**STATE OF NEW HAMPSHIRE**

**BEFORE THE**

**PUBLIC UTILITIES COMMISSION**

**AQUARION WATER COMPANY OF NEW HAMPSHIRE, INC.**

**DOCKET NO. DW 12-085**

# REBUTTAL TESTIMONY

**OF**

**PAULINE M. AHERN**

March 6, 2013

Corrected
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## Introduction

**Q. Please state your name, occupation and business address.**

A. My name is Pauline M. Ahern. I am a Principal of AUS Consultants. My business address is 155 Gaither Drive, Suite A, Mt. Laurel, New Jersey 08054.

**Q. Please summarize your professional experience and educational background.**

A. I have offered expert testimony on behalf of investor-owned utilities before twenty-eight state regulatory commissions 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, credit quality issues, etc. 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. The details of my educational background, expert witness appearances, presentations I have given and articles I have co-authored are shown in Appendix A supplementing this testimony.

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 also the Publisher of AUS Utility Reports, responsible for supervising the production, publication, distribution and marketing of its reports.

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 Energy Association of Pennsylvania, formerly the Pennsylvania Gas Association; and a member of the American Finance, Financial Management and Energy Bar Associations. I am also a member of Edison Electric Institute's Cost of Capital Working Group and the Advisory Board of the Financial Research Institute of the University of Missouri.

**Purpose**

**Q. What is the purpose of this testimony?**

A. The purpose is to provide testimony on behalf of Aquarion Water Company of New Hampshire, Inc. (the Company) in rebuttal to certain aspects of the direct testimony of David C. Parcell, witness for the Towns of Hampton and North Hampton, NH (Towns). With regard to Mr. Parcell's testimony, I will address his use of a natural gas distribution proxy group, his applications of the Discounted Cash Flow Model (DCF), the Capital Asset Pricing Model (CAPM) and Comparable Earnings Model (CEM) as well as his failure to reflect both the greater financial risk inherent in the Company's requested capital structure[1] and

[1] Adopted by Mr. Parcell.

the greater risk of the Company's small size relative to Mr. Parcell's water group.

**Q. Have you prepared attachments which support your rebuttal testimony?**

A. Yes. They are Attachments PMA-1 through PMA-11.

**Review of Analysis of Witness David C. Parcell**

**Water Group Selection**

**Q. Do you have any comment upon Mr. Parcell's use of a natural gas distribution secondary proxy group in addition to the *Value Line Investment Survey* (*Value Line*) group?**

A. Yes. Mr. Parcell's use of a natural gas distribution group is inappropriate because, as discussed below, the water utility industry faces unique investment risks relative to the electric, combination electric and gas, and natural gas utility industries. Using a proxy group comprised of natural gas distribution companies for a return on common equity analysis for a water company, like the Company, even if only as a secondary group, cannot reflect water industry risk, nor the Company's specific risks, and is therefore inadequate for water utility cost of capital purposes. Therefore, I will not address the results of his analysis of that group in further detail.

**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 the riskiness of a company's common stock without the use of debt and/or preferred capital. Examples of such general business risks to all utilities, i.e., water, electric and natural gas distribution, include the quality of

management, the regulatory environment, customer mix and concentration of customers, service territory growth, capital intensity, size, and the like, which have a direct bearing on earnings.

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.

**Q. What business risks face the water industry in general?**

A. Water is essential to life and unlike electricity or natural gas, water is the only utility product which is ingested. Consequently, water quality is of paramount importance to the health and well-being of customers and is therefore subject to extensive additional strict health and safety regulations. Beyond health and safety concerns, water utility customers also have significant aesthetic concerns regarding the water delivered to them by utilities, 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, streams and rivers, or through water rights. Throughout the years, well supplies and aquifers have been environmentally threatened, with historically minor purification treatment giving way to major well rehabilitation, treatment or replacement. Simultaneously, environmental water quality standards have tightened considerably, requiring multiple treatments. Supply availability is also limited by drought, water source overuse, runoff, threatened species/habitat protection and other factors. In the course of procuring water supplies and

treating water so that it meets 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 the natural resources of the United States.

Electric and natural gas companies, where transmission and distribution is separate from generation, generally do not produce the electricity or natural gas which they transmit and distribute. In contrast, water utilities are typically vertically engaged in the entire process of acquiring supply, production, treatment and distribution of water. Hence, water utilities require significant capital investment in not only sources of supply and production (wells and treatment facilities), but also in transmission and distribution systems, both to serve additional customers and to replace aging systems, creating a major risk facing the water and wastewater utility industry.

*Value Line*[2] observes the following about the water utility industry:

> …industry conditions are likely to stiffen going forward. Although the regulatory environment ought to remain favorable, and be a big help with costs, providers will be left holding sizable tabs, nonetheless. Unfortunately, most operating in this space lack the cash balances to meet the capital requirements that loom.
>
> One of, if not the, biggest essentials to sustaining just about any life form, water demand is undeniable. As a result, demand will probably continue to grow along with the population, with the only other major determinant being weather conditions.
>
> * * *
>
> Despite the improved regulatory environment, water providers are still left holding the bill for most of the infrastructure improvements that need to be made. And that can be substantial amounts of cash in this space, given the age and conditions of many of these infrastructures. However, the majority of those operating here lack the finances to fund the improvements on their own and are forced

[2] *Value Line Investment Survey*, January 18, 2013.

> to look to outside financiers in order to meet the capital requirements. Although external financing has become commonplace, the increased shares and or debt taken on in order to finance the upgrades are eating away at profits and diluting shareholder gains.
>
> * * *
>
> The capital-intensive nature of this business, coupled with financial constraints, spell trouble for the future gains of those in this space. Indeed, maintenance costs alone are expected to cost operators hundreds of millions of dollars each year.

Consequently, because the water and wastewater industry is much 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 Attachment PMA-1, it took $3.89 of net utility plant on average to produce $1.00 in operating revenues in 2011 for the water utility industry as a whole. In contrast, for the electric, combination electric and gas and natural gas utility industries, on average it took only $2.29, $1.88 and $1.29, respectively, to produce $1.00 in operating revenues in 2011. The greater capital intensity of water utilities is not a new phenomenon as water utilities have exhibited a consistently and significantly greater capital intensity relative to electric, combination electric and gas and natural gas utilities during the ten years ended 2011, as shown on page 2 of Attachment PMA-1. As financing needs have increased over the last decade, the competition for capital from traditional sources has increased, making the need to maintain financial integrity and the ability to attract needed new capital increasingly important.

The National Association of Regulatory Commissioners (NARUC) has also highlighted the challenges facing the water and wastewater industry stemming from its capital intensity. NARUC's Board of Directors adopted the

following resolution in July 2005:[3]

> WHEREAS, To meet the challenges of the water and wastewater industry which may face a combined capital investment requirement nearing one trillion dollars over a 20-year period, the following policies and mechanisms were identified to help ensure sustainable practices in promoting needed capital investment and cost-effective rates: a) the use of prospectively relevant test years; b) the distribution system improvement charge; c) construction work in progress; d) pass-through adjustments; e) staff-assisted rate cases; f) consolidation to achieve economies of scale; g) acquisition adjustment policies to promote consolidation and elimination of non-viable systems; h) a streamlined rate case process; i) mediation and settlement procedures; j) defined timeframes for rate cases; k) integrated water resource management; l) a fair return on capital investment; *and* m) improved communications with ratepayers and stakeholders; *and*
>
> WHEREAS, Due to the massive capital investment required to meet current and future water quality and infrastructure requirements, adequately adjusting allowed equity returns to recognize industry risk in order to provide a fair return on invested capital was recognized as crucial…
>
> RESOLVED, That the National Association of Regulatory Utility Commissions (NARUC), convened in its July 2006 Summer Meetings in Austin, Texas, conceptually supports review and consideration of the innovative regulatory policies and practices identified herein as "best practices;" *and be it further*
>
> RESOLVED, That NARUC recommends that economic regulators consider and adopt as many as appropriate of the regulatory mechanisms identified herein as best practices…

The water utility industry also experiences lower relative depreciation rates. Lower depreciation rates, as one of the principal sources of internal cash flows for all utilities, 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 utilities' 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

[3] "Resolution Supporting Consideration of Regulatory Policies Deemed as 'Best Practices'", Sponsored by the Committee on Water. Adopted by the NARUC Board of Directors, July 27, 2005.

utilities. As shown on page 3 of Attachment PMA-1, water utilities experienced an average depreciation rate of 3.0% for 2011. In contrast, in 2011, the electric, combination electric and gas and natural gas experienced average depreciation rates of 3.5%, 3.5% and 3.4%, respectively.

As with capital intensity, the lower relative depreciation rates of water and wastewater utilities is not a new phenomenon. As shown on page 4 of Attachment PMA-1, water utility depreciation rates have been consistently and significantly lower than those of the electric, combination electric and gas and natural gas utilities. Such 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. Prior to the recent economic and capital market turmoil, Standard & Poor's (S&P) noted[4]:

> Standard & Poor's expects the already capital-intensive water utility industry to become even more so over the next several years. Due to the aging pipeline infrastructure and more stringent quality standards, the U.S. Environmental Protection Agency's [sic] (EPA) foresees a need for $277 billion to upgrade and maintain U.S. water utilities through 2022, with about $185 billion going toward infrastructure improvements. In addition, about $200 billion will be needed for wastewater applications, which suggests increased capital spending to be a long-term trend in this industry.
>
> In line with these trends, many companies have announced aggressive capital spending programs. Forecast capital spending primarily focuses on infrastructure replacements and growth initiatives. Over the past five years, capital spending has been equivalent to about three times its depreciation expense. However, companies are now forecasting spending to be at or

[4] Standard & Poor's, Credit Outlook For U.S. Investor-Owned Water Utilities Should Remain Stable in 2008 (January 31, 2008) 2, 4.

above four times depreciation expense over the intermediate term. However, companies in areas without these mechanisms, earnings, and cash flow could be negatively affected by the increased spending levels, which over the longer term could harm a company's overall credit profile.

Due to the high level of capital spending, U.S. investor-owned water utilities do not generate positive free cash flow. This, coupled with the forecast increase in capital spending over the intermediate term, will require additional access to capital markets. We expect rated water companies to have enough financial flexibility to gain that access. Ratings actions shouldn't result from this increased market activity because we expect companies to use a balanced financing approach, which should maintain debt near existing levels.

Specifically, the EPA states the following[5]:

The survey found that the total nationwide infrastructure need is $334.8 billion for the 20-year period from January 2007 through December 2026. With $200.8 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". The large magnitude of the national need 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.

The 2009 Report Card for America's Infrastructure[6] published by the American Society of Civil Engineers (ASCE) states:

The nation's drinking-water systems face staggering public investment needs over the next 20 years. Although America spends billions on infrastructure each year, drinking water systems face an annual shortfall of at least $11 billion in funding needed to replace aging facilities that are near the end of their useful life and to comply with existing and future federal water regulations. The shortfall does not account for any growth in the demand for water

[5] "Fact Sheet: "EPA's 2007 Drinking Water Infrastructure Needs Survey and Assessment", United States Environmental Protection Agency, Office of Water, February 2009, 1 (the most recently available).

[6] 2009 American Society of Civil Engineers, Report Card for America's Infrastructure 2009 (the most recently available).

over the next 20 years.[2] (footnote omitted)

Water utility capital expenditures as large as those projected by the EPA and ASCE 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 the *Hope* and *Bluefield*, the return must be sufficient 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, both of which are directly linked to earning a sufficient rate of return. If either is inadequate, it will be nearly impossible for the utility to invest in needed infrastructure. Since all utilities typically experience negative free cash flows, it is clear that an insufficient rate of return can be financially devastating for utilities and for their customers, the ratepayers. Page 5 of Attachment PMA-1 demonstrates that the free cash flows (funds from operations minus capital expenditures) of water utilities as a percent of total operating revenues has been consistently more negative than that of the electric, combination electric and gas and natural gas utilities for the ten years ended 2011, only showing some improvement in 2011. Magnifying the impact of water utilities' negative free cash flow position is a continued inability to achieve their authorized rate of return on common equity, as has been the case for the Company.

Consequently, as with the previously discussed capital intensity, depreciation rates and significant capital expenditures relative to net plant, the consistently and more significantly negative free cash flows relative to operating revenues of water utilities indicates greater investment risk for water utilities

relative to electric, combination electric and gas and natural gas utilities.

In view of the foregoing, it is clear that the water utility industry's high degree of capital intensity, low depreciation rates and consistently low free cash flow, coupled with the need for substantial infrastructure capital spending, requires regulatory support in the form of adequate and timely rate relief, including sufficient authorized returns on common equity as recognized by NARUC, so water utilities will be able to successfully meet the challenges they face.

**Q. Are there other indications that the water utility industry exhibits more investment risk than the electric, combination electric and gas and natural gas utility industries?**

A. Yes. Pages 6 through 12 of Attachment PMA-1 present several such indications: total debt / earnings before interest, taxes, depreciation and amortization (EBITDA); funds from operations (FFO) / total debt; funds from operations / interest coverage; before-income tax / interest coverage; market capitalization; earned returns on common equity (ROEs) and earned v. authorized ROEs for the water industry for the ten years ended 2011. The increasing proportion of total debt to EBITDA for the water utilities indicates significantly increasing and greater financial risk for water utilities, which began the most recent ten years below that of electric, combination electric and gas and natural gas utilities and is now higher.

As noted below, S&P evaluates total debt as a percentage of EBITDA and FFO as a percentage of debt in the bond / credit rating process. Page 6 of Attachment PMA-1 shows that total debt / EBITDA has risen steadily for water utilities through 2009, dropping in both 2010 and 2011. Notwithstanding the

decline in 2010 and 2011, total debt / EBITDA is now approximately the same as that for the electric utilities, but higher than that for combination electric and gas and natural gas utilities. Page 7 shows that FFO / total debt has remained in the approximately 10.00% - 20.00% range for water utilities over the decade ending 2011, rising slightly in 2011. However, FFO / total debt for combination electric and gas as well as natural gas utilities rose during the ten years, exceeding that of water utilities significantly in 2009 and dropping back somewhat in 2010 and still higher than for the water utilities in 2011. The consistently low level of FFO / total debt for the water utilities, is a further indication of the pressures upon water utility cash flows and the increased relative investment risk which the water utility industry faces.

Pages 8 and 9 of Attachment PMA-1 confirm the pressures upon both cash flows and income faced by water utilities. Page 8 shows that FFO / interest coverage for the water, electric, combination electric and gas and natural gas utilities followed a similar pattern to FFO/total debt for the ten years ended 2011. FFO interest coverage remained relative consistent for water utilities, rising and falling between approximately 2.0 and 4.0 times during the period. A similar pattern was exhibited by electric utilities. Page 9 shows that before-income tax coverage interest coverage for water utilities also remained relatively stable, between 2.50 and 3.25 times, similar to that of the electric and combination electric and gas utility groups, but significantly lower than that of the natural gas utility group for the last nine years In 2009, in all likelihood due to the “Great Recession” and the economy’s currently nascent, fragile recovery from it, before-income tax interest coverage for water, electric and combination electric and gas utilities all fell below 3.0 times, rising slightly in 2011, while

natural gas utilities continue to enjoy a significantly higher before-income tax interest coverage. Once again, the consistency and relatively low level of interest coverage ratios for water utilities are further indications of the pressures upon cash flow which water utilities face, confirming greater investment risk for water utilities relative to electric, combination electric and gas and natural gas utilities.

The market capitalization of the four groups shown on page 10 clearly indicates that the water utility group has the lowest market capitalization, and therefore, the most risk based on size relative to the other utility groups as will be discussed below.

A final indication of the relative investment risk of water utilities compared with electric, combination electric and gas and natural gas utilities, are trends in earned ROEs. Low earned ROEs relative to the other utility group reflects a decreased ability to achieve sufficient free cash flows and as stated previously, magnifies the impact of water utilities' negative free cashflow position. As shown on page 11 of Attachment PMA-1, earned returns on average for water utilities have generally been below those of electric, combination electric and gas and natural gas utilities during the ten years ended 2011. Page 12 of Attachment PMA-1 indicates that water utilities have consistently (with the exception of 2005) earned an average ROE below their average authorized ROEs. Note that at year-end 2011, authorized ROEs for the group averaged slightly below 10.00% in contrast to Mr. Parcell's 6.1% - 9.5% recommended range of common equity cost rate. Also, the March 2013 AUS Utility Report is currently reporting an average authorized ROE of 9.98% for the water group. In addition, the most recently authorized water utility ROE of which I am aware is

an ROE of 10.55% on a 50.97% common equity ratio awarded to Arizona Water Company – Eastern Group in Decision No. 73736 in Docket No. W-01445A-11-0310 on February 20, 2013.

In view of all of the foregoing, it is clear that the investment risk of water utilities has increased over the most recent ten years and that water utilities currently face greater investment risk relative to electric, combination electric and gas and natural gas utilities.

**Discounted Cash Flow Model**

**Q. Please comment upon the applicability of the DCF model in establishing a cost of common equity for the Company.**

A. As with any established cost of equity model, the extent to which the DCF is relied upon should depend upon the extent to which the cost rate results differ from those resulting from the use of other cost of common equity models. The DCF model has a tendency to mis-specify investors' required return rate when the market value of common stock differs significantly from its book value. The market-based DCF model will result in a total annual dollar return on book common equity equal to the total annual dollar return expected by investors only when market and book values are equal, but market values and book values of common stocks are rarely at unity. On average, for the years 2002-2011[7], the market values of utilities' common stocks have been well in excess of their book values as shown on page 2 of Schedule 9 of Exhibit__(DCP-1), ranging between 169% and 288% for the water group.

Mathematically, the DCF model understates investors' required return

[7] Although page 2 of Schedule 9 of Exhibit__(DCP-1) say that the last column is from 2002-2010, The averages shown are for 2002-2011.

rate when market value exceeds book value and overstates them when market value is less than book value because, in many instances, market prices reflect investors' assessments of long-range market price growth potentials (consistent with the infinite investment horizon implicit in the standard regulatory version of the DCF model) not fully reflected in analysts' shorter range forecasts of future growth for earnings per share (EPS) and dividends per share (DPS) and other accounting proxies. This indicates the need to better match market prices with investors' longer range growth expectations which are embedded in those prices. The understatement/overstatement of investors' required return rate associated with the application of the market price-based DCF model to the book value of common equity clearly illustrates why reliance upon a single common equity cost rate model should be avoided.

Thus, a mismatch results in the application of the DCF model as market prices reflect long range expectations of growth in market prices (consistent with the presumed infinite investment horizon of the standard DCF model), while the short range forecasts of growth in accounting proxies, i.e., EPS and DPS, do not reflect the full measure of growth (market price appreciation) expected in per share market value.

**Q. Please explain why a DCF-derived common equity cost rate mis-specifies investors' expected common equity cost rate when the market/book ratio is greater or less than unity (100%).**

A. Under the DCF model, the rate of return investors require is related to the price paid for a stock i.e., market prices form the basis upon which they formulate the required rate of return. However, a regulated utility is limited to earning on its net book value (depreciated original cost) rate base. As discussed previously,

market values differ from book values for many reasons unrelated to earnings. Thus, when market values differ significantly from book values, a market-based DCF cost rate applied to the book value of common equity will not accurately reflect investors' expected common equity cost rate. It will either overstate or understate investors' expected common equity cost rate.

Therefore, in an attempt to emulate investor behavior, neither the DCF nor any single common equity cost rate model should be relied upon exclusively in determining a cost rate of common equity and the results of multiple costs of common equity models should be evaluated. Moreover, the use of multiple cost of common equity models adds reliability to the estimation of the investor-required cost of common equity by moderating potentially abnormal results from any single model. In addition, the need to rely upon more than one cost of common equity model in arriving at a recommended common equity cost rate is well documented in the academic literature.[8]

**Q. Please comment upon Mr. Parcell's estimation of the growth component for his DCF analysis.**

A. In essence, without explanation, Mr. Parcell relied exclusively upon FirstCall's projected EPS growth rates to arrive at this DCF results while ignoring *Value Line*'s projected EPS growth rates, although he evaluated a multitude of historical and projected cost rates. On page 17, line 26 through page 18, line 29 of his direct testimony, Mr. Parcell discusses his use of historical growth in

[8] Roger A. Morin, New Regulatory Finance, (Public Utility Reports, Inc., 2006) 428-431.
Eugene F. Brigham and Louis C. Gapenski, Financial Management – Theory and Practice Fourth Edition, (The Dryden Press, 1985) 256.
Eugene F. Brigham and Phillip R. Daves, Intermediate Financial Management, (Thomson-Southwestern, 2007) 332-333.

earnings retention, EPS, DPS, book value per share (BVPS), projected growth in earnings retention, EPS, DPS, and BVPS as well as FirstCall security analysts' five-year projections in EPS growth. As I explain below, it is not necessary to evaluate any growth proxy except security analysts' forecasts of EPS growth because security analysts' forecasts take into account historical information as well as all current information likely to impact the future, which is critical since both cost of capital and ratemaking are prospective. In addition, Myron Gordon, who first introduced the DCF model adapted for utility ratemaking, came to recognize long after his book, The Cost of Capital to a Public Utility, was published in 1974 that the growth component of his original "Gordon Model" which relied upon the sustainable growth method had a serious limitation. Dr. Gordon, in a presentation on March 27, 1990 (some 16 years after the publication of his 1974 book), before the Institute for Quantitative Research In Finance, in Palm Beach, Florida, entitled The Pricing of Common Stocks, stated that analysts' growth rate projections were superior to the sustainable or earnings retention growth method:

> The most serious limitation of the Gordon Model is the assumption that the dividend expectation can be represented with just two parameters, D and br … We have seen that earnings and growth estimates by security analysts were found by Malkiel and Cragg to be superior to data obtained from financial statements for the explanation of variation in price among common stocks. That is, better estimates are obtained for the coefficient of the various explanatory variables. …*estimates by security analysts available from sources such as IBES are far superior to the data available to Malkiel and Cragg. Secondly, the estimates by security analysts must be superior to the estimates derived solely from financial statements*. (italics added)

Also, Morin notes[9]:

[9] Morin 298.

> Because of the dominance of institutional investors and their influence on individual investors, analysts' forecasts of long-run growth rates provide a sound basis for estimating required returns. Financial analysts exert a strong influence on the expectations of many investors who do not possess the resources to make their own forecasts, that is, they are a cause of g. The accuracy of these forecasts in the sense of whether they turn out to be correct is not at issue here, as long as they reflect widely held expectations. As long as the forecasts are typical and/or influential in that they are consistent with current stock price levels, they are relevant. The use of analysts' forecasts in the DCF model is sometimes denounced on the grounds that it is difficult to forecast earnings and dividends for only one year, let alone for longer time periods. This objection is unfounded, however, because it is present investor expectations that are being priced; it is the consensus forecast that is embedded in price and therefore in required return, and not the future as it will turn out to be.
>
> . . . .
>
> Published studies in the academic literature demonstrate that growth forecasts made by security analysts represent an appropriate source of DCF growth rates, are reasonable indicators of investor expectations and are more accurate than forecasts based on historical growth. These studies show that investors rely on analysts' forecasts to a greater extent than on historic data only.

In addition, studies performed by Cragg and Malkiel[10] demonstrate that analysts' forecasts are superior to historical growth rate extrapolations. While some question the accuracy of analysts' forecasts of EPS growth, it does not really matter what the level of accuracy of those analysts' forecasts is well after the fact. What is important is that they influence investors and hence the market prices they pay on any given day.

Moreover, there is no empirical evidence that investors would discount or disregard analysts' estimates of growth in earnings per share. "Do Analyst

[10] John G. Cragg and Burton G. Malkiel, Expectations and the Structure of Share Prices (University of Chicago Press, 1982) Chapter 2 (Ahern Workpaper 13).

Conflicts Matter? Evidence From Stock Recommendations,"[11] provided in Attachment PMA-10, examined whether conflicts of interest with investment banking [IB] and brokerage businesses induced sell-side analysts to issue optimistic stock recommendations and whether investors were misled by such biases. They conclude on page 1 of Attachment PMA-2.

> Overall, our findings do not support the view that conflicted analysts are able to systematically mislead investors with optimistic stock recommendations.

Hence, since investors have such security analysts' EPS growth rate projections available to them, investors are aware of the accuracy of such projections and investors are aware of the literature supporting the superiority of such projections, security analysts' earnings projections including those from *Value Line* should be used in a cost of common equity analysis.

**Q. Please comment upon Mr. Parcell's calculation of his DCF results.**

A. First, Mr. Parcell used the average growth rates of all the growth rates he evaluated, historical and projected, shown in the next to last column on page 4 of Schedule 6 on Exhibit ____(DPC-1) in adjusting his water company dividend yields. Second, he added the resultant composite mean / median adjusted dividend yields to the FirstCall EPS composite mean / growth rates to derive his composite mean / median DCF results. Thus, Mr. Parcell's use of two different growth rates, one to adjust the dividend yield and one as the growth component of his DCF analysis is inconsistent. In addition, it is incorrect, in my opinion, to add a the median adjusted dividend yield to the median growth rate to derive

[11] Anup Agrawal and Mark A. Chen, "Do Analysts' Conflicts Matter? Evidence from Stock Recommendations", (Journal of Law and Economics, August 2008), Vol. 51.

a composite group median. There is a mismatch between the median adjusted dividend yield of 3.3%, which is the adjusted dividend yield for either American States Water Co. and Connecticut Water Service, Inc. and EPS growth rate of 5.0% which is Connecticut Water Service, Inc.'s FirstCall EPS growth rate.

Mr. Parcell more correctly should have used an average of the *Value Line* projected EPS growth rate and the FirstCall EPS growth rate for each water company to adjust his unadjusted water company dividend yields. Then he should have added the average of each company's *Value Line* / First Call projected EPS growth to each company's adjusted dividend yield to derive a DCF result for each company. The median of these DCF results for each company is the appropriate "composite median".

**Q. What would Mr. Parcell's DCF results have been had he correctly relied upon both *Value Line* and FirstCall's projected growth in EPS and correctly relied upon the median DCF results?**

A. As shown on page 1 of Attachment PMA-3, I have derived DCF cost rates for Mr. Parcell's water group using his dividend yields and average forecasted growth rates in EPS for each company. Focusing on the upper portion of the broad DCF range, as Mr. Parcell states he did on lines 16-17 on page 19 of his direct testimony, a range of DCF-derived common equity cost rate of 9.32% - 9.54%, with a midpoint of 9.43% is indicated for the water group. However, because this common equity cost rate range is based upon the market data of Mr. Parcell's water group, it reflects no adjustment for the specific financial and business risks of the Company which I will discuss later in this testimony.

**Capital Asset Pricing Model**

**Q. At page 20 lines 7-10 of Mr. Parcell's direct testimony, he states "…the CAPM is generally superior to the simple RP method because the CAPM specifically recognizes the risk of a particular company or industry, (*i.e.*, beta) whereas the simple RP method assumes the same COE for all companies exhibiting similar bond ratings or other characteristics." Please comment.**

A. Mr. Parcell is incorrect. In his application of the CAPM, he relies upon the yield on 20-year U.S. Treasury bonds as the risk-free rate. By definition, the yield on 20-year U.S. Treasury bonds cannot recognize the risk of a particular company or industry because it reflects the "risk" of the U.S. Government. Moreover, beta is a measure of systematic risk only. As Mr. Parcell notes on page 20, lines 24-25, "Beta is a measure of the relative volatility (or risk) of a particular stock in relation to the overall market." Thus, it does not reflect non-systematic or company-specific risks. Beta measures a small percent of the total risk of a particular company because the $R^2$ (R-Squared) or the correlation coefficients average only 0.1956 and 0.2740 for Mr. Parcell's water group, indicating that the average beta of the water group reflects only 19.56% of the total risk for the group, as shown on Attachment PMA-4. In contrast, the risk premium method relies upon the use of a company- or proxy group-specific expected bond yield. As shown on Attachment PMA-5, pages 3 through 5, Standard & Poor's (S&P) explains how and why the utility bond rating process takes into account all of the basic components of business and financial risk. In addition, a significant portion of one application of the risk premium method is derived by the use of beta to allocate a total market equity risk premium. This approach to the risk

premium analysis reflects all company-specific risk (i.e., in the company-specific bond yield plus that portion which is contained in beta), and the remainder of all risk is reflected through the use of beta in determining the applicable equity risk premium. In view of the foregoing, Mr. Parcell's comments that his CAPM is somehow superior to the risk premium method because the risk premium method is "simple" are without merit.

**Q. Please comment upon Mr. Parcell's CAPM analysis.**

A. Mr. Parcell's CAPM analysis is flawed in three respects. First, he has incorrectly relied upon an historical risk-free rate despite the fact the both ratemaking and the cost of capital are prospective. Second, he has incorrectly calculated his market equity risk premium by relying upon: actually achieved, or non-market based, rates of return on book common equity for a proxy for the market, the S&P 500; a geometric mean historical market equity risk premium; the historical total return on U.S. Treasury securities; and, not employing a prospective, or forward-looking equity risk premium. Third, he has not incorporated an empirical CAPM (ECAPM) analysis despite the fact that empirical evidence indicates that the low-beta securities earn returns higher than the CAPM predicts and high-beta securities earn less.

**Q. Please comment upon Mr. Parcell's use of historical, i.e., a recent three-month average, yields on 20-year U.S. Treasury Bonds.**

A. Mr. Parcell's use of historical yields on 20-year U.S. Treasury bonds ignores the fact that both the cost of capital and ratemaking are prospective, which Mr. Parcell acknowledges himself when he states on page 5, lines 30-31 that "the cost of capital is an opportunity cost and is prospective-looking." The cost of capital, including the cost rate of common equity, is expectational in that it

reflects investors' expectations of future capital markets, including an expectation of interest rate levels, as well as risks. In addition, ratemaking is prospective in that the rates set in this proceeding will be in effect for a period of time in the future.

As with forecasts of EPS growth rates, investors are also aware of the accuracy of past forecasts, whether for earnings or dividends growth or for interest rates. However, investors do not have prior knowledge of the accuracy of the forecasts available to them at the time they make their investment decisions. The accuracy of any forecast only becomes known after some future period of time has elapsed. For example, the accuracy of the current *Blue Chip Financial Forecasts* (*Blue* Chip) January 1, 2013 consensus forecast of the 30-Year U.S. Treasury Bond of 3.60% for the six quarters ending with the second quarter 2014 (as can be gleaned from page 3 of Attachment PMA-15), cannot be known until the end of the second quarter 2014, more than one year into the future. Therefore, consistent with the efficient market hypothesis, since investors have such interest rate projections available to them and are aware of the past accuracy of such projections, current interest rate projections should not be used in cost of common equity analyses.

**Q. Please comment upon Mr. Parcell's estimation of the market equity risk premium for his CAPM analysis.**

A. Mr. Parcell's derivation of the market equity risk premium for his CAPM analysis is flawed for the following three reasons. First, he incorrectly relied upon achieved rates of return on book common equity. Second, he incorrectly relied in part upon geometric mean historical market returns. Third, he incorrectly relied upon the historical mean total return on U.S. Treasury securities. Fourth,

he did not employ a prospective equity risk premium.

**Q. Please comment upon Mr. Parcell's use of the rate of return on book common equity for the S&P 500.**

A. Mr. Parcell used the actual achieved rates of earnings on book common equity of the S&P 500 Composite for the period 1978-2011 as shown on Schedule 7 of Exhibit__(DCP-1). As discussed above, both the cost of capital and ratemaking are prospective in nature. In addition, the underlying theory of the CAPM requires the use of an expected market return. Therefore, the use of historically achieved earnings on book common equity is inconsistent with both the prospective nature of the cost of capital and ratemaking as well as with the very theory of the CAPM. In his second CAPM analysis, Mr. Parcell calculates the historical risk premium using page 32 of Ibbotson® SBBI® – 2012 Classic Yearbook – Market Results for Stocks, Bonds, Bills and Inflation – 1926-2011 (SBBI – 2012 Classic) which presents the average total return on large company stocks from 1926-2011, which are appropriately market returns – not returns on book common equity. Thus, Mr. Parcell's two CAPM analyses are a mismatch because he has mixed returns on book common equity with market returns. Moreover, in estimating the total return on the market, whether by returns on book common equity or with market returns, he did not even consider forecasted market returns. This is in total contradiction to his recognition of the need to use an expected total return (page 19, lines 23-25 of his direct testimony) and his acknowledgement that the cost of capital is prospective (page 5, lines 30-31 of his direct testimony).

**Q. Please comment upon Mr. Parcell's use of the geometric mean historical market return.**

A. At lines 13-19 on page 21 of his direct testimony, Mr. Parcell notes that he has relied upon both the arithmetic and geometric mean returns for the S&P 500 as tabulated by Morningstar, i.e., Ibbotson Associates. Only arithmetic mean return rates and yields are appropriate for cost of capital purposes because ex-post (historical) total returns and equity risk premiums differ in size and direction over time, 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 *risk* in the future when making a current investment. Absent such valuable insight into the potential variance of returns, investors cannot meaningfully evaluate prospective risk. The geometric mean of ex-post equity risk premiums provides no insight into the potential variance of future returns because the geometric mean relates the change over many periods to a constant rate of change, rather than the year-to-year fluctuations, or variance, *critical to risk analysis* and therefore has little or no value to investors seeking to measure risk. Moreover, from a statistical perspective, stock returns and equity risk premiums are randomly generated. Thus, the arithmetic mean is also expectational, as is the cost of capital and ratemaking as noted above.

The financial literature is quite clear on this point, that risk is measured by the variability of expected returns, i.e., the probability distribution of returns.[12] Pages 56 and 57 of Ibbotson® SBBI® – 2012 Valuation Yearbook – Market Results for Stocks, Bonds, Bills and Inflation – 1926-2011 (SBBI – 2012 Valuation) (see pages 9 and 10 of Attachment PMA-6) explain in detail why the arithmetic mean is the correct mean to use when estimating the cost of capital.

[12] Eugene F. Brigham, Fundamentals of Financial Management (The Dryden Press, 1989) 639.

In addition, Weston and Brigham[13] provides the standard financial textbook definition of the riskiness of an asset when they state:

> The riskiness of an asset is defined in terms of the likely variability of future returns from the asset. (emphasis added)

And Morin states[14]:

> The geometric mean answers the question of what constant return you would have to achieve in each year to have your investment growth match the return achieved by the stock market. The arithmetic mean answers the question of what growth rate is the best estimate of the future amount of money that will be produced by continually reinvesting in the stock market. It is the rate of return which, compounded over multiple periods, gives the mean of the probability distribution of ending wealth. (emphasis added)

In addition, Brealey and Myers[15] note:

> The proper uses of arithmetic and compound rates of return from past investments are often misunderstood. . . Thus the arithmetic average of the returns correctly measures the opportunity cost of capital for investments. . . *Moral*: If the cost of capital is estimated from historical returns or risk premiums, use arithmetic averages, not compound annual rates of return. (italics in original)

As previously discussed, investors gain insight into relative riskiness by analyzing expected future *variability*. This is accomplished by the use of the arithmetic mean of a distribution of returns / premiums. 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.

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[13] J. Fred Weston and Eugene F. Brigham, Essentials of Managerial Finance Third Edition (The Dryden Press, 1974) 272.

[14] Morin 133.

[15] R. A. Brealey and S. C. Myers, Principles of Corporate Finance Fifth Edition (McGraw-Hill Publications, Inc., 1996) 146-147.

**Q. Can it be demonstrated that the arithmetic mean takes into account all of the returns and therefore, that the arithmetic mean is appropriate to use when estimating the opportunity cost of capital in contrast to the geometric mean?**

A. Yes. Pages 1 through 3 of Attachment PMA-6 graphically demonstrate this. Page 1 charts the returns on large company stocks for each and every year, 1926 through 2011 from SBBI 2012 Valuation. It is clear from looking at the year-to-year variation of these returns, that stock market returns, and hence, equity risk premiums, vary.

The distribution of each and every one of those returns for the entire period from 1926 through 2012 is shown on page 2. There is a clear bell-shaped pattern to the probability distribution of returns, an indication that they are randomly generated and not serially correlated. The arithmetic mean of this distribution of returns considers each and every return in the distribution. In doing so, the arithmetic mean takes into account the standard deviation or likely variance which may be experienced in the future when estimating the rate of return based upon such historical returns. In contrast, page 3 of Attachment PMA-6 demonstrates that when the geometric mean is calculated, only two of the returns are considered, namely the initial and terminal years, which, in this case, are 1926 and 2011. Based upon only those two years, a constant rate of return is calculated by the geometric average. That constant return, graphically, is represented by a flat line, showing no year-to-year variation, over the entire 1926 to 2011 time period, which is obviously far different from reality, based upon the probability distribution of returns shown on page 2 and demonstrated on page 1.

Consequently, only the arithmetic mean takes the standard deviation of returns which is critical to risk analysis into account. The geometric mean is appropriate only when measuring historical performance and should not be used to estimate the investors required rate of return.

**Q. Please comment upon Mr. Parcell's use of the historical mean <u>total</u> return on U.S. Treasury securities.**

A. Although relying upon Morningstar's (i.e., Ibbotson & Associates) historical returns in his CAPM analysis, Mr. Parcell has ignored Ibbotson Associates' recommendations regarding the use of the <u>income</u> return and not the total return on U.S. Treasury securities in deriving an equity risk premium. As indicated on pages 55 and 56 of the <u>SBBI 2012 Valuation</u> (pages 8 and 9 of Attachment PMA-6):

> Another point to keep in mind when calculating the equity risk premium is that the income return on the appropriate-horizon Treasury security, rather than the total return, is used in the calculation. The total return is comprised of three return components: the income return, the capital appreciation return, and the reinvestment return. The income return is defined as the portion of the total return that results from a periodic cash flow or, in this case, the bond coupon payment. The capital appreciation return results from the price change of a bond over a specific period. Bond prices generally change in reaction to unexpected fluctuations in yields. Reinvestment return is the return on a given month's investment income when reinvested into the same asset class in the subsequent months of the year. The income return is thus used in the estimation of the equity risk premium because it represents the truly riskless portion of the return.[2] (footnote omitted)
>
> * * * *
>
> Anticipated changes in yields are assessed by the market and figured into the price of a bond. Future changes in yields that are not anticipated will cause the price of the bond to adjust accordingly. Price changes in bonds due to unanticipated changes in yields introduce price risk into the total return. Therefore, the total return on the bond series does not

> represent the riskless rate of return. The income return better represents the unbiased estimate of the purely riskless rate of return, since an investor can hold a bond to maturity and be entitled to the income return with no capital loss.

Hence, it is appropriate to use the income return and not the total return on long-term U.S. government bonds when calculating a market equity risk premium. Therefore, the correct derivation of the historical market equity risk premium is the difference between the arithmetic mean total return on large company common stocks of 11.8% and the arithmetic mean 1926-2011 income return on long-term government bonds of 5.2% which results in a market equity risk premium of 6.6% as derived in note 1 on page 4 of Attachment PMA-7.

**Q. Please comment upon Mr. Parcell's failure to use a prospective, or forward-looking market equity risk premium?**

A. No. As noted above, in addition to page 5, lines 30-31, Mr. Parcell clearly states on page 22, lines 15-16 of his direct testimony that, "the cost of capital is an opportunity cost: the prospective return available to investors from alternative investments of similar risk." Therefore, it is appropriate to also give weight to an expected market return. One way to do so is to use the forecasted market risk premium derived from *Value Line's* average median price appreciation potential and average median expected dividend yield 3-5 years hence of 10.62% as derived in note 1 on page 4 of Attachment PMA-7 which, when averaged with the 6.60%, properly calculated arithmetic mean historical market equity risk premium results in a market equity risk premium of 8.61%.

**Q. Please comment upon Mr. Parcell's failure to incorporate an empirical or ECAPM analysis?**

A. No. Mr. Parcell failed to consider that, although numerous tests of the CAPM

have confirmed its validity, it has been determined that the empirical Security Market Line (SML) described by the traditional CAPM is not as steeply sloped as the predicted SML.

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. However, Morin observes 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. Morin[16] states:

> With few exceptions, the empirical studies agree that … low-beta securities earn returns somewhat higher than the CAPM would predict, and high-beta securities earn less than predicted.
>
> * * *
>
> Therefore, the empirical evidence suggests that the expected return on a security is related to its risk by the following approximation:
>
> $$K = R_F + x\,\beta(R_M - R_F) + (1-x)\,\beta(R_M - R_F)$$
>
> where x is a fraction to be determined empirically. The value of x that best explains the observed relationship Return = 0.0829 + 0.0520 β is between 0.25 and 0.30. If x = 0.25, the equation becomes:
>
> $$K = R_F + 0.25(R_M - R_F) + 0.75\,\beta(R_M - R_F)$$[17]

In view of theory and practical research, both the traditional CAPM and the ECAPM should be used.

**Q. Some critics of the ECAPM model claim that using adjusted betas in a traditional CAPM amounts to using an ECAPM. Is such a claim valid?**

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[16] Morin 175.

[17] Morin 190.

A. Using adjusted betas in a CAPM analysis is not equivalent to the ECAPM. Betas are adjusted because of the general regression tendency of betas to converge toward 1.0 over time, i.e., over successive calculations of beta. As noted above, numerous studies have determined that the Security Market Line (SML) described by the CAPM formula at any given moment in time is not as steeply sloped as the predicted SML. Morin[18] states:

> Some have argued that the use of the ECAPM is inconsistent with the use of adjusted betas, such as those supplied by Value Line and Bloomberg. This is because the reason for using the ECAPM is to allow for the tendency of betas to regress toward the mean value of 1.00 over time, and, since Value Line betas are already adjusted for such trend [sic], an ECAPM analysis results in double-counting. This argument is erroneous. Fundamentally, the ECAPM is not an adjustment, increase or decrease, in beta. This is obvious from the fact that the expected return on high beta securities is actually lower than that produced by the CAPM estimate. The ECAPM is a formal recognition that the observed risk-return tradeoff is flatter than predicted by the CAPM based on myriad empirical evidence. The ECAPM and the use of adjusted betas comprised two separate features of asset pricing. Even if a company's beta is estimated accurately, the CAPM still understates the return for low-beta stocks. Even if the ECAPM is used, the return for low-beta securities is understated if the betas are understated. Referring back to Figure 6-1, the ECAPM is a return (vertical axis) adjustment and not a beta (horizontal axis) adjustment. Both adjustments are necessary.

Moreover, the slope of the Security Market Line (SML) should not be confused with beta. As Eugene F. Brigham, finance professor emeritus and the author of many financial textbooks states[19] :

> The slope of the SML reflects the degree of risk aversion in the economy – the greater the average investor's aversion to risk, then (1) the steeper is the slope of the line, (2) the greater is the risk premium for any risky asset, and (3) the higher is the required rate of return on risky assets.[12]

[18] Morin 191.

[19] Brigham and Gapenski 203.

[12]Students sometimes confuse beta with the slope of the SML. This is a mistake. As we saw earlier in connection with Figure 6-8, and as is developed further in Appendix 6A, beta does represent the slope of a line, but *not* the Security Market Line. This confusion arises partly because the SML equation is generally written, in this book and throughout the finance literature, as $k_i = R_F + b_i(k_M - R_F)$, and in this form $b_i$ looks like the slope coefficient and $(k_M - R_F)$ the variable. It would perhaps be less confusing if the second term were written $(k_M - R_F)b_i$, but this is not generally done.

Hence, the traditional CAPM understates the cost rate for common equity for companies with betas less than 1.0 and overstates the cost rate for companies with betas greater than 1.0. Consequently, Mr. Parcell erred by not employing the Empirical CAPM (ECAPM).

**Q. What would Mr. Parcell's CAPM results be had he utilized the prospective yield on long-term U.S. Treasury bonds, correctly estimated the market equity risk premium based upon arithmetic mean historical returns, including the correct income return on long-term government bonds, and a prospective market equity risk premium as well as the ECAPM?**

A. Attachment PMA-7 presents the results of the correct application of both the traditional CAPM and the ECAPM for Mr. Parcell's water group. Page 1 shows the mean / median traditional CAPM results: 10.02% / 9.78%, while page 2 shows the mean / median ECAPM results: 10.71% / 10.53%. The mean / median traditional CAPM and ECAPM results average: 10.37% / 10.16% for the water group. Focusing on the mean result as Mr. Parcell implicitly does on page 22, lines 7-8 of his direct testimony, the CAPM-derived indicated result is 10.37% for the water group. This cost rate is still understated because it does not reflect any additional risk of the Company due to its greater financial risk and small size as will be discussed below.

Clearly, then, Mr. Parcell's CAPM conclusion of 6.1% is grossly understated.

**Q. Do you have any final comments on Mr. Parcell's comments as to why his CAPM results are so low, i.e., 6.0% - 6.1%?**

A. Yes. Mr. Parcell provides two reasons for his "CAPM results" being lower than his DCF and CE results on page 26, lines 9-25 of his direct testimony. First, he states that "risk premiums are lower currently than was the case in prior years" on lines 10-11. Second, he states on lines 13-14, that "the level of interest rates on U.S. Treasury bonds (i.e., the risk free rate) has been lower in recent years."

**Q. Do you agree with Mr. Parcell that risk premiums are lower currently than in prior years.**

A. No. Relative to Mr. Parcell's first points, that risk premiums are lower currently than in prior years, Attachment PMA-8 demonstrates that the long-term market equity risk premium has actually risen since 2009[20]. Using the Predictive Risk Premium Model™ (PRPM™) to calculate market equity risk premiums based upon the returns on large company common stocks from Ibbotson® SBBI® – 2013 Valuation Yearbook – Market Results for Stocks, Bonds, Bills and Inflation – 1926-2012 (SBBI – 2013 Valuation) from January 1926 through each of the month-ends, September, 2009 – December, 2012, it is clear that the market equity risk premium has actually risen from 9.95% in September 2009 to 10.19% in December 2012 as shown on page 1 of Attachment PMA-8.

The PRPM™, which has been recently published in the *Journal of*

[20] September 2009 was the month in which the Company's was last authorized a return on common equity (9.75% in Docket No. 08-098).

*Regulatory Economics (JRE)*[21] 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)[22]" with ARCH standing for autoregressive conditional heteroskedasticity. In other words, volatility changes over time and is related from one period to the next, especially in financial markets. Engle discovered that the volatility (usually measure by variance) in prices and returns also clusters over time, is therefore highly predictable and can be used to predict future levels of risk and risk premiums. In addition, the PRPM™ is not based upon an estimate of investor behavior, but rather upon the evaluation of the results of that behavior, i.e., the variance of historical equity risk premiums. Also, in the derivation of the premiums, greater weight is given to more recent time periods, in contrast to reliance upon the geometric mean equity risk premium which gives equal weight to the first and last premiums only and the arithmetic mean premium which gives equal weight to each observed premium. Consequently, the market equity risk premiums derived using the PRPM™, shown on page 1 of Attachment PMA-8 can provide valuable and statistically robust insight into market equity risk premium levels at any given point in time.

In addition, while market equity risk premiums may have been lower in any given recent year, Mr. Parcell did not rely upon recent, short-term, market equity risk premiums in his CAPM analysis. He relied upon the long-term (1926-2011) historical total returns on both large company common stocks and long-

[21] "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.

[22] www.nobelprize.org

term government bonds from Morningstar consistent with the long-term nature of the cost of common equity. Page 2 of Attachment PMA-8 derives the market equity risk premiums based upon large company common stocks and long-term government bonds from Ibbotson Associates (Morningstar) for 1926-2009, 1926-2010, 1926-2011 and 1926-2012. Although I have previously discussed why the use of the total return on government bonds as well as geometric means are both inappropriate for cost of capital purposes, page 2 of Attachment PMA-8 presents these premiums for informational purposes. Page 2 also presents the correctly derived equity risk premiums based upon the arithmetic mean and the income return on long-term government bonds. It is clear that based upon all of the equity risk premiums, correctly or incorrectly derived, on page 2, that the long-term market equity risk premium is actually higher now than when the Company was last authorized its current 9.75% return on common equity in September 2009.

As to Mr. Parcell's second point that interest rate levels have been lower in recent years. Again, the cost of common equity is a long-term and prospective concept and looking at recent and expected interest rate levels over short periods of time in the future, i.e., since September 2009 and through 2014, is inconsistent with the concept that rate of return analysts are seeking to determine investors' expectations and requirements over the long term . Mr. Parcell has no basis for stating that because the Federal Reserve System (Federal Reserve) intends to maintain low interest rate levels through at least 2014, that these levels reflect investors' long term expectations. Moreover, on page 26, line 15, Mr. Parcell has acknowledged that the level of interest rates is "partially the result of the actions of the Federal Reserve System to stimulate the

economy." Therefore, recent interest rate levels and those expected in the near-term future, i.e., through 2014, are not representative of the long-term cost of capital. Page 2 of Attachment PMA-8 corroborates this as it shows that, as measured by the geometric mean, the average total return on long-term government bonds is the same for the years 1926-2012, 5.70%, as it was for the years 1926-2009 with the correct income returns actually dropping from 5.20% for 1926-2009 to 5.10% for 1926-2012. On a correct arithmetic mean basis, the average total return on long-term government bonds are the same 6.10% for 1926-2009 as it was for 1926-2012. Similarly, the correct arithmetic mean income return on long-term government bonds is the same, 5.2% for 1926-2009 as it was for 1926-2012, as well as for the period in between.

Clearly, then, Mr. Parcell is wrong on both points. The long-term market equity risk premium is not lower now than when the Company received its last authorized return on common equity in 2009 and, while interest rate levels have been and are expected to remain low in the short-term, long-term interest rate levels have remained stable since 2009.

**Comparable Earnings Analysis (CE)**

**Q. Do you have any comments regarding Mr. Parcell's application of the CE?**

A. Yes. At page 25, lines 7-8 of his direct testimony, Mr. Parcell discusses his CEM result of no more than 9.0% to 10.0% for his proxy utilities. As support for his conclusion, he cites recent returns of 9.5% to 11.4% and market-to-book ratios greater than 170% as well as prospective returns of 8.5% to 10.6%, coupled with market-to-book ratios in excess of 150%. He concludes on lines 11-14 on page 25 that "[a]s a result, it is apparent that returns below this level would continue to result in market-to-book ratios of well above 100 percent. An

earned return of 9.0% to 10.0% should thus result in a market-to-book ratio of well above 100 percent." By these statements, it is clear that Mr. Parcell believes that a direct relationship exists between market-to-book ratios and the rate of earnings on book common equity. Such a relationship is not supported by either the academic literature nor by an historical analysis of the experience of unregulated companies.

**Q. What does the academic literature say about the relationship between allowed regulatory rates of return on common equity and utility market-to-book ratios?**

A. It is very clear from the academic literature that there is no such relationship. Phillips[23] states the following:

> Many question the assumption that market price should equal book value, believing that 'the earnings of utilities should be sufficiently high to achieve market-to-book ratios which are consistent with those prevailing for stocks of unregulated companies.
>
> Also, as I noted earlier on page 29, lines 4 – 6, while EPS is a significant factor influencing market prices, it is by no means the only factor that affects market prices. Bonbright[24] recognizes as much when he states:
>
> In the first place, commissions cannot forecast, except within wide limits, the effect their rate Orders will have on the market prices of the stocks of the companies they regulate. In the second place, *whatever the initial market prices may be, they are sure to change not only with the changing prospects for earnings, but with the changing outlook of an inherently volatile stock market.* Moreover, even if a commission did possess the power of control, any attempt to exercise it . . . would result in harmful, uneconomic shifts in public utility rate levels. (italics

[23] Charles F. Phillips, Jr., The Regulation of Public Utilities – Theory and Practice, 1993, Public Utilities Reports, Inc., Arlington, VA, p. 395.

[24] James C. Bonbright, Albert L. Danielsen, and David R. Kamerschen, Principles of Public Utility Rates, 1988, Public Utilities Reports, Inc., Arlington, VA, p. 334.

added)

**Q. Have you performed an analysis to determine the existence of a direct relationship between the market-to-book ratios of unregulated companies and their earned rates of return on book common equity?**

A. Yes. Since regulation acts as a surrogate for competition, it is reasonable to look to the competitive environment for evidence of a direct relationship between market-to-book ratios and earned returns on common equity (ROE). To determine if Mr. Parcell's implicit assumption of such a direct relationship has any merit, I observed the market-to-book ratios and the ROEs of the S&P Industrial Index and the S&P 500 Composite Index over a long period of time. On Attachment PMA-9, I have shown the market-to-book ratios, rates of return on book common equity (earnings/book ratios), annual inflation rates, and the earnings/book ratios net of inflation (real rate of earnings) annually for the years 1947 through 2011. In each and every year, the market-to-book ratios of the S&P Industrial Index equaled or exceeded 1.00 times. In 1949, the only year in which the market-to-book ratio was 1.00 (or 100%), the real rate of earnings on book equity, adjusted for deflation, was 18.1% (16.3% + 1.8%). In contrast, in 1961, when the S&P Industrial Index experienced a market-to-book ratio of 2.01 times, the real rate of earnings on book equity for the Index was only 9.1% (9.8% - 0.7%). In 1997, the market-to-book ratio for the Index was 5.88 times, while the average real rate of earnings on book equity was 22.9% (24.6% - 1.7%).

This analysis clearly demonstrates that competitive, unregulated companies have never sold below book value, on average, and have sold at book value in only one year since 1947. The data show that there is no

relationship between earnings/book ratios and market-to-book ratios.

Because this lack of a relationship between earnings/book ratios and market-to-book ratios covers a 65-year period, 1947 through 2011, it cannot be validly argued that going forward a relationship would exist between earnings/book ratios and market-to-book ratios. The analysis shown on Attachment PMA-9, coupled with the supportive academic literature, demonstrate the following:

1. that while regulation is a substitute for marketplace competition, it can influence but not directly control market prices, and, hence, market-to-book ratios; and,
2. that the rates of return investors expect to achieve and which influence their willingness to pay market prices well in excess of book values have no meaningful, direct relationship to rates of earnings on book equity.

**Q. Do you have any comment upon the proxy groups Mr. Parcell used in his comparable earnings (CE) analysis?**

A. Yes. Mr. Parcell used his water and gas company proxy groups as well as the S&P 500 as discussed on pages 23 and 24 of his direct testimony. Any proxy group selected for a CE analysis should be broad-based in order to obviate any company-specific aberrations and should exclude utilities to avoid circularity since the achieved returns on book common equity of utilities, being a function of the regulatory process, are substantially influenced by regulatory awards. Therefore, the achieved ROEs of utilities are not representative of the returns that could be earned in a truly competitive market. Hence, Mr. Parcell's use of his water and gas proxy groups in his CE analysis should be rejected.

That leaves his use of the S&P 500 which, in my opinion, is too broad-based to be comparable in total risk to his proxy groups and, hence, the Company. Also, the use of the S&P 500 does not meet the "'corresponding risk' concept discussed in the Bluefield and Hope cases" (Mr. Parcell's direct testimony, page 22, lines 13-14).

In view of the foregoing, Mr. Parcell's CE analysis should be rejected.

**Corrected Conclusion of Mr. Parcell's Cost of Common Equity**

**Q. What would Mr. Parcell's conclusion of common equity cost rate be based upon the corrections to his analyses discussed above?**

A. Based upon the corrections to Mr. Parcell's DCF and CAPM results discussed above, his three analyses produce the following:

| | *Value Line* Water Group |
|---|---|
| DCF | 9.32% - 9.54% (midpoint: 9.43%) |
| CAPM | 10.37% |
| CE | NA |

NA = Not Applicable

Focusing on the midpoint of the DCF range, a range of common equity cost rate of 9.43% - 10.37% with a midpoint of 9.90% is indicated, as Mr. Parcell did on page 25 of his direct testimony. However, this 9.90% still understates the Company's common equity cost rate because it does not reflect any adjustment for the Company's greater financial risk and business risk due to its smaller size relative to the water proxy group as will be discussed below.

**Adjustment to Reflect Company-Specific Risk**

**Financial Risk**

**Q. Does your correction to Mr. Parcell's common equity cost rate analysis adequately reflect the greater financial risk of the Company relative to the water group?**

A. No. 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. Please describe the financial risk inherent in the Company's requested capital structure relative to the financial risk of the water group.**

A. The Company experiences greater financial risk than the water group because its requested capital structure contains a greater proportion of long-term debt than does the water group. The Company's requested long-term debt ratio is 58.73% as shown on page 1 of Schedule 4 of the Company's permanent rate filing. In contrast, as shown on Attachment PMA-10, the water group experiences a long-term debt ratio of 50.69% on average at December 31, 2011.

Thus, the Company has greater financial risk than the companies in the water group. The market data of the water group reflects investors' perception of the financial and business risks of the companies in the group and not those

of the Company. Rate of return analysts such as Mr. Parcell rely upon the market data of group(s) of companies as similar in risk as possible to the utility for whom rates are being set. In this instance, Mr. Parcell relied upon a group of publicly-traded water companies for whom the market data necessary for a cost of common equity analysis could be undertaken was available. However, any group of comparable companies may be relatively similar to, but not identical in risk, to the Company for whom rates are being set. Since the market data of the water group reflects the risks of the water group and not the Company, the financial and business risks of the Company must be compared with those of the average company in the water group and adjusted, if necessary, to reflect the unique relative financial (credit) and/or business risk of the Company. Because investors require a higher return in exchange for bearing higher risk, an upward adjustment to the common equity cost rate derived from the market data of the water group companies which have a lower degree of financial and business risk than the Company is necessary.

**Q. Do you agree with Mr. Parcell when he states on lines 5 – 8 on page 14 of his direct testimony that: "Without a comparison of the Company's capital structures with its affiliated companies, which are frequently inter-twined for financing, it is not feasible to conclude that AWC-NH's capital structure has less equity, and thus more financial risk, than other water utilities?"**

A. No. The Company informs me that its long-term debt currently consists of three issues, all of which are privately placed with external debt-holders. Therefore, no "inter-twining" exists. Moreover, as will be discussed relative to business risk, it is not the source of funds which gives rise to the risk of an investment, but

rather the use of the funds. Therefore, it is irrelevant whether the "inter-twining" tacitly alleged by Mr. Parcell exists. Consequently, a comparison of the Company's financial risk, as measured by the level of debt in its capital structure, with that of the water group is both feasible and necessary since it is the group's market data upon which Mr. Parcell relied in arriving at a recommended range of common equity cost rate.

**Q. Is there a way to quantify a financial risk adjustment due to the Company's greater financial risk relative to the water group?**

A. Yes. An indication of the magnitude of the necessary financial risk adjustment is given by the Hamada equation[25], which un-levers and then re-levers betas based upon changes in capital structure.

The Hamada equation un-levers the median beta of the water group of 0.65 with an average December 31, 2011 total equity ratio of 49.31% to 0.39 when applied to a 100% common equity ratio and then levers the beta to 0.75 using the Company's total (including preferred stock) requested equity ratio of 41.27% at December 31, 2011. The re-levered beta, applied to a 8.61% corrected market risk premium and a 4.18% corrected risk-free rate translates to a 10.86%[26] common equity cost rate. The difference between the 10.64% relevered beta common equity cost rate and the result of my application of the traditional CAPM for the water group with a median beta of 0.65, 9.78%[27] is 86 basis points. Thus, a financial adjustment of 86 basis points reflects the greater financial risk of the Company attributable to its lower requested total equity ratio

[25] Brigham and Daves 533.

[26] 10.64% = (0.75 x 8.61%) + 4.18%.

[27] 9.78% = (0.65 x 8.61%) + 4.18%.

of 41.27% at December 13, 2011 compared with the water group's average total equity ratio of 49.31% at December 31, 2011. The Hamada Equation and calculations are as follows:

$$b_l = b_u[1 + (1 - T)(D/S)]$$

Where $b_l$ = Levered beta
$b_u$ = Un-levered beta
$T$ = Tax Rate
$(D/S)$ = Debt to Common Equity Ratio

To un-lever the beta from a 49.03% average water group total equity ratio, the following equation is used:

$$0.65 = b_u[1 + (1 - 0.35)\ (50.69\%/49.31\%)]$$

When solved for $b_u$, $b_u$ = 0.39, indicating that the beta for the water group of water group would be 0.39 if their average capital structure contained 100% total equity.

To re-lever the beta relative to the Company's 41.27% at December 31, 2011 ratemaking total equity ratio, the following equation is used:

$$b_l = 0.39\ [1 + (1 - 0.35)\ (58.73\%/41.27\%)]$$

When solved for $b_l$, $b_l$ = 0.75, indicating that the beta for the water group would be 0.75, if their average capital structure contained 41.27% total equity.

**Business Risk Adjustment**

**Q. Does your correction to Mr. Parcell's common equity cost rate analysis adequately reflect the risk implications of the Company's small size relative to the water group?**

A. No. Company size is a significant element of business risk for which investors expect to be compensated through greater returns. Smaller companies are

simply less able to cope with significant events which 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 larger company with a larger, more diverse, customer base. Moreover, smaller companies are generally less diverse in their operations and have less financial flexibility. In addition, extreme weather conditions, i.e., prolonged droughts or extremely wet weather, will have a greater affect upon a small operating water utility than upon the much larger, more geographically diverse holding companies.

A specific example of the very real impact of how Company size affects business risk is the significant impact on the Company of the increase in property-related taxes of $107,540 assessed by the Town of Hampton since the Company's last rate case, which includes a substantial new "right of way tax". This represents an exceptionally high percentage, 28% of the Company's test year net income. Such a large reduction in net income will negatively affect the Company's cashflows, reducing the funds available to be retained to meet the Company's ongoing capital requirements as well as the cash available to pay a return to investors in the form of a dividend. The fact that a single expense imposed by a single town can have an impact of this magnitude provides a vivid demonstration of the heightened risk faced by investors in this small Company versus a utility that serves a broad area of the state.

Further evidence of the risk effects of size include the fact that investors demand greater returns to compensate for the lack of marketability and liquidity of the securities of smaller firms. It is a generally-accepted financial principle

that the risk of any investment is directly related to the assets in which the capital is invested. The Commission should focus on the risk and return on the common equity investment in the Company's jurisdictional rate base because it is the Company's rates which will be set in this proceeding. The fair rate of return must relate to where capital is invested. In other words, that it is the use of funds invested and not the source of those funds which gives rise to the risk of any investment. Therefore, the relevant risk reflected in the cost of capital must be that of the Company, including the impact of its small size on common equity cost rate. As noted above, the Company is significantly smaller than the average water group company based upon total capitalization.

Consistent with the financial principle of risk and return discussed above, such increased risk due to small size must be taken into account in the allowed rate of return on common equity.

**Q. Does the financial literature support the basic financial principle that it is the use of the funds invested which gives rise to the risk of the investment, not the source of the funds?**

A. Yes. As Richard A. Brealey and Stewart C. Myers state in Principles of Corporate Finance[28]:

> *But the company cost of capital rule can also get a firm into trouble if the new projects are more or less risky than its existing business. Each project should be evaluated at its own opportunity cost of capital*. This is a clear implication of the value-additivity principle introduced in Chapter 7. For a firm composed of assets A and B, the firm value is
>
> Firm Value = PV (AB) = PV (A) + PV(B) = sum of separate asset values

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

> Here PV(A) and PV(B) are valued just as if they were mini-firms in which stockholders could invest directly …If the firm considers investing in a third project C, it should also value C as if C were a mini-firm. That is, the firm should discount the cash flows of C at the expected rate of return that investors would demand to make a separate investment in C. *The true cost of capital depends on the use to which the capital is put.* (italics added to first paragraph, italics in original text in last paragraph)

In addition, Haim Levy and Marshall Sarnat[29] state:

> The cost of capital and the discount rate are two concepts which are used throughout the book interchangeably. However, there is a distinction between the *firm's* cost of capital and specific *project's* cost of capital. (Italics contained in original text.)

> In any case where the risk profile of the individual projects differ from that of the firm, an adjustment should be made in the required discount rate, to reflect this deviation in the risk profile.

It is fundamental that individual investors expect a return commensurate with the risk associated with where their capital is invested. Hence, the Company must be viewed on its own merits. As *Bluefield*[30] so clearly states:

> A public utility is entitled to such rates as will permit it to earn a return on the value of the property which it employs for the convenience of the public equal to that generally being made at the same time and in the same general part of the country on investments in other business undertakings which are attended by corresponding risks and uncertainties; . . .

*Bluefield* is clear, then, that it is the "risks and uncertainties" surrounding the property employed for the "convenience of the public" which determines the appropriate level of rates and not the source of the capital financing that property. In this proceeding, the property employed "for the convenience of the public" is the rate base of the Company. Therefore, it is the total investment risk of the Company and its rate base alone that is relevant.

**Q. Please compare the size of the Company with that of the companies in the**

[29] Haim Levy and Marshall Sarnat, Capital Investments and Decisions, 5th Ed. (Prentice/Hall International, 1986) 464-465.

[30] Bluefield Water Works Improvement Co. v. Public Serv. Comm'n, 252 U.S. 679 (1922).

**water group.**

A. I have made a study of the market capitalization of the Company relative to the water group. The results are shown on Attachment PMA-12. Page 1 contains a summary of an indicated small size risk adjustment based upon the SBBI-2012 size premium study, while page 2 contains a summary of the market capitalizations based upon each water company's average market prices for the three months ended December 2012 from Exhibit__(DHC-1), Schedule 6, page 1. As shown, the Company is significantly smaller than the average company in the water group based upon market capitalization as shown below:

Table 3

| | Market Capitalization (1) ($ millions) | Times Greater than Town of Hampton ($ Millions) |
|---|---|---|
| *Value Line* Water Group | $1,438.822 | 82.4x |
| Town of Hampton | 17.455 | |

(1) From page 1 of Attachment PMA-12.

The Company has no common stock which is publicly traded. Consequently, I have assumed that if it did and it were publicly traded, its common shares would be selling at the same market-to-book value as the average water company in the water group. Hence, the Company's market capitalization is estimated to be $17.455 million, based upon the water group as shown in Table 3 above. In contrast, the market capitalization of the average water company in the water group was $1.439 billion, or 82.4 times larger than the Company's estimated market capitalization.

Because of the Company's extremely small estimated market capitalization, relative to the estimated average market capitalization of the

water group, a 4.35% small size risk premium, or the difference between the size premium applicable to the 10th decile in which the Company falls and the 6th decile in which the average company in the water group falls, is justified. In my opinion, although an adjustment of 4.35% is indicated by the SBBI – 2012 Valuation size premium study, an adjustment to common equity cost rate of 40 basis points, represents an extremely conservative and reasonable size premium which would be applicable to the Company based upon its smaller relative size.

In view of the foregoing, an upward adjustment of 0.86 basis points to reflect the Company's greater relative financial risk and a business risk adjustment of 40 basis points, due to its smaller size are necessary. When added to the corrected range of DCF cost rate and CAPM cost rate, a risk-adjusted range of DCF cost rate of 10.58% - 10.80% and of CAPM cost rate of 11.63% are indicated as summarized below:

| | Corrected Range DCF Cost Rate 9.32%-9.54% (midpoint: 9.43%) | Corrected CAPM Cost Rate 10.37% |
|---|---|---|
| Financial Risk Adjustment | 0.86 | 0.86 |
| Business Risk Adjustment | 0.40 | 0.40 |
| Financial- and Business-Risk Adjusted Cost Rate | 10.58%-10.80% (midpoint: 10.69%) | 11.63% |

Focusing on the midpoint of the risk-adjusted DCF cost rate, a range of corrected, risk-adjusted common equity cost rate of 10.69% - 11.63% with a midpoint of 11.16% is indicated, which confirms the reasonable and conservative nature of the Company's requested 10.25% common equity cost

rate.

**Q. Does that conclude your rebuttal testimony?**

A. Yes.