STATE OF NEW HAMPSHIRE

BEFORE THE

PUBLIC UTILITIES COMMISSION

AQUARION WATER COMPANY OF NEW HAMPSHIRE, INC.
DOCKET NO. DW 20-184

PREFILED DIRECT TESTIMONY OF

DYLAN W. D'ASCENDIS, CRRA, CVA
SCOTTMADDEN, INC.

ON BEHALF OF
AQUARION WATER COMPANY OF NEW HAMPSHIRE

December 18, 2020

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I. INTRODUCTION

A. WITNESS IDENTIFICATION

Q. Please state your name and business address.

A. My name is Dylan W. D'Ascendis. My business address is 3000 Atrium Way, Suite 241, Mount Laurel, NJ 08054.

Q. By whom are you employed and in what capacity?

A. I am a Director at ScottMadden, Inc.

B. BACKGROUND AND QUALIFICATIONS

Q. Please summarize your professional experience and educational background.

A. I have offered expert testimony on behalf of investor-owned utilities in over 20 state regulatory commissions in the United States, the Federal Energy Regulatory Commission, the Alberta Utility Commission, and one American Arbitration Association panel on issues including, but not limited to, common equity cost rate, rate of return, valuation, capital structure, class cost of service, and rate design.

On behalf of the American Gas Association ("AGA"), I calculate the AGA Gas Index, which serves as the benchmark against which the performance of the American Gas Index Fund ("AGIF") is measured on a monthly basis. The AGA Gas Index and AGIF are a market capitalization weighted index and mutual fund, respectively, comprised of the common stocks of the publicly traded corporate members of the AGA.

I am a member of the Society of Utility and Regulatory Financial Analysts ("SURFA"). In 2011, I was awarded the professional designation "Certified Rate

of Return Analyst" by SURFA, which is based on education, experience, and the successful completion of a comprehensive written examination.

I am also a member of the National Association of Certified Valuation Analysts ("NACVA") and was awarded the professional designation "Certified Valuation Analyst" by the NACVA in 2015.

I am a graduate of the University of Pennsylvania, where I received a Bachelor of Arts degree in Economic History. I have also received a Master of Business Administration with high honors and concentrations in Finance and International Business from Rutgers University.

The details of my educational background and expert witness appearances are included in Appendix A.

II. PURPOSE OF TESTIMONY

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my testimony is to present evidence on behalf of Aquarion Water Company of New Hampshire, Inc. ("AWNH" or the "Company") about the appropriate capital structure and corresponding cost rates the Company should be given the opportunity to earn on its jurisdictional rate base.

Q. Have you prepared Attachments in support of your recommendation?

A. Yes. Attachments DWD-1 through DWD-10 have been prepared by me or under my direct supervision.

Q. What is your recommended cost of capital for AWNH?

A. I recommend the New Hampshire Public Utilities Commission (the "Commission") authorize the Company the opportunity to earn an overall rate of return of 8.15% based on a test year ending December 31, 2019. The ratemaking capital

structure consists of 43.85% long-term debt at an embedded cost rate of 6.14%, 3.78% short-term debt at an embedded cost rate of 2.42%, 0.01% preferred equity at a 6.00% cost rate and 52.36% common equity at my recommended common equity cost rate of 10.25%. The overall rate of return is summarized on page 1 of Attachment DWD-1 and in Table 1 below:

Table 1: Summary of Overall Rate of Return

Type of Capital	Ratios	Cost rate	Weighted Cost Rate
Long-Term Debt	43.85%	6.14%	2.69%
Short-Term Debt	3.78%	2.42%	0.09%
Preferred Equity	0.01%	6.00%	0.00%
Common Equity	52.36%	10.25%	5.37%
Total	100.00%		8.15%

III. SUMMARY

Q. Please summarize your recommended common equity cost rate.

A. My recommended common equity cost rate of 10.25% is summarized on page 2 of Attachment DWD-1. I have assessed the market-based common equity cost rates of companies of relatively similar, but not necessarily identical, risk to AWNH. Using companies of relatively comparable risk as proxies is consistent with the principles of fair rate of return established in the *Hope*[1] and *Bluefield*[2] cases. No proxy group can be identical in risk to any single company, so there must be an evaluation of relative risk between the company and the proxy group to see if it is appropriate to make adjustments to the proxy group's indicated rate of return.

[1] *Federal Power Commission v. Hope Natural Gas Co.*, 320 U.S. 591 (1944).
[2] *Bluefield Water Works Improvement Co. v. Public Serv. Comm'n*, 262 U.S. 679 (1922). ("*Bluefield*")

My recommendation results from the application of several cost of common equity models, specifically the Discounted Cash Flow ("DCF") model, the Risk Premium Model ("RPM"), and the Capital Asset Pricing Model ("CAPM"), to the market data of a proxy group of seven water companies ("Utility Proxy Group") whose selection criteria will be discussed below. In addition, I also applied the DCF, RPM, and CAPM to a proxy group of domestic, non-price regulated companies comparable in total risk to the Utility Proxy Group ("Non-Price Regulated Proxy Group").

The results derived from each are as follows:

Table 2: Summary of Common Equity Cost Rate

	Utility Proxy Group
Discounted Cash Flow Model	9.09%
Risk Premium Model	10.56%
Capital Asset Pricing Model	10.87%
Cost of Equity Models Applied to Comparable Risk, Non-Price Regulated Companies	10.76%
Range of Model Results	9.09% - 10.87%
Size Adjustment	1.00%
Flotation Cost Adjustment	0.04%
Indicated Range of Common Equity Cost Rates After Adjustments	10.13% - 11.91%
Recommended Common Equity Cost Rate After Adjustments	10.25%

After analyzing the indicated common equity cost rates derived through these models, the indicated range of common equity cost rates produced by the models are between 9.09% and 10.87%, which are applicable to the Utility Proxy

Group. In view of these model results, it is clear that the DCF model is a low side outlier when compared to the results of the other models.

The indicated range of common equity cost rates was then adjusted upward by 1.00% and 0.04% to reflect AWNH's smaller relative size and flotation costs, respectively. These adjustments result in a Company-specific range of common equity cost rates between 10.13% and 11.91%. From this range of results, I recommend the Commission consider a common equity cost rate of 10.25% for use in setting rates for the Company.

IV. GENERAL PRINCIPLES

Q. What general principles have you considered in arriving at your recommended common equity cost rate of 10.25%?

A. In unregulated industries, the competition of the marketplace is the principal determinant of the price of products or services. For regulated public utilities, regulation must act as a substitute for marketplace competition. Assuring that the utility can fulfill its obligations to the public, while providing safe and reliable service at all times, requires a level of earnings sufficient to maintain the integrity of presently invested capital. Sufficient earnings also permit the attraction of needed new capital at a reasonable cost, for which the utility must compete with other firms of comparable risk, consistent with the fair rate of return standards established by the U.S. Supreme Court in the previously cited *Hope* and *Bluefield* decisions. Consequently, marketplace data must be relied on in assessing a common equity cost rate appropriate for ratemaking purposes. Just as the use of the market data for the proxy group adds reliability to the informed expert's judgment used in arriving at a recommended common equity cost rate, the use of

multiple generally accepted common equity cost rate models also adds reliability and accuracy when arriving at a recommended common equity cost rate.

Q. Can you please provide some examples from the financial literature which support the use of multiple cost of common equity models in determining the investor-required return?

A. Yes. In one example, Morin states:

> Each methodology requires the exercise of considerable judgment on the reasonableness of the assumptions underlying the methodology and on the reasonableness of the proxies used to validate a theory. The inability of the DCF model to account for changes in relative market valuation, discussed below, is a vivid example of the potential shortcomings of the DCF model when applied to a given company. Similarly, the inability of the CAPM to account for variables that affect security returns other than beta tarnishes its use.
>
> No one individual method provides the necessary level of precision for determining a fair return, but each method provides useful evidence to facilitate the exercise of an informed judgment. Reliance on any single method or preset formula is inappropriate when dealing with investor expectations because of possible measurement difficulties and vagaries in individual companies' market data. (emphasis added)
>
> * * *
>
> The financial literature supports the use of multiple methods. Professor Eugene Brigham, a widely respected scholar and finance academician, asserts(footnote omitted):
>
> > Three methods typically are used: (1) the Capital Asset Pricing Model (CAPM), (2) the discounted cash flow (DCF) method, and (3) the bond-yield-plus-risk-premium approach. **These methods are not mutually exclusive – no method dominates the others**, and all are subject to error when used in practice. Therefore, when faced with the task of estimating a company's cost of equity, we generally use all three methods and then choose among them on the basis of our confidence in the data used for each in the specific case at hand. (emphasis added)

Another prominent finance scholar, Professor Stewart Myers, in an early pioneering article on regulatory finance, stated(footnote omitted):

> Use more than one model when you can. Because estimating the opportunity cost of capital is difficult, **only a fool throws away useful information**. That means you should not use any one model or measure mechanically and exclusively. Beta is helpful as one tool in a kit, to be used in parallel with DCF models or other techniques for interpreting capital market data. (emphasis added)

Reliance on multiple tests recognizes that no single methodology produces a precise definitive estimate of the cost of equity. As stated in Bonbright, Danielsen, and Kamerschen (1988), '*no single or group test or technique is conclusive*.' Only a fool discards relevant evidence. (italics in original) (emphasis added)

* * *

While it is certainly appropriate to use the DCF methodology to estimate the cost of equity, there is no proof that the DCF produces a more accurate estimate of the cost of equity than other methodologies. Sole reliance on the DCF model ignores the capital market evidence and financial theory formalized in the CAPM and other risk premium methods. **The DCF model is one of many tools to be employed in conjunction with other methods to estimate the cost of equity.** It is not a superior methodology that supplants other financial theory and market evidence. The broad usage of the DCF methodology in regulatory proceedings in contrast to its virtual disappearance in academic textbooks does not make it superior to other methods. The same is true of the Risk Premium and CAPM methodologies. (emphasis added) [3]

Finally, Brigham and Gapenski note:

In practical work, *it is often best to use all three methods* – CAPM, bond yield plus risk premium, and DCF – and then apply judgment when the methods produce different results. People experienced in estimating equity capital costs recognize that both careful analysis and some very fine judgments are required. It would be nice to pretend that these judgments are unnecessary and to specify an easy, precise way of determining the exact cost of equity capital.

[3] Roger A. Morin, New Regulatory Finance, Public Utilities Reports, Inc., 2006, at 428-431. ("Morin")

> Unfortunately, this is not possible. Finance is in large part a matter of judgment, and we simply must face this fact. (italics in original) [4]

In the academic literature cited above, three methods are consistently mentioned: the DCF, CAPM, and the RPM, all of which I used in my analyses.

A. BUSINESS RISK

Q. Please define business risk and explain why it is important to the determination of a fair rate of return.

A. Business risk is the riskiness of a company's common stock without the use of debt and/or preferred capital. Examples of such general business risks faced by all utilities (*i.e.*, electric, natural gas distribution, and water) include size, the quality of management, the regulatory environment in which utilities operate, customer mix and concentration of customers, service territory growth, and capital intensity. All of these have a direct bearing on earnings.

Consistent with the basic financial principle of risk and return, business risk is important to the determination of a fair rate of return, because the higher the level of risk, the higher the rate of return investors demand.

Q. What business risks do the water and wastewater industries face in general?

A. Water and wastewater utilities have an ever-increasing responsibility to be stewards of the environment from which water supplies are drawn in order to preserve and protect essential natural resources of the United States. This increased environmental stewardship is a direct result of compliance with the Safe Water Drinking Act, as well as a response to continuous monitoring by the

[4] Eugene F. Brigham and Louis C. Gapenski, Financial Management – Theory and Practice, 4th Ed. (The Dryden Press, 1985) at 256. ("Brigham and Gapenski")

Environmental Protection Agency ("EPA") and state and local governments, of the water supply for potential contaminants and their resultant regulations. This, plus aging infrastructure, necessitate additional capital investment in the distribution and treatment of water, exacerbating the pressure on free cash flows arising from increased capital expenditures for infrastructure repair and replacement. The significant amount of capital investment and, hence, high capital intensity, is a major risk factor for the water and wastewater utility industry.

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

> After decades of under investment, American utilities are now spending heavily to modernize and upgrade aging pipelines and wastewater facilities. Funding these projects requires significant amounts of capital, much of it coming from external financing.
>
> * * *
>
> Utilities understand that they are being granted a monopoly of a vital resource and must provide good service. The regulatory climate is much more favorable in the water industry compared to that of other the electric utility industry.[5]

The water and wastewater industry also experience low depreciation rates. Depreciation rates are one of the principal sources of internal cash flows for all utilities (through a utility's depreciation expense), and are vital for a company to fund ongoing replacements and repairs of water and wastewater systems. Water / wastewater utility assets have long lives, and therefore have

[5] *Value Line Investment Survey*, October 9, 2020.

long capital recovery periods. As such, they face greater risk due to inflation, which results in a higher replacement cost per dollar of net plant.

Substantial capital expenditures, as noted by *Value Line,* will require significant financing. The three sources of financing typically used are debt, equity (common and preferred), and cash flow. All three are intricately linked to the opportunity to earn a sufficient rate of return as well as the ability to achieve that return. Consistent with *Hope* and *Bluefield*, the return must be sufficient to maintain credit quality as well as enable the attraction of necessary new capital, be it debt or equity capital. If unable to raise debt or equity capital, the utility must turn to either retained earnings or free cash flow,[6] both of which are directly linked to earning a sufficient rate of return. The level of free cash flow represents a utility's ability to meet the needs of its debt and equity holders. If either retained earnings or free cash flow is inadequate, it will be nearly impossible for the utility to attract the needed capital for new infrastructure investment necessary to ensure quality service to its customers. An insufficient rate of return can be financially devastating for utilities as well as a public safety issue for their customers.

The water and wastewater utility industry's high degree of capital intensity and low depreciation rates, coupled with the need for substantial infrastructure capital spending, require regulatory support in the form of adequate and timely rate relief, and in particular, a sufficient authorized return on common equity, so that the industry can successfully meet the challenges it faces.

[6] Free Cash Flow = Operating Cash Flow (Funds From Operations) minus Capital Expenditures.

B. FINANCIAL RISK

Q. Please define financial risk and explain why it is important to the determination of a fair rate of return.

A. Financial risk is the additional risk created by the introduction of debt and preferred stock into the capital structure. The higher the proportion of debt and preferred stock in the capital structure, the higher the financial risk (*i.e.* likelihood of default). Therefore, consistent with the basic financial principle of risk and return, investors demand a higher common equity return as compensation for bearing higher default risk.

Q. Can bond and credit ratings be a proxy for the combined business and financial risk (*i.e.*, investment risk of an enterprise)?

A. Yes, similar bond ratings/issuer credit ratings reflect, and are representative of, similar combined business and financial risks (*i.e.*, total risk) faced by bond investors.[7] Although specific business or financial risks may differ between companies, the same bond/credit rating indicates that the combined risks are roughly similar, albeit not necessarily equal, as the purpose of the bond/credit rating process is to assess credit quality or credit risk, and not common equity risk.

[7] Risk distinctions within S&P's bond rating categories are recognized by a plus or minus, i.e., within the A category, an S&P rating can be at A+, A, or A-. Similarly, risk distinctions for Moody's ratings are distinguished by numerical rating gradations, i.e., within the A category, a Moody's rating can be A1, A2 and A3.

Q. That being said, do rating agencies reflect company size in their bond ratings?

A. No. Neither S&P nor Moody's have minimum company size requirements for any given rating level. This means, all else equal, a relative size analysis needs to be conducted for companies with similar bond ratings.

V. AQUARION WATER COMPANY OF NEW HAMPSHIRE AND THE UTILITY PROXY GROUP

Q. Are you familiar with the operations of AWNH?

A. Yes. AWNH's operations serve approximately 9,541 customers in three communities within Rockingham County in New Hampshire. As a wholly-owned subsidiary of Aquarion Water Company, which is a wholly-owned subsidiary of Eversource Energy, AWNH is not publicly-traded.

Q. Please explain how you chose your Utility Proxy Group.

A. The basis of selection for the Utility Proxy Group was to select those companies which meet the following criteria:

(i) They are included in the Water Utility Group of *Value Line's Standard Edition* (October 9, 2020);

(ii) They have 70% or greater of 2019 total operating income and 70% or greater of 2019 total assets attributable to regulated water operations;

(iii) At the time of preparation of this testimony, they had not publicly announced that they were involved in any major merger or acquisition activity (*i.e.*, one publicly-traded utility merging with or acquiring another);

(iv) They have not cut or omitted their common dividends during the five years ending 2019 or through the time of the preparation of this testimony;

(v) They have *Value Line* and Bloomberg Professional Services ("Bloomberg") adjusted betas;

(vi) They have a positive *Value Line* five-year dividends per share ("DPS") growth rate projection; and

(vii) They have *Value Line*, Zacks, Yahoo! Finance, or Bloomberg consensus five-year earnings per share ("EPS") growth rate projections.

The following seven companies met these criteria: American States Water Co., American Water Works Co., Inc., California Water Service Group, Essential Utilities, Inc., Middlesex Water Co., SJW Corp., and York Water Co.

Q. Please describe Attachment DWD-2, page 1.

A. Page 1 of Attachment DWD-2 contains comparative capitalization and financial statistics for the Utility Proxy Group identified above for the years 2015 to 2019. During the five-year period ending 2019, the historically achieved average earnings rate on book common equity for the group averaged 10.45%. The average common equity ratio based on total capital (including short-term debt) was 51.09%, and the average dividend payout ratio was 60.34%.

Total debt to earnings before interest, taxes, depreciation, and amortization for the years 2015 to 2019 ranges between 3.41 and 5.54, with an average of 4.00. Funds from operations to total debt range from 14.49% to 25.81%, with an average of 21.64%.

VI. CAPITAL STRUCTURE

Q. What capital structure ratios do you recommend be employed in developing an overall fair rate of return appropriate for the Company?

A. I recommend the use of the actual test year capital structure of AWNH at December 31, 2019, which consists of 43.85% long-term debt, 3.78% short-term debt, 0.01% preferred equity, and 52.36% common equity as shown on page 1 of Attachment DWD-1.

Q. How does your proposed ratemaking common equity ratio of 52.36% for AWNH compare with the equity ratios maintained by the companies in your Utility Proxy Group?

A. My proposed ratemaking common equity ratio of 52.36% for AWNH is reasonable and consistent with the range of common equity ratios maintained, on average, by the companies in the Utility Proxy Group on which I base my recommended common equity cost rate. As shown on page 2 of Attachment DWD-2, the common equity ratios of the Utility Proxy Group range from 38.48% to 57.05% in 2019. In my opinion, AWNH's actual capital structure consisting of 43.85% long-term debt, 3.78% short-term debt, 0.01% preferred equity, and 52.36% common equity is appropriate. This is how AWNH is actually financed, and is comparable to the range of capital structure ratios (based on total capital) maintained by the companies in the Utility Proxy Group, on whose market data I base my recommended common equity cost rate.

Q. What cost rates are most appropriate for use in a cost of capital determination for AWNH?

A. The Company's actual long- and short-term debt cost rates at December 31, 2019 of 6.14% and 2.42%, respectively, are reasonable and appropriate for use in the calculation of the overall cost of capital in this proceeding. Likewise, the actual preferred equity cost rate of 6.00% should be approved by the Commission.

VII. COMMON EQUITY COST RATE MODELS

Q. Are your cost of common equity models market-based models?

A. Yes. The DCF model is market-based because market prices are used in developing the dividend yield component of the model. The RPM is market-based because the bond ratings and expected bond yields used in the application of the RPM reflect the market's assessment of bond/credit risk. In addition, the use of beta coefficients (β) to determine the equity risk premium reflects the market's assessment of market/systematic risk, since beta coefficients are derived from regression analyses of market prices. The Predictive Risk Premium Model ("PRPM") uses monthly market returns in addition to expectations of the risk-free rate. The CAPM is market-based for many of the same reasons that the RPM is market-based (*i.e.*, the use of expected bond yields and beta coefficients). Selection of the comparable risk non-price regulated companies is market-based because it is based on statistics which result from regression analyses of market prices and reflect the market's assessment of total risk.

A. DISCOUNTED CASH FLOW MODEL

Q. What is the theoretical basis of the DCF model?

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

Q. Which version of the DCF model did you use?

A. I used the single-stage constant growth DCF model.

Q. Please describe the dividend yield you used in your application of the DCF model.

A. The unadjusted dividend yields are based on the proxy companies' dividends as of October 16, 2020, divided by the average of closing market prices for the 60 trading days ending October 16, 2020.[8]

Q. Please explain your adjustment to the dividend yield.

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

DCF theory calls for the use of the full growth rate, or D_1, in calculating the dividend yield component of the model. Since the various companies in the

[8] See Attachment DWD-3, page 1, Column 1.

Utility Proxy Group increase their quarterly dividend at various times during the year, a reasonable assumption is to reflect one-half the annual dividend growth rate in the dividend yield component, or $D_{1/2}$. Because the dividend should be representative of the next 12-month period, my adjustment is a conservative approach that does not overstate the dividend yield. Therefore, the actual average dividend yields in Column 1 on page 1 of Attachment DWD-3 have been adjusted upward to reflect one-half the average projected growth rate shown in Column 6.

Q. Please explain the basis of the growth rates you applied to the Utility Proxy Group in your DCF model.

A. Investors with more limited resources than institutional investors are likely to rely on widely available financial information services, such as *Value Line*, Zacks, Yahoo! Finance, and Bloomberg. Investors realize that analysts have significant insight into the dynamics of the industries and individual companies they analyze, as well as companies' abilities to effectively manage the effects of changing laws and regulations, and ever-changing economic and market conditions. For these reasons, I used analysts' five-year forecasts of EPS growth in my DCF analysis.

Over the long run, there can be no growth in DPS without growth in EPS. Security analysts' earnings expectations have a more significant influence on market prices than dividend expectations. Thus, the use of earnings growth rates in a DCF analysis provides a better match between investors' market price appreciation expectations and the growth rate component of the DCF.

Q. Please summarize the DCF model results.

A. As shown on page 1 of Attachment DWD-3, the mean result of the application of the single-stage DCF model is 9.19%, the median result is 8.99%, and the average of the two is 9.09% for the Utility Proxy Group. In arriving at a conclusion for the DCF-indicated common equity cost rate for the Utility Proxy Group, I have relied on an average of the mean and the median results of the DCF. This approach takes into consideration all the proxy companies' results, while mitigating the high and low outliers of those individual results.

B. THE RISK PREMIUM MODEL

Q. Please describe the theoretical basis of the RPM.

A. The RPM is based on the fundamental financial principle of risk and return, namely, that investors require greater returns for bearing greater risk. The RPM recognizes that common equity capital has greater investment risk than debt capital, as common equity shareholders are behind debt holders in any claim on a company's assets and earnings. As a result, investors require higher returns from common stocks than from investment in bonds, to compensate them for bearing the additional risk.

While it is possible to directly observe bond returns and yields, investors' required common equity return cannot be directly determined or observed. According to RPM theory, one can estimate a common equity risk premium over bonds (either historically or prospectively), and use that premium to derive a cost rate of common equity. The cost of common equity equals the expected cost rate for long-term debt capital plus a risk premium over that cost rate to compensate common shareholders for the added risk of being unsecured and

last-in-line for any claim on the corporation's assets and earnings in the event of a liquidation.

Q. Please explain how you derived your indicated cost of common equity based on the RPM.

A. I relied on the results of the application of two risk premium methods. The first method is the PRPM, while the second method is a risk premium model using a total market approach.

Q. Please explain the PRPM.

A. The PRPM, published in the *Journal of Regulatory Economics* and *The Electricity Journal*[9], 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")".[10] Engle found that volatility changes over time and is related from one period to the next, especially in financial markets. Engle discovered that the volatility in prices and returns clusters over time and is therefore highly predictable and can be used to predict future levels of risk and risk premiums.

The PRPM estimates the risk / return relationship directly, as the predicted equity risk premium is generated by the prediction of volatility or risk. The PRPM is not based on an estimate of investor behavior, but rather on the evaluation of the results of that behavior (*i.e.*, the variance of historical equity risk premiums).

[9] Autoregressive conditional heteroscedasticity. See "A New Approach for Estimating the Equity Risk Premium for Public Utilities", Pauline M. Ahern, Frank J. Hanley and Richard A. Michelfelder, Ph.D. The Journal of Regulatory Economics (December 2011), 40:261-278 and "Comparative Evaluation of the Predictive Risk Premium Model, the Discounted Cash Flow Model and the Capital Asset Pricing Model for Estimating the Cost of Common Equity", Richard A. Michelfelder, Ph.D, Pauline M. Ahern, Dylan W. D'Ascendis, and Frank J. Hanley, The Electricity Journal (May 2013), 84-89.

[10] www.nobelprize.org.

The inputs to the model are the historical returns on the common shares of each company in the Utility Proxy Group minus the historical monthly yield on long-term U.S. Treasury securities through September 2020. Using a generalized form of ARCH, known as GARCH, I calculated each Utility Proxy Group company's projected equity risk premium using Eviews© statistical software. When the GARCH Model is applied to the historical return data, it produces a predicted GARCH variance series[11] and a GARCH coefficient[12]. Multiplying the predicted monthly variance by the GARCH coefficient, then annualizing it[13], produces the predicted annual equity risk premium. I then added the forecasted 30-year U.S. Treasury Bond yield, 2.11%[14], to each company's PRPM-derived equity risk premium to arrive at an indicated cost of common equity. The 30-year Treasury yield is a consensus forecast derived from the *Blue Chip Financial Forecasts ("Blue Chip")*[15]. The mean PRPM indicated common equity cost rate for the Utility Proxy Group is 11.20%, the median is 10.43%, and the average of the two is 10.82%. Consistent with my reliance on the average of the median and mean results of the DCF, I relied on the average of the mean and median results of the Utility Proxy Group PRPM to calculate a cost of common equity rate of 10.82%.

Q. Please explain the total market approach RPM.

A. The total market approach RPM adds a prospective public utility bond yield to an average of: 1) an equity risk premium that is derived from a beta-adjusted total

[11] Illustrated on Columns 1 and 2 of page 2 of Attachment DWD-4.
[12] Illustrated on Column 4 of page 2 of Attachment DWD-4.
[13] Annualized Return = (1+Monthly Return)^12 - 1
[14] *See*, Column 6 of page 2 of Attachment DWD-4.
[15] *Blue Chip Financial Forecasts*, June 1, 2020 at p. 14 and October 1, 2020 at p. 2.

market equity risk premium, and 2) an equity risk premium based on the S&P Utilities Index.

Q. Please explain the basis of the expected bond yield of 3.56% applicable to the Utility Proxy Group.

A. The first step in the total market approach RPM analysis is to determine the expected bond yield. Because both ratemaking and the cost of capital, including common equity cost rate, are prospective in nature, a prospective yield on similarly-rated long-term debt is essential. I rely on a consensus forecast of about 50 economists of the expected yield on Aaa-rated corporate bonds for the six calendar quarters ending with the first calendar quarter of 2022 and the long-term projections for 2022 to 2026, and 2027 to 2031 from *Blue Chip*. As shown on line No. 1 of page 3 of Attachment DWD-4, the average expected yield on Moody's Aaa-rated corporate bonds is 2.96%. In order to derive an expected yield on A2-rated public utility bonds, I make an upward adjustment of 0.54%, which represents a recent spread between Aaa-rated corporate bonds and A2-rated public utility bonds, in order to adjust the expected Aaa-rated corporate bond yield to an equivalent Moody's A2-rated public utility bond.[16] Adding that recent 0.54% spread to the expected Aaa-rated corporate bond yield of 2.96% results in an expected A2 public utility bond of 3.50%.

Since the Utility Proxy Group's average Moody's long-term issuer rating is A2/A3, another adjustment to the expected A2-rated public utility bond yield is needed to reflect the difference in bond ratings. An upward adjustment of 0.06%, which represents one-sixth of a recent spread between A2- and Baa2-rated

[16] As shown on Line No. 2 and explained in Note 2 of page 3 of Attachment DWD-4.

public utility bond yields, is necessary to make the A2-rated prospective bond yield applicable to an A2/A3-rated public utility bond.[17] Adding the 0.06% to the 3.50% prospective A2-rated public utility bond yield results in a 3.56% expected bond yield for the Utility Proxy Group.

Q. Please explain how the beta-derived equity risk premium is determined.

A. The components of the beta-derived risk premium model are: 1) an expected market equity risk premium over corporate bonds, and 2) the beta coefficient. The derivation of the beta-derived equity risk premium that I applied to the Utility Proxy Group is shown on lines 1 through 9 of page 8 of Attachment DWD-4. The total beta-derived equity risk premium I applied was based on an average of: 1) Ibbotson-based equity risk premiums; 2) *Value Line*-based equity risk premiums; and 3) Bloomberg-based equity risk premium. Each of these is described in turn.

Q. How did you derive a market equity risk premium based on long-term historical data?

A. To derive a historical market equity risk premium, I used the most recent holding period returns for the large company common stocks from the Stocks, Bonds, Bills, and Inflation ("SBBI") 2020 Yearbook ("SBBI – 2020")[18] less the average historical yield on Moody's Aaa/Aa-rated corporate bonds for the period 1928 to 2019. The use of holding period returns over a very long period of time is appropriate because it is consistent with the long-term investment horizon presumed by investing in a going concern, *i.e.*, a company expected to operate in perpetuity.

[17] As shown on Line No. 4 and explained in Note 3 on page 3 of Attachment DWD-4.
[18] SBBI Appendix A Tables: Morningstar Stocks, Bonds, Bills, & Inflation 1926-2019.

SBBI's long-term arithmetic mean monthly total return rate on large company common stocks was 11.83% and the long-term arithmetic mean monthly yield on Moody's Aaa/Aa-rated corporate bonds was 6.05%.[19] As shown on line 1 of page 8 of Attachment DWD-4, subtracting the mean monthly bond yield from the total return on large company stocks results in a long-term historical equity risk premium of 5.78%.

I used the arithmetic mean monthly total return rates for the large company stocks and yields (income returns) for the Moody's Aaa/Aa corporate bonds, because they are appropriate for the purpose of estimating the cost of capital as noted in SBBI – 2020.[20] The use of the arithmetic mean return rates and yields is appropriate because historical total returns and equity risk premiums provide insight into the variance and standard deviation of returns needed by investors in estimating future risk when making a current investment. If investors relied on the geometric mean of historical equity risk premiums, they would have no insight into the potential variance of future returns because the geometric mean relates the change over many periods to a constant rate of change, thereby obviating the year-to-year fluctuations, or variance, which is critical to risk analysis.

Q. Please explain the derivation of the regression-based market equity risk premium.

A. To derive the regression analysis-derived market equity risk premium of 9.42%, shown on line 2 of page 8 of Attachment DWD-4, I used the same monthly annualized total returns on large company common stocks relative to the monthly

[19] As explained in Note 1 on page 9 of Attachment DWD-4.
[20] SBBI – 2020, at 10-22.

annualized yields on Moody's Aaa/Aa-rated corporate bonds as mentioned above. The relationship between interest rates and the market equity risk premium was modeled using the observed monthly market equity risk premium as the dependent variable, and the monthly yield on Moody's Aaa/Aa-rated corporate bonds as the independent variable. I used a linear Ordinary Least Squares ("OLS") regression, in which the market equity risk premium is expressed as a function of the Moody's Aaa/Aa-rated corporate bonds yield:

$$RP = \alpha + \beta\ (R_{Aaa/Aa})$$

Q. Please explain the derivation of a PRPM equity risk premium.

A. I used the same PRPM approach described previously to develop another equity risk premium estimate. The inputs to the model are the historical monthly returns on large company common stocks minus the monthly yields on Aaa/Aa-rated corporate bonds during the period from January 1928 through September 2020.[21] Using the previously discussed generalized form of ARCH, known as GARCH, the projected equity risk premium is determined using Eviews© statistical software. The resulting PRPM predicted market equity risk premium is 9.54%.[22]

Q. Please explain the derivation of a projected equity risk premium based on *Value Line* data for your RPM analysis.

A. As noted previously, because both ratemaking and the cost of capital are prospective, a prospective market equity risk premium is needed. The derivation of the forecasted or prospective market equity risk premium can be found in Note 4 on page 9 of Attachment DWD-4. Consistent with my calculation of the

[21] Data from January 1928-December 2019 is from SBBI – 2019. Data from January – September 2020 is from Bloomberg Professional Services.

[22] Shown on Line No. 3 on page 8 of Attachment DWD-4.

dividend yield component in my DCF analysis, this prospective market equity risk premium is derived from an average of the three- to five-year median market price appreciation potential by *Value Line* for the 13 weeks ending October 16, 2020, plus an average of the median estimated dividend yield for the common stocks of the 1,700 firms covered in *Value Line*'s Standard Edition.[23]

The average median expected price appreciation is 54%, which translates to an 11.40% annual appreciation, and when added to the average of *Value Line's* median expected dividend yields of 2.29%, equates to a forecasted annual total return rate on the market of 13.69%. The forecasted Aaa-rated bond yield of 2.96% is deducted from the total market return of 13.69%, resulting in an equity risk premium of 10.73%, shown on page 8, line 4 of Attachment DWD-4.

Q. Please explain the derivation of an equity risk premium based on the S&P 500 companies.

A. Using data from *Value Line*, I calculated an expected total return on the S&P 500 using expected dividend yields and long-term growth estimates as a proxy for capital appreciation. The expected total return for the S&P 500 is 13.95%. Subtracting the prospective yield on Aaa-rated Corporate bonds of 2.96% results in a 10.99% projected equity risk premium.

Q. Please explain the derivation of an equity risk premium based on Bloomberg data.

A. Using data from Bloomberg, I calculated an expected total return on the S&P 500 using expected dividend yields and long-term growth estimates as a proxy for capital appreciation, identical to the method described above. The expected total

[23] As explained in detail in page 2, Note 1 of Attachment DWD-5.

return for the S&P 500 is 13.70%. Subtracting the prospective yield on Aaa-rated Corporate bonds of 2.96% results in a 10.74% projected equity risk premium.

Q. What is your conclusion of a beta-derived equity risk premium for use in your RPM analysis?

A. I gave equal weight to the six equity risk premiums in arriving at my conclusion of 9.53%.[24]

After calculating the average market equity risk premium of 9.53%, I adjusted it by beta to account for the risk of the Utility Proxy Group. As discussed below, the beta coefficient is a meaningful measure of prospective relative risk to the market as a whole and is a logical means by which to allocate a company's, or proxy group's, share of the market's total equity risk premium relative to corporate bond yields. As shown on page 1 of Attachment DWD-5, the average of the mean and median beta coefficient for the Utility Proxy Group is 0.81. Multiplying the beta coefficient of the Utility Proxy Group of 0.81 by the market equity risk premium of 9.53% results in a beta-adjusted equity risk premium of 7.72% for the Utility Proxy Group.

Q. How did you derive the equity risk premium based on the S&P Utility Index and Moody's A-rated public utility bonds?

A. I estimated three equity risk premiums based on S&P Utility Index holding returns, and two equity risk premiums based on the expected returns of the S&P Utilities Index, using *Value Line* and Bloomberg data, respectively. Turning first to the S&P Utility Index holding period returns, I derived a long-term monthly arithmetic mean equity risk premium between the S&P Utility Index total returns

[24] *See,* Line No. 7 on page 8 of Attachment DWD-4.

of 10.74% and monthly A-rated public utility bond yields of 6.53% from 1928 to 2019, to arrive at an equity risk premium of 4.21%.[25] I then used the same historical data to derive an equity risk premium of 6.88% based on a regression of the monthly equity risk premiums. The final S&P Utility Index holding period equity risk premium involved applying the PRPM using the historical monthly equity risk premiums from January 1928 to September 2020 to arrive at a PRPM-derived equity risk premium of 5.53% for the S&P Utility Index.

I then derived expected total returns on the S&P Utilities Index of 10.18% and 8.94% using data from *Value Line* and Bloomberg, respectively, and subtracted the prospective A2-rated public utility bond yield (3.50%[26]), which results in risk premiums of 6.68% and 5.44%, respectively. As with the market equity risk premiums, I averaged each risk premium to arrive at my utility-specific equity risk premium of 5.75%.

Q. What is your conclusion of an equity risk premium for use in your total market approach RPM analysis?

A. The equity risk premium I applied to the Utility Proxy Group is 6.74%, which is the average of the beta-derived and the S&P utility equity risk premiums of 7.72% and 5.75%, respectively.[27]

[25] As shown on Line No. 1 on page 12 of Attachment DWD-4.
[26] Derived on Line No. 3 of page 3 of Attachment DWD-4.
[27] As shown on page 7 of Attachment DWD-4.

Q. What is the indicated RPM common equity cost rate based on the total market approach?

A. As shown on line No. 7 of Attachment DWD-4, page 3, I calculated a common equity cost rate of 10.30% for the Utility Proxy Group based on the total market approach of the RPM.

Q. What are the results of your application of the PRPM and the total market approach RPM?

A. As shown on page 1 of Attachment DWD-4, the indicated RPM-derived common equity cost rate is 10.56%, which gives equal weight to the PRPM (10.82%) and the adjusted market approach results (10.30%).

C. THE CAPITAL ASSET PRICING MODEL

Q. Please explain the theoretical basis of the CAPM.

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

The CAPM assumes that all other risk (*i.e.*, all non-market or unsystematic risk) can be eliminated through diversification. The risk that cannot be eliminated through diversification is called market, or systematic, risk. In addition, the CAPM presumes that investors require compensation only for systematic risk, which is the result of macroeconomic and other events that affect the returns on all assets. The model is applied by adding a risk-free rate of return to a market risk premium, which is adjusted proportionately to reflect the systematic risk of

the individual security relative to the total market as measured by the beta coefficient. The traditional CAPM model is expressed as:

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

Where: R_s = Return rate on the common stock;

R_f = Risk-free rate of return;

R_m = Return rate on the market as a whole; and

β = Adjusted beta coefficient (volatility of the security relative to the market as a whole).

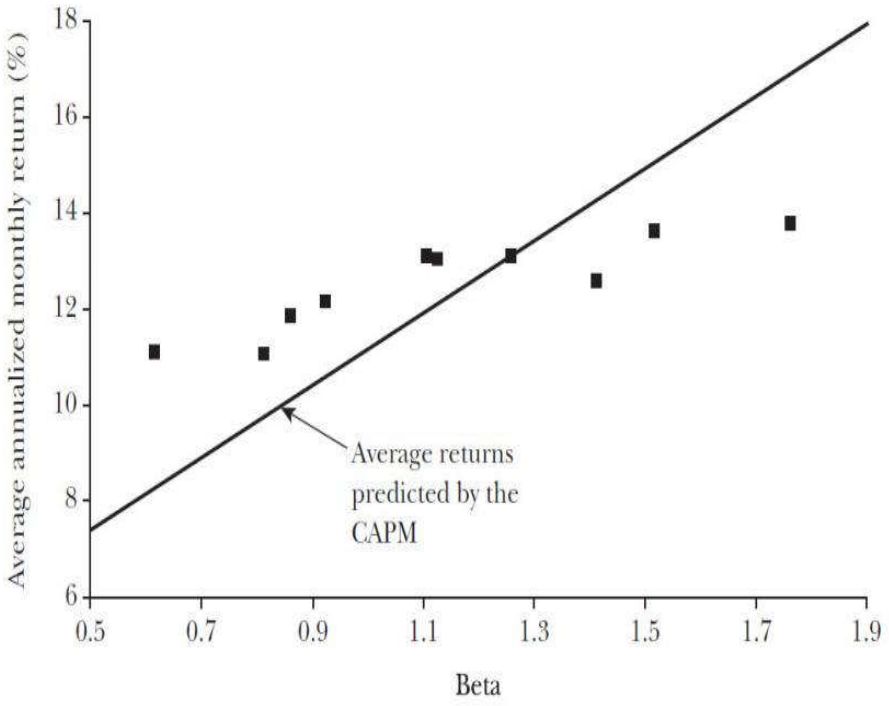
Numerous tests of the CAPM have measured the extent to which security returns and beta coefficients are related as predicted by the CAPM, confirming its validity. The empirical CAPM ("ECAPM") reflects the reality that while the results of these tests support the notion that the beta coefficient is related to security returns, the empirical Security Market Line ("SML") described by the CAPM formula is not as steeply sloped as the predicted SML.[28] The 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."[29]

[28] Morin, at 175.

[29] 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 ("Fama & French"). http://pubs.aeaweb.org/doi/pdfplus/10.1257/0895330042162430

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



In addition, 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. Morin states:

> With few exceptions, the empirical studies agree that … low-beta securities earn returns somewhat higher than the CAPM would predict, and high-beta securities earn less than predicted.[30]
>
> * * *
>
> 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 +

[30] Morin, at 175.

0.0520 β is between 0.25 and 0.30. If x = 0.25, the equation becomes:

$$K = R_F + 0.25(R_M - R_F) + 0.75\ \beta(R_M - R_F)$$ [31]

Fama and French provide similar support for the ECAPM when they state:

> 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).[32]

Finally, Fama and French further note:

> 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.[33]

Clearly, the justification from Morin, Fama, and French along with their reviews of other academic research on the CAPM, validate the use of the ECAPM. In view of theory and practical research, I have applied both the traditional CAPM and the ECAPM to the companies in the Utility Proxy Group and averaged the results.

Q. What beta coefficients did you use in your CAPM analysis?

A. With respect to the beta coefficient, I considered two methods of calculation: the average of the beta coefficients of the Utility Proxy Group companies reported by Bloomberg Professional Services and the average of the beta coefficients of the

[31] Morin, at 190.
[32] Fama & French, at 32.
[33] *Ibid.,* at 33.

Utility Proxy Group companies as reported by *Value Line*. While both of those services adjust their calculated (or "raw") beta coefficients to reflect the tendency of the beta coefficient to regress to the market mean of 1.00, *Value Line* calculates the beta coefficient over a five-year period, while Bloomberg's calculation is based on two years of data.

Q. Please describe your selection of a risk-free rate of return.

A. As shown in Column 5 on page 1 of Attachment DWD-5, the risk-free rate adopted for both applications of the CAPM is 2.11%. This risk-free rate of 2.11% is based on the average of the *Blue Chip* consensus forecast of the expected yields on 30-year U.S. Treasury bonds for the six quarters ending with the first calendar quarter of 2022, and long-term projections for the years 2022 to 2026 and 2027 to 2031.

Q. Why is the yield on long-term U.S. Treasury bonds appropriate for use as the risk-free rate?

A. The yield on long-term U.S. Treasury Bonds is almost risk-free and its term is consistent with the long-term cost of capital to public utilities measured by the yields on A-rated public utility bonds; the long-term investment horizon inherent in utilities' common stocks; and the long-term life of the jurisdictional rate base to which the allowed fair rate of return (*i.e.*, cost of capital) will be applied. In contrast, short-term U.S. Treasury yields are more volatile and largely a function of Federal Reserve monetary policy.

Q. Please explain the estimation of the expected risk premium for the market used in your CAPM analyses.

A. The basis of the market risk premium is explained in detail in note 1 on page 2 of Attachment DWD-5. As discussed previously, the market risk premium is derived from an average of:

(i) Ibbotson-based market risk premiums;

(ii) *Value Line* data-based market risk premiums; and

(iii) Bloomberg data-based market risk premium.

The long-term income return on U.S. Government Securities of 5.09% was deducted from the SBBI - 2020 monthly historical total market return of 12.10%, which results in an historical market equity risk premium of 7.01%.[34] I applied a linear OLS regression to the monthly annualized historical returns on the S&P 500 relative to historical yields on long-term U.S. Government Securities from SBBI - 2020. That regression analysis yielded a market equity risk premium of 10.18%. The PRPM market equity risk premium is 10.66% and is derived using the PRPM relative to the yields on long-term U.S. Treasury securities from January 1926 through September 2020.

The *Value Line*-derived forecasted total market equity risk premium is derived by deducting the forecasted risk-free rate of 2.11%, discussed above, from the *Value Line* projected total annual market return of 13.69%, resulting in a forecasted total market equity risk premium of 11.58%. The S&P 500 projected market equity risk premium using *Value Line* data is derived by subtracting the

[34] SBBI – 2020, at Appendix A-1 (1) through .A-1 (3) and Appendix A-7 (19) through A-7 (21).

projected risk-free rate of 2.11% from the projected total return of the S&P 500 of 13.95%. The resulting market equity risk premium is 11.84%.

The S&P 500 projected market equity risk premium using Bloomberg data is derived by subtracting the projected risk-free rate of 2.11% from the projected total return of the S&P 500 of 13.70%. The resulting market equity risk premium is 11.59%.

These six market risk premiums, when averaged, result in an average total market equity risk premium of 10.48%.

Q. What are the results of your application of the traditional and empirical CAPM to the Utility Proxy Group?

A. As shown on page 1 of Attachment DWD-5, the mean result of my CAPM/ECAPM analyses is 10.61%, the median is 11.12%, and the average of the two is 10.87%. Consistent with my reliance on the average of mean and median DCF results discussed above, the indicated common equity cost rate using the CAPM/ECAPM is 10.87%.

D. COMMON EQUITY COST RATES FOR A PROXY GROUP OF DOMESTIC, NON-PRICE REGULATED COMPANIES BASED ON THE DCF, RPM, AND CAPM

Q. Why did you also consider a proxy group of domestic, non-price regulated companies?

A. In the *Hope* and *Bluefield* cases, the U.S. Supreme Court did not specify that comparable risk companies had to be utilities. Since the purpose of rate regulation is to be a substitute for the competition of the marketplace, non-price regulated firms operating in the competitive marketplace make an excellent proxy if they are comparable in total risk to the Utility Proxy Group being used to

estimate the cost of common equity. The selection of such domestic, non-price regulated competitive firms theoretically and empirically results in a proxy group which is comparable in total risk to the Utility Proxy Group.

Q. How did you select non-price regulated companies that are comparable in total risk to the Utility Proxy Group?

A. In order to select a proxy group of domestic, non-price regulated companies similar in total risk to the Utility Proxy Group, I relied on the beta coefficients and related statistics derived from *Value Line* regression analyses of weekly market prices over the most recent 260 weeks (*i.e.*, five years). Using these selection criteria resulted in a proxy group of 23 domestic, non-price regulated firms comparable in total risk to the Utility Proxy Group. Total risk is the sum of non-diversifiable market risk and diversifiable company-specific risks. The criteria used in the selection of the domestic, non-price regulated firms was:

(i) They must be covered by *Value Line Investment Survey* (Standard Edition);

(ii) They must be domestic, non-price regulated companies, *i.e.*, non-utilities;

(iii) Their beta coefficients must lie within plus or minus two standard deviations of the average unadjusted beta coefficient of the Utility Proxy Group; and

(iv) The residual standard errors of the *Value Line* regressions which gave rise to the unadjusted beta coefficients must lie within plus or minus two standard deviations of the average residual standard error of the Utility Proxy Group.

Beta coefficients are a measure of market or systematic risk, which is not diversifiable. The residual standard errors of the regressions were used to measure each firm's company-specific, diversifiable risk. Companies that have similar beta coefficients and similar residual standard errors resulting from the same regression analyses have similar total investment risk.

Q. Have you prepared an attachment which shows the data from which you selected the 23 domestic, non-price regulated companies that are comparable in total risk to the Utility Proxy Group?

A. Yes, the basis of my selection, and both proxy groups' regression statistics, are shown in Attachment DWD-6.

Q. Did you calculate common equity cost rates using the DCF, RPM, and CAPM for the Non-Price Regulated Proxy Group?

A. Yes. Because the DCF, RPM, and CAPM have been applied in an identical manner as described above, I will not repeat the details of the rationale and application of each model. One exception is in the application of the RPM, where I did not use public utility-specific equity risk premiums, nor did I apply the PRPM to the individual companies.

Page 2 of Attachment DWD-7 contains the derivation of the DCF cost rates. As shown, the indicated common equity cost rate using the DCF for the Non-Price Regulated Proxy Group comparable in total risk to the Utility Proxy Group, is 10.26%.

Pages 3 through 5 contain the data and calculations that support the 11.50% RPM cost rate. As shown on Line No. 1 of page 3 of Attachment DWD-7, the consensus prospective yield on Moody's Baa-rated corporate bonds for the

six quarters ending in the first quarter of 2022, and for the years 2022 to 2026 and 2027 to 2031, is 4.08%.[35] Because the Non-Price Regulated Proxy Group has an average Moody's bond rating of Baa1, a downward adjustment of 0.20% to the prospective Baa2-rated bond yield is necessary to reflect the difference in bond ratings.[36] Subtracting 0.20% from the prospective Baa2-rated bond yield of 4.08% is 3.88%.

When the beta-adjusted risk premium of 7.62%[37] relative to the Non-Price Regulated Proxy Group is added to the prospective Baa1-rated corporate bond yield of 3.88%, the indicated RPM cost rate is 11.50%.

Page 6 contains the inputs and calculations that support my indicated CAPM/ECAPM cost rate of 10.70%.

Q. What is the cost rate of common equity based on the Non-Price Regulated Proxy Group comparable in total risk to the Utility Proxy Group?

A. As shown on page 1 of Attachment DWD-7, the results of the DCF, RPM, and CAPM applied to the Non-Price Regulated Proxy Group comparable in total risk to the Utility Proxy Group are 10.26%, 11.50%, and 10.70%, respectively. The average of the mean and median of these models is 10.76%, which I used as the indicated common equity cost rate for the Non-Price Regulated Proxy Group.

[35] *Blue Chip Financial Forecasts*, June 1, 2020, at p. 14 and October 1, 2020, at p. 2.
[36] As demonstrated on Attachment DWD-7, page 3, note 2.
[37] Derived on page 5 of Attachment DWD-7.

VIII. CONCLUSION OF COMMON EQUITY COST RATE BEFORE ADJUSTMENT

Q. What is the indicated range of common equity cost rates before adjustment?

A. Based on the results of the application of multiple cost of common equity models to the Utility Proxy Group and the Non-Price Regulated Proxy Group, the indicated model results are between 9.09% and 10.87%. I used multiple cost of common equity models as primary tools in arriving at my recommended common equity cost rate, because no single model is so inherently precise that it can be relied on solely to the exclusion of other theoretically sound models. The use of multiple models adds reliability to the estimation of the common equity cost rate, and the prudence of using multiple cost of common equity models is supported in both the financial literature and regulatory precedent.

IX. ADJUSTMENTS TO THE COMMON EQUITY COST RATE

A. SIZE ADJUSTMENT

Q. Does AWNH's smaller size compared with the Utility Proxy Group increase its business risk?

A. Yes. AWNH's smaller size relative to the Utility Proxy Group companies indicates greater relative business risk for the Company because, all else being equal, size has a material bearing on risk.

Size affects business risk because smaller companies generally are less able to cope with significant events that affect sales, revenues, and earnings. For example, smaller companies face more risk exposure to business cycles and economic conditions, both nationally and locally. Additionally, the loss of revenues from a few larger customers would have a greater effect on a small

company than on a bigger company with a larger, more diverse, customer base.

As further evidence illustrates that smaller firms are riskier, investors generally demand greater returns from smaller firms to compensate for less marketability and liquidity of their securities. Duff & Phelps' 2020 Valuation Handbook – U.S. Guide to Cost of Capital ("D&P - 2020") discusses the nature of the small-size phenomenon, providing an indication of the magnitude of the size premium based on several measures of size. In discussing "Size as a Predictor of Equity Premiums," D&P - 2020 states:

> The size effect is based on the empirical observation that companies of smaller size are associated with greater risk and, therefore, have greater cost of capital [sic]. The "size" of a company is one of the most important risk elements to consider when developing cost of equity capital estimates for use in valuing a business simply because size has been shown to be a *predictor* of equity returns. In other words, there is a significant (negative) relationship between size and historical equity returns - as size *decreases*, returns tend to *increase*, and vice versa. (footnote omitted) (emphasis in original)[38]

Furthermore, in "The Capital Asset Pricing Model: Theory and Evidence," Fama and French note size is indeed a risk factor which must be reflected when estimating the cost of common equity. On page 14, they note:

> **. . .** the higher average returns on small stocks and high book-to-market stocks reflect unidentified state variables that produce undiversifiable risks (covariances) in returns not captured in the market return and are priced separately from market betas.[39]

Based on this evidence, Fama and French proposed their three-factor model which includes a size variable in recognition of the effect size has on the cost of common equity.

Also, it is a basic financial principle that the use of funds invested, and not

[38] Duff & Phelps 2020 Valuation Handbook – U.S. Guide to Cost of Capital, Wiley 2018, at 4-1.
[39] Fama & French, at 25-43.

the source of funds, is what gives rise to the risk of any investment.[40] Eugene Brigham, a well-known authority, states:

> A number of researchers have observed that portfolios of small-firms (sic) have earned consistently higher average returns than those of large-firm stocks; this is called the "small-firm effect." On the surface, it would seem to be advantageous to the small firms to provide average returns in a stock market that are higher than those of larger firms. In reality, it is bad news for the small firm; **what the small-firm effect means is that the capital market demands higher returns on stocks of small firms than on otherwise similar stocks of the large firms.** (emphasis added)[41]

Consistent with the financial principle of risk and return discussed above, increased relative risk due to small size must be considered in the allowed rate of return on common equity. Therefore, the Commission's authorization of a cost rate of common equity in this proceeding must appropriately reflect the unique risks of AWNH, including its small size, which is justified and supported above by evidence in the financial literature.

Q. Should the Commission consider AWNH as a stand-alone company?

A. Yes, it should. Because it is AWNH's rate base to which the overall rates of return set forth in this proceeding will be applied, they should be evaluated as a stand-alone entity. To do otherwise would be discriminatory, confiscatory, and inaccurate. It is also a basic financial precept that the use of the funds invested give rise to the risk of the investment. As Brealey and Myers state:

> The true cost of capital depends on the use to which the capital is put.
>
> ***
>
> *Each project should be evaluated at its own opportunity cost of*

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

[41] Eugene F. Brigham, Fundamentals of Financial Management, Fifth Edition (The Dryden Press, 1989), at 623.

> *capital; the true cost of capital depends on the use to which the capital is put*. (italics and bold in original) [42]

Morin confirms Brealey and Myers when he states:

> Financial theory clearly establishes that the cost of equity is the risk-adjusted opportunity cost of the investors and not the cost of the specific capital sources employed by the investors. The true cost of capital depends on the use to which the capital is put and not on its source. The Hope and Bluefield doctrines have made clear that the relevant considerations in calculating a company's cost of capital are the alternatives available to investors and the returns and risks associated with those alternatives.[43]

Additionally, Levy and Sarnat state:

> The firm's cost of capital is the discount rate employed to discount the firm's average cash flow, hence obtaining the value of the firm. It is also the weighted average cost of capital, as we shall see below. The weighted average cost of capital should be employed for project evaluation… only in cases where the risk profile of the new projects is a "carbon copy" of the risk profile of the firm[44]

Although Levy and Sarnat discuss a project's cost of capital relative to a firm's cost of capital, these principles apply equally to the use of a proxy group-based cost of capital. Each company must be viewed on its own merits, regardless of the source of its equity capital. As *Bluefield* 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; [45]

In other words, it is the "risks and uncertainties" surrounding the property employed for the "convenience of the public" which determines the appropriate

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[42] Richard A. Brealey and Stewart C. Myers, Principles of Corporate Finance, McGraw-Hill, Third Edition, 1988, at pp. 173, 198.

[43] Morin, at 523.

[44] Haim Levy & Marshall Sarnat, Capital Investment and Financial Decisions, Prentice/Hall International, 1986, at 465.

[45] *Bluefield*, at 6.

level of rates. In this proceeding, the property employed "for the convenience of the public" is the rate base of AWNH. Thus, it is only the risk of investment in AWNH that is relevant to the determination of the cost of common equity to be applied to the common equity-financed portion of that rate base.

In addition, in the Fama and French article previously cited, the authors[46] proposed that their three-factor model include the SMB (Small Minus Big) factor, which indicates that small capitalization firms are more risky than large capitalization firms, confirming that size is a risk factor which must be taken into account in estimating the cost of common equity.

Consistent with the financial principle of risk and return discussed previously, and the stand-alone nature of ratemaking, an upward adjustment must be applied to the indicated cost of common equity derived from the cost of equity models of the proxy groups used in this proceeding.

Q. Is there a way to quantify a relative risk adjustment due to AWNH's small size relative to the Utility Proxy Group?

A. Yes. The Company has greater relative risk than the average company in the Utility Proxy Group because of its smaller size compared with the group, as measured by an estimated market capitalization of common equity for AWNH (whose common stock is not publicly-traded).

[46] Fama & French, at 39.

Table 5: Size as Measured by Market Capitalization for the Company and the Utility Proxy Group

	Market Capitalization* ($ Millions)	Times Greater than the Company
AWNH	$54.075	
Utility Proxy Group	$6,572.792	121.5x

*From page 1 of Attachment DWD-8.

The Company's estimated market capitalization was at $54.075 million as of October 16, 2020, compared with the market capitalization of the average water company in the Utility Proxy Group of $6.573 billion as of October 16, 2020. The Utility Proxy Group's market capitalization is 121.5 times the size of AWNH's estimated market capitalization.

As a result, it is necessary to upwardly adjust the indicated range of common equity cost rates to reflect AWNH's greater risk due to its smaller relative size. The determination is based on the size premiums for portfolios of New York Stock Exchange, American Stock Exchange, and NASDAQ listed companies ranked by deciles for the 1926 to 2019 period. The average size premium for the Utility Proxy Group with a market capitalization of $6.573 billion falls in the 4th decile, while AWNH's market capitalization of $54.075 million places the Company in the 10th decile. The size premium spread between the 4th decile and the 10th decile is 4.20%. Even though a 4.20% upward size adjustment is indicated, I apply a size premium of 1.00% to AWNH's indicated range of common equity cost rates.

Q. Since AWNH is a wholly-owned subsidiary of Aquarion Water Company, which is in turn a wholly-owned subsidiary of Eversource Energy, why is the size of Eversource Energy not more appropriate to use when determining the size adjustment?

A. As discussed above, the return derived in this proceeding will not apply to Eversource Energy as a whole, but only AWNH. Eversource Energy is the sum of its constituent parts, including those constituent parts' returns on common equity. Potential investors in Eversource Energy are aware that it is a combination of operations in each state, and that each state's operations experience the operating risks specific to their jurisdiction. The market's expectation of Eversource Energy's return is commensurate with the realities of its composite operations in each of the states in which it operates.

B. CONSIDERATION OF REQUESTED MECHANISMS FOR AWNH

Q. Does AWNH's requested revenue adjustment mechanism ("RAM") decrease its required return on common equity?

A. No. The cost of capital is a comparative exercise, so if the mechanism is common throughout the companies on which one bases their analyses on, the comparative risk is zero, because any impact of the perceived reduced risk of the mechanism(s) by investors would be reflected in the market data of the proxy group. To that point, as shown on Attachment DWD-9, every single one of the proxy companies has a Distribution Service Improvement Charge and five of seven of the Utility Proxy Group companies have a RAM-type mechanism in at least one of their jurisdictions.

Q. ARE YOU AWARE OF ANY STUDIES THAT HAVE ADDRESSED THE RELATIONSHIP BETWEEN DECOUPLING MECHANISMS, GENERALLY, AND the return on common equity?

A. Yes. I, along with Dr. Richard A. Michelfelder of Rutgers University, and my colleague at ScottMadden, Pauline M. Ahern, CRRA, examined the relationship between decoupling and return on common equity among electric, gas, and water utilities. Using the PRPM, we found decoupling to have no statistically significant effect on investor perceived risk, and hence, the return on common equity.[47]

Also, in March 2014, The Brattle Group ("Brattle") published a study addressing the effect of revenue decoupling structures on the cost of capital for electric utilities.[48] In its report, which extended a prior analysis focused on natural gas distribution utilities, Brattle pointed out that although decoupling structures may affect revenues, net income still can vary.[49] Brattle further noted that the distinction between diversifiable and non-diversifiable risk is important to equity investors, and the relationship between decoupling and return on common equity should be examined in that context. Further to that point, Brattle noted that although reductions in total risk may be important to bondholders, only reductions in non-diversifiable business risk would justify a reduction to the return

[47] Dr. Richard A. Michelfelder, Pauline M. Ahern, Dylan W. D'Ascendis, *The Impact of Decoupling on The Cost of Capital of Public Utilities*, Energy Policy 130 (2019), at 311-319.

[48] The Brattle Group, *The Impact of Revenue Decoupling on the Cost of Capital for Electric Utilities: An Empirical Investigation*, Prepared for the Energy Foundation, March 20, 2014.

[49] *Ibid*., at 7.

on common equity.[50] In November 2016, the Brattle study was updated based on data through the fourth quarter of 2015.[51]

Brattle's empirical analysis examined the relationship between decoupling and the After-Tax weighted average cost of capital for a group of electric utilities that had implemented decoupling structures in various jurisdictions throughout the United States. As with Brattle's 2014 study, the updated study found no statistically significant link between the cost of capital and revenue decoupling structures.[52]

In view of all of the above, AWNH's return on common equity should not be reduced if the RAM is approved by the Commission in this Docket.

C. FLOTATION COST ADJUSTMENT

Q. What are flotation costs?

A. Flotation costs are those costs associated with the sale of new issuances of common stock. They include market pressure and the essential costs of issuance (*e.g.*, underwriting fees and out-of-pocket costs for printing, legal, registration, etc.).

Q. Why is it important to recognize flotation costs in the allowed common equity cost rate?

A. It is important because there is no other mechanism in the ratemaking paradigm through which such costs can be recovered. Because these costs are real and legitimate, recovery of these costs should be permitted. As noted by Morin:

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50 *Ibid*., at 8.

51 Michael J. Vilbert, Joseph B. Wharton, Shirley Zhang and James Hall, *Effect on the Cost of Capital of Innovative Ratemaking that Relaxes the Linkage between Revenue and kWh Sales – An Updated Empirical Investigation*, November 2016.

52 *Ibid*.

> The costs of issuing these securities are just as real as operating and maintenance expenses or costs incurred to build utility plants, and fair regulatory treatment must permit recovery of these costs….
>
> The simple fact of the matter is that common equity capital is not free….[Flotation costs] must be recovered through a rate of return adjustment.[53]

Q. Should flotation costs be recognized only when there has been an issuance during the test year or there is an imminent post-test year issuance of additional common stock?

A. No. As noted above, there is no mechanism to recapture such costs in the ratemaking paradigm other than an adjustment to the allowed common equity cost rate. Flotation costs are charged to capital accounts and are not expensed on a utility's income statement. As such, flotation costs are analogous to capital investments reflected on the balance sheet. Recovery of capital investments relates to the expected useful lives of the investment. Since common equity has a very long and indefinite life (assumed to be infinity in the standard regulatory DCF model), flotation costs should be recovered through an adjustment to common equity cost rate, even when there has not been an issuance during the test year or in the absence of an expected imminent issuance of additional shares of common stock.

Historical flotation costs are a permanent loss of investment to the utility and should be accounted for. When any company, including a utility, issues common stock, flotation costs are incurred for legal, accounting, printing fees and the like. For each dollar of issuing market price, a small percentage is expensed and is permanently unavailable for investment in utility rate base. Since these

[53] Morin, at p. 321.

expenses are charged to capital accounts and not expensed on the income statement, the only way to restore the full value of that dollar of issuing price with an assumed investor required return of 10% is for the net investment, $0.95, to earn more than 10% to net back to the investor a fair return on that dollar. In other words, if a company issues stock at $1.00 with 5% in flotation costs, it will net $0.95 in investment. Assuming the investor in that stock requires a 10% return on his or her invested $1.00 (*i.e.*, a return of $0.10), the company needs to earn approximately 10.5% on its invested $0.95 to receive a $0.10 return.

Q. Do the common equity cost rate models you have used already reflect investors' anticipation of flotation costs?

A. No. All of these models assume no transaction costs. The literature is quite clear that these costs are not reflected in market prices paid for common stocks. For example, Brigham and Daves confirm this and provide the methodology utilized to calculate the flotation adjustment.[54] In addition, Morin confirms the need for such an adjustment even when no new equity issuance is imminent.[55] Consequently, it is proper to include a flotation cost adjustment when using cost of common equity models to estimate the common equity cost rate.

Q. How did you calculate the flotation cost allowance?

A. I modified the DCF calculation to provide a dividend yield that would reimburse investors for issuance costs in accordance with the method cited in literature by Brigham and Daves, as well as by Morin. The flotation cost adjustment recognizes the costs of issuing equity that were incurred by Eversource Energy,

[54] Eugene F. Brigham and Phillip R. Daves, Intermediate Financial Management, 9th Edition, Thomson/Southwestern, at p. 342.

[55] Morin, at pp. 327-330.

AWNH's parent company, since its acquisition of AWNH. Based upon the issuance costs shown on page 1 of Attachment DWD-10, an adjustment of 0.04% is required to reflect the flotation costs applicable to the Company.

Q. What is the indicated range of common equity cost rates after adjustments for size, credit risk, and flotation costs?

After applying the 1.00% size adjustment and 0.04% flotation cost adjustment to the indicated range of common equity cost rates between 9.09% and 10.87%, based on the Utility Proxy Group results, a range of common equity cost rates between 10.13% and 11.91% is applicable to AWNH.

X. CONCLUSION OF COMMON EQUITY COST RATE

Q. What is your recommended common equity cost rate for AWNH?

A. Given the indicated range of common equity cost rates between 9.09% and 10.87% applicable to the Utility Proxy Group and 10.13% and 11.91% applicable to AWNH, I conclude that a common equity cost rate of 10.25% for the Company is appropriate.

Q. In your opinion, is your proposed common equity cost rate of 10.25% fair and reasonable to AWNH, its shareholders, and its customers?

A. Yes, it is.

Q. Does this conclude your direct testimony?

A. Yes, it does.