Exhibit No. _____
Issue: Cost of Capital
Witness: Dylan W. D'Ascendis
Type of Exhibit: Direct Testimony
Sponsoring Party: Indian Hills
Case No.: SR-2017-0259
Date: October 13, 2017

Missouri Public Service Commission

Direct Testimony

of

Dylan W. D'Ascendis, CRRA, CVA

On Behalf of

Indian Hills Utility Operating Company, Inc.

October 13, 2017

AFFIDAVIT

STATE OF New Jersey)
) ss
COUNTY OF Burlington)

I, Dylan W. D'Ascendis, state that the answers to the questions posed in the attached Direct Testimony are true to the best of my knowledge, information and belief.

Subscribed and sworn to before me this 13 day of October, 2017.

Notary Public

My Commission Expires:

BRIDGET D JUNGBLUT
NOTARY PUBLIC
My Comm. Exp. 01-25-2022
No. 2283356
NEW JERSEY

TABLE OF CONTENTS

Page

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 offer expert testimony on behalf of investor-owned utilities on a variety of regulatory subjects including rate of return issues. I have previously testified to rate of return before regulatory commissions on nineteen separate occasions in eleven different regulatory jurisdictions, including Missouri. I am a graduate of the University of Pennsylvania, where I received a Bachelor of Arts degree in Economic History. I also hold a Master of Business Administration from Rutgers University with a concentration in Finance and International Business, which was conferred with high honors. I am a Certified Rate of Return Analyst ("CRRA") and a Certified Valuation Analyst ("CVA"). My full professional qualifications are provided 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 testify on behalf of Indian Hills Utility Operating Company ("Indian Hills" or the "Company") about the appropriate capital structure and corresponding cost rates that the Company should be afforded the opportunity to earn on its jurisdictional rate base.

Q. Have you prepared an exhibit in support of your recommendation?

A. Yes. I have prepared Schedule DWD-01, which consists of Sub-Schedules DWD-1 through DWD-9.

III. SUMMARY

Q. What is your recommended cost of capital for Indian Hills?

A. I recommend that the Missouri Public Service Commission ("MO PSC" or the "Commission") authorize the Company the opportunity to earn weighted average cost of capital ("WACC") of 14.28%. My recommended capital structure consists of 77.12% long-term debt at an embedded debt cost rate of 14.00%, and 22.88% common equity at my recommended common equity cost rate[1] of 15.20%. The overall rate of return is summarized on page 1 of Sub-Schedule DWD-1 and in Table 1 below:

[1] I will also refer to the cost of common equity as return on equity ("ROE")

Table 1: Summary of Overall Rate of Return

Type of Capital	Ratios	Cost Rate	Weighted Cost Rate
Long-Term Debt	77.12%	14.00%	10.80%
Common Equity	22.88%	15.20%	3.48%
Total	100.00%		14.28%

Q. Do you have any general comments regarding the Missouri Public Service Commission ("MOPSC" or the "Commission") Staff's ("Staff") cost of capital recommendation in this case?

A. Yes. The Staff recommended WACC of 12.37%, derived using a hypothetical capital structure of 65.00% long-term debt at a cost rate of 14.00% and 35.00% common equity at a cost rate of 9.34%, is inadequate for ratemaking purposes. It is inadequate because, first, Staff's recommended hypothetical capital structure is based on a faulty premise that Indian Hills can receive traditional utility financing from commercial lenders. As will be discussed in detail by Mr. Josiah Cox in his direct testimony, Indian Hills currently cannot be traditionally financed, and because of this, Staff's assumption for their capital structure is incorrect. Second, Staff's recommended ROE ignores the basic financial precept that debt investments are less risky than equity investments. In other proceedings before this Commission, Staff uses a "rule of thumb" test for ROE recommendations which simply adds a 3.00% to 4.00% risk premium to the yield to maturity of the subject company's cost of long-term debt.[2] While I do not agree with the method, if Staff followed their "rule of thumb" cost of equity model for Indian Hills' actual cost of long-term debt of 14.00%, indicated ROEs of 17.00% and 18.00% would

[2] For example, Missouri Public Service Commission Staff Report, Cost of Service: Spire Missouri, Inc. Case Nos. GR-2017-0215 and GR-2017-0216, September 2017.

result.[3] As it stands currently, the Staff's own ROE recommendation for Indian Hills clearly fails their own reasonableness check.

Indian Hills' request for relief is both reasonable and conservative given the Company's significant risks compared to other water utilities and is consistent regarding the relative riskiness of long-term debt versus common equity.

IV. CAPITAL STRUCTURE AND COST OF LONG-TERM DEBT

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 Indian Hills' actual capital structure consisting of 77.12% long-term debt and 22.88% common equity as shown on page 1 of Sub-Schedule DWD-1.

Q. What capital structure is Staff recommending in this proceeding?

A. Staff is recommending a hypothetical capital structure of 65% long-term debt and 35% common equity in this proceeding.

Q. Is the Staff recommended hypothetical capital structure appropriate in this proceeding?

A. No. As mentioned above, the hypothetical capital structure recommended by Staff is based on the faulty premise that Indian Hills is traditionally financed. As

[3] In this proceeding, Staff applied the 3%-4% equity premium indicated by the "rule of thumb" method to a recent BB bond yield of 5.34% instead of the Company's long-term debt cost rate of 14.00%. What is prescribed in the "rule of thumb" method is to use the target company's long-term debt cost rate. *See*, John D. Stowe, Thomas R. Robinson, Jerald E. Pinto and Dennis W. McLeavey, *Analysis of Equity Investments: Valuation*, Association for Investment Management and Research, 2002, p. 54. I would also note that Staff has agreed to Indian Hills' requested cost of long-term debt in this proceeding.

discussed in detail in Mr. Cox' direct testimony, the operations of Indian Hills cannot be traditionally financed.

Q. How has the Commission recently ruled regarding actual capital structures in small utility rate cases?

A. In a Report and Order in Case No. WR-2016-0064, issued on July 12, 2016, this Commission authorized the actual capital structure of Hillcrest Utility Operating Company, Inc.,[4] which consisted of 81.00% long-term debt and 19.00% common equity. The Commission stated:

> The Commission concludes that in calculating Hillcrest's cost of capital and cost of debt, the appropriate capital structure to use is the actual capital structure of Hillcrest as of September 2015, which was 19% equity and 81% debt.

Staff in that case recommended a hypothetical capital structure consisting of 75% long-term debt and 25%.

Q. Given the above, is Staff's recommendation of a hypothetical capital structure in this proceeding reasonable?

A. No. Staff should have used Indian Hills' actual capital structure in its analysis.

Q. Is the level of debt proposed in this case already approved by the Commission?

A. Yes. The original indebtedness Indian Hills sought was authorized in File No. WO-2016-0045.

4 Hillcrest Utility Operating Company is a sister company to Indian Hills.

Q. What cost rate for long-term debt is most appropriate for use in a cost of capital determination for Indian Hills?

A. A long-term debt cost rate of 14.00% is reasonable and appropriate and is the actual cost of long-term debt outstanding for the Company. Staff does not object to this cost rate.

Q. Is long-term debt available to Indian Hills at a lower cost rate than 14%?

A. No. As mentioned previously and discussed in Messrs. Cox' and Thaman's testimonies, the operations of small water utilities like Indian Hills cannot attract traditional financing from commercial lenders.

V. COST OF COMMON EQUITY

Q. Please summarize your recommended common equity cost rate.

A. My recommended common equity cost rate of 15.20% is summarized on page 2 of Sub-Schedule DWD-1. I have assessed the market-based common equity cost rates of companies of relatively similar, but not necessarily identical, risk to Indian Hills. Using companies of relatively comparable risk as proxies to derive a return on common equity is consistent with the principles of fair rate of return established in the *Hope*[5] and *Bluefield*[6] 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.

---

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

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

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 eight 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	8.63%
Risk Premium Model	10.75
Capital Asset Pricing Model	10.21
Cost of Equity Models Applied to Comparable Risk, Non-Price Regulated Companies	11.38
Indicated Common Equity Cost Rate Before Adjustments	10.35%
Financial Risk Adjustment	2.49
Size Risk Adjustment	2.38
Indicated Common Equity Cost Rate after Adjustment	15.22%
Recommended Common Equity Cost Rate after Adjustment	15.20%

After analyzing the indicated common equity cost rates derived by these models, I conclude that a common equity cost rate of 10.35% for the Company is

indicated before any Company-specific adjustments. I then adjusted the indicated common equity cost rate upward by 2.49% and 2.38% to reflect Indian Hills' significantly greater financial risk and size risk relative to the Utility Proxy Group, respectively which resulted in a financial and size risk adjusted indicated common equity cost rate of 15.22%. After rounding down to the nearest five basis points, 15.20% is my recommendation for the Commission to adopt for use in setting rates for the Company.

VI. GENERAL PRINCIPLES

Q. What general principles have you considered in arriving at your recommended common equity cost rate of 15.20%?

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* cases. 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 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.

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 they 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 does the water industry face in general?

A. Increasingly stringent standards 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 utility industry.

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

> In the most recent report card by the American Society of Civil Engineers (ACSC), the nation's drinking water and wastewater infrastructure received grades of D and D+, respectively.
>
> ***
>
> Even with the higher capital spending, much more work needs to be done. According to the ACSC report, much of the one million miles of pipes that carry drinking water across the country is in dire need of repair as some pipes are approaching 100 years old.
>
> ***
>
> Overall, the Water Utility Industry is in decent shape. Every company is in the process of rebuilding an antiquated system, which will require tremendous amounts of capital. Fortunately, regulators are working with the companies to gradually replace the antiquated infrastructure.[7]

The water industry also experiences 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 to a company to fund ongoing replacements and repairs of the system. Water utilities' assets have long lives, and therefore have 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,

[7] *Value Line Investment Survey*, July 14, 2017.

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,[8] both of which are directly linked to earning a sufficient rate of return. The level of free cash flow represents a company'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 new capital to invest in new infrastructure to ensure quality service to its customers. An insufficient rate of return can be financially devastating for utilities and a public safety issue for their customers.

The water 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, particularly a sufficient authorized return on common equity, so that the industry can successfully meet the challenges it faces.

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

[8] Free Cash Flow = Operating Cash Flow (funds from operations) minus Capital Expenditures.

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. How does your proposed ratemaking common equity ratio of 22.88% for Indian Hills compare with the total equity ratios maintained by the companies in your Utility Proxy Group?

A. My proposed ratemaking common equity ratio of 22.88% for Indian Hills is substantially outside of the range of total equity ratios maintained, on average, by the companies in the Utility Proxy Group on which I base my recommended common equity cost rate, indicating extraordinary relative risk. As shown on page 2 of Sub-Schedule DWD-2, the common equity ratios of the Utility Proxy Group range from 45.17% to 60.60%, with a midpoint of 52.89% and an average of 53.75% in 2016.

Q. Can bond and credit ratings be a proxy for the combined business and financial risks (*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.[9] 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

[9] 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.

rating process is to assess credit quality or credit risk and not common equity risk.

Q. 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.

VII. INDIAN HILLS UTILITY OPERATING COMPANY, INC.

Q. Please describe Indian Hills' operations.

A. The original Indian Hills drinking water system was constructed approximately fifty years ago. Indian Hills currently serves approximately 700 water customers in and immediately surrounding Indian Hills subdivision, a residential/recreational lake development near Cuba, Missouri in Crawford County. Indian Hills was recently purchased by Indian Hills Utility Operating Company, Inc. on March 31, 2016. Indian Hills is not publicly-traded.

Q. What condition was the Indian Hills' system in when it was acquired last year?

A. As explained further in detail in Mr. Cox' testimony, the original system was in a state of significant disrepair that centered around six major enforcement issues or schedules of compliance associated with the system's existing operation before Indian Hills bought the water assets. Additionally, the water system was found to be out of compliance by the Missouri Department of Natural Resources ("MDNR") on twenty-seven different measures.

Q. After acquisition of Indian Hills, have significant improvements been made to the water system?

A. Yes. As explained in greater detail by Mr. Cox, approximately $1.8 million of improvements were made to the system from the time of acquisition to February 2017.

VIII. PROXY GROUP SELECTION

Q. Please explain how you chose your proxy group of eight water companies.

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* (July 14, 2017);

(ii) They have 70% or greater of 2016 total operating income and 70% or greater of 2016 total assets attributable to regulated water operations;

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

(iv) They have not cut or omitted their common dividends during the five years ending 2016 or through the time of the preparation of this testimony;

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

The following eight companies met these criteria: American States Water Co., American Water Works Co., Inc., Aqua America, Inc., California Water Service Corp., Connecticut Water Service, Inc., Middlesex Water Co., SJW Corp., and York Water Co.

Q. Please describe Sub-Schedule DWD-2, page 1.

A. Page 1 of Sub-Schedule DWD-2 contains comparative capitalization and financial statistics for the eight water companies identified above for the years 2012 to 2016.

During the five-year period ending 2016, the historically achieved average earnings rate on book common equity for the group averaged 10.56%. The average common equity ratio based on total permanent capital (excluding short-term debt) was 53.13%, and the average dividend payout ratio was 56.73%.

Total debt to earnings before interest, taxes, depreciation, and amortization ("EBITDA") for the years 2012 to 2016 ranges between 3.40 and 3.83, with an average of 3.63. Funds from operations to total debt range from 20.86% to 25.95%, with an average of 23.18%.

IX. 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 betas). 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 do you use?

A. I use 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 August 31, 2017, divided by the average of closing market prices for the 60 trading days ending August 31, 2017.[10]

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 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 twelve-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 Sub-Schedule DWD-3 have been adjusted upward to reflect one-half the average projected growth rate shown in Column 6.

[10] See Sub-Schedule DWD-3, page 1, column 1.

Q. Please explain the basis of the growth rates you apply 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*, Reuters, Zacks, and Yahoo! Finance. 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 use analysts' five-year forecasts of earnings per share ("EPS") growth in my DCF analysis.

Over the long run, there can be no growth in dividends per share ("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 matching 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 Sub-Schedule DWD-3, the mean result of the application of the single-stage DCF model is 8.77%, the median result is 8.48%, and the average of the two is 8.63% 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 of 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 ("JRE"),*[11] was developed from the work of Robert F. Engle, who shared the Nobel Prize in Economics in 2003 "for methods of analyzing economic time series with time-varying volatility ("ARCH")".[12] 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).

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

[11] 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.

[12] www.nobelprize.org.

long-term U.S. Treasury securities through August 2017. Using a generalized form of ARCH, known as GARCH, I calculate 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[13] and a GARCH coefficient[14]. Multiplying the predicted monthly variance by the GARCH coefficient and annualizing it[15] produces the predicted annual equity risk premium. I then add the forecasted 30-year U.S. Treasury Bond yield, 3.56%[16], 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")*[17]. The mean PRPM indicated common equity cost rate for the Utility Proxy Group is 12.06%, the median is 11.55%, and the average of the two is 11.81%. Consistent with my reliance on the average of the median and mean results of the DCF, I will rely on the average of the mean and median results of the Utility Proxy Group PRPM to calculate a cost of common equity rate of 11.81%.

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

[13] Illustrated on Columns 1 and 2 of page 2 of Sub-Schedule DWD-4.

[14] Illustrated on Column 4 of page 2 of Sub-Schedule DWD-4.

[15] Annualized Return = (1+Monthly Return)^12 - 1

[16] See column 6 of page 2 of Sub-Schedule DWD-4.

[17] *Blue Chip Financial Forecasts*, June 1, 2017 at p. 14 and September 1, 2017, 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 4.89% 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 fourth calendar quarter of 2018 and the long-term projections for 2019 to 2023 and 2024 to 2028 from Blue Chip. As shown on Line No. 1 of page 3 of Sub-Schedule DWD-4, the average expected yield on Moody's Aaa-rated corporate bonds is 4.57%. In order to derive an expected yield on A2 rated-public utility bonds, I make an upward adjustment of 0.26%, which represents a recent spread between Aaa corporate bonds and A2-rated public utility bonds, in order to adjust the expected Aaa corporate bond yield to an equivalent Moody's A2-rated public utility bond.[18] Adding that recent 0.26% spread to the expected Aaa corporate bond yield of 4.57% results in an expected A2 public utility bond of 4.83%.

Since the Utility Proxy Group's average Moody's long-term issuer rating is A2/A3, another adjustment to the expected A2 public utility bond yield is needed to reflect the difference in bond ratings. An upward adjustment of 0.06%, which

[18] As shown on Line No. 2 and explained in note 2 of page 3 of Sub-Schedule DWD-4.

represents one-sixth of a recent spread between A2 and A3 public utility bond yields, is necessary to make the A2 prospective bond yield applicable to an A2/A3 public utility bond.[19] Adding the 0.06% to the 4.83% prospective A2 public utility bond yield results in a 4.89% expected bond yield for the Utility Proxy Group.

Q. Please explain the derivation of the beta-derived equity risk premium.

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 apply to the Utility Proxy Group is shown on lines 1 through 11 of page 8 of Sub-Schedule DWD-4. The total beta-derived equity risk premium I apply is based on an average of: 1) Historical data-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 2017 Stocks, Bonds, Bills, and Inflation ("SBBI") Yearbook ("SBBI – 2017")[20] less the average historical yield on Moody's Aaa/Aa-rated corporate bonds for the period 1928 to 2016. The use of holding period returns over a very long period of time is

[19] As shown on Line No. 4 and explained in note 3 on page 3 of Sub-Schedule DWD-4.

[20] SBBI Appendix A Tables: Morningstar Stocks, Bonds, Bills, & Inflation 1926-2016.

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.

SBBI's long-term arithmetic mean monthly total return rate on large company common stocks was 11.69% and the long-term arithmetic mean monthly yield on Moody's Aaa/Aa-rated corporate bonds was 6.13%.[21] As shown on line 1 of page 8 of Sub-Schedule 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 5.56%.

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 – 2017.[22] 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.

[21] As explained in note 1 on page 8 of Sub-Schedule DWD-4.

[22] SBBI – 2017, at 10-22.

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 corporate bonds during the period from January 1928 through August 2017.[23] 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 5.96%.[24]

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 7.41%, shown on line 2 of page 8 of Sub-Schedule DWD-4, I used the same monthly annualized total returns on large company common stocks relative to the monthly annualized yields on Moody's Aaa/Aa 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 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 corporate bonds yield:

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

[23] Data from January 1926-December 2016 is from SBBI – 2017. Data from January – August 2017 is from Bloomberg Professional Services.

[24] Shown on Line No. 3 on page 8 of Sub-Schedule DWD-4.

The average historical data-based equity risk premium is 6.31%, which is shown on line 4 of page 8 of Sub-Schedule DWD-4.

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

A. Because both ratemaking and the cost of capital, including the cost rate of common equity, are prospective, a prospective market equity risk premium is essential. The derivation of the forecasted or prospective market equity risk premium can be found in note 4 on page 8 of Sub-Schedule DWD-4. Consistent with my calculation of the 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 thirteen weeks ending September 1, 2017, 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.[25]

The average median expected price appreciation is 34%, which translates to a 7.59% annual appreciation, and, when added to the average of *Value Line's* median expected dividend yields of 2.05%, equates to a forecasted annual total return rate on the market of 9.64%. The forecasted Aaa bond yield of 4.57% is deducted from the total market return of 9.64%, resulting in an equity risk premium of 5.07%, shown on page 8, line 5 of Sub-Schedule DWD-4.

[25] As explained in detail in page 2, note 1 of Sub-Schedule DWD-5.

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

A. Using data from *Value Line*, I calculate 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 14.13%. Subtracting the prospective yield on Aaa Corporate bonds of 4.57% results in an 9.56% projected equity risk premium.

The average *Value Line*-based Equity risk premium is 7.32%, which is shown on Line No. 7 on page 8 of Sub-Schedule DWD-4.

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

A. Using data from Bloomberg Professional Services, I calculate 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 return for the S&P 500 is 13.65%. Subtracting the prospective yield on Aaa Corporate bonds of 4.57% results in an 9.08% projected equity risk premium.

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

A. I give equal weight to equity risk premiums based on each source, historical, *Value Line*, and Bloomberg in arriving at my conclusion of 7.57%.[26]

[26] 7.57% = (6.31% + 7.32% + 9.08%)/3. See Line No. 9 on page 8 of Sub-Schedule DWD-4.

After calculating the average market equity risk premium of 7.57%, I adjust 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 Sub-Schedule DWD-5, the average of the mean and median beta coefficient for the Utility Proxy Group is 0.74. Multiplying the beta coefficient of the Utility Proxy Group of 0.74 by the market equity risk premium of 7.57% results in a beta-adjusted equity risk premium of 5.60% 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 estimate three equity risk premiums based 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 derive a long-term monthly arithmetic mean equity risk premium between the S&P Utility Index total returns of 10.57% and monthly A-rated public utility bond yields of 6.61% from 1928 to 2016 to arrive at an equity risk premium of 3.96%.[27] I then apply the PRPM using the historical monthly equity risk premiums from January 1928 to August 2017 to arrive at a PRPM-derived equity risk premium of 4.03% for the S&P Utility Index. The final S&P Utility Index holding period equity risk premium uses the same

[27] As shown on Line No. 1 on page 12 of Sub-Schedule DWD-4.

historical data stated above to derive an equity risk premium of 5.62% based on a regression of the monthly equity risk premiums. The average of the three S&P Utilities Index holding return equity risk premiums is 4.53%.

I then derive expected total returns on the S&P Utilities Index of 8.98% and 8.10% using data from *Value Line* and Bloomberg Professional Services, respectively, and subtract the prospective A2-rated public utility bond yield (4.83%[28]), which results in risk premiums of 4.15% and 3.27%, respectively. As with the market equity risk premiums, I average the risk premium based on each source (*i.e.*, Historical, *Value Line*, and Bloomberg) to arrive at my utility-specific equity risk premium of 3.98%.[29]

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 apply to the Utility Proxy Group is 4.79%, which is the average of the beta-derived and the S&P utility equity risk premiums of 5.60% and 3.98%, respectively.[30]

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

A. As shown on Line No. 7 on Sub-Schedule DWD-4, page 3, I calculate a common equity cost rate of 9.68% for the Utility Proxy Group based on the total market approach of the RPM.

---

[28] Derived on Line No. 3 of page 3 of Sub-Schedule DWD-4.

[29] 3.98% = (4.53% + 4.15% + 3.27%)/3.

[30] As shown on page 7 of Sub-Schedule DWD-4.

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

A. As shown on page 1 of Sub-Schedule DWD-4, the indicated RPM-derived common equity cost rate is 10.75%, which gives equal weight to the PRPM (11.81%) and the adjusted market approach results (9.68%).

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

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.[31] 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 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.

[31] Roger A. Morin, New Regulatory Finance (Public Utility Reports, Inc., 2006), at p. 175.

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

A. As shown in column 5 on page 1 of Sub-Schedule DWD-5, the risk-free rate adopted for both applications of the CAPM is 3.56%. This risk-free rate of 3.56% 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 fourth calendar quarter of 2018 and long-term projections for the years 2019 to 2023 and 2024 to 2028.

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 Sub-Schedule DWD-5. As discussed previously, the market risk premium is derived from an average of:

1) Historical data-based market risk premiums;

2) *Value Line* data-based market risk premiums;

3) Bloomberg data-based market risk premium;

The long-term income return on U.S. Government Securities of 5.17% was deducted from the *SBBI-2017* monthly historical total market return of 11.97%, which results in an historical market equity risk premium of 6.80%.[32] The PRPM market equity risk premium is 6.75%, and is derived using the PRPM relative to the yields on long-term U.S. Treasury securities from January 1926 through August 2017. 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-2017*. That regression analysis yielded a market equity risk premium of 8.62%. The average of the historical data-based market risk premiums is 7.39%.[33]

The *Value Line*-derived forecasted total market equity risk premium is derived by deducting the forecasted risk-free rate of 3.56%, discussed above, from the *Value Line* projected total annual market return of 9.64%, resulting in a forecasted total market equity risk premium of 6.08%. The S&P 500 projected market equity risk premium using *Value Line* data is derived by subtracting the projected risk-free rate of 3.56% from the projected total return of the S&P 500 of 14.13%. The resulting market equity risk premium is 10.57%. The average *Value Line* market risk premium is 8.33%.[34]

The S&P 500 projected market equity risk premium using Bloomberg data is derived by subtracting the projected risk-free rate of 3.56% from the projected

[32] SBBI – 2016, at pp. 3-5 and 21-23.

[33] 7.39% = (6.80% + 8.62% + 6.75%)/3.

[34] 8.33% = (6.08% + 10.57%)/2.

total return of the S&P 500 of 13.65%. The resulting market equity risk premium is 10.09%.

These three sources (historical, *Value Line*, and Bloomberg), when averaged, result in an average total market equity risk premium of 8.60%.[35]

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 Sub-Schedule DWD-5, the mean result of my CAPM/ECAPM analyses is 10.21%, the median is 10.21%, and the average of the two is 10.21%. 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 10.21%.

D. Common Equity Cost Rates for a Proxy Group of Domestic, Non-Price Regulated Companies Based on the DCF, RPM, and CAPM

Q. Why do 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-

[35] 8.60% = (7.39% + 8.33% + 10.09%)/3.

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 unregulated companies that are comparable in total risk to the regulated public 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 rely 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 results in a proxy group of seventeen 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 were:

1) They must be covered by *Value Line Investment Survey* (Standard Edition);
2) They must be domestic, non-price regulated companies, *i.e.*, non-utilities;
3) Their beta coefficients must lie within plus or minus two standard deviations of the average unadjusted beta of the Utility Proxy Group; and
4) 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 betas and similar residual standard errors resulting from the same regression analyses have similar total investment risk.

Q. Have you prepared a Sub-Schedule which shows the data from which you selected the seventeen 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 Sub-Schedule 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. An exception is that, in the application of the RPM, I did not use public utility-specific equity risk premiums, nor have I applied the PRPM to the individual companies.

Page 2 of Sub-Schedule 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 12.73%.

Pages 3 through 5 contain the data and calculations that support the 11.18% RPM cost rate. As shown on Line No. 1 of page 3 of Sub-Schedule DWD-7, the consensus prospective yield on Moody's Baa rated corporate bonds for the six quarters ending in the fourth quarter of 2018 and for the years 2019 to

2023 and 2024 to 2028 is 5.33%.[36] Since the Non-Price Regulated Proxy Group has an average Moody's long-term issuer rating of A2/A3, a downward adjustment of 0.36% to the projected Baa corporate bond yield is necessary to reflect the difference in ratings[37] which results in a projected A2/A3 corporate bond yield of 4.97%.

When the beta-adjusted risk premium of 6.21%[38] relative to the Non-Price Regulated Proxy Group is added to the prospective A2/A3 rated corporate bond yield of 4.97%, the indicated RPM cost rate is 11.18%.

Page 6 contains the inputs and calculations that support my indicated CAPM/ECAPM cost rate of 10.79%.

Q. How 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 Sub-Schedule 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 12.73%, 11.18%, and 10.79%, respectively. The average of the mean and median of these models is 11.38%, which I use as the indicated common equity cost rate for the Non-Price Regulated Proxy Group.

---

[36] *Blue Chip Financial Forecasts*, September 1, 2017, at p. 2 and June 1, 2017, at p. 14.

[37] As demonstrated in line 2 and described in note 2 of page 3 of Sub-Schedule DWD-7.

[38] Derived on page 5 of Sub-Schedule DWD-7.

X. CONCLUSION OF COMMON EQUITY COST RATE BEFORE ADJUSTMENT

Q. What is the indicated common equity cost rate 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 cost of equity before adjustments is 10.35%. I use 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.

Based on these common equity cost rate results, I conclude that a common equity cost rate of 10.35% is reasonable and appropriate for the Company before any adjustment is made for relative risk between the Company and the Utility Proxy Group. The 10.35% indicated ROE is the approximate average of the mean and median results produced by my application of the models as explained above.

XI. ADJUSTMENT TO THE COMMON EQUITY COST RATE

A. Financial Risk Adjustment

Q. Does Indian Hills have increased financial risk relative to the Utility Proxy Group?

A. Yes. The Company has significantly greater financial risk than the average company in the Utility Proxy Group because of its highly leveraged debt ratio

compared with the Utility Proxy Group. When Indian Hills was purchased in March 2016, their net book value was $43,966.[39] As mentioned above and detailed by Mr. Cox in his direct testimony, the Company spent approximately $1.8 million in rate base investments in the eleven months subsequent to the acquisition to get the Company back into regulatory compliance. Because of this, the Indian Hills' rate base is almost entirely comprised of the current capital expenditures in the past eleven months. Additionally, of that $1.8 million capital spend, $1.45 million was financed with debt capital, which indicates a debt ratio of approximately 80%. This indicated debt ratio is more highly leveraged than that of the average Utility Proxy Group company, which is 46.13% in fiscal 2016.[40]

Q. How does one measure the relationship between leverage and risk?

A. I relied on the Modigliani / Miller leverage adjustment to measure the relationship between leverage and financial risk. Franco Modigliani and Merton Miller[41] demonstrated that the cost of common equity may be expressed as:

$$k_{e,L} = k_{e,U} + (k_{e,U} - k_d)(1-T)(D/E) \quad \text{Equation [1]}$$

where

$k_{e,U}$ = Cost of common equity for an unlevered firm

[39] Staff determined value at the time of acquisition.

[40] As shown on Sub-Schedule DWD-2.

[41] F. Modigliani and M. Miller, "The Cost of Capital, Corporation Finance, and the Theory of Investment", The American Economic Review 48 No. 3, June 1958,261-297; F. Modigliani and M. Miller, "Corporate Income Taxes and the Cost of Capital: A Correction", The American Economic Review 53 No. 3, June 1963, at 433-443.

$k_{e,L}$ = Cost of common equity for a levered firm

k_d = Cost of debt (interest rate)

D = Level of debt

E = Level of equity

T = Income tax rate

Equation [1] expresses the cost of common equity for a levered firm as the cost of common equity for an unlevered firm, which reflects business risk only, plus a premium for financial risk. Financial risk, or leverage, has an effect on the cost of capital, including the cost of common equity: the greater the degree of financial leverage, the greater the concentration of business risk on common shareholders, increasing their required return to compensate them for bearing that risk. Indications of the magnitude of the effect upon common equity cost rate due to financial leverage is given by the Modigliani/Miller ("M&M") method as shown on page 1 of Sub-Schedule DWD-8.

The M&M method holds the pretax WACC constant regardless of capital structure. As shown and explained on page 1 of Sub-Schedule DWD-8, applying the M&M method results in an indicated effect upon common equity cost rate is 2.49% relative to the common equity cost rate based on the Company's actual capital structure. In other words, applying the indicated common equity cost rate of 10.35% (which reflects the financial risk of the average Utility Proxy Group company capital structure), results in a pretax WACC of 15.62%[42] as shown in the top half of page 1 of Sub-Schedule DWD-8. Applying that 15.62% WACC to

42 This WACC includes the implied 14.00% Indian Hills long-term debt cost rate.

Indian Hills' actual capital structure, which contains greater financial risk than the average proxy group company, results in a common equity cost rate of 12.84% which properly reflects the increased financial risk of the Company's capital structure as shown in the lower half of page 1. The indicated effect on common equity cost rate is the difference between the 10.35% and 12.84% common equity cost rates, 2.49%.[43]

B. Business Risk Adjustment

Q. Does Indian Hills have increased business risk relative to the 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.

Q. Please explain the risk associated with small size.

A. Both the financial and academic communities have long accepted the proposition that the Cost of Equity for small firms is subject to a "size effect."[44] While empirical evidence of the size effect often is based on studies of industries beyond regulated utilities, utility analysts also have noted the risks associated with small market capitalizations. Specifically, Ibbotson Associates noted: "For small utilities, investors face additional obstacles, such as a smaller customer base, limited financial resources, and a lack of diversification across customers, energy sources, and geography. These obstacles imply the need for a higher investor return."[45] Further evidence of the risk effects of size include the fact that

[43] 2.49% = (12.84% - 10.35%).

[44] *See* Mario Levis, *The record on small companies: A review of the evidence*, Journal of Asset Management, March 2002, at 368-397, for a review of literature relating to the size effect.

[45] Michael Annin, *Equity and the Small-Stock Effect*, Public Utilities Fortnightly, October 15, 1995.

investors demand greater returns to compensate for the lack of marketability and liquidity of the securities of smaller firms. As discussed below, relative to the proxy group Indian Hills' operations are both substantially smaller in size and less diversified.

Q. Is there a way to quantify a relative risk adjustment due to Indian Hills' higher business risk relative to the Utility Proxy Group?

A. Yes. The Company has greater business risk than the companies in the Utility Proxy Group as discussed above. Duff & Phelps' ("D&P") 2017 Valuation Handbook Guide to Cost of Capital – Market Results through 2016 ("D&P 2017") presents a Size Study based on the relationship of various measures of size and return.[46] Relative to the relationship between average annual return and the various measures of size, D&P state:

> **The size of a company is one of the most important risk elements to consider when developing cost of equity estimates for use in valuing** a firm. Traditionally, researchers have used market value of equity (*i.e.,* "market capitalization" or "market cap") as a measure of size in conducting historical rate of return research. For example, the Center for Research in Security Prices (CRSP) "deciles" are developed by sorting U.S. companies by market capitalization. Another example is the Fama-French "Small Minus Big" (SMB) series, which is the difference in return of "small" stocks minus "big" (*i.e.*, large) stocks, as defined by market capitalization. (emphasis added)[47]

The Size Study uses the following eight measures of size, all of which have empirically shown that over the long-term, the smaller the company, the higher the risk:

---

[46] Market value of equity, book value of equity, 5-year average net income, market value of invested capital, total assets, 5-year average EBITDA, sales number of employees, and the average of all of these size measures.

[47] D&P 2017, at p. 10-1.

- Market Value of Common Equity (or total capital if no debt / equity);
- Book Value of Common Equity;
- Net Income (five-year average);
- Market Value of Invested Capital;
- Total Assets (Invested Capital);
- Earnings Before Interest, Taxes, Depreciation & Amortization ("EBITDA") (five-year average);
- Sales / Operating Revenues; and
- Number of Employees.

I used the D&P Size Study to determine the approximate magnitude of any necessary risk premium due to the size of Indian Hills relative to the Utility Proxy Group. Sub-Schedule DWD-9 shows the relative size of Indian Hills compared with the water proxy group. Indicated size adjustments based on these relative measures range from 1.34% to 3.94%. averaging 2.38%.

As a result, it is necessary to upwardly adjust the indicated common equity cost rate of 10.35% to reflect Indian Hills' greater risk due to its higher relative business risk. The average size premium from the D&P Size Study indicates an upward adjustment 2.38%, which I will apply to Indian Hills' indicated common equity cost rate.

Q. What is the indicated cost of common equity after your adjustments for financial and size risk?

A. After applying the 2.49% and 2.38% financial and size risk adjustments to the indicated cost of common equity of 10.35%, a financial and size-adjusted cost of common equity of 15.22% results.

XII. CONCLUSION OF COST OF CAPITAL

Q. What is your recommended WACC for Indian Hills?

A. I recommend that the Commission authorize the Company the opportunity to earn a WACC of 14.28% based on its actual capital structure as of the end of the test year. The capital structure consists of 77.12% long-term debt at an embedded debt cost rate of 14.00% and 22.88% common equity at my recommended common equity cost rate of 15.20%. This capital structure and common equity cost rate reflect Indian Hills' significant investment risk compared to the Utility Proxy Group due to its necessary, significant investment in the water system after its acquisition on March 31, 2016 to get the system into environmental compliance.[48]

Staff's recommended WACC of 12.37% ignores the current options for raising capital available to Indian Hills and also ignores the basic financial precept that common equity is a riskier investment than long-term debt, necessitating a higher investor-required return.

My overall rate of return of 14.28% provides enough operating income to service the Company's debt and compensate its equity investors, and is consistent with established financial precepts

Q. Does that conclude your direct testimony?

A. Yes, it does.

[48] As mentioned above Indian Hills' 2016 capital expenditures of approximately $1.8 million represent almost all of its net book value.