium relative to corporate bond yields.

The total market equity risk premium utilized is 6.55%, based upon an average of the long-term arithmetic mean historical market equity risk premium; a predicted market equity risk premium based upon the PRPM; a forecasted market equity risk premium based upon *Value Line's* projected market appreciation and dividend yield; and, a forecasted market equity risk based upon the S&P 500's projected market appreciation and dividend yield as detailed below and in Notes 1 through 4 on page 7 of Ahern Direct Exhibit 6.

Q. HOW DID YOU DERIVE THE LONG-TERM HISTORICAL MARKET EQUITY RISK PREMIUM?

A. To derive the historical (expectational) market equity risk premium, I used the most recent Morningstar data on holding period returns for the large company common stocks

from the Ibbotson® SBBI® 2014 Valuation Yearbook – Market Results for Stocks, Bonds, Bill and Inflation ("SBBI – 2014")[13] and the average historical yield on Moody's Aaa and Aa rated corporate bonds for the period 1926-2013. Moreover, the use of holding period returns over a very long period of time is useful because it is consistent with the long-term investment horizon presumed by the DCF model.

Consequently, as explained in Note 1 on page 8 of Ahern Direct Exhibit 6, the long-term arithmetic mean monthly total return rate on large company common stocks of 12.05% and the long-term arithmetic mean monthly yield on Moody's Aaa and Aa rated corporate bonds of 6.20% were used. As shown on Line No. 1, the resultant long-term historical equity risk premium on the market as a whole is 5.85%.

I used arithmetic mean monthly total return rates for the large company stocks and yields (income returns) for Moody's Aaa/Aa corporate bonds, because they are appropriate for cost of capital purposes as noted in the SBBI – 2014. Arithmetic mean return rates and yields are appropriate because ex-post (historical) total returns and equity risk premiums differ in size and direction over time,

[13] Ibbotson® SBBI® Valuation Yearbook – Market Results for Stocks, Bonds, Bills and Inflation, Morningstar, Inc., 2014.

providing insight into the variance and standard deviation of returns. Because the arithmetic mean captures the prospect for variance in returns and equity risk premiums, it provides the valuable insight needed by investors in estimating future risk when making a current investment. Absent such valuable insight into the potential variance of returns, investors cannot meaningfully evaluate prospective risk. If investors alternatively relied upon the geometric mean of ex-post equity risk premiums, they would have no insight into the potential variance of future returns because the geometric mean relates the change over many periods of time to a constant rate of change, thereby obviating the period-to-period fluctuations, or variance, *critical to risk analysis.*

Only the arithmetic mean takes into account all of the returns / premiums, hence, providing meaningful insight into the variance and standard deviation of those returns / premiums.

Q. PLEASE EXPLAIN THE DERIVATION OF PRPM MARKET EQUITY RISK PREMIUM.

A. The inputs to the model are the historical monthly returns on large company common stocks from SBBI – 2014 minus the monthly yields on Aaa and Aa corporate bonds during the

period from January 1926 through January 2015 (the latest available at the time of the preparation of this testimony), consistent with the rationale for using of the long-term historical arithmetic market equity risk premium discussed above. Using the previously discussed generalized form of ARCH, known as GARCH, the market's projected equity risk premium was determined using Eviews© statistical software. The resulting predicted market equity risk premium based upon the PRPM of 6.18% is shown on Line No. 2 on page 8 of Ahern Direct Exhibit 6.

Q. PLEASE EXPLAIN THE DERIVATION OF A MARKET EQUITY RISK PREMIUM BASED UPON *VALUE LINE'S* 3-5 YEAR ESTIMATED MEDIAN TOTAL ANNUAL MARKET RETURN MINUS THE PROSPECTIVE YIELD ON AAA RATED CORPORATE BONDS IN YOUR DEVELOPMENT OF A MARKET EQUITY RISK PREMIUM FOR YOUR RPM ANALYSIS.

A. Because both ratemaking and the cost of capital, including the cost rate of common equity, are prospective, a prospective market equity risk premium is essential. The derivation of the *Value Line* based forecasted or prospective market equity risk premium of 4.76% can be found in Note 3 on page 8 of Ahern Direct Exhibit 6.

Consistent with the development of the dividend yield component of my DCF analysis, it is derived from an average of the most recent thirteen weeks ending February 27, 2015 3-5 year estimated median market price appreciation potential by *Value Line* plus an average of the median estimated dividend yield for the common stocks of the approximately 1,700 firms covered in *Value Line*'s Standard Edition as explained in detail in Note 1 on page 2 of Ahern Direct Exhibit 7.

The average median expected price appreciation is 3%, which translates to a 7.39% annual appreciation and, when added to the average (similarly calculated) median dividend yield of 2.02% equates to a forecasted annual total return rate on the market as a whole of 9.41%. The forecasted total market equity risk premium of 4.76%, shown on Line No. 3, page 8 of Ahern Direct Exhibit 6, is derived by deducting the 4.65% prospective yield on Moody's Aaa rated corporate bonds discussed previously from the *Value Line*-derived projected market return of 9.41% (4.76% = 9.41% - 4.65%).

Q. PLEASE EXPLAIN THE DERIVATION OF THE MARKET EQUITY RISK PREMIUM BASED UPON THE S&P 500.

A. Using data from Bloomberg Professional Service, an

expected total return for the S&P 500 can be derived by adding the expected dividend yield for the S&P 500 to long-term growth in earnings per share as a proxy for capital appreciation. The expected total return for the S&P 500 is 14.05%. Subtracting the prospective yield on Moody's Aaa rated corporate bonds of 4.65% results in a 9.40% projected market equity risk premium.

In arriving at my conclusion of market equity risk premium of 6.55% on Line No. 4 on page 8, I averaged the historical market equity risk premium of 5.85%; the PRPM based market equity risk premium of 6.18%; the *Value Line*-based forecasted market equity risk premium of 4.76%; and the S&P 500 projected market equity risk premium of 9.40% shown on Line Nos. 1 through 4. (6.55% = ((5.85% + 6.18% + 4.76% + 9.40%) / 4).

Q. WHAT IS YOUR CONCLUSION OF A BETA-DERIVED EQUITY RISK PREMIUM FOR USE IN YOUR RPM ANALYSIS?

A. As shown on page 1 of Ahern Direct Exhibit 7, the most current average and median *Value Line* betas for the eight water companies is 0.74. Applying a median beta of 0.74 to the market equity risk premium of 6.55%, on Line No. 4 of page 8 of Ahern Direct Exhibit 6, results in a beta adjusted

equity risk premium of 4.85% for the eight water companies.

Q. HOW DID YOU DERIVE THE 4.73% EQUITY RISK PREMIUM BASED UPON THE S&P UTILITY INDEX AND MOODY'S A RATED PUBLIC UTILITY BONDS?

A. First, I derived the long-term monthly arithmetic mean equity risk premium between the S&P Utility Index total returns of 10.69% and monthly A rated public utility bond yields of 6.48% from 1928-2014 to arrive at an equity risk premium of 4.21% as shown on Line No. 3 on page 11 of Ahern Direct Exhibit 6. I then performed the PRPM using historical monthly equity risk premiums from January 1928 through February 2015 to arrive at the PRPM derived equity risk premium of 4.18% for the S&P Utility Index shown on Line No. 4, on page 11. Finally, I derived the projected total return on the S&P Utilities Index using data from Bloomberg Professional Service of 10.55%, identically to the projected total return on the S&P 500 discussed above, and subtracting the prospective Moody's A rated public utility bond yield of 4.75% from Line No. 3 on page 3 of Ahern Direct Exhibit 6. The resulting equity risk premium is 5.80%

I rely upon the average of the historical (4.21%); the PRPM (4.18%) and S&P Utilities Index (5.80%) derived equity risk premiums, which is 4.73%. (4.73% = ((4.21% +

4.18% + 5.80%) / 3).

Q. WHAT IS YOUR CONCLUSION OF AN EQUITY RISK PREMIUM FOR USE IN YOUR ADJUSTED TOTAL MARKET APPROACH RPM ANALYSIS?

A. The equity risk premium applicable to the proxy group of eight water companies is the average of the beta-derived premium, 4.85%, and that based upon the holding period returns of public utilities with Moody's A rated bonds, 4.73%, as summarized on Line No. 3 on Ahern Direct Exhibit 6, page 7, i.e., (4.79% = (4.85% + 4.73%) / 2).

Q. WHAT IS THE INDICATED RPM COMMON EQUITY COST RATE BASED UPON THE ADJUSTED TOTAL MARKET APPROACH?

A. It is 9.67% for the eight water companies as shown on Line No. 7 on Ahern Direct Exhibit 6 page 3.

Q. WHAT ARE THE RESULTS OF YOUR APPLICATION OF THE PRPM AND THE ADJUSTED TOTAL MARKET APPROACH RPM?

A. As shown on page 1 of Ahern Direct Exhibit 6, the indicated RPM-derived common equity cost rate is 10.74%, derived by averaging the PRPM results with those based upon the adjusted total market approach. (10.74% = ((11.81% + 9.67%) / 2).

The Capital Asset Pricing Model ("CAPM")

Q. PLEASE EXPLAIN THE THEORETICAL BASIS OF THE CAPM.

A. CAPM theory defines risk as the covariability of a security's returns with the market's returns as measured by beta (β). A beta less than 1.0 indicates lower variability while a beta greater than 1.0 indicates greater variability than the market.

The CAPM assumes that all other risk, i.e., all non-market or unsystematic risk, can be eliminated through diversification. The risk that cannot be eliminated through diversification is called market or systematic risk. In addition, the CAPM presumes that investors require compensation only for these systematic risks that are the result of macroeconomic and other events that affect the returns on all assets. The model is applied by adding a risk-free rate of return to a market risk premium, which is adjusted proportionately to reflect the systematic risk of the individual security relative to the total market as measured by beta. The traditional CAPM model is expressed as:

$$R_s = R_f + \beta(R_m - R_f)$$

Where:
R_s = Return rate on common stock
R_f = Risk-free rate of return
R_m = Return rate on the entire market
B = Adjusted beta

Numerous tests of the CAPM have measured the

extent to which security returns and betas are related as predicted by the CAPM confirming its validity. The empirical CAPM ("ECAPM") reflects the reality that while the results of these tests support the notion that beta is related to security returns, the empirical Security Market Line ("SML") described by the CAPM formula is not as steeply sloped as the predicted SML.[14]

In view of theory and practical research, I have applied both the traditional CAPM and the ECAPM to the companies in the proxy group and averaged the results.

Q. PLEASE DESCRIBE YOUR SELECTION OF THE BETA COEFFICIENT FOR YOUR CAPM ANALYSIS?

A. I relied upon an average of the adjusted betas published by the *Value Line* and provided by Bloomberg Professional Service.

Q. PLEASE DESCRIBE YOUR SELECTION OF A RISK-FREE RATE OF RETURN FOR YOUR CAPM ANALYSIS.

A. As shown in column [3] on page 1 of Ahern Direct Exhibit 7, the risk-free rate adopted for both applications of the CAPM is 3.61%. The risk-free rate for my CAPM analysis is based upon the average of the consensus forecast of the second calendar quarter of 2016 from the March 1, 2015 *Blue Chip*

[14] Morin 175.

averaged with the long-range forecasts for 2016-2020 and 2021-2025 from the December 1, 2014 *Blue Chip*, as shown in Note 2, page 2 of Ahern Direct Exhibit 7.

Q. WHY IS THE YIELD ON LONG-TERM U.S. TREASURY BONDS APPROPRIATE FOR USE AS THE RISK-FREE RATE?

A. The yield on long-term U.S. Treasury T-Bonds is almost risk-free and its term is consistent with the long-term cost of capital to public utilities measured by the yields on A rated public utility bonds, the long-term investment horizon inherent in utilities' common stocks, the long-term investment horizon presumed in the standard DCF model employed in regulatory ratemaking, and the long-term life of the jurisdictional rate base to which the allowed fair rate of return (i.e., cost of capital) will be applied. In contrast, short-term U.S. Treasury yields are more volatile and largely a function of Federal Reserve monetary policy.

Q. PLEASE EXPLAIN THE ESTIMATION OF THE EXPECTED EQUITY RISK PREMIUM FOR THE MARKET.

A. The basis of the market equity risk premium is explained in detail in Note 1 on page 2 of Ahern Direct Exhibit 7. It is derived from *Value Line's* 3-5 year median total market price appreciation projections averaged over the most recent

thirteen weeks ending February 27, 2015; the arithmetic mean monthly equity risk premiums of large company common stocks relative to long-term U.S. Treasury bond income yields from SBBI-2014 from 1926-2013; the PRPM predicted market equity risk premium using monthly equity risk premiums for large company common stocks relative to long-term U.S. Treasury securities from January 1926 through January 2015 (the latest available at the time of the preparation of this testimony); and the projected total return on the S&P 500 less the projected risk free rate as detailed below and in Note 1 on of Ahern Direct Exhibit 7.

The *Value Line*-derived forecasted total market equity risk premium is derived by deducting the 3.61% risk-free rate discussed above from the *Value Line* projected total annual market return of 9.41%, also discussed above, resulting in a forecasted total market equity risk premium of 5.80%.

The long-term income return on U.S. Government Securities of 5.26% was deducted from the SBBI-2014 monthly historical total market return of 12.05% resulting in an historical market equity risk premium of 6.79%.

The PRPM market equity risk premium is 6.98%, derived using the PRPM, discussed above, relative to the yields on long-term U.S. Treasury securities from January

1926 through January 2015 (the latest available at the time of the preparation of this testimony).

The S&P 500 projected market equity risk premium of 10.44% is derived by subtracting the 3.61% projected risk-free rate, discussed above, from the projected total return of 14.05%, also discussed above.

These four market equity risk premiums result in an average total market equity risk premium of 7.50%. (7.50% = ((5.80% + 6.79% + 6.98% + 10.44%) / 4)

Q. WHAT ARE THE RESULTS OF YOUR APPLICATION OF THE TRADITIONAL AND EMPIRICAL CAPM TO THE PROXY GROUP?

A. As shown on Ahern Direct Exhibit 7, page 1, the average traditional CAPM cost rate is 9.10% while the median is 9.16% for the eight water companies. The average ECAPM cost rate is 9.61%, while the median is 9.65%. Consistent with my reliance upon the median results of the DCF discussed above, I rely upon the median results of the traditional CAPM and ECAPM for the proxy group, 9.16% and 9.65%, respectively, or 9.41% as shown on column [6] on page 1 of Ahern Direct Exhibit 7. (9.41% = ((9.16% + 9.65%) / 2)

Common Equity Cost Rates for the Proxy Group of Domestic,

Non-Price Regulated Companies Based Upon the DCF, RPM and CAPM

Q. PLEASE DESCRIBE THE BASIS OF APPLYING COST OF COMMON EQUITY MODELS TO COMPARABLE RISK, NON-PRICE REGULATED COMPANIES.

A. Applying cost of common equity models to non-price regulated companies, comparable in total risk, is derived from the *"corresponding risk"* standard of the landmark cases of the U.S. Supreme Court, i.e., *Hope* and *Bluefield*, previously discussed. Therefore, it is consistent with the *Hope* doctrine that the return to the equity investor should be commensurate with returns on investments in other firms having corresponding risks based upon the fundamental economic concept of opportunity cost which maintains that the true cost of an investment is equal to the cost of the best available alternative use of the funds to be invested. The opportunity cost principle is also consistent with one of the fundamental principles upon which regulation rests: that regulation is intended to act as a surrogate for competition and to provide a fair rate of return to investors.

The first step in determining such an opportunity cost of common equity based upon a group of non-price regulated companies comparable in total risk to the eight

water companies is to choose an appropriate broad-based proxy group of non-price regulated firms comparable in total risk to the proxy group of eight water companies which excludes utilities to avoid circularity.

The selection criteria for the non-price regulated firms of comparable risk are based upon statistics derived from the market prices paid by investors. *Value Line* betas were used as a measure of systematic risk. The standard error of the regression was used as a measure of each firm's unsystematic or specific risk with the standard error of the regression reflecting the extent to which events specific to a company's operations affect its stock price. In essence, companies which have similar betas and standard errors of the regression, have similar total investment risk. Using a *Value Line* proprietary database dated December 15, 2015, the application of these criteria based upon the eight water companies results in a proxy group of non-price regulated firms comparable in total risk to the average water company in the proxy group of eight water companies as explained on page 1 of Ahern Direct Exhibit 8. Pages 3 provides the identities of the companies in the proxy group of non-price regulated companies.

Q. DID YOU CALCULATE COMMON EQUITY COST RATES

USING THE DCF, RPM AND CAPM FOR THE PROXY GROUP OF DOMESTIC, NON-PRICE REGULATED COMPANIES THAT ARE COMPARABLE IN TOTAL RISK TO THE UTILITY PROXY GROUP?

A. Yes. Because the DCF, RPM and CAPM have been applied in an identical manner as described above relative to the market data of the eight water companies, I will not repeat the details of the rationale and application of each model shown on page 1 of Ahern Direct Exhibit 9. An exception is that, in the application of the RPM, I did not use public utility-specific equity risk premiums nor apply the PRPM to the individual companies.

Page 2 of Ahern Direct Exhibit 9 contains the derivation of the DCF cost rates. As shown, the average and median DCF cost rates for the proxy group of twenty-eight non-price regulated companies comparable in total risk to the eight water companies, is 10.63%.

Pages 3 through 5 of Ahern Direct Exhibit 9 contain information relating to the 11.01% RPM cost rate for the proxy group of twenty-eight non-price regulated companies summarized on page 3. As shown on Line No. 1 of page 3, the consensus prospective yield on Moody's Baa rated corporate bonds of 5.51% is based upon the forecasted yields

for the six quarters ending with the second quarter of 2016 averaged with the long-range forecasted yields for 2016-2020 and 2021-2025 from the March 1, 2015 and December 1, 2014 *Blue Chip*, respectively. Since the twenty-eight non-price regulated companies comparable in total risk to the eight water companies have an average Moody's long-term issuer rating of Baa2 as shown on page 4 of Ahern Direct Exhibit 9, no adjustment is necessary to make the prospective bond yield applicable to the Baa corporate bond yield. Thus, the expected specific bond yield is 5.51% for the twenty-eight non-price regulated companies as shown on Line No. 1 on page 3 of Ahern Direct Exhibit 9. When the beta-adjusted risk premium of 5.50% relative to the proxy group of non-price regulated companies, as derived on page 5, is added to the prospective Baa rated corporate bond yields of 5.51%, the indicated RPM cost rate is 11.10%.

Page 6 of Ahern Direct Exhibit 9 contains the details of the application of the traditional CAPM and ECAPM to the proxy group of twenty-eight non-price regulated companies comparable in total risk to the eight water companies. As shown, the median traditional CAPM and ECAPM results are 10.17% and 10.21%, respectively, for the twenty-eight non-price regulated companies which, when averaged, result in an

indicated CAPM cost rate of 10.19%.

Q. WHAT IS YOUR CONCLUSION OF THE COST RATE OF COMMON EQUITY BASED UPON THE PROXY GROUP OF NON-PRICE REGULATED COMPANIES COMPARABLE IN TOTAL RISK TO THE EIGHT WATER COMPANIES?

A. As shown on page 1 of Ahern Direct Exhibit 9, the results of the DCF, RPM and CAPM applied to the non-price regulated group comparable in total risk to the eight water companies are 10.63%, 11.01% and 10.06%, respectively. Based upon these results, I will rely upon the median of the DCF, RPM and CAPM results of 10.63% for the proxy group of non-price regulated companies as summarized on page 1 of Ahern Direct Exhibit 9.

Conclusion of Common Equity Cost Rate

Q. WHAT IS YOUR RECOMMENDED COMMON EQUITY COST RATE?

A. It is 10.40% based upon the indicated common equity cost rate resulting from the application of multiple cost of common equity models to the eight water companies adjusted for CWSNC's business risks.

As discussed above, I employ multiple cost of common equity models as primary tools in arriving at my

recommended common equity cost rate because: 1) no single model is so inherently precise that it can be relied upon solely to the exclusion of other theoretically sound models; 2) all of the models are market-based; 3) the use of multiple models adds reliability to the estimation of the common equity cost rate; and 4) the prudence of using multiple cost of common equity models is supported in both the financial literature and regulatory precedent. Therefore, no single model should be relied upon exclusively to estimate the investor required rate of return on common equity.

The results of the cost of common equity models applied to the eight water companies are shown on page 2 of Ahern Direct Exhibit 1, and summarized below:

Discounted Cash Flow Model	8.52%
Risk Premium Model	10.74
Capital Asset Pricing Model	9.41
Cost of Equity Models Applied to Comparable Risk, Non-Price Regulated Companies	10.63%
Indicated Common Equity Cost Rate	10.02%
Business Risk Adjustment	0.40%
Indicated Common Equity Cost Rate	10.42%
Recommended Common Equity Cost Rate	10.40%

Business Risk Adjustment

Q. IS THERE A WAY TO QUANTIFY A BUSINESS RISK ADJUSTMENT DUE TO CWSNC'S SMALL SIZE RELATIVE TO THE PROXY GROUP?

A. Yes. As discussed above, increased risk due to small size must be taken into account in the cost of common equity consistent with the financial principle of risk and return. Since the Company is smaller in size relative to the proxy group, measured by the estimated market capitalization of common equity for CWSNC, whose common stock is not traded, it has greater business risk than the average company in the proxy group.

	Market Cap. (1) ($ Millions)	Times Greater than CWSNC
CWSNC	$127.613	
Proxy Group of Eight Water Cos.	2,355.800	18.5x

(1) From page 1 of Ahern Direct Exhibit 10.

As derived on page 2 of Ahern Direct Exhibit 10, CWSNC's estimated market capitalization based upon the proxy group's February 27, 2015 market-to-book ratio was $127.613 million. In contrast, the market capitalization of the average water company was $2.336 billion on February 27, 2015, or 18.5 times the size of CWSNC's market capitalization.

Therefore, it is necessary to upwardly adjust the indicated common equity cost rate of 10.02% based upon the eight water companies to reflect CWSNC's greater risk due to its smaller relative size. The determination is based upon the size premiums for decile portfolios of New York Stock Exchange (NYSE), American Stock Exchange (AMEX) and NASDAQ listed companies for the 1926-2013 period and related data from Duff & Phelps 2015 Valuation Handbook (Preview Edition). The size premium for the 6th decile (1.74%) in which the eight water companies fall has

been compared with the size premium for the 10th decile (5.78%) in which the estimated market capitalization of CWSNC falls. As shown on page 1, the size premium spread between the 10th and 6th deciles is 4.04%. In view of the foregoing, I am recommending a business risk adjustment to reflect CWSNC's greater relative business risk due to CWSNC's smaller size relative to the proxy group of 0.40%, which, in my opinion, is both reasonable and conservative.

Adding a business risk adjustment of 0.40% to the 10.02% indicated common equity cost rate based upon the eight water companies before adjustment, results in a business risk-adjusted common equity cost rate of 10.42%[15] which when rounded to 10.40% is my recommended common equity cost rate.

In my opinion, a common equity cost rate of 10.40%, which results in an overall rate of return of 8.54%, is both reasonable and conservative.

A common equity cost rate of 10.40% is consistent with the *Hope* and *Bluefield* standards of a fair and reasonable return which ensures the integrity of presently invested capital and enables the attraction of needed new

[15] 10.42% = 10.02% + 0.40%.

capital on reasonable terms. It also ensures the continued reliability and quality of service to the benefit of ratepayers. Thus, it balances the interests of both ratepayers and the Company.

Q. DOES THAT CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes.

ATTACHMENT A

RESUME OF

PAULINE M. AHERN, CRRA
PARTNER

SUSSEX ECONOMIC ADVISORS, LLC

Pauline M. Ahern, CRRA
Partner
Sussex Economic Advisors, LLC

Ms. Ahern has served as a consultant for investor-owned and municipal utilities and authorities for 27 years. As a Certified Rate of Return Analyst (CRRA), she has extensive experience in rate of return analyses, including the development of ratemaking capital structure ratios, senior capital cost rates, and the cost rate of common equity for regulated public utilities. She has testified as an expert witness before 29 regulatory commissions and one Canadian province.

She also maintains the benchmark index against which the American Gas Association's (AGA) Mutual
Fund performance is measured. Ms. Ahern has also served as President of the Society of Utility Regulatory and Financial Analysts (SURFA) from 2006-2010 and now sits on its Board of Directors. SURFA is a non-profit organization founded to promote the education and understanding of rate of return analysis which represents utility financial analysts in government, the financial community, industry and academia. She also serves on the Finance/Accounting/Taxation Committees of the National Association of Water Companies. Ms. Ahern is also a member of the Advisory Council, Financial Research Institute, University of Missouri - Robert J. Trulaske, Sr. School of Business. She is also a member of Edison Electric Institute's Cost of Capital Working Group.

PROFESSIONAL HISTORY

Sussex Economic Advisors, LLC (2015 – Present)

Partner

AUS Consultants (1988 – 2015)

Principal

- Offered testimony as an expert witness on the subjects of fair rate of return, cost of capital and related issues before state public utility commissions.
- Provided assistance and support to clients throughout the entire ratemaking litigation process; supervision of the financial analyst and administrative staff in the preparation of fair rate of return and cost of capital testimonies and exhibits which are filed along with expert testimony before various state and federal public utility regulatory bodies as well as the preparation of interrogatory responses, as well as rebuttal exhibits.
- Responsible for the production, publishing, and distribution of the AUS Utility Reports (formerly C. A. Turner Utility Reports), which has provided financial data and related ratios for about 80 public utilities (*i.e.*, electric, combination gas and electric, natural gas distribution, natural gas transmission, telephone, and water utilities, on a monthly, quarterly and annual basis) since 1930. Subscribers include utilities, many state regulatory commissions, federal agencies, individuals, brokerage firms, attorneys, as well as public and academic libraries.
- Responsible for maintaining and calculating the performance of the AGA

Index, a market capitalization weighted index of the common stocks of the approximately 70 corporate members of the AGA, which serves as the benchmark for the AGA Gas Utility Index Fund.

Assistant Vice President

- Prepared fair rate of return and cost of capital exhibits which were filed along with expert testimony before various state and federal public utility regulatory bodies; supporting exhibits include the determination of an appropriate ratemaking capital structure and the development of embedded cost rates of senior capital and also support the determination of a recommended return on common equity through the use of various market models, such as, but not limited to, Discounted Cash Flow analysis, Capital Asset Pricing Model and Risk Premium Methodology, as well as an assessment of the risk characteristics of the client utility.
- Assisted in the preparation of responses to any interrogatories received regarding such testimonies filed on behalf of client utilities. Following the filing of fair rate of return testimonies, assisted in the evaluation of opposition testimony in order to prepare interrogatory questions, areas of cross-examination, and rebuttal testimony and evaluated and assisted in the preparation of briefs and exceptions following the hearing process.
- Submitted testimony before state public utility commissions regarding appropriate capital structure ratios and fixed capital cost rates.

Senior Financial Analyst

- Supervised two analysts and assisted in the preparation of fair rate of return and cost of capital exhibits which are filed along with expert testimony before various state and federal public utility regulatory bodies; the team also assisted in the preparation of interrogatory responses.
- Evaluated the final orders and decisions of various commissions to determine whether further actions were warranted and to gain insight which assisted in the preparation of future rate of return studies.
- Assisted in the preparation of an article authored by Frank J. Hanley and A. Gerald Harris entitled "Does Diversification Increase the Cost of Equity Capital?" published in the July 15, 1991 issue of Public Utilities Fortnightly.

Administrator of Financial Analysis for AUS Utility Reports

- Oversaw the preparation of this monthly publication, as well as the accompanying annual publication, Financial Statistics - Public Utilities.

Financial Analyst

- Assisted in the preparation of fair rate of return studies including capital structure determination, development of senior capital cost rates, determination of an appropriate rate of return on equity, preparation of interrogatory responses, interrogatory questions of the opposition, areas of cross-examination and rebuttal testimony, as well as preparation of the annual publication C. A. Turner Utility Reports - Financial Statistics - Public Utilities.

Research Dept. of the Regional Economics Division of the Federal Reserve Bank of Boston (1973 – 1975)

Research Assistant

- Involved in the development and maintenance of econometric models to

simulate regional economic conditions in New England in order to study the effects of, among other things, the energy crisis of the early 1970's and property tax revaluations on the economy of New England. I was also involved in the statistical analysis and preparation of articles for the New England Economic Review. Also, I was Assistant Editor of New England Business Indicators.

Office of the Assistant Secretary for International Affairs, U.S. Treasury Department, Washington, D.C. (1972)

Research Assistant

- Developed and maintained econometric models which simulated the economy of the United States in order to study the results of various alternate foreign trade policies so that national trade policy could be formulated and recommended.

Education

M.B.A., Rutgers University, High Honors, 1991

B.A., Clark University, Honors, 1973

Designations and Professional Affiliations

Advisory Council

Financial Research Institute

University of Missouri's Trulaske School of Business

Edison Electric Institute

Cost of Capital Working Group

National Association of Water Companies

Member of the Finance/Accounting/Taxation and Rates and Regulation Committees

Society of Utility and Regulatory Financial Analysts

Member, Board of Directors – 2010-2014 President – 2006-2008 and 2008-2010

Secretary/Treasurer – 2004-2006

American Finance Association

Financial Management Association

SPEAKING ENGAGEMENTS

"Leadership in the Financial Services Sector", Guest Professor – Cost of Capital, Business Leader Development Program, Rutgers University School of Business,

February 20, 2015, Camden, NJ.

"ROE: Trends & Analysis", American Gas Association, AGA Mini-Forum for the Financial Analysts Community & Finance Committee Meeting, September 11, 2014, The Princeton Club, New York, NY.

Guest Professor, "Measuring Risk", Asset Supervision and Administration Commission of the State Council of the Peoples' Republic of China, Rutgers School of Business, July 21, 2014, New Brunswick, NJ.

Instructor, "Cost of Capital 101", EPCOR Water America, Inc., Regulatory Management Team, June 9, 2014, Phoenix, AZ.

Moderator: Society of Utility Financial Analysts: 46th Financial Forum – "The Rating Agencies' Perspectives: Regulatory Mechanisms and the Regulatory Compact", April 22-25, 2014, Indianapolis, IN.

"The Return on Equity Debate: Its Impact on Budgeting and Investment and Wall Street's View of Risk", National Association of Water Companies – 2014 Indiana Chapter Water Summit, March 13, 2014, Indianapolis, IN.

"Regulatory Training in Financing, Planning, Strategies and Accounting Issues for Publicly- and Privately-Owned Water and Wastewater Utilities", New Mexico State University Center for Public Utilities, October 13-18, 2013, Instructor (Cost of Capital).

"Regulated Utilities – Access to Capital", (panelist) - Innovation: Changing the Future of Energy, 2013 Deloitte Energy Conference, Deloitte Center for Energy Solutions, May 22, 2013, Washington, DC.

"Comparative Evaluation of the Predictive Risk Premium Model, the Discounted Cash Flow Model and the Capital Asset Pricing Model for Estimating the Cost of Common Equity", (co-presenter with Richard A. Michelfelder, Ph.D., Rutgers University) – Advanced Workshop in Regulation and Competition, 32nd Annual Eastern Conference of the Center for Research in Regulated Industries (CRRI), May 17, 2013, Rutgers University, Shawnee on the Delaware, PA.

"Decoupling: Impact on the Risk and Cost of Common Equity of Public Utility Stocks", before the Society of Utility and Regulatory Financial Analysts: 45th Financial Forum, April 17-18, 2013, Indianapolis, IN.

"Issues Surrounding the Determination of the Allowed Rate of Return", before the Staff Subcommittee on Electricity of the National Association of Regulatory Utility Commissioners, Winter 2013 Committee Meetings, February 3, 2013, Washington, DC.

"Leadership in the Financial Services Sector", Guest Professor – Cost of Capital, Business Leader Development Program, Rutgers University School of Business, February 1, 2013, Camden, NJ.

"Analyst Training in the Power and Gas Sectors", SNL Center for Financial Education, Downtown Conference Center at Pace University, New York City, December 12, 2012, Instructor (Financial Statement Analysis).

"Regulatory Training in Financing Planning, Strategies and Accounting Issues for Publicly and Privately Owned Water and Wastewater Utilities", New Mexico State University Center for Public Utilities, October 14-19, 2012, Instructor (Cost of Financial Capital).

"Application of a New Risk Premium Model for Estimating the Cost of Common Equity", Co-Presenter with Dylan W. D'Ascendis, CRRA, AUS Consultants, Edison Electric Institute Cost of Capital Working Group, October 3, 2012, Webinar.

"Application of a New Risk Premium Model for Estimating the Cost of Common Equity", Co-Presenter with Dylan W. D'Ascendis, CRRA, AUS Consultants, Staff Subcommittee on Accounting and Finance of the National Association of Regulatory Commissioners, September 10, 2012, St. Paul, MN.

"Analyst Training in the Power and Gas Sectors", SNL Center for Financial Education, Downtown Conference Center at Pace University, New York City, August 7, 2012, Instructor (Financial Statement Analysis).

"Advanced Regulatory Training in Financing Planning, Strategies and Accounting Issues for Publicly and Privately Owned Water and Wastewater Utilities", New Mexico State University Center for Public Utilities, May 13-17, 2012, Instructor (Cost of Financial Capital).

"A New Approach for Estimating the Equity Risk Premium Applied to Public Utilities", before the Finance and Regulatory Committees of the National Association of Water Companies, March 29, 2012, Telephonic Conference.

"A New Approach for Estimating the Equity Risk Premium Applied to Public Utilities", (co-presenter with Frank J. Hanley, Principal and Director, AUS Consultants) before the Water Committee of the National Association of Regulatory Utility Commissioners' Winter Committee Meetings, February 7, 2012, Washington, DC.

"A New Approach for Estimating the Equity Risk Premium Applied to Public Utilities", (co-presenter with Richard A. Michelfelder, Ph.D., Rutgers University and Frank J. Hanley, Principal and Director, AUS Consultants) before the Wall Street Utility Group, December 19, 2011, New York City, NY.

"Advanced Cost and Finance Issues for Water", (co-presenter with Gary D. Shambaugh, Principal & Director, AUS Consultants), 2011 Advanced Regulatory Studies Program – Ratemaking, Accounting and Economics, September 29, 2011, Kellogg Center at Michigan State University – Institute for Public Utilities, East Lansing, MI.

"Public Utility Betas and the Cost of Capital", (co-presenter with Richard A. Michelfelder, Ph.D., Rutgers University) – Advanced Workshop in Regulation and Competition, 30th Annual Eastern Conference of the Center for Research in Regulated Industries (CRRI), May 20, 2011, Rutgers University, Skytop, PA.

Moderator: Society of Utility and Regulatory Financial Analysts: 43rd Financial Forum – "Impact of Cost Recovery Mechanisms on the Perception of Public Utility Risk", April 14-15, 2011, Washington, DC.

"A New Approach for Estimating the Equity Risk Premium for Public Utilities", (co-presenter with Richard

A. Michelfelder, Ph.D., Rutgers University) – Hot Topic Hotline Webinar, December 3, 2010, Financial Research Institute of the University of Missouri.

"A New Approach for Estimating the Equity Risk Premium for Public Utilities", (co-presenter with Richard

A. Michelfelder, Ph.D., Rutgers University) before the Indiana Utility Regulatory Commission Cost of Capital Task Force, September 28, 2010, Indianapolis, IN.

Tomorrow's Cost of Capital: Cost of Capital Issues 2010, Deloitte Center for Energy Solutions, 2010 Deloitte Energy Conference, "Changing the Great Game: Climate, Customers and Capital", June 7-8, 2010, Washington, DC.

"A New Approach for Estimating the Equity Risk Premium for Public Utilities", (co-presenter with Richard

A. Michelfelder, Ph.D., Rutgers University) – Advanced Workshop in Regulation and Competition, 29th

Annual Eastern Conference of the Center for Research in Regulated Industries (CRRI), May 20, 2010, Rutgers University, Skytop, PA.

Moderator: Society of Utility and Regulatory Financial Analysts: 42nd Financial Forum – "The Changing Economic and Capital Market Environment and the Utility Industry", April 29-30, 2010, Washington, DC.

"A New Model for Estimating the Equity Risk Premium for Public Utilities" (co-presenter with Richard A. Michelfelder, Ph.D., Rutgers University) – Spring 2010 Meeting of the Staff Subcommittee on Accounting and Finance of the National Association of Regulatory Utility Commissioners, March 17, 2010,

Charleston, SC.

"New Approach to Estimating the Cost of Common Equity Capital for Public Utilities" (co-presenter with Richard A. Michelfelder, Ph.D., Rutgers University) - Advanced Workshop in Regulation and Competition, 28th Annual Eastern Conference of the Center for Research in Regulated Industries (CRRI), May 14, 2009, Rutgers University, Skytop, PA.

Moderator: Society of Utility and Regulatory Financial Analysts: 41st Financial Forum – "Estimating the Cost of Capital in Today's Economic and Capital Market Environment",

April 16-17, 2009, Washington, DC.

"Water Utility Financing: Where Does All That Cash Come From?", AWWA Pre-Conference Workshop: Water Utility Ratemaking, March 25, 2008, Atlantic City, NJ.

PAPERS

"Comparative Evaluation of the Predictive Risk Premium ModelTM, the Discounted Cash Flow Model and the Capital Asset Pricing Model", co-authored with Richard A. Michelfelder, Ph.D., Rutgers University, Dylan W. D'Ascendis, and Frank J. Hanley, The Electricity Journal, May, 2013 (forthcoming).

"A New Approach for Estimating the Equity Risk Premium for Public Utilities", co-authored with Frank J. Hanley and Richard A. Michelfelder, Ph.D., Rutgers University, The Journal of Regulatory Economics (December 2011), 40:261-278.

"Comparable Earnings: New Life for Old Precept" co-authored with Frank J. Hanley, Financial Quarterly Review, (American Gas Association), Summer 1994.

Clients Served

I have offered expert testimony before the following commissions:

Alaska
Arkansas
Arizona
British Columbia
California
Connecticut
Delaware
Florida
Hawaii
Idaho
Illinois
Indiana
Iowa
Kentucky
Louisiana
Maine
Maryland
Michigan
Missouri
Nevada
New Hampshire
New Jersey
New York
North Carolina
Ohio
Pennsylvania
Rhode Island
South Carolina
Virginia
Washington

I have sponsored testimony on fair rate of return and related issues for:

Alpena Power Company
Apple Canyon Utility Company
Applied Wastewater Management, Inc.
Aquarion Water Company
Aquarion Water Co. of New Hampshire, Inc.
Arizona Water Company
Artesian Water Company
The Atlantic City Sewerage Company
Audubon Water Company
Bermuda Water Company
Carolina Pines Utilities, Inc.
Carolina Water Service, Inc. of NC
Carolina Water Service, Inc. of SC
Chaparral City Water Company
Aqua Illinois, Inc.
Aqua New Jersey, Inc.
Aqua North Carolina, Inc.
Aqua Ohio, Inc.
Aqua Virginia, Inc.
The Columbia Water Company
The Connecticut Water Company
Consumers Illinois Water Company
Consumers Maine Water Company
Consumers New Jersey Water Company
Corix Utilities
City of DuBois, Pennsylvania
Elizabethtown Water Company
Emporium Water Company
EPCOR Water Arizona, Inc.

Fairbanks Natural Gas LLC
Greenridge Utilities, Inc.
The Borough of Hanover, PA
GTE Hawaiian Telephone Inc.
Illinois American Water Company
Indiana American Water Company
Iowa American Water Company
Jersey Central Power & Light Co.
Lake Wildwood Utilities Corp.
Land'Or Utility Company
Long Island American Water Company
Long Neck Water Company
Louisiana Water Service, Inc.
Maine Water Company
Massanutten Public Service Company
Middlesex Water Company
Missouri Gas Energy
Missouri-American Water Company
Mt. Holly Water Company
Nero Utility Services, Inc.
New Jersey Utilities Association
The Newtown Artesian Water Company
NRG Energy Center Harrisburg LLC
NRG Energy Center Pittsburgh LLC
Ohio-American Water Company
Penn Estates Utilities
Pinelands Waste Water Company
Pinelands Water Company
Pioneer Water LLC
Pittsburgh Thermal
San Gabriel Valley Water Company
San Jose Water Company
Southland Utilities, Inc.
Spring Creek Utilities, Inc.
Sussex Shores Water Company
Tega Cay Water Services, Inc.
Thames Water Americas
Tidewater Utilities, Inc.
Total Environmental Services, Inc. – Treasure Lake Water & Sewer Divisions
Transylvania Utilities, Inc.
Trigen – Philadelphia Energy Corporation
Twin Lakes Utilities, Inc.
United Utility Companies
United Water Arkansas, Inc.
United Water Arlington Hills Sewerage, Inc.
United Water Connecticut, Inc.
United Water Delaware, Inc.
United Water Great Gorge Inc./United Water Vernon Transmission, Inc.
United Water Idaho, Inc.
United Water Indiana, Inc.
United Water New Jersey, Inc.
United Water New Rochelle, Inc.
United Water New York, Inc.
United Water Owego/Nichols, Inc.
United Water Pennsylvania, Inc.
United Water Rhode Island, Inc.
United Water South County, Inc.
United Water Toms River, Inc.
United Water Vernon Sewage Inc.
United Water Virginia, Inc.
United Water West Lafayette, Inc.
United Water West Milford, Inc.
United Water Westchester,

Inc.
Utilities, Inc.
Utilities Inc. of Central Nevada
Utilities, Inc. of Florida
Utilities, Inc. of Louisiana
Utilities, Inc. of Nevada
Utilities, Inc. of Pennsylvania
Utilities, Inc. - Westgate
Utilities Services of South Carolina
Utility Center, Inc.
Valley Energy, Inc.
Water Services Corp. of Kentucky
Wellsboro Electric Company
Western Utilities, Inc.

I have sponsored testimony on generic/uniform methodologies for determining the return on common equity for:

Aquarion Water Company
The Connecticut Water Company
Corix Multi-Utility Services, Inc.
United Water Conn., Inc.
Utilities, Inc.

I have sponsored testimony on the rate of return and capital structure effects of merger and acquisition issues for:

California-American Water Co.
NJ American Water Co.

I have sponsored testimony on capital structure and senior capital cost rates for the following clients:

Alpena Power Company
Arkansas-Western Gas Company
Associated Natural Gas Company
PG Energy Inc.
United Water Delaware, Inc.
Washington Natural Gas Company

I have sponsored testimony on Distribution System Improvement Charges (DSIC):

Arizona Water Company

I have assisted in the preparation of rate of return studies on behalf of the following clients:

Algonquin Gas Transmission Company
Anadarko Petroleum Corporation
Arizona Water Company
Arkansas-Louisiana Gas Company
Arkansas Western Gas Company
Artesian Water Company
Associated Natural Gas Company
Atlantic City Electric Company
Bridgeport-Hydraulic Company
Cambridge Electric Light Company
Carolina Power & Light Company
Citizens Gas and Coke Utility
City of Vernon, CA
Columbia Gas/Gulf Transmission Cos.
Commonwealth Electric Company
Commonwealth Telephone Company
Conestoga Telephone & Telegraph Co.
Connecticut Natural Gas Corporation
Consolidated Gas Transmission Company
Consumers Power Company
CWS Systems, Inc.
Delmarva Power & Light Company
East Honolulu Community Services, Inc.
Equitable Gas Company
Equitrans, Inc.
Fairbanks Natural Gas, LLC
Florida Power & Light Company
Gary Hobart Water Company
Gasco, Inc.
Great Lakes Gas Transmission L.P.
GTE Arkansas, Inc.
GTE California, Inc.
GTE Florida, Inc.
GTE Hawaiian Telephone
GTE North, Inc.
GTE Northwest, Inc.
GTE Southwest, Inc.
Hawaiian Electric Company
Hawaiian Electric Light Company
IES Utilities Inc.
Illinois Power Company
Interstate Power Company
Interstate Power & Light Co.
Iowa Electric Light and Power Company
Iowa Southern Utilities Company
Kentucky-West Virginia Gas Company
Lockhart Power Company
Middlesex Water Company
Milwaukee Metropolitan Sewer District
Mountaineer Gas Company
National Fuel Gas Distribution Corp.
National Fuel Gas Supply Corp.
Newco Waste Systems of NJ, Inc.
New Jersey Natural Gas Company
New Jersey-American Water Company
New York-American Water Company
North Carolina Natural Gas Corp.
Northumbrian Water Company
Ohio-American Water Company
Oklahoma Natural Gas Company
Orange and Rockland Utilities
Paiute Pipeline Company
PECO Energy Company

Penn Estates Utilities, Inc.
Penn-York Energy Corporation
Pennsylvania-American Water Co.
PG Energy Inc.
Philadelphia Electric Company
Providence Gas Company
South Carolina Pipeline Company
Southwest Gas Corporation
Stamford Water Company
Tesoro Alaska Petroleum Company
Tesoro Refining & Marketing Co.
United Telephone of New Jersey
United Utility Companies
United Water Arkansas, Inc.
United Water Delaware, Inc.
United Water Idaho, Inc.
United Water Indiana, Inc.
United Water New Jersey, Inc.
United Water New York, Inc.
United Water Pennsylvania, Inc.
United Water Virginia, Inc.
United Water West Lafayette, Inc.
Utilities, Inc. of Pennsylvania
Utilities, Inc. - Westgate
Vista-United Telecommunications Corp.
Washington Gas Light Company
Washington Natural Gas Company
Washington Water Power Corporation
Waste Management of New Jersey –
Transfer Station A
Wellsboro Electric Company
Western Reserve Telephone Company
Western Utilities, Inc.
Wisconsin Power and Light Company