BEFORE THE ARIZONA CORPORATION COMMISSION

COMMISSIONERS

TOM FORESE, Chairman
BOB BURNS
ANDY TOBIN
BOYD DUNN
JUSTIN OLSON

IN THE MATTER OF THE APPLICATION OF EPCOR WATER ARIZONA INC. FOR A DETERMINATION OF THE CURRENT FAIR VALUE OF ITS UTILITY PLANT AND PROPERTY AND FOR INCREASES/DECREASES IN ITS RATES AND CHARGES BASED THEREON FOR UTILITY SERVICE BY ITS AGUA FRIA, ANTHEM, CHAPARRAL, HAVASU, MOHAVE, NORTH MOHAVE, PARADISE VALLEY, SUN CITY, SUN CITY WEST, TUBAC, AND WILLOW VALLEY WATER DISTRICTS AND FOR CONSIDERATION OF CONSOLIDATION PROPOSALS	DOCKET NO: WS-01303A-17-0257

REBUTTAL TESTIMONY
OF
PAULINE M. AHERN, CRRA
ON BEHALF OF
EPCOR WATER ARIZONA INC.
APRIL 9, 2018

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TABLE OF CONTENTS

EXECUTIVE SUMMARY

Ms. Ahern's Rebuttal Testimony responds to certain aspects of the Direct Testimony of Mr. Yue "Nick" Liu, witness for the Arizona Corporation Commission's Utilities Division, and the Direct Testimony of Mr. John A. Cassidy, witness for the Residential Utility Consumer Office, on the following issues:

Common Equity Cost Rate

Ms. Ahern provides evidence that Mr. Liu's Capital Asset Pricing Model ("CAPM") and Comparable Earnings ("CE") are flawed in several respects. Correcting the flaws in Mr. Liu's CAPM and CE analyses results in an indicated common equity cost rate of 10.77%. Ms. Ahern also demonstrates that Mr. Liu has incorrectly calculated the Fair Value Rate Base ("FVRB") incremental return by ignoring the fact that the FVRB is an equal blend of the Original Cost Less Depreciation ("OCRB") and the Reconstructed Cost New Depreciated ate bases ("RCND").

Ms. Ahern also provides evidence that Mr. Cassidy's applications of the CAPM and the CE are also flawed in several respects. Correcting the flaws in Mr. Cassidy's CAPM and CE analyses results in an indicated common equity cost rate of 11.57%. Ms. Ahern also demonstrates that Mr. Cassidy has incorrectly calculated the Fair Value Rate Base ("FVRB") incremental return by ignoring the fact that the FVRB is an equal blend of the Original Cost Less Depreciation ("OCRB") and the Reconstructed Cost New Depreciated ate bases ("RCND")

Credit Risk Adjustment

Ms. Ahern also explains that neither Mr. Liu nor Mr. Cassidy included an adjustment to reflect the greater credit risk of EWAZ, as evidenced by its likely bond rating of Moody's A3/ S&P A-. An indication of the magnitude of such an adjustment relative to Mr. Liu's water proxy group is 0.12% and relative to Mr. Cassidy's water proxy group, 0.06%, which will be discussed in detail below.

Business Risk Adjustment

Ms. Ahern also explains that neither Mr. Liu nor Mr. Cassidy included an adjustment to reflect the greater business risk of EWAZ, as evidenced by its smaller size relative to their respective water proxy groups upon whose market data their respective recommended common equity cost rates are based. Based upon her analysis, Ms. Ahern suggests conservative adjustments of 0.12% relative to Mr. Liu's water proxy group and 0.16% relative to Mr. Cassidy's water proxy group based upon the size of EWAZ.

Properly including these adjustments, coupled with the proper applications of the CAPM and CE analyses results in a common equity cost rate for Mr. Liu of 11.01% and of for 11.79% for Mr. Cassidy.

I. INTRODUCTION

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

A. My name is Pauline M. Ahern and I am an Executive Advisor with ScottMadden, Inc. My address is 202 Nathan Place, Mount Laurel, NJ 080854.

Q. ARE YOU THE SAME PAULINE M. AHERN WHO PREVIOUSLY SUBMITTED DIRECT TESTIMONY IN THIS PROCEEDING?

A. Yes, I am.

Q. HAVE YOU PREPARED AN EXHIBIT WHICH SUPPORTS YOUR REBUTTAL TESTIMONY?

A. Yes. It is Exhibit PMA-RT1, which includes Schedules 1 through 41.[1] In short, my testimony and exhibits support the Company's rebuttal position for a return on equity equal to 10.1% as reasonable.

II. PURPOSE

Q. WHAT IS THE PURPOSE OF THIS TESTIMONY?

A. The purpose is to provide testimony on behalf of EPCOR Water Arizona Inc. ("EWAZ" or "Company") in rebuttal to certain aspects of the Direct Testimony of Mr. Yue "Nick" Liu ("Mr. Liu"), witness for the Arizona Corporation Commission's ("ACC") Utilities Division ("Staff"), and the Direct Testimony of Mr. John A. Cassidy ("Mr. Cassidy"), witness for the Residential Utility Consumer Office ("RUCO"), concerning the rate of return which EWAZ should be allowed an opportunity to earn on its authorized rate base. I will also address the Direct Testimony of Jeffrey M. Michlik ("Mr. Michlik"), also a

[1] Throughout this testimony, unless otherwise indicated, a reference to a "Schedule" is to a Schedule in Exhibit PMA-RT1.

witness for RUCO regarding his recommendation that the rate of return on common equity authorized for EWAZ in this proceeding be reduced due to the presence of various surcharge and adjustment mechanisms.

First, I will address Mr. Liu's Direct Testimony relative to: 1) his recommended return on common equity *i.e.* Discounted Cash Flow Model ("DCF"), Capital Asset Pricing Model ("CAPM"), and Comparable Earnings Analysis ("CE"), and his failure to address the greater credit and business risks of EWAZ relative to his water proxy group due to its likely bond rating of A3 / A- by Moody's and Standard & Poor's ("S&P"), respectively, as well as EWAZ's smaller size relative to the water proxy group; and 2) his estimation of the Fair Value Rate Base increment ("FVRB").

Second, I will address Mr. Cassidy's Direct Testimony relative to: 1) his discussion of general economic conditions; 2) his recommended return on common equity analysis, *i.e.*, DCF, CAPM, and CE, and his failure to address the greater credit and business risks of EWAZ relative to his water proxy group; and 3) his estimation of the FVRB increment. In addition, I will also respond to certain of the comments and critiques of my Direct Testimony by Mr. Cassidy. The fact that I do not address every comment or critique should not be construed as meaning that I agree with any such comment or critique.

Third, I will address Mr. Michlik's contention that the rate of return on common equity authorized for EWAZ in this proceeding be reduced due to the presence of several surcharge adjustment mechanisms.

III. RESPONSE TO THE DIRECT TESTIMONY OF MR. LIU

Q. PLEASE PROVIDE A SUMMARY OF MR. LIU'S DIRECT TESTIMONY AND RECOMMENDATIONS.

A. Mr. Liu estimates EWAZ's cost of common equity based upon: 1) the constant growth DCF model (9.25%); 2) the CAPM (7.20%); and 3) the CE (9.75%).[2] He also recommends a FVRB increment of 0.48% based upon the FVRB increment authorized in EWAZ's most recent wastewater rate case (Docket No. WS-01303A-16-0145).

a. Common Equity Cost Rate

i. Discounted Cash Flow Model ("DCF")

Q. PLEASE COMMENT UPON MR. LIU'S DCF ANALYSIS.

A. Even though I do not agree with Mr. Liu's estimation of growth in the DCF, his conclusion of a DCF cost rate of 9.25%, is a reasonable DCF result in my opinion. Thus, I will not address Mr. Liu's DCF analysis.

However, as previously noted,[3] given the current high level of market-to-book ratios for the water utility industry, all of the DCF results in this proceeding underestimate the investor-required return.

ii. Capital Asset Pricing Model ("CAPM")

Q. DO YOU HAVE ANY GENERAL COMMENTS ON MR. LIU'S CAPM ANALYSIS?

A. Yes. Mr. Liu 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)

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[2] *See* Direct Testimony of Yue "Nick" Liu (hereinafter "*Liu*") at 23, - 24.
[3] *See* Direct Testimony of Pauline M. Ahern (hereinafter "*Ahern*") at 23 – 31.

whereas the simple RP method assumes the same risk premium for all companies exhibiting similar bond ratings or other characteristics."[4] Mr. Liu 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. However, 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.

In addition, beta is a measure of systematic risk only. Mr. Liu notes: "Beta is a measure of the relative volatility (and thus risk) of a particular stock in relation to the overall market."[5] Thus, it does not reflect non-systematic or company-specific risks. Moreover, beta measures only a small percentage of the total risk of a particular company because the R^2 (R-Squared), or the correlation coefficients of betas, average only 0.1401 for Mr. Liu's water proxy group, indicating that the average betas of these water companies reflect only 14.01% of the total risk of the water proxy group, as shown on page 2 of Schedule 14.

In contrast, the Risk Premium Method / Method ("RPM") relies upon the use of a company- or proxy group-specific expected bond yield. As shown in Schedule 1, S&P[6] 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 RPM is derived by the use of beta to allocate a total market equity risk premium. Also, an even greater proportion of company-specific risk is reflected with the

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[4] *Liu* at 19.
[5] *Liu* at 19.
[6] Standard & Poor's Ratings Services – "Key Credit Factors For The Regulated Utilities Industry" (Nov. 19, 2013). *See* Exhibit PMA-RT1, Schedule 1.

use of the Predictive Risk Premium Model ("PRPM") which uses only the volatility of a company's equity risk premiums as a measure of risk as previously discussed.[7] These approaches to the RPM reflect all company-specific risk.

In view of the foregoing, Mr. Liu's comments that the CAPM is superior to the RPM are without merit.

Q. PLEASE COMMENT UPON MR. LIU'S CAPM ANALYSIS.

A. Mr. Liu'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, Mr. Liu incorrectly calculated the market equity risk premium by relying, in part, upon a geometric mean historical market equity risk premium as well as the historical <u>total</u> return on U.S. Treasury securities.

Third, Mr. Liu did not incorporate an empirical CAPM ("ECAPM") analysis despite the fact that empirical evidence indicates that low-beta securities, such as utilities, earn returns higher than the CAPM predicts and high-beta securities earn less.

Q. PLEASE COMMENT UPON MR. LIU'S USE OF THE 20-YEAR U.S. TREASURY BOND YIELD AS THE RISK-FREE RATE.

A. First, Mr. Liu's use of the 20-year U.S. Treasury Bond yield is inappropriate for cost of capital purposes. Because both ratemaking and the cost of common equity are long-term concepts related to long-lived assets, *i.e.*, the utility's rate base, the horizon of the chosen U.S. Treasury security should match the horizon of whatever is being valued, similar to

[7] *Ahern* at 32 – 33.

the DCF model and its presumption of an infinite investment horizon. In other words, the horizon of the chosen risk-free rate is a function of the horizon of the investment.

The 2017 SBBI® Yearbook | Stocks, Bonds, Bills and Inflation ("SBBI – 2017") notes[8]:

> Our methodology for estimating the long-horizon equity risk premium makes use of the income return on a 20-year Treasury bond; however, the Treasury stopped issuing 20-year bonds in 1986. The 30-year bond that the Treasury returned to issuing in 2006 is theoretically more correct when dealing with to the long-term nature of business valuation, yet Ibbotson Associates instead creates a series of returns using bonds on the market with approximately 20 years to maturity. The reason for the use of a 20-year maturity bond is that 30-year Treasury securities have only been issued over the relatively recent past, starting in February of 1977, and were suspended from 2001 to 2006.
>
> The same reason exists for why we do not use the 10-year Treasury bond - a long history of market data is not available for 10-year bonds. We have persisted in using a 20-year bond to keep the basis of the time series consistent. (page 6 of Schedule 2)

Dr. Roger A. Morin confirms this when he states[9] :

> …[b]ecause common stock is a long-term investment and because the cash flows to investors in the form of dividends last indefinitely, the yield on very long-term government bonds, namely, the yield on 30-year Treasury bonds, is the best measure of the risk-free rate for use in the CAPM[5(footnote omitted)] . …The expected common stock return is based on long-term cash flows, regardless of an individuals' holding time period. (page 14 of Schedule 3)

Therefore, with the expectation that the U.S. Treasury Bond will be held to maturity, there is no market or unexpected inflation risk associated with its yield. Consequently, the yield, or income return, on 30-year U.S. Treasury Bonds is the

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[8] 2017 SBBI® Yearbook | Stocks, Bonds, Bills and Inflation by Asset Class 1926-2016 ("SBBI – 2017") Wiley, 2017 at 10-22. *See* Exhibit PMA-RT1, Schedule 2.

[9] Roger A. Morin, New Regulatory Finance Public Utility Reports, Inc., 2006 at 151. *See* Exhibit PMA-RT1, Schedule 3.

appropriate yield to use as the risk-free rate in a CAPM analysis, and not the 20-year bond.

Second, as discussed below, Mr. Liu incorrectly relies upon an historical or recent yield on U.S. Treasury Bonds as his risk-free rates.

Q. WHY IS MR. LIU'S USE OF HISTORICAL, *I.E.*, A RECENT THREE-MONTH AVERAGE, YIELD ON U.S. TREASURY BONDS NOT APPROPRIATE FOR COST OF CAPITAL PURPOSES.

A. Mr. Liu's use of current, rather than projected, yields on 20-year U.S. Treasury Bonds ignores the fact that the cost of capital and ratemaking are prospective. Mr. Liu concurs when he states that[10]:

> Technically, "fair rate of return" is a legal and accounting concept that refers to an ex-post facto (after the fact) earned return on an asset base, while the cost of capital is an economic and financial concept which refers to an ex-ante facto [sic] (before the fact) expected, or required, return on a capital base. In regulatory proceedings, however, the two terms are often used interchangeably, and I have equated the two concepts in my testimony.

Mr. Liu implicitly agrees when he incorporates projected growth rates in his DCF analysis. The cost of capital, including the cost rate of common equity, reflects investors' expectations of future capital markets, including an expectation of interest rate levels, as well as future 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.

Therefore, the appropriate expected risk-free rate available at the time of the preparation of Mr. Liu's Direct Testimony is the average of the consensus forecasts of

[10] *Liu* at 4.

approximately 50 economists from *Blue Chip Financial Forecasts ("Blue Chip")* for the six quarters ending with the second quarter 2019, from the January 1, 2018 edition, and the long-range forecasts from the December 1, 2017, edition for 2019-2023 and 2024-2028, or 3.54%, derived In Note 1 on page 1 of Schedule 9.

Q. PLEASE COMMENT UPON MR. LIU'S ESTIMATION OF THE MARKET EQUITY RISK PREMIUM FOR HIS CAPM ANALYSIS.

A. Mr. Liu's derivation of the market equity risk premium for his CAPM analysis is flawed for the following two reasons. First, he incorrectly relies, in part, upon geometric mean historical market returns. Second, he incorrectly relies upon the historical mean total return on U.S. Treasury securities.

Q. PLEASE COMMENT UPON MR. LIU'S USE OF LONG-TERM HISTORICAL EQUITY RISK PREMIUMS.

A. Mr. Liu calculates the historical market equity risk premium from data tabulated by Duff & Phelps, presumably using the SBBI – 2017, which presents return data from 1926 – 2016. However, he relied upon both arithmetic and geometric mean returns for both large company common stocks and long-term U.S. Treasury Bonds, rather than exclusively relying upon the appropriate arithmetic mean returns as detailed below.

Q. PLEASE COMMENT UPON MR. LIU'S USE OF THE GEOMETRIC MEAN HISTORICAL MARKET RETURN.

A. Mr. Liu notes that he has relied upon both the arithmetic and geometric mean returns for the S&P 500 as tabulated by Duff & Phelps.[11] Only arithmetic mean return rates and

[11] *Liu* at 20.

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.

In contrast, 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. Therefore, the geometric mean is of little or no value to investors seeking to measure risk. Moreover, from a statistical perspective, because stock returns and equity risk premiums are random, the arithmetic mean is also forward-looking, consistent with the prospective nature of the cost of capital and ratemaking noted above.

The financial literature is quite clear that risk is measured by the variability of expected returns, *i.e.*, the probability distribution of returns.[12] SBBI – 2017 explains in detail why the arithmetic mean is the correct mean to use when estimating the cost of capital.[13]

[12] Eugene F. Brigham, Fundamentals of Financial Management (The Dryden Press, 1989) at 639. *See* Exhibit PMA-RT1, Schedule 4.

[13] SBBI – 2017 at 10-22. *See* Exhibit PMA-RT1, Schedule 2.

In addition, Weston and Brigham provide the standard financial textbook definition of the riskiness of an asset when they state[14]:

> The riskiness of an asset is defined in terms of the likely variability of future returns from the asset. (emphasis added) (page 3 of Schedule 5)

Furthermore, Dr. Morin states[15]:

> 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) (page 3 of Schedule 3)

In addition, Brealey and Myers note[16]:

> 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) (pages 3 - 4 of Schedule 6)

As previously discussed, investors gain insight into relative riskiness by analyzing expected *future* variability. This is accomplished through the use of the arithmetic mean of a random distribution of returns / premiums. Only the arithmetic mean takes into account all of the returns / premiums over a period of time, hence, providing meaningful insight into the variance and standard deviation of those returns / premiums.

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[14] J. Fred Weston and Eugene F. Brigham, Essentials of Managerial Finance, 3rd Edition (The Dryden Press, 1974) at 272. *See* Exhibit PMA-RT1, Schedule 5.

[15] Roger A. Morin, New Regulatory Finance Public Utility Reports, Inc., 2006 at 133. *See* Exhibit PMA-RT1, Schedule 3.

[16] Richard A. Brealey and Stewart C. Myers, S.C., Principles of Corporate Finance, 5th Ed. (McGraw-Hill Publications, Inc., 1996) at 146 – 147. *See* Exhibit PMA-RT1, Schedule 6.

Q. CAN IT BE DEMONSTRATED THAT THE ARITHMETIC MEAN TAKES INTO ACCOUNT ALL OF THE RETURNS AND THEREFORE, THE ARITHMETIC MEAN IS APPROPRIATE TO USE WHEN ESTIMATING THE OPPORTUNITY COST OF CAPITAL IN CONTRAST TO THE GEOMETRIC MEAN?

A. Yes. Pages 1 and 2 of Schedule 7 graphically demonstrate this. Page 1 charts the returns on large company stocks for each of the years, 1926 through 2016, from the SBBI – 2017 Appendix A Tables.[17] 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 one of those returns for the entire period from 1926 through 2016 is shown on page 2. There is a clear bell-shaped pattern to the histogram, or probability distribution, of returns, an indication that the returns are randomly generated and not serially correlated. The arithmetic mean of this distribution of returns considers each and every return in the distribution, thus, taking into account the standard deviation or variance which may be experienced in the future when estimating the rate of return based upon such historical returns.

In contrast, the geometric mean of these returns considers only two of the returns, the initial and terminal years, which, in this case, are 1926 and 2016. Based upon only those two years, a constant rate of return is calculated by the geometric average. That constant return is graphically represented by a flat line, showing no year-to-year variation, over the entire 91-year (1926 to 2016) time period, which is obviously far

[17] SBBI – 2017 Appendix A Tables. *See* Exhibit PMA-RT1, Schedule 7.

different from reality, based upon the histogram, or probability distribution, of returns shown on page 2 and demonstrated on page 1 of Schedule 7.

Clearly, only the arithmetic mean takes the volatility of returns into account and, thus, is appropriate for estimating the investor required rate of return. The geometric mean, which does not take this volatility into account, is appropriate only when measuring historical performance and should not be used to estimate the investors required rate of return.

As discussed previously[18], all the cost of common equity models that I used as well as Mr. Liu and Mr. Cassidy, including the DCF, are market-based, being based upon market prices which embody investors risk expectations. If investors relied upon the geometric mean of ex-post spreads, they would have 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, thereby obviating the year-to-year fluctuations, or variance.

To put it even more simply, using the geometric mean to estimate the equity risk premium is tantamount to reading the first and last page of a complete history of World War II and presuming to know what occurred during World War II. Consequently, Mr. Liu should have relied upon the historical arithmetic mean return on large company stocks from 1926-2016 from SBBI – 2017 in his CAPM analysis.

Q. PLEASE COMMENT UPON MR. LIU'S USE OF THE HISTORICAL MEAN TOTAL RETURN ON U.S. TREASURY SECURITIES.

[18] *Ahern* at 20 – 21.

A. Although relying upon Duff & Phelps' historical returns in his CAPM analysis, Mr. Liu has ignored their recommendation to rely upon the income return and not the total return on U.S. Treasury securities in deriving an equity risk premium. As indicated in SBBI – 2017[19]:

> 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. (page 6 of Schedule 2)

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 12.0%, and the arithmetic mean 1926-2016 income return on long-term government bonds of 5.0% which results in a market equity risk premium of 7.0%.

Q. DID MR. LIU INCORPORATE AN EMPIRICAL OR ECAPM ANALYSIS?

A. No. Mr. Liu failed to consider the ECAPM, even though numerous tests of the CAPM have confirmed its validity by showing that the empirical Security Market Line ("SML")

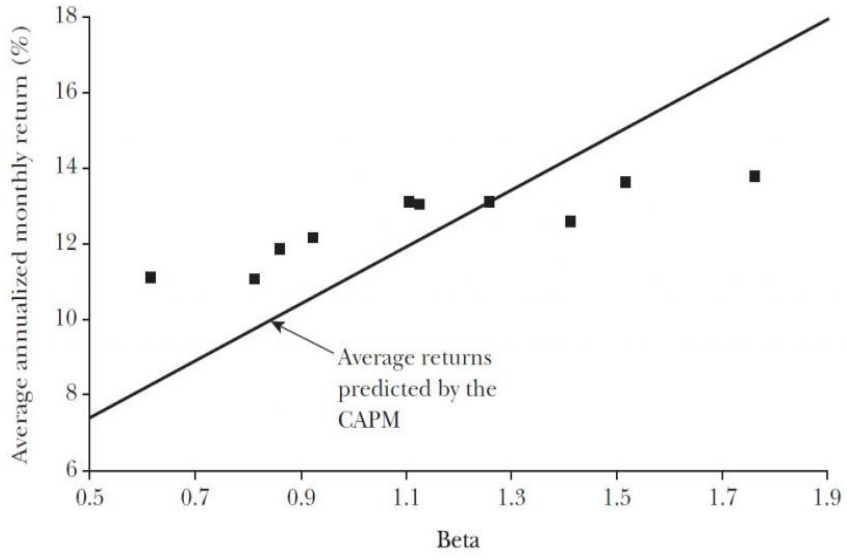
[19] SBBI – 2017 at 10-22. *See* Exhibit PMA-RT1, Schedule 2.

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, and confirm its validity. While the results of these tests support the notion that beta is related to security returns, the empirical SML described by the CAPM formula is not as steeply sloped as the predicted SML.[20]

The empirical CAPM ("ECAPM") reflects this empirical reality. Fama and French clearly state regarding Figure 2, below, that "[t]he returns on the low beta portfolios are too high, and the returns on the high beta portfolios are too low." [21]

Figure 2 http://pubs.aeaweb.org/doi/pdfplus/10.1257/0895330042162430

Average Annualized Monthly Return versus Beta for Value Weight Portfolios Formed on Prior Beta, 1928–2003



[20] Morin 175. *See* Exhibit PMA-RT1, Schedule 3.

[21] Eugene F. Fama and Kenneth R. French, "The Capital Asset Pricing Model: Theory and Evidence", *Journal of Economic Perspectives*, Vol. 18, No. 3, Summer 2004 at 33. *See* Exhibit RPM-RT1, Schedule 8.

In addition, Dr. Morin observes that while the results of these tests support the notion that beta is related to security returns, the empirical SML described by the CAPM formula is not as steeply sloped as the predicted SML. Dr. Morin states[22]:

> 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. (page 17 of Schedule 3)
>
> * * *
>
> 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 [is] Return = 0.0829 + 0.0520 β is between 0.25 and 0.30. If x = 0.25, the equation becomes:
>
> $$K = R_F + 0.25(R_M - R_F) + 0.75\,\beta(R_M - R_F)$$[23]
>
> (page 19 of Schedule 3)

Fama and French provide similar support for the ECAPM when the state[24] :

> The early tests firmly reject the Sharpe-Lintner version of the CAPM. There is a positive relation between beta and average return, but it is too 'flat.' . . . The regressions consistently find that the intercept is greater than the average risk-free rate . . . and the coefficient on beta is less than the average excess market return. . . This is true in the early tests . . . as well as in more recent cross-section regressions tests, like Fama and French (1992). (page 8 of Schedule 8)

Finally, Fama and French further note[25]:

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22 Morin at 175. *See* Exhibit PMA-RT1, Schedule 3.
23 Morin at 190. *See* Exhibit PMA-RT1, Schedule 3.
24 Fama & French at 32. *See* Exhibit PMA-RT1, Schedule 8.
25 Fama & French at 33. *See* Exhibit PMA-RT1, Schedule 8.

> Confirming earlier evidence, the relation between beta and average return for the ten portfolios is much flatter than the Sharpe-Linter CAPM predicts. The returns on low beta portfolios are too high, and the returns on the high beta portfolios are too low. For example, the predicted return on the portfolio with the lowest beta is 8.3 percent per year; the actual return as 11.1 percent. The predicted return on the portfolio with the t beta is 16.8 percent per year; the actual is 13.7 percent. (page 9 of Schedule 8)

Clearly, the justification from Dr. Morin, as well as Fama and French's article along with their review of other academic research on the CAPM, validate the use of the ECAPM.

In view of theory and practical research, both the traditional CAPM and the ECAPM should have been used by Mr. Liu.

Q. IF CORRECTED FOR THE ABOVE ERRORS, WHAT WOULD BE THE CORRECTED RESULTS OF MR. LIU'S CAPM ANALYSIS?

A. Schedule 9 presents the results of the correct applications of both the traditional CAPM and the ECAPM for Mr. Liu's water proxy group. The corrected CAPM results indicate a range of cost of common equity of 10.20% to 10.58% for Mr. Liu's water proxy group. Consistent with Mr. Liu's conclusion that the median CAPM result is an appropriate CAPM cost of common equity result, the corrected CAPM result is 10.58%

Clearly, then, Mr. Liu's CAPM conclusion of 7.20% CAPM is grossly understated.

Q. DOES MR. LIU RELY UPON HIS 7.20% INDICATED CAPM COST RATE?

A. Without stating so specifically, it is clear that Mr. Liu does not rely upon his CAPM analysis in arriving at his recommended return on common equity range of 9.25% - 9.75%, with a 9.50% midpoint. In fact, his 7.20% CAPM cost rate is more than 200 basis

points below the bottom of his recommended range. Clearly, he did not rely upon his 7.20% CAPM cost rate.

He does note, however, that his CAPM results are lower than his DCF and CE results[26] for two reasons. Both of those reasons are incorrect. Mr. Liu's first reason is that "risk premiums are lower currently than was the case in prior years" as a "result of lower equity market returns that have been experienced in the past several years".[27] As shown in Table 1 below, although the Large-Cap Stock return for 2015 was distinctly lower than any year within the most recent five-year period (2012 – 2016), the other four years cannot be classified as "lower". The 2012 – 2016 average market return was 18.51%. If the extremely low return in 2015, 1.38%, is excluded the average rises to 18.51%. Mr. Liu's first reason is thus incorrect.

As for Mr. Liu's second reason, it is true that "the level of interest rates on U.S. Treasury Bonds (*i.e.*, the risk-free rate) has been lower in recent years[28]", but the results of these low interest rate levels has actually been higher market equity risk premiums "than was the case in prior years" as also demonstrated in Table 1 below. As can be derived from the data in Table 1, the average market equity risk premium over long-term government bond income return was extremely low in 2015, a negative 1.09% averaging 12.38% over the 5-year period and 15.75% excluding 2015. So, Mr. Liu's second reason is also incorrect.

[26] *Liu* at 24.
[27] *Liu* at 24.
[28] *Liu* at 24.

Table 1

Year	Total Return on Large-Cap Common Stocks | 2012 - 2016	Market Equity Risk Premium Large-Cap Common Stocks | 2012 - 2016[A]
2012	16.00%	13.54%
2013	32.39%	29.51%
2014	13.69%	10.28%
2015	1.38%	-1.09%
2016	11.96%	9.66%
Average	15.08%[B]	12.38%[C]

[A] Total return on large-cap common stocks minus income return on long-term government bonds for 1926 – 2016.
[B] Average excluding 2012 is 18.51%.
[C] Average excluding 2012 is 15.75%.

Source: SBBI – 2017 Appendix A Tables.

Finally, Mr. Liu opines that "it cannot be maintained that low interest rates (and low CAPM results) are temporary and do not reflect investor expectations".[29] Later in this Rebuttal Testimony, relating to Mr. Cassidy's Direct Testimony, I will discuss why the current low level of interest rates is temporary, with increasing interest rates a question of when, not if. In addition, I will discuss and demonstrate that the current low interest rate environment is not expected to continue.

iii. Comparable Earnings ("CE") Analysis

Q. DO YOU HAVE ANY COMMENTS REGARDING MR. LIU'S CE ANALYSIS?

A. Yes. Based upon his CE analysis, Mr. Liu concludes that the return on equity for his water proxy group is no more than 9.25 to 10.25% (midpoint of 9.75%). In support for

[29] *Liu* at 24.

his conclusion, he cites recent returns of 9.6% - 10.0% and market-to-book ratios of 192%, as well as prospective returns of 11.0% - 12.8% accompanied by market-to-book ratios higher than of 200%.[30]

He concludes that "[a]s a result, it is apparent that authorized ROEs below this level would continue to result in [an] M/B of over 100 percent."[31] By such a statement, it is clear that Mr. Liu believes that a direct relationship exists between market-to-book ratios ("M/Bs") and the rate of earnings on book common equity. Such a relationship is supported neither by the academic literature nor by an historical analysis of the experience of unregulated companies.

As noted by Phillips[32]:

> 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.' (page 4 of Schedule 10)

In addition, Bonbright[33]:

> 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.* In short, market prices are beyond the control, though not beyond the influence of rate regulation. 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 added) (page 3 of Schedule 11)

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30 *Liu* at 23.

31 *Liu* at 23.

32 Charles F. Phillips, Jr., The Regulation of Public Utilities – Theory and Practice, 1993, Public Utility Reports, Inc., Arlington, VA at 395. *See* Exhibit PMA-RT1, Schedule 10.

33 James C. Bonbright, Albert L. Danielsen and David R. Kamerschen, Principles of Public Utility Rates (Public Utilities Reports, Inc. 1988) at 334. *See* Exhibit PMA-RT1, Schedule 11.

Thus, it is very clear that there is no such direct relationship between M/Bs and the rate of earnings on book common equity.

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 book common equity (ROE). To determine if Mr. Liu's implicit assumption of such a direct relationship has any merit, I observed the market-to-book ratios and the earned ROEs of the S&P Industrial Index and the S&P 500 Composite Index over a long period of time.

On Schedule 12, I have shown the market-to-book ratios, rates of return on book common equity (earnings / book ratios, *i.e.*, ROEs), annual inflation rates, and the earnings / book ratios net of inflation (real rate of earnings) annually for the years 1947 through 2016. In each year, the market-to-book ratios of the S&P Industrial Index equaled or exceeded 1.00. 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 <u>deflation</u>, 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 of this lack of a relationship between earnings / book ratios and market-to-book ratios over a 70-year period, 1947 through 2016, it cannot be argued that a relationship would exist between earnings / book ratios and market-to-book ratios going forward. The analysis shown on Schedule 12 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 direct and exclusive relationship to rates of earnings on book equity.

Q. DO YOU HAVE ANY COMMENT UPON THE PROXY GROUP MR. LIU USED IN HIS CE ANALYSIS?

A. Yes. Mr. Liu used his water proxy group in his CE analysis.[34] Any proxy group selected for a CE analysis should be broad-based in order to obviate company-specific aberrations

[34] *Liu* at 21.

and should exclude utilities to avoid circularity since the achieved returns on book common equity of utilities, being a function of the regulatory process itself, are substantially influenced by regulatory return on common equity awards. Therefore, the achieved ROEs of utilities are not representative of the returns that could be earned in a truly competitive market. Hence, Mr. Liu's use of his water proxy utilities in his CE analysis should be rejected.

Therefore, Mr. Liu's entire CE analysis should be rejected and replaced with the results of market models applied to a group of non-price regulated companies similar in total risk to Mr. Liu's water proxy group.

Q. PLEASE EXPLAIN THE BASIS OF USING A NON-PRICE REGULATED PROXY GROUP IN A CE ANALYSIS.

A. Neither the *Hope* nor *Bluefield* cases specify that comparable risk companies must be regulated utilities. Since rate regulation is a substitute for the competition of the marketplace, non-price regulated firms operating in the competitive marketplace are an excellent proxy if a group can be selected to be comparable in total risk to the water proxy group upon whose market data Mr. Liu relied upon to estimate the cost of common equity. The bases of the selection applied are theoretically and empirically sound, identical to those I applied in my Direct Testimony,[35] and results in a non-price regulated proxy group which is comparable in total risk to Mr. Liu's water proxy group.[36]

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[35] *Ahern* at 47.

[36] Frank J. Hanley & Pauline M. Ahern, "Comparable Earnings: New Life for an Old Precept," American Gas Association, *Financial Quarterly Review*, Summer 1994 at 4 – 8. *See* Exhibit PMA-RT1, Schedule 13.

Q. PLEASE EXPLAIN HOW YOU CHOSE THE NON-PRICE REGULATED PROXY GROUP COMPARABLE IN TOTAL RISK TO MR. LIU'S WATER PROXY GROUP.

A. As previously discussed,[37] the selection criteria for the non-price regulated firms are based upon statistics derived from *Value Line* regression analyses of weekly market prices over the most recent 260 weeks, *i.e.*, five years, from the market prices paid by investors. *Value Line* unadjusted betas were used as a measure of systematic risk, while the standard errors of the regressions giving rise to those beta coefficients are a measure of unsystematic or firm-specific risk reflecting the extent to which events specific to a firm's operations affect its stock price. In essence, companies with similar betas and standard errors of the regression have similar total investment risk. Using a *Value Line* proprietary database dated December 2017, and the same selection criteria as in my Direct Testimony results in a non-price regulated proxy group comparable in total risk to the water proxy group comprised of the thirteen following companies:

- AmerisourceBergen ("ABC"));
- Bright Horizons Family Solutions Inc.("BFAM");
- Cheesecake Factory ("CAKE");
- CBOE Holdings ("CBOE");
- Cigna Corp. ("CI");
- CME Group ("CME");
- Forrester Research ("FORR");
- Intercontinental Exc. ("ICE");
- Kroger Co. ("KR");
- Mercury General ("MCY");
- O'Reilly Automotive ("ORLY");

[37] *Ahern* at 47.

- Pinnacle Foods ("PF"); and,
- WD-40 Co. ("WDFC")

The basis of selection and the comparison group's regression statistics are shown on pages 1 – 3 of Schedule 14.

Q. HOW DID YOU CALCULATE COMMON EQUITY COST RATES FOR THE NON-PRICE REGULATED PROXY GROUP THAT IS COMPARABLE IN TOTAL RISK TO MR. LIU'S PROXY GROUP?

A. I applied the DCF in a manner identical to Mr. Liu's application of the DCF and the CAPM in a manner identical to my correction of Mr. Liu's CAPM analysis for his water proxy group as shown on Schedule 9.

Page 5 of Schedule 14 contains the derivation of the DCF cost rates. Following Mr. Liu's reliance upon the average of the mean high and median high DCF indicated common equity cost rates for his water proxy group, an 18.31%[38] cost rate is indicated for the non-price regulated proxy group. However, in my judgment, 14.39%[39], the average of the mean and median DCF results based upon the Yahoo Finance EPS projected growth rates of 14.82% (mean) and 13.97% (median) is an appropriate DCF conclusion because it is based upon theoretically correct projected earnings per share ("EPS") growth as discussed below.

Q. PLEASE EXPLAIN WHY EPS GROWTH RATES ARE THEORETICALLY CORRECT TO USE IN A DCF ANALYSIS.

[38] 18.31% = (20.26% + 16.36%)/2.
[39] 14.39% = (14.82% + 13.97%/2.

A. Rate of return analysts must attempt to emulate investor behavior in their rate of return analyses and evaluate those factors that influence investor behavior. Security analysts' forecasted EPS growth rates are one such factor. As discussed previously in my Direct Testimony[40] and noted by Dr. Morin, what is relevant to investor behavior is the fact that security analysts' forecasted EPS growth rates influence investors' pricing decisions. Moreover, as noted above, both the cost of common equity as well as ratemaking by this Commission are prospective or forward-looking. The cost of common equity is forward-looking as it is a function of investor expectations. Likewise, this Commission's ratemaking is forward-looking as rates set in this proceeding will be in effect in a future period.

Mr. Liu's use of growth rates other than security analysts' EPS growth forecasts in his DCF also ignores the significant body of empirical evidence indicating the superiority of the use analysts' EPS growth rates in a DCF analysis and that analysts' forecasts of earnings remain the best predictor of growth to use in the DCF model. Mr. Liu has no justification for ignoring such ample evidence of the proven reliability and superiority of analysts' forecasts of EPS. Implicitly, Mr. Liu acknowledges as much when he uses an expected dividend yield in his DCF analysis, which is forward looking, based, in part, upon *Value Line* projected growth rates and Yahoo Finance EPS projected growth to derive the average growth rate he uses to calculate the expected dividend yield.

[40] *Ahern* at 23.

Q. PLEASE DESCRIBE SOME OF THE EMPIRICAL EVIDENCE SUPPORTING THE RELIABILITY AND SUPERIORITY OF THE USE OF ANALYSTS' EPS GROWTH RATES IN A DCF ANALYSIS.

A. As previously discussed,[41] over the long run, there can be no growth in DPS without growth in EPS. While security analysts' earnings expectations are not the only influence on market prices, they have a more significant influence on market prices than dividend expectations. Thus, the use of projected 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 because projected earnings growth rates have a significant influence on market prices and the appreciation or "growth" experienced by investors.[42] This should be evident even to relatively unsophisticated investors just by listening to financial news reports on radio, TV or reading the newspapers.

In addition, Myron Gordon, the "father" of the standard regulatory version of the DCF model widely utilized throughout the United States in rate base/rate of return regulation, recognized the significance of analysts' forecasts of growth in EPS in a speech he gave in March 1990 before the Institute for Quantitative Research and Finance.[43] As Professor Gordon stated[44]:

> 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. . . (page 13 of Schedule 15)

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41 *Ahern* at 23.
42 Morin at 298-303 *See* Exhibit PMA-RT1, Schedule 3.
43 Myron J. Gordon, "The Pricing of Common Stocks', Presented before the Spring 1990 Seminar, March 27, 1990 of the Institute for Quantitative Research in Finance, Palm Beach Fl. *See* Exhibit PMA-RT1, Schedule 15.
44 Gordon at 12.

Professor Gordon recognized that total return is largely affected by the terminal price which is mostly affected by earnings (hence price earnings multiples). However, while EPS is the most significant factor influencing market prices, it is by no means the only factor that affects market prices, as recognized by Bonbright[45] when he stated:

> *[w]hatever 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. In short, market prices are beyond the control, though not beyond the influence of rate regulation. (italics added) (page 3 of Schedule 11)

As Professor Gordon noted, studies performed by Cragg and Malkiel[46] demonstrate that analysts' forecasts are superior to historical growth rate extrapolations. While some question the accuracy of analysts' forecasts of EPS growth, the level of accuracy of those analysts' forecasts well after the fact does not really matter for our purposes. What is important is that the forecasts reflect widely held expectations influencing investors at the time they make their pricing decisions and hence the market prices they pay.

Jeremy J. Siegel also notes the importance of security analysts' EPS growth estimates to investors when he states[47]:

> For the equity holder, the source of future cash flows is the earnings of firms.

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[45] Bonbright, Danielsen, & Kamerschen at 334. *See* Exhibit PMA-RT1, Schedule 11.

[46] John G. Cragg and Burton G. Malkiel, Expectations and the Structure of Share Prices (University of Chicago Press 1982) Chapter 4. *See* Exhibit PMA-RT1, Schedule 16

[47] Jeremy J. Siegel, Stocks for the Long Run – The Definitive Guide to Financial Market Returns and Long-Term Investment Strategies (McGraw-Hill 2002) at 90-94. *See* Exhibit PMA-RT1, Schedule 17.

* * *

> Some people argue that shareholders most value stocks' cash dividends. But this is not necessarily true.
>
> * * *
>
> Since the price of a stock depends primarily on the present discounted value of all expected future dividends, it appears that dividend policy is crucial to determining the value of the stock.
>
> However, this is not generally true.
>
> * * *
>
> Since stock prices are the present value of future dividends, it would seem natural to assume that economic growth would be an important factor influencing future dividends and hence stock prices. However, this is not necessarily so. The determinants of stock prices are earnings and dividends on a per-share basis. Although economic growth may influence aggregate earnings and dividends favorably, economic growth does not necessarily increase the growth of per-share earnings of dividends. It is earnings per share (EPS) that is important to Wall Street because per-share data, not aggregate earnings or dividends, are the basis of investor returns. (italics in original) (pages 4 – 8 of Schedule 17)

Moreover, there is no empirical evidence that investors would disregard analysts' estimates of growth in earnings per share. "Do Analyst Conflicts Matter? Evidence From Stock Recommendations"[48] by Anup Agrawal and Mark A. Chen 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 when they state: "our findings do not support the view that

[48] Anup Agrawal and Mark A. Chen, "Do Analysts' Conflicts Matter? Evidence from Stock Recommendations", Journal of Law and Economics (August 2008), Vol. 51 at 503-537. *See* Exhibit PMA-RT1, Schedule 18.

conflicted analysts are able to systematically mislead investors with optimistic stock recommendations".[49]

Agrawal and Chen explain[50] :

> Overall, our empirical findings suggest that while analysts do respond to IB and brokerage conflicts by inflating their stock recommendations, the market discounts these recommendations after taking analysts' conflicts into account. These findings are reminiscent of the story of the nail soup told by Brealey and Myers (1991), except that here analysts (rather than accountants) are the ones who put the nail in the soup and investors (rather than analysts) are the ones to take it out. Our finding that the market is not fooled by biases stemming from conflicts of interest echoes similar findings in the literature on conflicts of interest in universal banking (for example, Kroszner and Rajan, 1994, 1997; Gompers and Lerner 1999) and on bias in the financial media (for examples, Bhattacharya et al. forthcoming; Reuter and Zitzewitz 2006). Finally, while we cannot rule out the possibility that some investors may have been naïve, our findings do not support the notion that the marginal investor was systematically misled over the last decade by analysts' recommendations. (page 29 of Schedule 18)

Therefore, given the overwhelming academic / empirical support regarding the superiority of security analysts' EPS growth rate forecasts, such EPS growth rate projections should have been exclusively relied upon by Mr. Liu in his DCF analysis.

Consequently, in my correction of Mr. Liu's CE, I have relied upon an average of the mean (14.82%) and median (13.97%) DCF results using Yahoo Finance EPS projected growth forecasts or 14.39% as shown on page 4 of Schedule 14.

Page 6 of Schedule 14 contains my correction of the CAPM applied to the non-price regulated proxy group comparable in total risk to Mr. Liu's water proxy group. The average CAPM/ECAPM result is 10.66% and median CAPM/ECAPM result is 10.57%.

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[49] Agrawal & Chen at 531. *See* Exhibit PMA-RT1, Schedule 18.
[50] Agrawal & Chen at 531. *See* Exhibit PMA-RT1, Schedule 18.

Based upon Mr. Liu's reliance upon his median CAPM result, I will use 10.57%, median CAPM/ECAPM results as the indicated CAPM result for the non-price regulated proxy group comparable in total risk to Mr. Liu's water proxy group.

Q. WHAT IS YOUR CONCLUSION OF THE COMMON EQUITY COST RATE BASED UPON THE NON-PRICE REGULATED PROXY GROUP?

A. It is 12.48% as shown on page 4 of Schedule 14. The results of the DCF and CAPM applied to the non-price regulated group are 14.39% and 10.57%, respectively, which average 12.48%.[51] Based upon these results, the average of the mean and median results of the three models, which is 11.57% for the non-price regulated proxy group.

iv. Corrected Conclusion of Mr. Liu's Costs of Common Equity

Q. WHAT WOULD MR. LIU'S CONCLUSIONS OF COMMON EQUITY COST RATE BE BASED UPON THE CORRECTIONS TO THE CAPM ANALYSES DISCUSSED ABOVE?

A. Based upon the corrections to Mr. Liu's CAPM analyses, as well as the inclusion of the results of market models applied to a non-price regulated proxy group comparable in total risk to the water proxy group discussed above, the analyses produce the following:

[51] 12.48% = (14.39% + 10.57%)/2.

Table 2

DCF	9.25%
CAPM	10.58%
CE	12.48%

Based upon these results, indicated cost rate of common equity average result based upon Mr. Liu's analysis is 10.77%[52], while the midpoint of the range[53] of 9.25% - 12.48% is 10.87%. However, these cost rates still understate EWAZ's common equity cost rate because they do not reflect any adjustments for EWAZ's greater credit or unique business due to its smaller relative size as will be discussed below.

v. Credit Risk Adjustment

Q. DOES YOUR CORRECTION TO MR. LIU'S COMMON EQUITY COST RATE ANALYSIS ADEQUATELY REFLECT THE RISK IMPLICATIONS OF EWAZ'S GREATER CREDIT RISK RELATIVE TO HIS WATER PROXY GROUP?

A. No. As previously discussed,[54] if EWAZ's bonds were rated by Moody's and / or S&P, they would likely be rated in the A / A bond (or long-term issuer credit) rating category, specifically A3 / A-, respectively. In contrast, the average Moody's and S&P bond (long-term issuer) ratings for his water proxy group are A2 and A, respectively, as can be gleaned from page 5 of Schedule 5 of Exhibit PMA-DT2.[55]

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[52] 10.77% = (9.25% + 10.58% + 12.48%)/3.

[53] 10.87% = (9.25% + 12.48%)/2. Note that Mr. Liu's recommended common equity cost rate for EWAZ is based upon the midpoint of his range of common equity cost rate results: 9.25% (DCF) and 9.75%. (CE).

[54] *Ahern* at 51 – 52.

[55] Note that none of the bond ratings of any of the companies in the Water Proxy Group have changed since the filing of my Direct Testimony.

Consequently, EWAZ experiences somewhat greater credit risk than Mr. Liu's water proxy group on average. Consistent with the financial principle of risk and return, *i.e.*, that investors require greater returns for bearing greater risk, the cost of common equity derived from the market data of his water proxy group must be adjusted to reflect EWAZ's greater credit risk relative to that group because it reflects that group's lower credit risk.

An indication of the magnitude of the necessary upward adjustment to reflect the greater credit risk inherent in EWAZ's likely A3 Moody's bond (long-term issuer credit) rating is one-third of a three-month ending December 2017, average spread between Moody's A and Baa rated public utility bond yields of 0.35% or 0.12%[56] as shown in Table 3 below:

Table 3: Selected Bond Yields[57]

	Moody's A Rated Public Utility Bond Yield	Moody's Baa Rated Public Utility Bond Yield	Spread
December 2017	3.79%	4.14%	0.35%
November 2017	3.83%	4.17%	0.34%
October 2017	3.91%	4.26%	0.35%
Average			0.35%

vi. Business Risk Adjustment

Q. DOES YOUR CORRECTION TO MR. LIU'S COMMON EQUITY COST RATE ANALYSIS ADEQUATELY REFLECT THE RISK IMPLICATIONS OF EWAZ'S SMALL SIZE RELATIVE TO HIS WATER PROXY GROUP?

[56] 0.12% = (1/3) * 0.35%.
[57] Bloomberg Professional Services, January 31, 2018.

A. No. As also discussed previously,[58] 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 much larger, more geographically diverse holding companies.

Further evidence of the risk effects of size includes 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 EWAZ's jurisdictional rate base because it is EWAZ's rates which will be set in this proceeding. The fair rate of return allowed must relate to where capital is invested. In other words, it is the use of the 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 EWAZ, including the impact of its small size on common

[58] *Ahern* at 52 – 54.

equity cost rate. As demonstrated below, EWAZ is significantly smaller than the average water company in Mr. Liu's water proxy group based upon estimated market capitalization.

Consistent with the financial principle of risk and return discussed above, such increased risk due to small size must be reflected 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 THESE FUNDS?

A. Yes. As Brealey and Myers state[59]:

> *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
>
> 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.* (page 5 – 6 of Schedule 6)

In addition, Haim Levy and Marshall Sarnat state[60]:

[59] Brealey & Myers at 204-205 (emphasis added in first paragraph). *See* Exhibit PMA-RT1, Schedule 6.

> 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 [sic] from that of the firm, an adjustment should be made in the required discount rate, to reflect this deviation in the risk profile. (pages 3 – 4 of Schedule 19)

It is fundamental that individual investors expect a return commensurate with the risk associated with where their capital is invested. Hence, EWAZ must be viewed on its own merits. As *Bluefield* 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; . . .

Thus, *Bluefield* is clear 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 EWAZ. Therefore, it is the total investment risk of EWAZ and its rate base alone that is relevant.

Q. PLEASE COMPARE THE SIZE OF EWAZ WITH THAT OF MR. LIU'S WATER PROXY GROUP.

[60] Haim Levy and Marshall Sarnat, Capital Investments and Decisions, 5th Ed. (Prentice/Hall International, 1986) at 464-465. *See* Exhibit PMA-RT1, Schedule 19.

A. Page 1 of Schedule 20 contains a summary of an indicated small size risk adjustment based upon the SBBI – 2017[61] size premium study, while page 2 contains a summary of the market capitalizations based upon each of Mr. Liu's water utility companies using his average high / low market prices for the three months ended January 2018. As shown in Table 4 below, EWAZ is significantly smaller than the average water utility based upon market capitalization as shown below:

Table 4

	Market Capitalization (1) ($ millions)	Times Greater than EWAZ ($ Millions)
Mr. Liu's Water Proxy Group	$1,968.159	2.6x
EWAZ	763.024	

(1) From page 1 of Schedule 20.

Based upon Mr. Liu's water proxy group's average market-to-book ratio for the three months ended December 2017, EWAZ's market capitalization is estimated to be $763.024 million, as shown in Table 4 above. In contrast, the market capitalization of the average water utility in Mr. Liu's water proxy group was $1.968 billion, or 2.6 times larger than EWAZ's estimated market capitalization.

Because of EWAZ's extremely small estimated market capitalization, relative to that of the water proxy group, a 0.57% small size risk premium, or the difference between the size premium applicable to the 8th decile in which EWAZ falls and the 5th decile in which the average company in the Mr. Liu's water proxy group falls, is justified. Although an adjustment of 0.42% is indicated by the SBBI – 2017 size premium study, in

[61] SBBI – 2017 at 7-16. *See* Exhibit PMA-RT1, Schedule 2

my opinion an adjustment to common equity cost rate of 12 basis points represents an extremely conservative and reasonable size premium which would be applicable to EWAZ based upon its smaller relative size.

In view of the foregoing, a credit and business (size) risk adjustments of 12 basis points and 12 basis points, respectively, are necessary. When added to a corrected common equity cost rate of 10.77%, a risk-adjusted common equity cost rate of 11.01%[62] results, which is significantly higher than Mr. Liu's common equity cost rate of 9.50% based upon a range of 9.25% to 9.75% and somewhat higher than EWAZ's requested common equity cost rate of 10.60%.

vii. Fair Value Rate Base ("FVRB") Incremental Return

Q. PLEASE COMMENT UPON MR. LIU'S CALCULATION OF THE FAIR VALUE RATE BASE ("FVRB") INCREMENTAL RATE OF RETURN.

A. Mr. Liu's recommended FVRB incremental return of 0.48%[63] based upon the FVRB increment authorized in EWAZ's most recent wastewater rate case (Docket No. WS-01303A-16-0145) and alternative method he used to estimate a FVRB incremental return of 1.57%[64] are both incorrect.

Mr. Liu's recommended 0.48% FVRB incremental return is incorrect because it is not based upon an empirical analysis of the appropriate risk-free and inflation rates. In fact, the 0.48% FVRB incremental return is not estimated at all, it is merely adopted

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62 11.01% = 10.77% + 0.12% + 0.11%.
63 *Liu* at 28.
64 *Liu* at 28.

by Mr. Liu as his recommendation because it is between 0.0% and 1.57% estimated using his alternative method.

Mr. Liu's alternative method for estimating the 1.57% is based upon the spread between the average nominal yield (*i.e.*, unadjusted for inflation) on 30-year U.S. Treasury Bonds and average inflation as measured by the Consumer Price Index ("CPI"), for the years 2009 – 2017.[65] However, Mr. Liu's alternative method is incorrect. First, the method ignores the prospective nature of ratemaking and the cost of capital, with which Mr. Liu concurs as discussed above. Second, as previously discussed[66], because the FVRB is an equal blend, or average, of the Original Cost Less Depreciation ("OCRB") and the Reconstructed Cost New Depreciated rate bases ("RCND"), the FVRB includes only a portion of the historical rate base. Therefore, it is appropriate to use both prospective inflation and the prospective nominal risk-free rate averaged with historical inflation and the historical nominal risk-free. Because the average life of EWAZ's utility plant is between 22 and 23 years,[67] it is appropriate to measure the average historical inflation and risk-free rate over approximately 23 years, as I have done in estimating my FVRB incremental return of 1.10%.[68] and

Therefore, the Commission should reject Mr. Liu's recommended 0.48% FVRB incremental return and adopt a FVRB incremental return of 1.10%.

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65 *Liu* at 28 and Exhibit YNL-1, Schedule 10.
66 *Ahern* at 57.
67 *Ahern* at 57.
68 *See* Exhibit PMA-DT2, Schedule 10.

IV. RESPONSE TO THE DIRECT TESTIMONY OF MR. CASSIDY

Q. PLEASE PROVIDE A SUMMARY OF MR. CASSIDY'S DIRECT TESTIMONY AND RECOMMENDATIONS.

A. Mr. Cassidy estimates EWAZ's cost of common equity based upon: 1) the constant growth DCF model (9.57%); 2) the CAPM (7.74%); and 3) the Comparable Earnings Model (11.75%). Mr. Cassidy recommends a 9.69% common equity cost rate for EWAZ by equally weighting these results.[69] He also recommends a FVRB incremental return of 0.9973% based upon a recent three-month average yield on 30-year U.S. Treasury Bonds and an inflation component of 0.50% over the same three- month to reduce inflation from the FVRB.[70]

a. General Economic Conditions

Q. PLEASE SUMMARIZE THE FINANCIAL AND ECONOMIC CONDITIONS THAT MR. CASSIDY DISCUSSES IN HIS DIRECT TESTIMONY.

A. Mr. Cassidy devotes a considerable portion of his Direct Testimony[71] to reviewing articles, press releases, and historical data, concluding that the suggestion that long-term interest rates and inflation will remain low on a going-forward basis. He further concludes that "the cost of equity will continue to remain low for an extended period of time"[72] and that future Gross Domestic Product ("GDP") growth will also decline from past levels, based upon a decline in productivity growth.[73]

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69 *See* Direct Testimony of John A. Cassidy (hereinafter "*Cassidy*") at iii.
70 *Cassidy* at 67.
71 *Cassidy* at 6 – 27, more than one-third of his Direct Testimony.
72 *Cassidy* at 27.
73 *Cassidy* at 27.

Q. PLEASE COMMENT UPON MR. CASSIDY'S CONCLUSIONS RELATIVE TO INCREASES IN THE FEDERAL FUNDS ("FED FUNDS") RATE.

A. Although acknowledging the January 1, 2018 *Blue Chip* expectation which implied three additional increases in the Fed Funds rate by the Federal Open Market Committee ("FOMC") by the end of 2018.[74], Mr. Cassidy's judgment as to the future direction of economic measures is based upon sources which predate December 31, 2017, the most recent few being from the third quarter 2017. In its March 21, 2018 press release, immediately after the March 20 – 21, 2018 FOMC meeting, the Fed stated[75]:

> Consistent with its statutory mandate, the Committee seeks to foster maximum employment and price stability. The economic outlook has strengthened in recent months. The Committee expects that, with further gradual adjustments in the stance of monetary policy, economic activity will expand at a moderate pace in the medium term and labor market conditions will remain strong. Inflation on a 12-month basis is expected to move up in coming months and to stabilize around the Committee's 2 percent objective over the medium term. Near-term risks to the economic outlook appear roughly balanced, but the Committee is monitoring inflation developments closely.
>
> In view of realized and expected labor market conditions and inflation, the Committee decided to raise the target range for the federal funds rate to 1-½ to 1-¾ percent.
>
> * * *
>
> The Committee expects that economic conditions will evolve in a manner that will warrant further gradual increases in the federal funds rate; the federal funds rate is likely to remain, for some time, below levels that are expected to prevail in the longer run. (pages 1 – 2 of Schedule 21)

[74] *Cassidy* at 19.

[75] Federal Reserve: Press Release, December 14, 2016, 2 p.m. EST. *See* Exhibit PMA-RT1, Schedule 21.

In reporting on the FOMC's March 21, 2018 Fed Funds increase, Donna Borak with CNN Money stated[76]:

> Interest rates are going up.
>
> The Federal Reserve raised rates on Wednesday in its first meeting under Chairman Jerome Powell – a sign of confidence that the economy is growing stronger with very low unemployment and rising wages.
>
> * * *
>
> The brightening economic outlook also prompted a shift in rate forecasts, with Fed officials now expecting to raise rates next year by another 0.75 percentage point [sic], likely in three quarter-point moves.
>
> * * *
>
> It was the sixth increase since December 2015, when the Fed started tightening monetary policy for the first time after the financial crisis.
>
> * * *
>
> [T]the central bank stuck to its plans for three interest rate hikes this year, reinforcing the message that it plans to maintain gradual increases.
>
> But the Fed signaled it may favor a more aggressive pace to keep the economy humming in the coming years. It shifted its plans for next year, calling for three more rate hikes instead of two.
>
> * * *
>
> Central bankers did offer hints that they may be inclined to raise rates more frequently this year to keep the economy from overheating. Nearly half of FOMC members now believe that will be necessary if the economy keeps performing as well as they expect.
>
> * * *
>
> The Fed now expects faster economic growth this year – 2.7%, up from a forecast of 2.5% in December. That was before Republican tax cuts were enacted and lawmakers made a deal for $300 billion in additional government spending.

[76] CNN Money, Donna Borak, "Fed raises interest rates in Powell's debut." March 21, 2018, http://money.cnn.com/2019/03/21/news/economy/us-interest-rates-fed/index.html. *See* Exhibit PMA-RT1, Schedule 22.

> Policy makers also maintained their inflation outlook of 1.9%, slightly below the Fed's target.
>
> * * *
>
> The Fed's preferred gauge of inflation stands at 1.5%. But central bankers expect it to "move up" this year, and data show it was already "a little bit higher" by the end of last year. Policy makers said Wednesday they now expect inflation to rise above their 2% target next year and in 2020. (pages 1 – 2 of Schedule 22)

Also, Patti Domm with CNBC reported[77]:

> Markets saw the Fed's rate hike and forecasts as initially good news for risk markets since officials did not add another rate hike for this year and are more optimistic on the economy.
>
> As expected, the Fed raised the fed funds target rate range by a quarter point from 1.50 percent to 1.75 percent. It kept the number of rate hikes expected for 2018 at three. But it did increase its long run rate to 2.9 percent, from 2.75, and added rate hikes in 2019 and 2020.
>
> * * *
>
> "*The big picture is they expect to continue to raise rates three, maybe, four, times this year and they expect to raise rates three times next year, more now than they did back in December, but they're not in a rush*," said Ward McCarthy, chief financial economist at Jeffries.
>
> * * *
>
> "*The hawks are thinking we could have a higher neutral rate. They added a line saying the economic outlook strengthened in recent months. But I think that just reinforces the idea that come June, they're going to be talking about four hikes,"* said Briggs.

Finally, Jeffry Bartash with MarketWatch reported[78]:

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[77] CNBC, Patti Domm, "Fed hike and economic forecast seen as a double-edged sword for markets." March 21, 2018, https://www.cnbc.com/2018/03/21/fed-hike-and-forecast-seen-as-a-duouble-edged-sword-for-markets.html. *See* Exhibit PMA-RT1, Schedule 23. (emphasis added)

[78] *M*arket*W*atch, Jeffry Bartash, "Fed's Powell seeks 'middle ground,' but others on FOMC push aggressive approach." March 22, 2018, https:www.marketwatch.com/story/why-the-fed-might-be-a little-more-

> The Fed on Wednesday raised its benchmark fed funds rate as expected and signaled it's still on track to raise rates a total three times in 2018. Many Wall Street . . . pros thought the Fed might pencil in four rate hikes this year because of higher inflation and an ultra-tight labor market.
>
> * * *
>
> Yet forecasts released by the Fed after it raised rates suggest a growing number of Fed officials want the central bank to start sliding over to the fast lane.
>
> For one thing, *the Fed raised its projection on where it expects its benchmark rate to end up in the long run. The central bank upped its long-run estimate to 2.9% from 2.8% and it's likely to raise it even further, reversing a long process during which the Fed lowered its target.*
>
> What's more, *seven of the 15 participants on the Fed's policymaking arm favored four rate hikes in 2018, compared to just four members at the end of 2017*. That number could grow if the U.S. economy expands as fast and the unemployment rate falls as low as the Fed now predicts.
>
> In its latest forecast, the Fed predicted the U.S. would grow 2.7% this year and 2.4% next year – well above the 1.8% percentage point below the pace that the central bank views as consistent with stable inflation.
>
> Similarly, the Fed forecast the jobless rate to fall to as low as 3.6% from the current rate of 4%. That's almost a full percentage point below the 4.5% rate at which the central bank believes wage-related inflation would accelerate.
>
> * * *
>
> The newly altered 2.9% estimate is still extremely low by historical standards (and roughly the same as the 10-year Treasury) . . . . The fed funds rate, for example, topped out at 5.25% at the height of the last economic expansion from 2001 to 2007.
>
> If the Fed keeps raising its long-run target for its benchmark interest rate, it would almost certainly mean the central bank plans to raise rates more

worried-than-it-lets-on-about-inflaton-2018-03-21/print. (*See* Exhibit PMA-RT1, Schedule 24) (emphasis added)

aggressively. But it could also be a sign the growth potential for the U.S. economy is finally improving. (pages 1 – 2 of Schedule 24.)

In addition, market data contradict Mr. Cassidy's judgment. For example, according to the FedWatch Tool compiled by the CME Group [79], investors currently see a 97.6% likelihood of up to five further increases in the Fed Funds rate by the end of 2018. As shown in Table 5 below, on March 23, 2018, the market was anticipating at least one additional rate hike (97.6% probability) and possibly a second hike (76.9% probability,) by December 2018 (assuming 25 basis point rate hikes) as shown in the 12/19/18 column below. In fact, the probability of no increase in the coming year is only 0.4%.[80]

Table 5: Probability of Federal Funds Rate Increases

	Federal Reserve Meeting Date					
Target Rate (bps)	5/2/18	6/13/18	8/1/18	9/26/18	11/8/18	12/19/18
150-175	97.9%	14.7%	13.8%	4.7%	4.2%	2.4%
175-200	2.1%	83.6%	79.4%	36.4%	33.1%	20.7%
200-225		1.8%	6.7%	54.9%	52.9%	44.0%
225-250			0.1%	0.1%	9.2%	28.4%
250-275					0.5%	4.3%
275-300						0.2%
Total	2.1%	85.4%	86.2%	91.4%	95.7%	97.6%
Probability Increase						
175-200	1	85.4%	86.1%	91.4%	95.7%	97.6%
200-225	2	0.0%	6.8%	55.0%	62.6%	76.9%

[79] Source: http://www.cmegroup.com/trading/interest-rates/countdown-to-fomc.html, accessed 3/23/2018.
[80] 0.04% = 100.0% - 97.6%.

* 97.6% = 20.7% + 44.0% + 28.4% + 4.3% + 0.2%.
** 76.9% = 44.0% + 28.4% + 4.3% + 0.2%

In summary, neither the FOMC's statements relative to its decision to increase the Fed Funds rate on March 21, 2018, CNN Money, CNBC, *M*arket*W*atch , nor market data, (*i.e.*, the CME Group's FedWatch Tool) support Mr. Cassidy's judgment relative to interest rates.

Q. PLEASE COMMENT UPON MR. CASSIDY'S CONCLUSIONS RELATIVE TO FUTURE EQUITY RETURNS AND GDP GROWTH.

A. Relative to persistently low future equity returns, I again disagree with Mr. Cassidy's conclusions. First, the expected return on the market as measured by analyzing the expected return on the market which formed the basis of Mr. Cassidy's market equity risk premium for his CAPM is 13.67% as shown on Schedule JAC-4, page 2 and 13.03% when the inverse relationship between equity risk premiums and interest rates (as discussed below) is taken into consideration.[81] Expected market returns of 13.67% and 13.03% are highly consistent with the long-term average market return of approximately 12.00%, especially when we consider the historical volatility of approximately 20.00%.[82] Both of these expected market returns also fall within the 49th percentile of observed market returns from 1926 – 2016 which will be discussed below.

Mr. Cassidy also cites to a McKinsey report to support his conclusion that future market returns will be lower than average. The McKinsey report, however, notes that

[81] *See* Exhibit PMA-RT1, Schedule 25.
[82] SBBI – 2017 at 6-17. *See* Exhibit PMA-RT1, Schedule 2.

although it explores many factors that could affect future returns, its assessments are scenarios, not forecasts:

> These outcomes are scenarios rather than forecasts, and other factors we have not explored could affect the business and other fundamentals. Technology and innovation might turn out to have less impact on productivity, growth, and margins than is commonly expected–or advances that are still below the radar could make current expectations look far too conservative.[83]

I therefore take exception to the weight that Mr. Cassidy gives to the McKinsey report.

As to his view regarding lower expected GDP growth, Mr. Cassidy focuses on current and forecasted lower productivity growth to support his conclusion. He then cites an Economic Letter published by the Federal Reserve Bank of San Francisco to support his position.[84] However, Mr. Cassidy's summarization included the periods 1948-1973, 1973-1995, 1995-2004, and 2004-2015. The Economic Letter cited by Mr. Cassidy stated that the history of productivity growth has shifted between normal and exceptional periods. Unusually influential innovations (*e.g.* internal combustion engine, microprocessor) typically lead to complementary innovations that boost productivity growth. The periods including 1948-1973 and 1995-2004 are classified as "exceptional" by the author of the Letter because of the expansion of critical infrastructure (such as electricity and highways) and information technology. The periods including 1973-1995 and 2004-2015 are classified as "normal" or mean-reverting. As Mr. Cassidy states, "the

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[83] McKinsey Global Institute, *Diminishing Returns: Why investors may need to lower their expectations*, May 2016 at 25. *See* Exhibit PMA-RT1, Schedule 26.

[84] John Fernald, "What is the New Normal for U.S. Growth?", *Economic Letter 2016*-30, Federal Reserve Bank of San Francisco (October 11, 2016) at 1. http*://www.frbsf.org/economic-research/publications/economic-letter/2016/october/new-normal-for-gdp-growth/*. *See* Exhibit PMA-RT1, Schedule 25.

major source of uncertainty about the future is productivity growth."[85] It is unclear why Mr. Cassidy would rely solely upon productivity growth (ignoring all other factors that influence GDP) for his conclusion that GDP will grow slowly when, as he points out, it is the most unpredictable factor of GDP. Absent specific knowledge to the contrary, it is reasonable to assume that over time, real GDP growth will revert to its long-term mean of approximately 3.3%.[86]

In view of all the foregoing, it is clear that capital costs are rising and will continue to do so. Consequently, Mr. Cassidy's conclusions regarding current and future economic conditions, expected equity returns (*i.e.*, the cost of common equity) and real GDP growth should be afforded little, if any, weight by the Commission.

b. <u>Common Equity Cost Rate</u>

i. Discounted Cash Flow Model ("DCF")

Q. PLEASE COMMENT UPON MR. CASSIDY'S DCF ANALYSIS.

A. Even though I do not agree with Mr. Cassidy's estimation of growth in the DCF, his conclusion of a DCF cost rate of 9.57% is reasonable in my opinion. Thus, I will not address Mr. Cassidy's DCF analysis.

ii. Capital Asset Pricing Model ("CAPM")

Q. PLEASE COMMENT UPON MR. CASSIDY'S CAPM ANALYSIS.

A. Mr. Cassidy's CAPM analysis is flawed in three respects. First, he has incorrectly relied upon a historical (*i.e.*, recent)[87] risk-free rate despite the fact the both ratemaking and the

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[85] *Cassidy* at 27.
[86] Source: Bureau of Economic Analysis.
[87] Average for November 2017 – January 2018.

cost of capital are prospective. Second, he incorrectly calculated the market equity risk premium by relying upon achieved, or non-market based, rates of return on book common equity for the S&P 500, a proxy for the market. Third, Mr. Cassidy did not incorporate an ECAPM analysis even though empirical evidence indicates that the low-beta securities, such as utilities, earn returns higher than the CAPM predicts and high-beta securities earn less.

Q. PLEASE COMMENT UPON MR. CASSIDY'S USE OF THE 20-YEAR U.S. TREASURY BOND YIELD AS THE RISK-FREE RATE.

A. First, as with the impropriety of Mr. Liu's use of the 20-year U.S. Treasury Bond yield for cost of capital purposes, Mr. Cassidy's use of the 20-year U.S. Treasury Bond yield is also inappropriate for the same reasons. As discussed above, the horizon of the chosen risk-free rate is a function of the horizon of the investment and supported by both SBBI – 2017 and Dr. Morin.

As SBBI – 2017 notes[88]:

> The 30-year bond that the Treasury returned to issuing in 2006 is theoretically more correct when dealing with to the long-term nature of business valuation. . . (page 6 of Schedule 2)

To reiterate Dr. Morin's confirmation, he states[89]:

> …[b]ecause common stock is a long-term investment and because the cash flows to investors in the form of dividends last indefinitely, the yield on very long-term government bonds, namely, the yield on 30-year Treasury bonds, is the best measure of the risk-free rate for use in the CAPM[5(footnote omitted)]. …The expected common stock return is based on long-term cash flows, regardless of an individuals' holding time period. (page 14 of Schedule 3)

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88 SBBI – 2017 at 10-22. *See* Exhibit PMA-RT1, Schedule 2.

89 Morin at 151. *See* Exhibit PMA-RT1, Schedule 3.

With the expectation that the U.S. Treasury Bond will be held to maturity, there is no market or unexpected inflation risk associated with its yield. Consequently, the yield, or income return, on 30-year U.S. Treasury Bonds is the appropriate yield to use as the risk-free rate in a CAPM analysis, and not the 20-year bond. [90]

Second, as discussed below, also like Mr. Liu, Mr. Cassidy incorrectly relies upon an historical or recent yield on U.S. Treasury Bonds as his risk-free rates.

Q. WHY IS MR. CASSIDY'S USE OF HISTORICAL YIELDS (*I.E.*, A RECENT THREE-MONTH AVERAGE) ON U.S. TREASURY BONDS NOT APPROPRIATE FOR COST OF CAPITAL PURPOSES?

A. Like Mr. Liu, Mr. Cassidy's use of current, not projected, yields on 20-year U.S. Treasury Bonds ignores the fact that the cost of capital and ratemaking are prospective. Again, similarly to Mr. Liu, Mr. Cassidy concurs when he states[91]:

> From a technical perspective, a "fair rate of return" is an ex-post (after the fact) earned return on an asset base. Conversely, the cost of capital is an ex-ante (before the fact) expected, or required, return on a capital base. In regulatory proceedings, the two terms are often used interchangeably.

Mr. Cassidy, once again similarly to Mr. Liu, implicitly agrees when he uses, in part, projected growth rates in his DCF analysis. As noted above, 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 future risks. Ratemaking is also prospective in that the rates set in this proceeding will be in effect for a period in the future.

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[90] Curiously, Mr. Cassidy correctly used 30-year U.S. Treasury Bond yields in estimating his FVRB increment.

[91] *Cassidy* at 5.

Therefore, the appropriate risk-free rate available at the time of the preparation of Mr. Cassidy's Direct Testimony is the average consensus forecast of 3.54%, as derived in Note 2 on page 1 of Schedule 9.[92]

Q. PLEASE COMMENT UPON MR. CASSIDY'S ESTIMATION OF THE MARKET EQUITY RISK PREMIUM FOR HIS CAPM ANALYSIS.

A. Mr. Cassidy's derivation of the market equity risk premium for his CAPM analysis is flawed because he incorrectly relied upon achieved rates of return on book common equity for the S&P 500.

Q. PLEASE EXPLAIN.

A. Mr. Cassidy used the achieved rates of earnings on book common equity of the S&P 500 Composite for the period 1978 - 2016 as shown on Schedule JAC-4, page 2. The underlying theory of the CAPM requires the use of an expected market return, a financial principle with which Mr. Cassidy implicitly concurs, as previously stated.[93] Therefore, the use of historically achieved earnings on book common equity is inconsistent with both the principle of the cost of common equity as a function of investor expectations reflected in market prices and market returns, and not earned returns on book common equity, the prospective nature of the cost of capital and ratemaking, as well as with the very theory of the CAPM.

Moreover, the use of a market equity risk premium measured over such a short period is inconsistent with the long-term nature of the cost of capital, the perpetual life of

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[92] Both the December 1, 2017 and January 1, 2018 *Blue Chip Financial Forecasts* were available when Mr. Cassidy conducted his rate of return analyses in mid-January 2018.

[93] *Cassidy* at 5.

common stock, as well as the infinite horizon presumed by the DCF model. In addition, the CAPM can be manipulated by the time period used to calculate the overall market return. SBBI – 2017 notes [94]:

> The estimate of the equity risk premium depends on the length of the data series studied. A proper estimate of the equity risk premium requires a data series long enough to give a reliable average without being unduly influenced by very good and very poor short-term returns. When calculated using a long data series, the historical equity risk premium is relatively stable. Furthermore, because an average of the realized equity risk premium is quite volatile when calculated using a short history, using a long series makes it less likely that the analyst can justify any number he or she wants. The magnitude of how shorter periods can affect the result will be explored later in this chapter.
>
> * * *
>
> Without an appreciation of the 1920s and 1930s, no one would believe that such events could happen. The 91-year period starting with 1926 is representative of what can happen: It includes high and low returns, volatile and quiet markets, war and peace, inflation and deflation, and prosperity and depression. Restricting attention to a shorter historical period underestimates the amount of change that could occur in a long future period. Finally, because historical event-types (not specific events) tend to repeat themselves, long-run capital market return studies can reveal a great deal about the future. Investors probably expect "unusual" events to occur from time to time, and their return expectations reflect this. (pages 7 – 8 of Schedule 2)

While SBBI – 2017 refers to the use of market equity risk premiums estimated over shorter time periods as permitting analyst bias and instability to enter into the calculation, the discussion is equally applicable to the 1978 – 2016 market equity risk premiums based upon achieved returns on book common equity for the S&P 500. Moreover, as SBBI – 2017 concludes that, without an appreciation of historical event-types and the impacts they may have on market returns over a long period of time, the use

[94] SBBI – 2017 at10-23 – 10-24. *See* Exhibit PMA-RT1, Schedule 2.

of short time periods would underestimate "the amount of change that could occur in a long future period." Therefore, consistent with the long-term nature of the cost of capital, "long-run capital market return studies" as noted by SBBI – 2017 are appropriate for determining the expected market return and equity risk premium.

Notwithstanding the bias which can be introduced when short term market equity risk premiums are estimated and the fact that Mr. Cassidy's market equity risk premium is not based upon market data, the data shown on Schedule JAC-4, page 2 can be used to estimate a market equity risk premium which reflects the well-established inverse relationship between market equity risk premiums and interest rates, ignored by Mr. Cassidy. As demonstrated on page 2 of Schedule 25, the data contained in Mr. Cassidy's Schedule JAC-4 produce a statistically significant negative relationship between the market equity risk premium and the 20-year U.S. Treasury Bond yield. When the inverse relationship between market equity risk premiums and interest rates using the data on Schedule JAC-4, page 2, via a simple linear regression analysis relative to 3.54%, the appropriate risk-free rate, the prospective yield on 30-year U.S. Treasury securities, [95] is derived a market equity risk premium of 9.83% is indicated as derived in Note 3 on page 1 of Schedule 25

Q. MR. CASSIDY ASSERTS THAT YOUR PROJECTED MARKET EQUITY RISK PREMIUMS ARE OVERSTATED.[96] PLEASE COMMENT.

A. Keeping in mind that the cost of common equity is based upon investors' expectations of risk and return, the average of my estimate of the market equity risk premium for my

[95] *Blue Chip* does not publish forecasts of yields on the 20-year U.S. Treasury Bond.
[96] *Cassidy* at 60.

CAPM analysis 8.39% compares favorably with the premiums since 2010 (averaging 10.59%) in Mr. Cassidy's Schedule JAC-4, page 2, as well as with the 9.83% market equity risk premium based upon Mr. Cassidy's own data when the inverse relationship between market equity risk premiums and interest rates is recognized.

Moreover, although Mr. Cassidy cites the previously discussed McKinsey report to assert that my market equity risk premiums are overstated, an expectation that both the market return and government bonds decline says nothing about the expected spread (the market equity risk premium) between the two. In other words, even if both the market return and the risk-free rate decline, if the decline in risk-free rate is greater, the market equity risk premium will increase.

Nevertheless, to get a sense of the historical distribution of my market equity risk premiums, I have produced a histogram of the observed equity risk premiums between market returns and long-term government bond yields from 1926 – 2016 as shown on page 2 of Schedule 28. The results of that analysis demonstrate that market equity risk premiums of at least 10.59% (the average of Mr. Cassidy's Schedule JAC-4, page 2 market equity risk premiums); 9.83% based upon Mr. Cassidy's data; and my average market equity risk premium of 8.39% will occur more than one-half of the time.

Q. DID MR. CASSIDY INCORPORATE AN EMPIRICAL OR ECAPM ANALYSIS?

A. No. 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. Like Mr. Liu, Mr. Cassidy failed to consider that the empirical CAPM ("ECAPM") reflects this empirical reality.

As discussed earlier relating to Mr. Liu's Direct Testimony, Fama and French clearly state on page 9 of Schedule 8, that "[t]he returns on the low beta portfolios are too high, and the returns on the high beta portfolios are too low".[97]

In addition, Dr. Morin, also cited previously, regarding empirical evidence to support the use of the ECAPM, states[98]:

> 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 [is] Return = 0.0829 + 0.0520 β is between 0.25 and 0.30. If x = 0.25, the equation becomes:
>
> $$K = R_F + 0.25(R_M - R_F) + 0.75\,\beta(R_M - R_F).$$
> (page 19 of Schedule 3)

Clearly, Fama and French's article along with their review of other academic research on the CAPM, validate the use of the ECAPM.

Thus, in view of theory and practical research, both the traditional CAPM and the ECAPM should have been used by Mr. Cassidy.

Q. IF CORRECTED FOR THE ABOVE ERRORS, WHAT WOULD BE THE CORRECTED RESULTS OF MR. CASSIDY'S CAPM ANALYSES?

A. Schedule 25 presents the results of the correct application of both the traditional CAPM and the ECAPM for Mr. Cassidy's water proxy group. Page 1 shows the average traditional CAPM results of 10.75% and average ECAPM results of 11.40% which

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97 Fama & French at 33. *See* Exhibit PMA-RT1, Schedule 8.
98 Morin at 175, 190. *See* Exhibit PMA-RT1, Schedule 3.

average 11.07% for his water proxy group. However, these cost rates are still understated because they do not reflect any additional risk of EWAZ due to its greater credit risk and smaller relative size as will be discussed below.

Clearly, then, Mr. Cassidy's CAPM conclusion of 7.74% is grossly understated.

iii. Comparable Earnings ("CE") Analysis

Q. DO YOU HAVE ANY COMMENT UPON THE PROXY GROUP MR. CASSIDY USED IN HIS CE ANALYSIS?

A. Yes. Again, like Mr. Liu, Mr. Cassidy used his water proxy group in his CE analysis.[99] Therefore, I will not repeat my previous discussion relative to the impropriety of using utilities in a CE analysis.

Because Mr. Cassidy's water proxy group is not appropriate for a CE analysis, his entire CE analysis should be rejected and replaced with the results of market models applied to a non-price regulated proxy group similar in total risk to his water proxy group as shown on page 1 of Schedule 29.

Q. PLEASE EXPLAIN HOW YOU CHOSE THE NON-PRICE REGULATED PROXY GROUP COMPARABLE IN TOTAL RISK TO MR. CASSIDY'S WATER PROXY GROUP.

A. I selected the non-price regulated proxy group using the same selection criteria used previously relative to Dr. Liu's CE analysis. Therefore, I will not repeat that discussion here.

[99] *Cassidy* at 37.

The bases of selection and the comparison group's regression statistics are shown on pages 1 – 3 of Schedule 29. The following eight companies met these criteria:

- CBOE Holdings ("CBOE");
- CME Group ("CME");
- Forrester Research ("FORR");
- Kroger Co. ("KR");
- Lancaster Colony ("LANC");
- Lilly (Eli) ("LLY");
- Mercury General ("MCY"); and
- WD-40 Co. ("WDFC").

Q. HOW DID YOU CALCULATE THE COMMON EQUITY COST RATES FOR THE NON-PRICE REGULATED PROXY GROUP THAT IS COMPARABLE IN TOTAL RISK TO MR. CASSIDY'S WATER PROXY GROUP?

A. I applied the DCF in a manner identical to Mr. Cassidy's application of the DCF. I also applied the CAPM in a manner identical to my correction of Mr. Cassidy's CAPM analysis for his water proxy group shown as on Schedule 25.

Page 5 of Schedule 29 contains the derivation of the DCF cost rates. Following Mr. Cassidy's reliance upon the highest DCF indicated common equity cost rate for his water proxy group, a 18.47% cost rate is indicated for the non-price regulated proxy group. However, in my judgment, a 16.65% common equity cost rate is an appropriate DCF conclusion because it is based upon the theoretically correct projected EPS growth as discussed previously relative to Mr. Liu's CE analysis.

Page 6 of Schedule 29 contains the CAPM applied to the non-price regulated proxy group. Based upon Mr. Cassidy's reliance upon his average CAPM results, I will

use the 11.49% average CAPM/ECAPM results as the indicated CAPM for the non-price regulated proxy group comparable in total risk to Mr. Cassidy's water proxy group.

Q. WHAT IS YOUR CONCLUSION OF THE COMMON EQUITY COST RATE BASED UPON THE NON-PRICE REGULATED PROXY GROUP?

A. The cost of equity cost rate is 14.07%[100] for the non-price regulated proxy group, as shown on page 4 of Schedule 29 and is the average of the DCF and CAPM applied to the non-price regulated group of 16.65% and 11.49%, respectively. However, this cost rate is still understated because it does not reflect any additional risk of EWAZ due to its greater credit risk and smaller relative size as will be discussed below.

iv. Corrected Conclusion of Mr. Cassidy's Cost of Common Equity

Q. WHAT WOULD MR. CASSIDY'S CONCLUSION OF COMMON EQUITY COST RATE BE BASED UPON THE CORRECTIONS TO HIS CAPM AND CE ANALYSES DISCUSSED ABOVE?

A. Based upon the corrections to Mr. Cassidy's CAPM and CE analyses, his analysis produces the following:

Table 6

DCF	9.57%
CAPM	11.07%
CE	14.07%

Based upon the average of these results, a common equity cost rate of 11.57%[101] is indicated. However, this cost rate still understates EWAZ's common equity cost rate

[100] 14.07% = (16.65% = 11.49%)/2.
[101] 11.57% = (9.57% + 11.07% + 14.07%)/3

because it does not reflect any adjustments for EWAZ's greater credit risk or unique business risk due to its smaller relative size as will be discussed below.

v. Credit Risk Adjustment

Q. DOES YOUR CORRECTION TO MR. CASSIDY'S COMMON EQUITY COST RATE ANALYSIS ADEQUATELY REFLECT THE RISK IMPLICATIONS OF EWAZ'S GREATER CREDIT RISK RELATIVE TO HIS WATER PROXY GROUP?

A. No. As previously discussed,[102] if EWAZ's bonds were rated by Moody's and / or S&P, they would likely be rated in the A / A bond (or long-term issuer credit) rating category, specifically A3 / A-, respectively. In contrast, the average Moody's and S&P bond (long-term issuer) ratings for his water proxy group are A2 / A3 and A, respectively, as shown on page 5of Schedule 5 of Exhibit PMA-DT2.[103]

Consequently, EWAZ experiences somewhat greater credit risk than the water proxy group on average. Consistent with the financial principle of risk and return discussed above, the cost of common equity derived from the market data of the water proxy group must be adjusted to reflect EWAZ's greater credit risk relative to the water proxy group because it reflects that group's lower credit risk.

As discussed previously,[104] an indication of the magnitude of the necessary upward adjustment to reflect the greater credit risk inherent in EWAZ's likely A3

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102 *Ahern* at 51 – 52.

103 Since Artesian Resources Corp. has not been assigned a long-term issuer rating by Moody's or S&P, the average bond ratings for Mr. Cassidy's water proxy group is the same as those for my water proxy group. Also, there have been no long-term issuer rating changes for the proxy group since the filing of my Direct Testimony.

104 *Ahern* at 52.

Moody's bond (long-term issuer credit) rating is one-sixth of a three-month ending January 2018, average spread between Moody's A and Baa rated public utility bond yields of 0.34% or 0.06%[105] as shown in Table 7 below:

Table 7: Selected Bond Yields[106]

	Moody's A Rated Public Utility Bond Yield	Moody's Baa Rated Public Utility Bond Yield	Spread
January 2018	3.86%	4.18%	0.32%
December 2017	3.79%	4.14%	0.35%
November 2017	3.83%	4.17%	0.34%
Average			0.34%

vi. Business Risk Adjustment

Q. DOES YOUR CORRECTION TO MR. CASSIDY'S COMMON EQUITY COST RATE ANALYSIS ADEQUATELY REFLECT THE RISK IMPLICATIONS OF EWAZ'S SMALL SIZE RELATIVE TO HIS WATER PROXY GROUP?

A. No. As also previously discussed,[107] company size is a significant element of business risk for which investors expect to be compensated through greater returns. Since I have already provided a detailed discussion of how company size is a significant risk factor to consider in estimating the cost of common equity, I will not repeat that discussion nor reiterate the academic, empirical support previously cited.

Q. PLEASE COMPARE THE SIZE OF EWAZ WITH THAT OF MR. CASSIDY'S WATER PROXY GROUP.

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105 0.06% = (1/6) * 0.34%.
106 Bloomberg Professional Services, February 28, 2018.
107 *Ahern* at 52 – 54.

A. Page 1 of Schedule 20 contains a summary of an indicated small size risk adjustment based upon the SBBI – 2017[108] size premium study, while page 2 contains a summary of the market capitalizations based upon each of Mr. Cassidy's water utility companies using his average high / low market prices for the three months ended January 2018. As shown in Table 8 below, EWAZ is significantly smaller than the average water utility based upon market capitalization as shown below:

Table 8

	Market Capitalization (1) ($ millions)	Times Greater than EWAZ ($ Millions)
Mr. Cassidy's Water Proxy Group	$3,282.582	4.5x
EWAZ	727.009	

(1) From page 1 of Schedule 20.

Based upon Mr. Cassidy's water proxy group's average market-to-book ratio for the three months ended January 2018, EWAZ's market capitalization is estimated to be $727.009 million, as shown in Table 8 above. In contrast, the market capitalization of the average water utility in the water proxy group was $3.283 billion, or 4.5 times larger than EWAZ's estimated market capitalization.

Because of EWAZ's extremely small estimated market capitalization, relative to that of the water proxy group, a 0.57% small size risk premium, or the difference between the size premium applicable to the 8th decile in which EWAZ falls and the 5th decile in which the average company in the Mr. Cassidy's water proxy group falls, is justified. Although an adjustment of 0.57% is indicated by the SBBI – 2017 size premium study, in

[108] SBBI – 2017 at 7-16. *See* Exhibit PMA-RT1, Schedule 2.

my opinion an adjustment to common equity cost rate of 16 basis points represents an extremely conservative and reasonable size premium which would be applicable to EWAZ based upon its smaller relative size.

In view of the foregoing, a credit and business (size) risk adjustments of 6 basis points and 16 basis points, respectively, are necessary. When added to a corrected common equity cost rate of 11.57%, a risk-adjusted common equity cost rate of 11.79%[109] results, which is significantly higher than Mr. Cassidy's common equity cost rate of 9.69%.

vii. Fair Value Rate Base ("FVRB") Incremental Return

Q. PLEASE COMMENT UPON MR. CASSIDY'S CALCULATION OF THE FAIR VALUE RATE BASE ("FVRB") INCREMENTAL RATE OF RETURN.

A. Mr. Cassidy's recommended FVRB incremental return of 0.9973%[110] based the spread between the average nominal yield on 30-year U.S. Treasury Bonds[111] and average inflation, or CPI, both for the three-months ended with January 2018.[112] However, Mr. Cassidy's estimation is incorrect. As previously discussed,[113] because the FVRB is an equal blend, or average, of the OCRB and the RCND rate bases, the FVRB includes only a portion of the historical rate base. Therefore, it is appropriate to use both prospective inflation and the prospective nominal risk-free rate averaged with historical inflation and the historical nominal risk-free. Because the average life of EWAZ's

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109 11.79% = 11.57% + 0.06% + 0.16%.

110 *Cassidy* at 66 – 67 and Schedules JAC-1(a) – JAC-1(b).

111 Note that Mr. Cassidy correctly use the yield on 30-year U.S. Treasury Bonds rather than the incorrect yield on 20-year U.S. Treasury Bonds as the risk-free rate for his CAPM analysis.

112 *Cassidy* at 66 – 67 and Schedules JAC-1(a) – JAC-1(b).

113 *Ahern* at 57.

utility plant is between 22 and 23 years,[114] it is appropriate to measure the average historical inflation and risk-free rate over approximately 23 years, as I have done in the estimating of my FVRB incremental return of 1.10%.[115]

Therefore, the Commission should reject Mr. Cassidy's recommended 0.9973% FVRB incremental return and adopt a FVRB incremental return of 1.10%.

I. RESPONSE TO MR. CASSIDY'S COMMENTS ON EWAZ'S COST OF CAPITAL TESTIMONY

a. Common Equity Cost Rate

Q. MR. CASSIDY SPECULATES HOW YOU ARRIVED AT YOUR 10.30% INDICATED COMMON EQUITY COST RATE BASED UPON YOUR WATER PROXY GROUP[116]. PLEASE COMMENT.

A. Mr. Cassidy engages in several mathematical calculations speculating how I arrived at the 10.30% indicated common equity cost rate based upon my water proxy group. Based upon his calculations and several quotes from my Direct Testimony, he erroneously concludes that the 10.30% is based solely upon the water proxy group and not on the results for the non-price regulated proxy group.[117] As is evident from my DCF, RPM and CAPM analyses for both the water proxy group and the non-price regulated proxy group comparable in total risk to the water proxy group, I consistently base the results of those models on averages of the mean and median results of either the models themselves or some of their inputs. Had Mr. Cassidy applied that same estimation, *i.e.*, averaging the

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114 *Ahern* at 57.
115 *See* Exhibit PMA-DT2, Schedule 10.
116 C*assidy* at 40 – 43.
117 *Cassidy* at 41.

mean and median results of DCF (8.56%), RPM (11.28%), CAPM (10.25%) and the market models applied to the non-price regulated proxy group (10.63%), he would have realized that the 10.30% indicated common equity cost rate is the 10.31% average of the mean and median results, rounded down to 10.30%. Consequently, Mr. Cassidy is incorrect in his speculation of the estimation of the 10.30% common equity cost rate and his assertion that "it appears this 27 basis point [combined credit and business risk adjustment] overstatement provides – effectively – for a 'double counting'"[118] is also incorrect.

Mr. Cassidy error is that he has both misinterpreted and mischaracterized both of the phrases he cites: "*based solely upon the Water Proxy Group*" and *"based upon the marketplace data of a group of utilities."* Mr. Cassidy has ignored and rejected the fact that the selection of the non-price regulated proxy group was based upon measures of both systematic and non-systematic risk, which collectively reflect total risk, based upon the marketplace data of my water proxy group. Therefore, the non-price regulated proxy group is indeed similar in risk to my water proxy group and, hence, by extension, to EWAZ.

Q. PLEASE EXPLAIN.

A. Total risk is defined in two ways. The first definition is that total investment risk is the sum of business and financial risk. The second definition of total risk is the sum of systematic (market or non-diversifiable) risk and unsystematic (company-specific or diversifiable) risk. It is this definition which forms the basis of portfolio theory that

[118] *Cassidy* at 42.

underpins the CAPM and assumes that investors are compensated only for systematic risk, as measured by beta.

The selection criteria for the non-price regulated firms are based upon the second definition of total risk, using statistics derived from the market prices paid by investors. *Value Line* betas were used as a measure of systematic, or market, risk. The standard error of regression was used as a measure of each firm's unsystematic or non-market, company specific risk with the standard error of regression reflecting the extent to which events specific to a company's operations affect its stock price.

Business and financial risks may vary between companies and proxy groups, but if the collective average betas and standard errors of regression of the group are similar, then the total, or aggregate, non-diversifiable market risks and diversifiable risks are similar, as noted above.[119] Thus, because the non-price regulated companies are selected based upon analyses of the market data of my water proxy group, they are comparable in total risk (even though individual risks may vary) to my water proxy group. This is demonstrated clearly by Francis who demonstrates that total risk can be "portioned into its systematic and unsystematic components".[120] In essence, companies which have similar betas and standard errors of regression have similar total investment risk.

Therefore, Mr. Cassidy's interpretation and characterization of my statements is incorrect. It is entirely appropriate to rely upon the results of the application of the DCF, RPM and CAPM to the non-price regulated proxy group.

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[119] Hanley & Ahern at 4 – 8. *See* Exhibit PMA-RT1, Schedule 13.

[120] Jack C. Francis, Investments: Analysis and Management 5th (McGraw-Hill, 1991) at 274. *See* Exhibit PMA-RT1, Schedule 30.

In view of the foregoing, Mr. Cassidy's entire discussion[121] regarding the fact that a different non-price regulated proxy group has been selected at different times merely means that risk profiles can and do change over time. Thus, there is no reason "to question the credibility associated with cost of equity estimates obtained from Ms. Ahern's non-price regulated proxy group".[122]

i. Discounted Cash Flow Model ("DCF")

Q. MR. CASSIDY HAS TWO CONCERNS WITH MY APPLICATION OF THE DCF MODEL. PLEASE COMMENT.

A Mr. Cassidy's first concern is my exclusive reliance upon security analysts' forecast of EPS growth. Since I have already addressed the academic and empirical research supporting the use of such forecasts in a DCF analysis, I will not repeat that discussion here.

Mr. Cassidy's second concern relates to the fact that my Direct Testimony reflects a DCF analysis based upon average stock market prices for the 60-days ended March 31, 2017, which correctly are reflective of then current and expected economic and market conditions. However, as noted previously in this Rebuttal Testimony, capital costs, including the cost of common equity, are rising and are expected to continue to rise. Therefore, EWAZ's rebuttal position on the rate of return on common equity of 10.1% is imminently reasonable and conservative, even relative to my recommended return on common equity of 10.60%.

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121 *Cassidy* at 43 – 46.
122 *Cassidy at 46.*

ii. Capital Asset Pricing Model ("CAPM") and Risk Premium Model ("RPM")

Q. MR. CASSIDY CITES STEPHEN G. HILL'S ORAL SURREBUTTAL` IN DOCKET NO. 2013-00362, RE: MAINE WATER COMPANY – CAMDEN & ROCKLAND DIVISION ("MAINE WATER") BEFORE THE MAINE PUBLIC UTILITIES COMMISSION.[123] PLEASE COMMENT.

A. Specifically, Mr. Cassidy concludes his paraphrasing Mr. Hill's oral surrebuttal testimony by stating that "at no time did Ms. Ahern take exception to the criticism leveled against the PRPM by Mr. Hill." [124]

Before addressing Mr. Cassidy's paraphrasing of Mr. Hill's oral testimony, the record in that proceeding must be clarified. By asserting that I did not take exception to Mr. Hill's criticism, Mr. Cassidy is demonstrating both a lack of understanding about rate case procedural schedules in various states as well a lack of understanding of the actual transcript of the Maine Water proceeding. In that proceeding, Maine Water filed its direct case without filing rate of return testimony. Mr. Hill then filed his direct testimony with his rate of return recommendation. After Mr. Hill's direct testimony was filed, I was engaged to prepare written rebuttal testimony in response to Mr. Hill. It is to this rebuttal testimony that Mr. Hill presented oral surrebuttal testimony at the evidentiary hearings. Contrary to Mr. Cassidy's implication, I did not have the opportunity to respond to Mr. Hill's oral surrebuttal testimony because I was excused after my oral rebuttal testimony,

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123 *Cassidy* at 49 – 51.

124 *Cassidy* at 51. Mr. Cassidy, on behalf of RUCO, made this same assertion in EPCOR Water Arizona, Inc. (Docket No. WS-01303A-16-0145) and Arizona Water Company (Docket No. W-01445A-15-0277, while Mr. Michlik, also on behalf of RUCO, made this same assertion in Arizona Water Company (Docket No. W-01445A-16-0443)

which preceded both Mr. Hill's oral direct testimony as well as his oral surrebuttal testimony. There was no provision for rejoinder by Maine Water, *i.e.*, by me. This is clear from reading the complete transcript.[125] Hence, I was not given the opportunity to respond to Mr. Hill's oral surrebuttal testimony. Mr. Cassidy's mischaracterization of the Maine Water proceeding only serves to confuse the record regarding the reasonableness of the PRPM, by leaving the impression that I chose not to respond to Mr. Hill's oral surrebuttal testimony.

Q. DO YOU HAVE ANY COMMENTS ON MR. CASSIDY PARAPHRASING OF MR. HILL'S ORAL SURREBUTTAL IN DOCKET NO. 2013-00362?

A. Yes. First, I would note that Mr. Cassidy simply paraphrased Mr. Hill's testimony and did not conduct any research of his own regarding Mr. Hill's claims. However, I will respond to Mr. Hill's claims point by point.

1) "The threshold question to be asked when a new cost of equity estimation model is introduced is whether it provides a reasonable estimate of the COE, and the PRPM™ model developed by Ms. Ahern and her former AUS colleagues fails to pass this threshold test because it **overstates** the COE."[126]

This statement is merely the opinion of a single witness, Mr. Hill, for which Mr. Cassidy provided no academic, empirical evidence in support.

2) "Unlike the DCF and CAPM models, both of which are based on financial economics, the PRPM™ is based on **behavioral economics**."[127]

Mr. Hill seems to confuse the term "behavioral economics" with "behavioral finance." All cost of common equity models (DCF, CAPM, RPM) are an attempt to

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[125] Docket No, 2013-00362 re: Maine Water Company – Camden & Rockland Division, Maine Public Utilities Commission, Hearing Transcript, January 14, 2014. See Exhibit PMA-RT1, Schedule 31.

[126] *Cassidy* at 49 – 50.

[127] *Cassidy* at 50.

emulate, predict, or mathematically quantify investor behavior, as they are social sciences. The difference between the models is how each model attempts to emulate, predict or quantify that behavior, *i.e.*, investor decision making. The PRPM is based upon classic valuation theory. As discussed previously,[128] the PRPM 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")"[129] (with "ARCH" standing for autoregressive conditional heteroskedasticity). Engle's work began in the early 1980s[130] and continued with his 1987 article[131] which formed the basis of the article I co-authored.[132] In an article that explains how to utilize the ARCH/GARCH models in practice, Engle concludes[133]:

> ARCH and GARCH models have been applied to a wide range of time series analyses, but applications in finance have been particularly successful and have been the focus of this introduction. Financial decisions are generally based upon the tradeoff between risk and return; the econometric analysis of risk is therefore an integral part of asset pricing, portfolio optimization, option pricing and risk management. This paper has presented an example of risk measurement that could be the input to a variety of economic decisions. The analysis of ARCH and GARCH models and their many extensions provides a statistical stage on which many theories of asset pricing and portfolio analysis can be exhibited and tested. (page 11 of Schedule 35)

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128 *Ahern* at 32.

129 www.nobelprize.org.

130 Robert F. Engle, "Autoregressive Conditional Heteroscedasticity with Estimates of the Variance of United Kingdom Inflation. *Econometrica*, Volume 50, Issue 4 (Jul., 1982) at 987 – 1008. *See* Exhibit PMA-RT1, Schedule 32.

131 Robert F. Engle, David M. Lilien, and Russell P. Robins, "Estimating Time Varying Risk Premia in the Term Structure, The ARCH-M Model", *Econometrica*, Volume 55, No. 2 (March 1987) at 391 – 407. *See* Exhibit PMA-RT1, Schedule 33.

132 Pauline M. Ahern, Frank J. Hanley and Richard A. Michelfelder, Ph.D., "New Approach to Estimating the Equity Risk Premium for Public Utilities", *The Journal of Regulatory Economics* (December 2011), 40:261-278 *See* Exhibit PMA-RT1, Schedule 34.

133 Robert Engle, "GARCH 101: The Use of ARCH/GARCH Models in Applied Econometrics", *Journal of Economic Perspectives*, Volume 15, Number 4, Fall 2001 at 157 – 168. *See* Exhibit PMA-RT1, Schedule 35.

The recent development of "behavioral finance" is well explained by Siegel who notes[134]:

> The finance profession is increasingly aware that psychological factors can thwart rational analysis and prevent investors from achieving the best results for their portfolio. The study of these psychological factors has burgeoned into the field of *behavioral finance*. (*italics in original*). (page 9 of Schedule 17)

As stated previously, the PRPM is based upon classic financial theory, not upon psychological factors that deter investors from achieving the best results for their portfolios. Mr. Hill's concern is misplaced.

3) "Behavioral economics is used to measure a "utility function," **not** a 'dollar return function;'."[135]

Mr. Hill is incorrect as utility functions are basic to both classic economic and financial theory as Nicholson notes[136]:

> Given the assumptions of completeness, transitivity, and continuity, it is possible to show formally that people are able to rank order all possible situations from the least desirable to the most. Following the terminology introduced by the nineteenth-century political theorist Jeremy Bentham, economists call this ranking *utility*. We also will follow Bentham by saying that more desirable situations offer more utility than do less desirable ones. That is, if a person prefers situation *A* to situation *B*, we would say that the utility assigned to option *A*, denoted by *U(A)*, exceeds the utility assigned to *B*, (*U(B)*. (pages 6 – 7 of Schedule 36)

4) "The PRPM utilizes a historical data set of monthly returns and **assumes that investors are buying and selling the market every month."[137]**

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134 Siegel at 315. *See* Exhibit PMA-RT1, Schedule 17.

135 *Cassidy* at 50.

136 Walter Nicholson, Microeconomic Theory | Basic Principles and Extensions, 8th Edition (South-Western | Thomson Learning 2002) 66 – 67 (footnotes omitted). *See* Exhibit PMA-RT1, Schedule 36.

137 *Cassidy* at 50.

Because the PRPM uses a historical data set of actual monthly stock returns based upon the pricing decisions of the aggregate investor, it makes no assumption concerning the pattern of investors' collective buying and selling. The actual monthly stock returns are based upon observed market returns. GARCH methodology is merely a statistical tool with which to analyze the pattern of the volatility, or variance, in observed returns and equity risk premiums. Because of that pattern as identified by Engle in historical returns and equity risk premiums, GARCH can be used to estimate predicted volatility, or variances, and hence returns and equity risk premiums.

5) "In using the PRPM™ to estimate the cost of equity for utility companies, Ms. Ahern improperly assumes that utility stocks are **not** defensive stocks."[138]

This statement is meaningless without the context of the entire article from which it was supposedly taken. In "New Approach to Estimating the Cost of Common Equity for Public Utilities," my co-authors and I state[139]:

> . . . several conclusions can be drawn from the general model of asset pricing. . . . Third, hedging assets have desired patterns of volatility that result in expected rates of return that are less than the risk-free rate. We do not expect that public utility stocks serve as a hedging asset as they are not viewed as defensive stocks (they do not rise in value during downturns in the stock market) due to asymmetric regulation and returns as discussed in detail in Kolbe and Tye (1990). Under asymmetric regulation, utility regulators have a tendency to allow the return on equity to fall below the allowed return during downturns in the business cycle and to reduce the return should it rise above the allowed return during expansions. Therefore we expect that the parameter estimates of the return-risk relationship to be positive as utility stocks are hypothesized to not be hedges.
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> * * *
>
> The model is tested to . . . ascertain whether utility stocks are assets that hedge shocks to the marginal utility of consumption.

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138 *Cassidy* at 50.

139 Ahern, Hanley, Michelfelder at 265 – 267, 277. *See* Exhibit PMA-RT1, Schedule 34.

> If utility stocks area hedging assets then the cost of common equity should reflect a downward adjustment to a specified risk-free rate to reflect investors' preferences for a hedge and the compensation that they are willing to pay for it.
>
> * * *
>
> Finally, the robust empirical evidence on the positive risk-return relationship also shows that utility stocks are not a consumption hedge and are not good hedging securities against contractions in the economy. The model and estimation methodology presented in this paper provide a relatively simple tool to determine whether any asset is a hedge to adverse changes in the business cycle through the level of consumption in the economy. (see pages 5 – 7 and 17 of Schedule 34)

Thus, the concept of utility stocks as defensive stocks during downturns in the stock market is not based upon the co-authors research but is based upon the research and conclusions of Kolbe and Tye and was tested for by the co-authors. It was found that utility stocks are not a consumption hedge against contractions in the economy. The co-authors make no conclusion as to the defensive nature of utility stocks relative to stock market movements.

6) "The PRPM™ is a consumption-based asset pricing model subject to statistical GARCH analysis, and there are **three general problems** associated with such models:

   a) Changes in conditional variance are much **more dramatic** when utilizing daily or **monthly data**, and much weaker at lower frequencies (i.e., the stock price volatilities obtained by Ms. Ahern when using monthly data are much more pronounced than had she utilized yearly data):
   b) Forecasts of excess stock returns do not move proportionally with estimates of conditional variance – Ms. Ahern's PRPM™ analysis assumes that conditional variance determines stock price movements, but research shows that this is not the case; and
   c) There is little evidence of cyclical variation and consumption volatility that could explain the variation in stock market volatility."[140]

[140] *Cassidy* at 50.

It is true that changes in conditional variance are greater utilizing monthly data than when using less frequent, *i.e.*, quarterly or annual, observations. However, since the cost of capital, including the cost of common equity, is a function of investor expectations of risk as discussed above, to use less frequent data would serve to dampen the true volatility of historical stock returns and equity risk premiums, similar to the manner in which a geometric mean historical stock return over a long period of time does not reflect any of the volatility of those returns.

Schedule 41 charts the predicted (using the GARCH methodology) and the actual market equity risk premiums over the income return on long-term U.S. Treasury Bonds from 1936 – 2016. The volatility pattern of the predicted equity risk premiums is nearly identical to the volatility pattern of the historical equity risk premiums.[141] Mr. Hill in comments in a) and b) above are thus incorrect.

In view of the foregoing, the citation from Mr. Hill's oral testimony in Docket No. 2013-00362 is incorrect, without merit and unsubstantiated. Thus, the Commission should disregard Mr. Cassidy's "insightful tutorial as to the reasons why . . . the PRPM™ [sic] should not be adopted in a regulatory rate proceeding."[142]

Q. MR. CASSIDY ALSO CRITICIZES YOUR DEVELOPMENT OF A MARKET RISK PREMIUM IN YOUR CAPM ANALYSIS. PLEASE COMMENT.

A. The market equity risk premiums of 7.50% (Ibbotson), 8.04% (*Value Line*) and 9.61% (Bloomberg) which Mr. Cassidy criticizes are based upon expected total market returns

[141] Because the predicted equity risk premiums are derived from the predicted variance – squared, they will always be positive, but their magnitude will mimic that of the actual equity risk premiums.

[142] *Cassidy* at 49. Note that the PRPM is no longer trademarked (TM).

of 11.97% (Ibbotson), 11.78% (*Value Line* 11.78% = (9.44% + 14.11%)/2) and 13.34% (Bloomberg) as shown or derived from Note 1 on page 1 of Schedule 6 of Exhibit PMA-DT2.

One means of assessing the reasonableness of these estimates is to view them in the context of historical returns. As discussed above, Schedule 7 is a histogram of observed market returns in the U.S. from 1926 to 2016 which demonstrates that the expected total market returns derived from Ibbotson, *Value Line* and Bloomberg are quite consistent with historical experience. The 11.97% Ibbotson return for example, falls in the 47th percentile of observed returns, while the 11.78% *Value Line* return falls in the 49% percentile and the 13.34% Bloomberg return falls in the 46% percentile. Given the historical 1926 – 2016 standard deviation of approximately 20.0%, my estimates are well within the bounds of a reasonable range being within 2.08 standard errors of the long-term average of the historical returns of approximately 12.0%.

Q. MR. CASSIDY CRITICIZES YOUR USE OF A PROSPECTIVE RISK-FREE RATE. PLEASE RESPOND.

A. Since I have previously addressed why the use of prospective interest rates is consistent with the basic precepts of utility regulation and the expectative nature of the cost of capital, I will not repeat that discussion here.

Q. MR. CASSIDY STATES THAT YOUR ECAPM RESULTS "SHOULD NOT BE RELIED UPON".[143] PLEASE COMMENT.

[143] *Cassidy* at 61.

A. Mr. Cassidy claims that "the ECAPM beta adjustment is an unnecessary redundancy which only serves to overstate the cost of equity".[144] Such a statement demonstrates a lack of understanding of the ECAPM for there is no "ECAPM beta adjustment" as will be demonstrated below.

Mr. Cassidy seems to believe that using adjusted betas in a CAPM analysis addresses the empirical issues with the CAPM, discussed above, by increasing the expected returns for low beta stocks and decreasing the returns for high beta stocks, concluding that there is no need to use the ECAPM. This is an incorrect understanding of the ECAPM. Using adjusted betas in a CAPM analysis is not equivalent to using the ECAPM nor is it an unnecessary redundancy.

Betas are adjusted because of their general regression tendency to converge toward 1.0 over time, *i.e.*, over successive calculations of beta. As also noted above, numerous studies have determined that the SML described by the CAPM formula at any given moment in time is not as steeply sloped as the predicted SML. Dr. Morin[145] 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

[144] *Cassidy* at 61.
[145] Morin at 191. *See* Exhibit PMA-RT1, Schedule 3.

> 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. (see page 20 of Schedule 3)

Moreover, the slope of the SML should not be confused with beta. As Brigham and Gapenski state[146]:

> 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]
>
> [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. (see page 5 of Schedule 37)

In addition, in Appendix 6A of Brigham and Gapenski's textbook, entitled "Calculating Beta Coefficients," Brigham and Gapenski also demonstrate that beta, which accounts for regression bias, is not a return adjustment but rather is based upon the slope of a different line.

Hence, using adjusted betas does not address the previously discussed empirical issues with the CAPM. In view of the foregoing, using adjusted betas in both the traditional and empirical applications of the CAPM is not incorrect, nor inconsistent with the financial literature, nor an unnecessary redundancy. In view of theory and practical

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[146] Eugene F. Brigham and Louis C. Gapenski, Financial Management – Theory and Practice, 4th Ed. (The Dryden Press, 1985) at 201-204. *See* Exhibit PMA-RT1, Schedule 37.

research, it is therefore appropriate to include the ECAPM when estimating the cost of common equity.

iii. Credit Risk Adjustment

Q. MR. CASSIDY ALSO CRITICIZES YOUR CREDIT RISK ADJUSTMENT.[147] PLEASE COMMENT.

A. Mr. Cassidy's citation from the 1994 study by S. Brooks Marshall is misplaced and irrelevant, as I have not used bond ratings as the criteria for selecting the companies in my water proxy group. Rather, I have used the difference in the credit risk of EWAZ's likely bond (long-term issuer) rating of A3 by Moody's and the credit risk of Mr. Cassidy's water proxy group's average Moody's long-term issuer rating, A2 / A3.

Consistent with the basic financial principle of risk and return, the greater credit risk of EWAZ's likely bond (long-term issuer) rating must be reflected in any common equity cost rate derived from the market data of their water proxy group which reflects the lower credit risk of an average A2 / A3 rating.

iv. Business Risk Adjustment

Q. MR. CASSIDY ALSO CRITICIZES YOUR BUSINESS RISK ADJUSTMENT BASED UPON SIZE. [148] PLEASE RESPOND.

A. In support of his criticism, Mr. Cassidy cites an article by Dr. Annie Wong.[149] However, Dr. Wong's study is flawed because she attempts to relate a change in size to beta, while beta accounts for only a small percentage of diversifiable company-specific risk. For

147 *Cassidy* at 62.
148 *Cassidy* at 62 – 65.
149 Cassidy at 63 (citing Annie Wong, "Utility Stocks and The Size Effect: An Empirical Analysis", *Journal of Midwest Finance Association*, 1993, p. 95-101). *See* Exhibit PMA-RT1, Schedule 38.

example, the average R-squared, or coefficient of determination for Mr. Cassidy's water proxy group is 0.1320 as shown on page 2 of Schedule 29. An R-squared of 0.1320 means that approximately only 13.20% of total risk is *unexplained* by beta. Therefore, beta is not an appropriate measure with which to evaluate relative size and risk.

Q. IS THERE ANY PUBLISHED RESPONSE TO PROFESSOR WONG'S ARTICLE?

A. Yes. Zepp commented upon Professor Wong's article concluding the following:[150]

> Her weak results, however, do not rule out the possibility of a small firm effect for utilities. (see page 1 of Schedule 39)

Dr. Zepp also noted:

> Two other studies discussed here support a conclusion that smaller water utility stocks are more risky than larger ones. To the extent that water utilities are representative of all utilities, there is support for smaller utilities being more risky than larger ones. (see page 5 of Schedule 39)

Q. ARE YOU AWARE OF ANY OTHER ACADEMIC ARTICLE RELATING TO THE APPLICABILITY OF A SIZE PREMIUM?

A. Yes. As discussed previously,[151] all else equal, size is a risk factor which must be taken into account when setting the cost of capital or capitalization (discount) rate. In this proceeding, all else is presumed to be equal in terms of the risk differential between EWAZ and the proxy water companies used by Mr. Cassidy, as he has not added any risk adjustments to the cost of common equity he derived based upon the market data of

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[150] Zepp, Thomas M. "Utility Stocks and the Size Effect --- Revisited", The Quarterly Review of Economics and Finance, 43 (2003) 578-582. *See* Exhibit PMA-RT1, Schedule 39.

[151] *Ahern* at 5.

his water proxy group. This is not appropriate and is contrary to the academic literature.

As Paschall and Hawkins note[152]:

> The current challenge to traditional thinking about a small stock premium is a very real and potentially troublesome issue. The challenge comes from bright and articulate people and has already been incorporated into some court cases, providing further ammunition for the IRS. Failing to consider the additional risk associated with most smaller companies, however, is to fail to acknowledge reality. Measured properly, small company stocks have proven to be more risky over a long period of time than have larger company stocks. This makes sense due to the various advantages that larger companies have over smaller companies. Investors looking to purchase a riskier company will require a greater return on investment to compensate for that risk. There are numerous other risks affecting a particular company, yet the use of a size premium is one way to quantify the risk associated with smaller companies. (see page 4 of Schedule 40)

Hence, Paschall and Hawkins corroborate the need for a small size adjustment.

v. Fair Value Rate Base ("FVRB") Incremental Return

Q. PLEASE COMMENT UPON MR. CASSIDY'S CALCULATION OF THE FAIR VALUE RATE BASE ("FVRB") INCREMENTAL RATE OF RETURN.

A. Mr. Cassidy's recommended FVRB incremental return of 0.9973%[153] is based the spread upon between the average nominal yield (*i.e.*, unadjusted for inflation) on 30-year U.S. Treasury Bonds[154] for the three-months ended with January 2018 and average inflation, or CPI, over the same three months.[155] However, Mr. Cassidy's estimation is

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[152] Michael A. Paschall, ASA, CFA and George B. Hawkins ASA, CFA, "Do Smaller Companies Warrant a Higher Discount Rate for Risk?", CCH Business Valuation Alert, Vol. 1, Issue No. 2, December 1999. *See* Exhibit PMA-RT1, Schedule 40.

[153] *Cassidy* at 66 – 67 and Schedules JAC-1(a) – JAC-1(b).

[154] Note that Mr. Cassidy correctly use the yield on 30-year U.S. Treasury Bonds rather than the incorrect yield on 20-year U.S. Treasury Bonds as the risk-free rate for his CAPM analysis.

[155] *Cassidy* at 66 – 67 and Schedules JAC-1(a) – JAC-1(b).

incorrect. As previously discussed,[156] because the FVRB is an equal blend, or average, of the OCRB and the RCND rate bases, the FVRB includes only a portion of the historical rate base. Therefore, it is appropriate to use both prospective inflation and the prospective nominal risk-free rate averaged with historical inflation and the historical nominal risk-free. Because the average life of EWAZ's utility plant is between 22 and 23 years,[157] it is appropriate to measure the average historical inflation and risk-free rate over approximately 23 years, as I have done in both my originally filed FVRB incremental return of 1.10%.[158]

Therefore, the Commission should reject Mr. Cassidy's recommended 0.9973% FVRB incremental return and adopt a FVRB incremental return of 1.10%.

V. GENERAL COMMENTS UPON VARIOUS EWAZ REQUESTED SURCHARGE AND ADJUSTMENT MECHANISMS AND THE COST OF COMMON EQUITY

Q. DO YOU HAVE ANY COMMENTS UPON THE EFFECT OF EWAZ'S REQUESTED SURCHARGE AND ADJUSTMENT MECHANISMS ON THE COST OF COMMON EQUITY?

A. Yes. Throughout his Direct Testimony[159] Mr. Michlik recommends that EWAZ's cost of equity be reduced for the presence of some of these mechanisms and notes that EWAZ did not reduce its requested cost of common equity to reflect these mechanisms. First, many if not most of the regulated subsidiaries of the water utilities in the proxy groups of all rate of return witnesses in this proceeding (*i.e.*, Mr. Liu, Mr. Cassidy and myself) have

156 *Ahern* at 57.
157 *Ahern* at 57.
158 *See* Exhibit PMA-DT2, Schedule 10.
159 *See* Direct Testimony of Jeffrey M. Michlik (hereinafter "*Michlik*"), at Executive Summary, 56, 59, 62, 66, 69.

similar mechanisms in place. Therefore, any investor-perceived risk reduction due to the presence of such mechanisms is already reflected in the market data of the proxy group companies, and thus, any cost of common equity derived from that market data, so no cost of common equity adjustment is warranted. Second, in my nearly thirty years as a rate of return analyst – where I have been an expert witness and testified in dozens (if not hundreds) of general rate cases – I cannot recall one matter where any party has recommended reducing the authorized cost of common equity due to the presence of any of the mechanisms outlined by Mr. Michlik; and I have never encountered a proceeding where the Commission authorized a reduction for that reason.

Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

A. Yes.