KENTUCKY PUBLIC SERVICE COMMISSION

Case No. 2017-00179

KENTUCKY POWER COMPANY

COST OF CAPITAL

DIRECT TESTIMONY

OF

J. RANDALL WOOLRIDGE, PH.D.

ON BEHALF OF
KENTUCKY OFFICE OF ATTORNEY GENERAL
October 3, 2017

KENTUCKY POWER COMPANY
Case No. 2017-00179

Direct Testimony of J. Randall Woolridge, Ph. D.

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

A. My name is J. Randall Woolridge, and my business address is 120 Haymaker Circle, State College, PA 16801. I am a Professor of Finance and the Goldman, Sachs & Co. and Frank P. Smeal Endowed University Fellow in Business Administration at the University Park Campus of the Pennsylvania State University. I am also the Director of the Smeal College Trading Room and President of the Nittany Lion Fund, LLC. A summary of my educational background, research, and related business experience is provided in Appendix A.

I. SUBJECT OF TESTIMONY AND SUMMARY OF RECOMMENDATIONS

Q. WHAT IS THE SCOPE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. I have been asked by the Kentucky Office of the Attorney General ("OAG") to provide an opinion as to the fair rate of return or cost of capital for Kentucky Power Company ("KPC" or the "Company") and to evaluate the cost of capital testimony of the Company.[1]

Q. HOW IS YOUR TESTIMONY ORGANIZED?

A. First, I summarize my cost of capital recommendation for the Company, and review the primary areas of contention on the Company's position. Second, I provide an assessment of capital costs in today's capital markets. Third, I discuss the selection of a proxy group of electric utility companies for estimating the cost of equity capital for the Company. Fourth, I discuss the Company's recommended capital structure and debt cost rates. Fifth,

[1] In my testimony, I use the terms 'rate of return' and 'cost of capital' interchangeably. This is because the required rate of return of investors on a company's capital is the cost of capital.

I provide an overview of the concept of the cost of equity capital, and then estimate the equity cost rate for the Company. Finally, I critique KPC's rate of return analysis and testimony. A table of contents is provided just after the title page.

Q. WHAT COMPRISES A UTILITY'S "RATE OF RETURN"?

A. A company's overall rate of return consists of three main categories: (1) capital structure (*i.e.*, ratios of short-term debt, long-term debt, preferred stock and common equity); (2) cost rates for short-term debt, long-term debt, and preferred stock; and (3) common equity cost, otherwise known as Return on Equity ("ROE").

Q. WHAT IS A UTILITY'S ROE INTENDED TO REFLECT?

A. An ROE is most simply described as the allowed rate of profit for a regulated company. In a competitive market, a company's profit level is determined by a variety of factors, including the state of the economy, the degree of competition a company faces, the ease of entry into its markets, the existence of substitute or complementary products/services, the company's cost structure, the impact of technological changes, and the supply and demand for its services and/or products. For a regulated monopoly, the regulator determines the level of profit available to the public utility. The United States Supreme Court established the guiding principles for determining an appropriate level of profitability for regulated public utilities in two cases: (1) *Bluefield* and (2) *Hope*.[2] In those cases, the Court recognized that the fair rate of return on equity should be: (1) comparable to returns investors expect to earn on other investments of similar

[2] *Federal Power Commission v. Hope Natural Gas Co*., 320 U.S. 591 (1944) ("*Hope*") and *Bluefield Water Works and Improvement Co. v. Public Service Commission of West Virginia*, 262 U.S. 679 (1923) ("*Bluefield*").

risk; (2) sufficient to assure confidence in the company's financial integrity; and (3) adequate to maintain and support the company's credit and to attract capital.

Thus, the appropriate ROE for a regulated utility requires determining the market-based cost of capital. The market-based cost of capital for a regulated firm represents the return investors could expect from other investments, while assuming no more and no less risk. The purpose of all of the economic models and formulas in cost of capital testimony (including those presented later in my testimony) is to estimate, using market data of similar-risk firms, the rate of return on equity investors require for that risk-class of firms in order to set an appropriate ROE for a regulated firm.

Q. PLEASE REVIEW THE ALTERNATIVE RECOMMENDATIONS REGARDING THE APPROPRIATE RATE OF RETURN FOR THE COMPANY.

A. The Company's proposed capital structure includes 0.0% short-term debt, 3.87% account receivable financing, 54.45% long-term debt, and 41.68% common equity. The Company has proposed a long-term debt cost rate of 4.36% and an account receivable financing rate of 1.95%.[3] I have employed the Company's proposed capital structure and senior capital cost rates.

Mr. Adrien M. McKenzie has recommended a common equity cost rate of 10.31% for the Company. I have applied the Discounted Cash Flow Model ("DCF") and the Capital Asset Pricing Model ("CAPM") to a proxy group of publicly-held

[3] This capital structure includes 56.64% long-term debt and 43.36% common equity from investor-supplied capital.

electric utility companies ("Electric Proxy Group") as well as the group developed by Mr. McKenzie ("McKenzie Proxy Group"). My analysis indicates an equity cost rate of 8.60% is appropriate for the Company. This figure is in the upper end of my equity cost rate range of 7.6% to 8.70%. With my proposed capital structure and senior capital cost rates, I am recommending an overall fair rate of return or cost of capital of 6.03%. This is summarized in Exhibit JRW-1.

Q. WHAT ARE THE PRIMARY AREAS OF DISAGREEMENT IN ESTIMATING THE RATE OF RETURN OR COST OF CAPITAL IN THIS PROCEEDING?

A. The primary areas of disagreement in measuring the Company's rate of return or cost of capital are: (1) our opposing views regarding the state of the markets and capital costs; (2) the DCF equity cost rate estimates, and in particular, (a) Mr. McKenzie has ignored a number of low-end DCF results, and (b) his exclusive use of the earnings per share growth rates of Wall Street analysts and *Value Line*; (3) the base interest rate and market or equity risk premium in Mr. McKenzie's Utility Risk Premium ("URP") model and CAPM approach; (4) Mr. McKenzie's two non-traditional equity cost rate approaches – the Expected Earnings approach and his DCF applied to non-utilities; and (5) Mr. McKenzie's equity cost rate adjustments for company size and flotation costs.

Q. PLEASE INITIALLY REVIEW THE DIFFERENCES IN OPINION REGARDING THE STATE OF THE CAPITAL MARKETS AND CAPITAL COSTS.

A. Mr. McKenzie and I have different opinions regarding capital market conditions. Mr. McKenzie's analyses and ROE results and recommendations reflect the assumption of higher interest rates and capital costs. I review current market conditions and conclude that interest rates and capital costs are at low levels and are likely to remain low for some time. On this issue, I show that the economists' forecasts of higher interest rates and capital costs, which are used by Mr. McKenzie, have been consistently wrong for a decade.

Q. WHAT ARE THE PRIMARY ISSUES WITH RESPECT TO MEASURING THE COST OF EQUITY CAPITAL IN THIS PROCEEDING?

A. There are two primary errors in Mr. McKenzie's DCF analysis. First, he has eliminated a number of his DCF results because he believes these DCF estimates are too low. Second, his DCF growth rate is based exclusively on the projected long-term earnings per share ("EPS") growth rates of Wall Street analysts. I provide empirical evidence that demonstrates the long-term earnings growth rates of these analysts are overly optimistic and upwardly-biased. In developing my DCF growth rate, I have used thirteen growth rate measures including historic and projected growth rate measures and have evaluated growth in dividends, book value, and earnings per share.

The CAPM approach requires an estimate of the risk-free interest rate, beta, and the market or equity risk premium. There are four major issues with Mr. McKenzie's CAPM analyses. In his CAPM analysis, Mr. McKenzie has: (1) employed the Empirical CAPM ("ECAPM") version of the CAPM, which makes inappropriate adjustments to the risk-free rate and the market risk premium; (2) employed an inflated projected interest rate of 4.20%; (3) included an unwarranted size adjustment; and (4) most significantly, used an inflated market or equity risk premium that is excessive and does not reflect current market fundamentals. As I highlight later in my testimony, there are three generally accepted procedures for estimating a market or equity risk premium – historic returns, surveys, and expected return models. To arrive at his projected market risk premium, however, Mr. McKenzie's approach uses an expected stock market return of 12.0% which is based primarily on analysts' EPS growth rate projections. These EPS growth rate projections and the resulting expected market returns and risk premiums include unrealistic assumptions regarding future economic and earnings growth and stock returns. I have used an equity risk premium of 5.5%, which: (1) factors in all three approaches to estimating a market risk premium; and (2) employs the results of many studies of the market risk premium. As I note, my market risk premium reflects the market risk premiums: (1) determined in studies by leading finance scholars; (2) employed by leading investment banks and management consulting firms; and (3) found in surveys of companies, financial forecasters, financial analysts, and corporate CFOs.

In addition, Mr. McKenzie also estimates an equity cost rate using the URP. His risk premium is based on the historical relationship between the long-term utility

yields and authorized returns on equity ("ROEs") for electric utility companies. There are several problems with this approach. First and foremost, this approach is a gauge of regulatory commission behavior and not investor behavior. Capital costs are determined in the marketplace through the financial decisions of investors and are reflected in such fundamental factors as dividend yields, expected growth rates, interest rates, and investors' assessment of the risk and expected return of different investments. Regulatory commissions evaluate capital market data in setting authorized ROEs, but also take into account other utility and rate case-specific information. As such, Mr. McKenzie's URP approach and results reflect other factors used by utility commissions in authorizing ROEs in addition to capital costs. This may especially be true when the authorized ROE data includes the results of rate cases that are settled and not fully litigated. Second, the methodology produces an inflated measure of the risk premium because the approach uses historic authorized ROEs and utility yields, and the resulting risk premium is applied to *projected* utility bond yields. Finally, the risk premium is inflated as a measure of an investor's required risk premium since electric utility companies have been selling at market-to-book ratios in excess of 1.0. This indicates that the authorized rates of return have been greater than the return that investors require. In other words, customers have been paying too much for too long.

Q. ARE THERE ANY OTHER ISSUES WITH MR. MCKENZIE'S EQUITY COST RATE ANALYSES?

A. There are several additional issues in Mr. McKenzie's equity cost rate analyses and recommendation. First, he has included a flotation cost adjustment of 0.11% without identifying any flotation costs actually paid by KPC. Second, Mr. McKenzie has also

used several other alternative ROE analyses. These approaches include an Expected Earnings approach and a DCF analysis for a non-utility group. Below, I show that these alternative approaches do not provide an appropriate measure of the equity cost rate for KPC.

II. CAPITAL COSTS IN TODAY'S MARKETS

A. Historic Interest Rates and Capital Costs

Q. PLEASE DISCUSS LONG-TERM INTEREST RATES AND CAPITAL COSTS IN U.S. MARKETS.

A. Long-term capital cost rates for U.S. corporations are a function of the required returns on risk-free securities plus a risk premium. The risk-free rate of interest is the yield on long-term U.S. Treasury bonds. The yields on 10-year U.S. Treasury bonds from 1953 to the present are provided on Panel A of Exhibit JRW-2. These yields peaked in the early 1980s and have generally declined since that time. These yields fell to below 3.0% in 2008 as a result of the financial crisis. In 2012, the yields on 10-year Treasuries declined from 2.5% to 1.5% as the Federal Reserve initiated the third stage of its quantitative easing program ("QE III") to support a low interest rate environment. These yields increased to 3.0% as of December 2013 on speculation of a tapering of the Federal Reserve's QE III policy. The Federal Reserve ended the QE III program in 2015 and increased the federal funds rate in December 2015. Nonetheless, due to slow economic growth and low inflation, the 10-year Treasury yield subsequently

declined to 1.5% in summer of 2016. The 10-year Treasury yield increased to 2.5% by the end of the year, with the majority of that increase coming in response to the November 8, 2016 U.S. presidential election. This yield has since declined to the 2.30% range.

Panel B on Exhibit JRW-2 shows the differences in yields between ten-year Treasuries and Moody's Baa-rated bonds since the year 2000. This differential primarily reflects the additional risk premium required by bond investors for the risk associated with investing in corporate bonds as opposed to obligations of the U.S. Treasury. The difference also reflects, to some degree, yield curve changes over time. The Baa rating is the lowest of the investment grade bond ratings for corporate bonds. The yield differential hovered in the 2.0% to 3.5% range until 2005, declined to 1.5% until late 2007, and then increased significantly in response to the financial crisis. This differential peaked at 6.0% at the height of the financial crisis in early 2009 due to tightening in credit markets, which increased corporate bond yields, and the "flight to quality," which decreased Treasury yields. The differential subsequently declined and bottomed out at 2.4%. The differential has since increased to the 3.00% range.

Q. YOU MENTIONED RISK PREMIUM BEING REFLECTED AS THE DIFFERENTIAL BETWEEN THE TEN-YEAR TREASURIES AND MOODY'S BAA-RATED BONDS. PLEASE EXPLAIN WHAT THE RISK PREMIUM IS AND HOW IT AFFECTS YOUR ANALYSIS.

A. The risk premium is the return premium required by investors to purchase riskier securities. The risk premium required by investors to buy corporate bonds is

observable based on yield differentials in the markets. The market risk premium is the return premium required to purchase stocks as opposed to bonds. The market or equity risk premium is not readily observable in the markets (like bond risk premiums) because expected stock market returns are not readily observable. As a result, equity risk premiums must be estimated using market data. There are alternative methodologies to estimate the equity risk premium, and these alternative approaches and equity risk premium results are subject to much debate. One way to estimate the equity risk premium is to compare the mean returns on bonds and stocks over long historical periods. Measured in this manner, the equity risk premium has been in the 5% to 7% range.[4] However, studies by leading academics indicate that the forward-looking equity risk premium is actually in the 4.0% to 6.0% range. These lower equity risk premium results are in line with the findings of equity risk premium surveys of CFOs, academics, analysts, companies, and financial forecasters.

Q. PLEASE REVIEW THE INTEREST RATES ON LONG-TERM UTILITY BONDS.

A. Panel A of Exhibit JRW-3 provides the yields on A-rated public utility bonds. These yields peaked in November 2008 at 7.75% and henceforth declined significantly. These yields dropped below 4.0% on three occasions - in late 2012, in the first quarter of 2015, and then again in the summer of 2016. These yields increased to about 4.25% after the U.S. presidential election but have since declined to about 4.0%.

Panel B of Exhibit JRW-3 provides the yield spreads between long-term A-

[4] See Exhibit JRW-11, p. 5-6.

rated public utility bonds relative to the yields on 20-year U.S. Treasury bonds. These yield spreads increased dramatically in the third quarter of 2008 during the peak of the financial crisis and have decreased significantly since that time. The yield spreads between 20-year U.S. Treasury bonds and A-rated utility bonds peaked at 3.4% in November 2008, then declined to about 1.5% in the summer of 2012 as investor return requirements declined. The differential has gradually increased in recent years, and is now close to 1.5%.

B. Capital Market Conditions

Q. **WHY ARE CAPITAL MARKET CONDITIONS AND THE OUTLOOK FOR INTEREST RATES AND CAPITAL COSTS IMPORTANT IN THIS CASE?**

A. As discussed above, a company's rate of return is its overall cost of capital. Capital costs, including the cost of debt and equity financing, are established in capital markets and reflect investors' return requirements on alternative investments based on risk and capital market conditions. These capital market conditions are a function of investors' expectations concerning many factors, including economic growth, inflation, government monetary and fiscal policies, and international developments, among others. In the wake of the financial crisis, much of the focus in the capital markets has been on the interaction of economic growth, interest rates, and the actions of the Federal Reserve (the "Fed").

Q. WHAT IS MR. MCKENZIE'S ASSESSMENT OF THE CAPITAL MARKETS ENVIRONMENT?

A. On pages 16-23 of his testimony, Mr. McKenzie discusses the outlook for interest rates and capital costs. Mr. McKenzie argues that market data and economists' projections indicate that long-term interest rates are going to increase and he employs forecasts of interest rates in his CAPM and URP approaches. He offers this following conclusion on the topic:[5]

> Given investors' expectations for rising interest rates and capital costs, the Commission should consider near-term forecasts for higher public utility bond yields in assessing the reasonableness of individual cost of equity estimates and in evaluating the ROE for Kentucky Power. The use of these near-term forecasts for public utility bond yields is supported below by economic studies that show that equity risk premiums are higher when interest rates are at very low levels.

Q. PLEASE EXPLAIN YOUR CONCERNS REGARDING MR. MCKENZIE'S CONCLUSION OF HIGHER LONG-TERM INTEREST RATES.

A. Over the last decade, there have been continual forecasts of higher long-term interest rates. However, these forecasts have proven to be wrong. For example, after the announcement of the end of the QE III program in 2014, all the economists in Bloomberg's interest rate survey forecasted interest rates would increase in 2014, and 100% of the economists were wrong. According to the *Market Watch* article:[6]

[5] McKenzie Direct Testimony, p. 23.

[6] Ben Eisen, "Yes, 100% of economists were dead wrong about yields, *Market Watch*," October 22, 2014. Perhaps reflecting this fact, *Bloomberg* reported that the Federal Reserve Bank of New York has stopped using the interest rate estimates of professional forecasters in the Bank's interest rate model due to the unreliability of those forecasters' interest rate forecasts. See Susanne Walker and Liz Capo McCormick, "Unstoppable $100 Trillion Bond Market Renders Models Useless," *Bloomberg.com* (June 2, 2014). http://www.bloomberg.com/news/2014-06-01/the-unstoppable-100-trillion-bond-market-renders-models-useless.html.

> The survey of economists' yield projections is generally skewed toward rising rates — only a few times since early 2009 have a majority of respondents to the Bloomberg survey thought rates would fall. But the unanimity of the rising rate forecasts in the spring was a stark reminder of how one-sided market views can become. It also teaches us that economists can be universally wrong.

Two other financial publications have produced studies on how economists consistently predict higher interest rates, and yet they have been wrong. The first publication, entitled "How Interest Rates Keep Making People on Wall Street Look Like Fools," evaluated economists' forecasts for the yield on ten-year Treasury bonds at the beginning of the year for the last ten years.[7] The results demonstrated that economists consistently predict that interest rates will go higher, and interest rates have not fulfilled those predictions.

The second study tracked economists' forecasts for the yield on ten-year Treasury bonds on an ongoing basis from 2010 until 2015.[8] The results of this study, which was entitled "Interest Rate Forecasters are Shockingly Wrong Almost All of the Time," are shown in Figure 1 and demonstrate how economists continually forecast that interest rates are going up, yet they do not. Indeed, as Bloomberg has reported, economists' continued failure in forecasting increasing interest rates has caused the Federal Reserve Bank of New York to stop using the interest rate estimates of professional forecasters in the Bank's interest rate model due to the unreliability of those forecasters' interest rate forecasts.[9]

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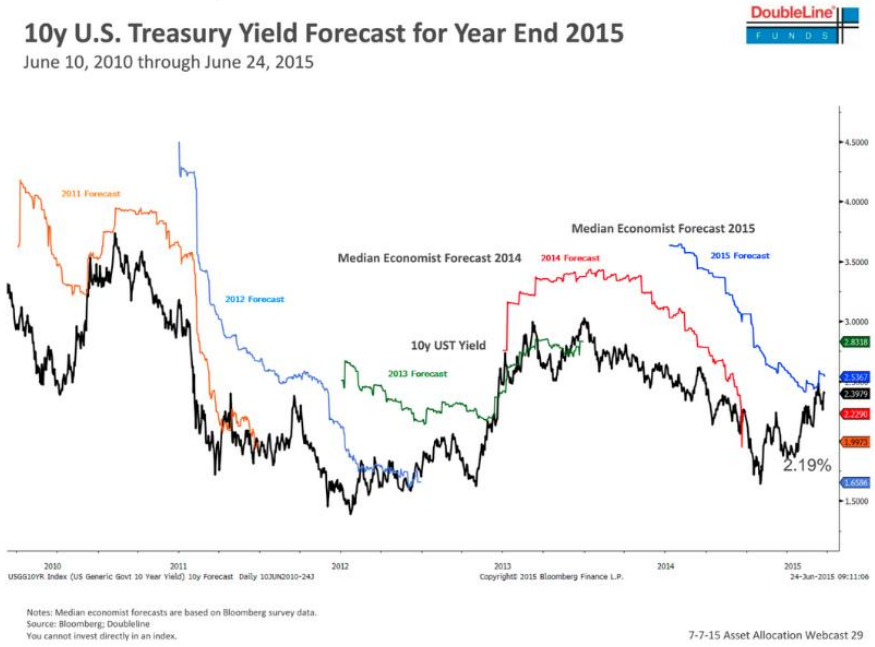
[7] Joe Weisenthal, "How Interest Rates Keep Making People on Wall Street Look Like Fools," Bloomberg.com, March 16, 2015. http://www.bloomberg.com/news/articles/2015-03-16/how-interest-rates-keep-making-people-on-wall-street-look-like-fools.

[8] Akin Oyedele, "Interest Rate Forecasters are Shockingly Wrong Almost All of the Time," *Business Insider*, July 18, 2015. http://www.businessinsider.com/interest-rate-forecasts-are-wrong-most-of-the-time-2015-7.

[9] "*Market Watch*," October 22, 2014.

Figure 1
Economists' Forecasts of the Ten-Year Treasury Yield
2010-2015



Source: Akin Oyedele, "Interest Rate Forecasters are Shockingly Wrong Almost All of the Time," *Business Insider*, July 18, 2015. .

Q. PLEASE REVIEW THE FEDERAL RESERVE'S DECISION TO RAISE THE FEDERAL FUNDS RATE.

A. On December 16, 2015, the Federal Reserve increased its target rate for federal funds to 0.25 – 0.50 percent.[10] This increase came after the rate was kept in the 0.0 to .25 percent range for over five years in order to spur economic growth in the wake of the financial crisis. As the economy has improved, with lower unemployment, steady but slow GDP growth, improving consumer confidence, and a better housing market, the Federal Reserve has increased the target federal funds rate on three occasions:

[10] The federal funds rate is set by the Federal Reserve and is the borrowing rate applicable to the most creditworthy financial institutions when they borrow and lend funds overnight to each other.

December, 2016, March, 2017, and June, 2017. The increases were widely anticipated and the markets did not respond in any significant way.

Q. HOW HAVE LONG-TERM RATES RESPONDED TO THE ACTIONS OF THE FEDERAL RESERVE?

A. Figure 2 shows the yield on thirty-year Treasury bonds over the 2015-2017 time period. These rates bottomed out in August 2016 and subsequently increased with improvements in the economy. Then came November 8, 2016, and financial markets moved significantly in the wake of the unexpected results in the U.S. presidential election. The stock market has gained more than 10% and the 30-year Treasury yield has increased about 50 basis points to 3.2% as of year-end. Even as the Federal Reserve increased the federal funds rate in March and June, the yield on thirty-year bonds decreased to below 3.0% due to relatively slow economic growth and low inflation.

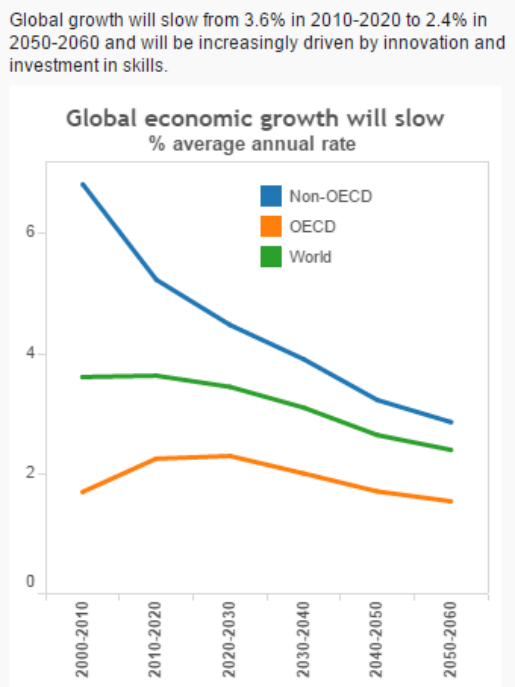
Figure 2
Thirty-Year Treasury Yield
2015-2017

Q. HOW WILL INTEREST RATES AND COST OF CAPITAL BE AFFECTED BY ECONOMIC FACTORS IN THE LONG TERM?

A. In the long term, the key drivers of economic growth measured in nominal dollars are population growth, the advancement and diffusion of science and technology, and currency inflation. Although the U.S. experienced rapid economic growth during the "post-war" period (the 63 years that separated the end of World War II and the 2008 financial crisis), the post-war period is not necessarily reflective of expected future growth. It was marked by a near-trebling of global population, from under 2.5 billion to approximately 6.7 billion. Over the next 50 years, according to United Nations projections, the global population will grow considerably more slowly, reaching approximately 10.3 billion in 2070. With population growth slowing, life expectancies lengthening, and post-war "baby boomers" reaching retirement age, median ages in developed-economy nations have risen and continue to rise. The postwar period was also marked by rapid catch-up growth as Europe, Japan, and China recovered from successive devastations and as regions such as India and China deployed and leapfrogged technologies that had been developed over a much longer period in earlier-industrialized nations. That period of rapid catch-up growth is coming to an end. For example, although China remains one of the world's fastest-growing regions, its growth is now widely expected to slow substantially. This convergence of projected growth in the former "second world" and "third world" towards the slower growth of the

nations that have long been considered "first world" is illustrated in this "key findings" chart published by the Organization for Economic Co-operation and Development:[11]

Figure 3
Projected Global Growth



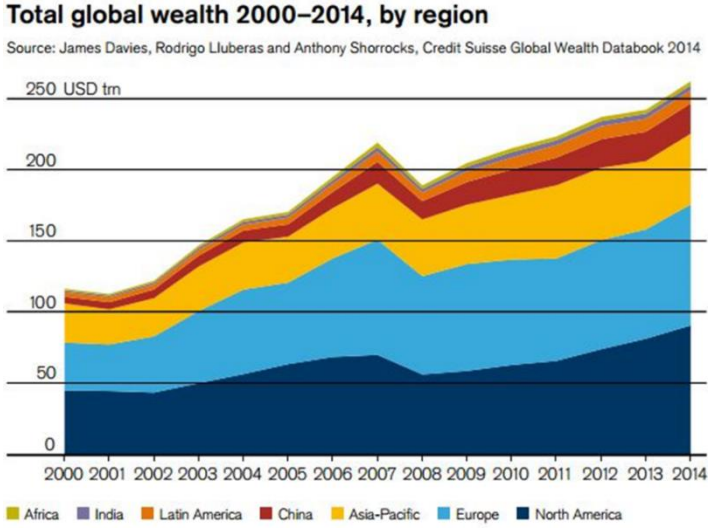
As to dollar inflation, it has declined to far below the level it reached in the 1970s. The Federal Reserve targets a 2% inflation rate; however, actual inflation has been below this figure. Indeed, inflation has been below the Fed's target rate for over four years due to a number of factors, including slow global economic growth, slack in the economy, and declining energy and commodity prices. The slow pace of inflation is also reflected in the decline in forecasts of future inflation. The Energy Information Administration's *Annual Energy Outlook* includes in its nominal GDP growth

[11] See http://www.oecd.org/eco/outlook/lookingto2060.htm.

projection a long-term inflation component, which the EIA projects at only 2.1% per year for its forecast period through 2050.[12]

All of this translates into slowed growth in annual economic production and income, even when measured in nominal rather than real dollars. Meanwhile, the stored wealth that is available to fund investments has continued to rise. According to the most recent release of the Credit Suisse global wealth report, global wealth has more than doubled since the turn of this century, notwithstanding the temporary setback following the 2008 financial crisis:

Figure 4
Global Wealth – 2000-2014



These long-term trends mean that overall, and relative to what had been the post-war norm, the world now has more wealth chasing fewer opportunities for investment rewards. Ben Bernanke, the former Chairman of the Federal Reserve, called this phenomenon a "global savings glut."[13] Like any other liquid market, capital markets are subject to the law of supply and demand. With a large supply of capital

[12]See EIA Annual Energy Outlook 2017, Table 20 (https://www.eia.gov/outlooks/aeo/tables_ref.php).pdf
[13] Ben S. Bernanke, *The Global Saving Glut and the U.S. Current Account Deficit* (Mar. 10, 2005), available at http://www.federalreserve.gov/boarddocs/speeches/2005/200503102/.

available for investment and relatively scarce demand for investment capital, it should be no surprise to see the cost of investment capital decline and therefore interest rates should remain low.

Q. ON THE ISSUE OF THE FEDERAL RESERVE AND LONG-TERM INTEREST RATES, PLEASE HIGHLIGHT MR. BERNANKE'S RECENT TAKE ON THE LOW INTEREST RATES IN THE U.S.

A. Mr. Bernanke addressed the issue of the continuing low interest rates in his weekly Brookings Blog. He indicated that the focus should be on real and not nominal interest rates and noted that, in the long term, these rates are not determined by the Federal Reserve:[14]

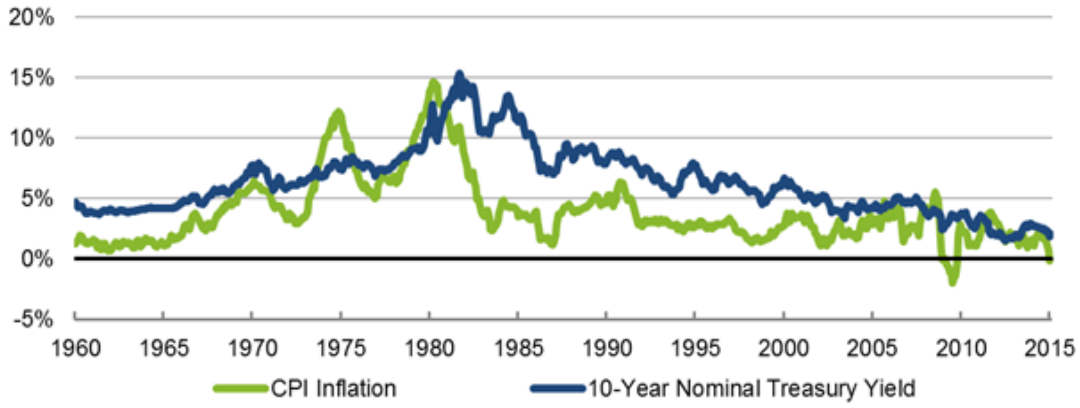
> If you asked the person in the street, "Why are interest rates so low?," he or she would likely answer that the Fed is keeping them low. That's true only in a very narrow sense. The Fed does, of course, set the benchmark nominal short-term interest rate. The Fed's policies are also the primary determinant of inflation and inflation expectations over the longer term, and inflation trends affect interest rates, as the figure above shows. But what matters most for the economy is the real, or inflation-adjusted, interest rate (the market, or nominal, interest rate minus the inflation rate). The real interest rate is most relevant for capital investment decisions, for example. The Fed's ability to affect real rates of return, especially longer-term real rates, is transitory and limited. Except in the short run, real interest rates are determined by a wide range of economic factors, including prospects for economic growth—not by the Fed.

Mr. Bernanke also addressed the issue about whether low-interest rates are a short-term aberration or a long-term trend:[15]

[14] Ben S. Bernanke, "Why are Interest Rates So Low," Weekly Blog, Brookings, March 30, 2015. https://www.brookings.edu/blog/ben-bernanke/2015/03/30/why-are-interest-rates-so-low/.
[15] Ibid.

Low interest rates are not a short-term aberration, but part of a long-term trend. As the figure below shows, ten-year government bond yields in the United States were relatively low in the 1960s, rose to a peak above 15 percent in 1981, and have been declining ever since. That pattern is partly explained by the rise and fall of inflation, also shown in the figure. All else equal, investors demand higher yields when inflation is high to compensate them for the declining purchasing power of the dollars with which they expect to be repaid. But yields on inflation-protected bonds are also very low today; the real or inflation-adjusted return on lending to the U.S. government for five years is currently about minus 0.1 percent.

Figure 5
Interest Rates and Inflation
1960-Present



Source: Federal Reserve Board, BLS.

BROOKINGS

Q. CAN YOU PLEASE PROVIDE THE KENTUCKY PUBLIC SERVICE COMMISSION WITH YOUR OPINION REGARDING THE FUTURE OUTLOOK FOR INTEREST RATES AND CAPITAL COSTS?

A. I believe that U.S. Treasuries offer an attractive yield relative to those of other major governments around the world; the yield will attract capital to the U.S. and keep U.S. interest rates down. There are several factors driving this conclusion.

First, the economy has been growing for over seven years, and, as noted above, the Federal Reserve sees continuing strength in the economy. The labor market has

improved, with unemployment now below 5.0%, and the stock market is near an all-time high.

Second, interest rates remain at relatively low levels and are likely to remain low. There are two factors driving the continued lower interest rates: (1) inflationary expectations in the U.S. remain low; and (2) global economic growth – including Europe, where growth has been stagnant, and China, where growth is slowing. As a result, while the yields on long-term U.S. Treasury bonds are low by historical standards, these yields are well above the government bond yields in Germany, Japan, and the United Kingdom. Thus, U.S. Treasuries offer an attractive yield relative to those of other major governments around the world, thereby attracting capital to the U.S. and keeping U.S. interest rates down.

Q. WHAT DO YOU RECOMMEND THE COMMISSION DO REGARDING THE FORECASTS OF HIGHER INTEREST RATES AND CAPITAL COSTS?

A. I suggest that the Commission set an equity cost rate based on current market cost rate indicators and not speculate on the future direction of interest rates. As the above studies indicate, economists are always predicting that interest rates are going up, and yet they are almost always wrong. Obviously, investors are well aware of the consistently wrong forecasts of higher interest rates, and therefore place little weight on such forecasts. Moreover, investors would not be buying long-term Treasury bonds or utility stocks at their current yields if they expected interest rates to suddenly increase, thereby producing higher yields and negative returns. For example, consider a utility that pays a dividend of $2.00 with a stock price of $50.00. The current dividend yield is 4.0%. If, as Mr.

McKenzie suggests, interest rates and required utility yields increase, the price of the utility stock would decline. In the example above, if higher return requirements led the dividend yield to increase from 4.0% to 5.0% in the next year, the stock price would have to decline to $40, which would be a negative 20% return on the stock.[16] Obviously, investors would not buy the utility stock with an expected return of negative 20% due to higher dividend yield requirements.

In sum, it appears to be impossible to accurately forecast prices and rates that are determined in the financial markets, such as interest rates, the stock market, and gold prices. For interest rates, I have never seen a study that suggests one forecasting service is consistently better than others or that interest rate forecasts are consistently better than just assuming that the current interest rate will be the rate in the future. As discussed above, investors would not be buying long-term Treasury bonds or utility stocks at their current yields if they expected interest rates to suddenly increase, thereby producing higher yields and negative returns.

III. PROXY GROUP SELECTION

Q. PLEASE DESCRIBE YOUR APPROACH TO DEVELOPING A FAIR RATE OF RETURN RECOMMENDATION FOR THE COMPANY.

A. To develop a fair rate of return recommendation for the Company, I have evaluated the return requirements of investors on the common stock of a proxy group of publicly-

[16] In this example, for a stock with a $2.00 dividend, a dividend yield 5.0% dividend yield would require a stock price of $40 ($2.00/$40 = 5.0%).

held electric utility companies ("Electric Proxy Group"). I have also employed the group developed by Mr. McKenzie ("McKenzie Proxy Group").

Q. PLEASE DESCRIBE YOUR PROXY GROUP OF COMPANIES.

A. The selection criteria for the Electric Proxy Group include the following:

1. At least 50% of revenues from regulated electric operations as reported by *AUS Utilities Report*;

2. Listed as an Electric Utility by *Value Line Investment Survey* and listed as an Electric Utility or Combination Electric & Gas Utility in *AUS Utilities Report*;

3. An investment-grade corporate credit and bond rating;

4. Has paid a cash dividend for the past six months, with no cuts or omissions;

5. Not involved in an acquisition of another utility, and not the target of an acquisition; and

6. Analysts' long-term EPS growth rate forecasts available from Yahoo, Reuters, and/or Zack's.

The Electric Proxy Group includes twenty-nine companies. Summary financial statistics for the proxy group are listed in Exhibit JRW-4.[17] The median operating revenues and net plant among members of the Electric Proxy Group are $6,399.0 million and $19,730.0 million, respectively. The group receives 82% of its revenues from regulated electric operations, has BBB+/Baa1 issuer credit ratings from S&P and Moody's respectively, a common equity ratio of 46.8%, and an earned return on common equity of 9.3%.

[17] In my testimony, I present financial results using both mean and medians as measures of central tendency. However, due to outliers among means, I have used the median as a measure of central tendency.

Q. PLEASE DESCRIBE THE MCKENZIE PROXY GROUP.

A. Summary financial statistics for Mr. McKenzie's proxy group are provided in Panel B of page 1 of Exhibit JRW-4.[18] The median operating revenues and net plant for the McKenzie Proxy Group are $8,350.1 million and $25,417.0 million, respectively. The group receives 67% of its revenues from regulated electric operations, has a BBB+ bond rating from Standard & Poor's and a Baa1 rating from Moody's, a common equity ratio of 45.1%, and a current earned return on common equity of 9.4%.

Q. HOW DOES THE INVESTMENT RISK OF THE COMPANY COMPARE TO THAT OF YOUR ELECTRIC PROXY GROUP AND THE MCKENZIE PROXY GROUP?

A. I believe that bond ratings provide a good assessment of the investment risk of a company. KPC's issuer credit rating is A- according to S&P and Baa2 according to Moody's. KPC's S&P issuer rating is one notch above the averages for the two proxy groups, while KPC's Moody's issuer rating is one notch below the averages of the groups. These ratings suggest that KPC's investment risk is in line with the proxy groups.

On page 2 of Exhibit JRW-4, I have assessed the riskiness of the two proxy groups using five different risk measures. These measures include Beta, Financial Strength, Safety, Earnings Predictability, and Stock Price Stability. These risk measures indicate that the two proxy groups are similar in risk. The comparisons of

[18] I have excluded Emera and Fortis from this group since they based on Canada.

the risk measures include Beta (0.68 vs. 0.67), Financial Strength (A vs. A) Safety (1.9 vs. 1.9), Earnings Predictability (80 vs. 82), and Stock Price Stability (94 vs. 97). On balance, these measures suggest that the two proxy groups are similar in risk.

IV. CAPITAL STRUCTURE RATIOS AND DEBT COST RATES

Q. WHAT ARE KPC'S RECOMMENDED CAPITAL STRUCTURE AND SENIOR CAPITAL COST RATES FOR RATEMAKING PURPOSES?

A. The Company's proposed capital structure includes 0.0% short-term debt, 3.87% account receivable financing, 54.45% long-term debt, and 41.68% common equity. The Company has proposed a long-term debt cost rate of 4.36% and an account receivable financing rate of 1.95%. This capital structure includes 56.64% long-term debt and 43.36% common equity from investor-supplied capital.

Q. HOW DOES KPC'S RECOMMENDED CAPITAL STRUCTURE COMPARE TO THAT OF ITS PARENT COMPANY, AMERICAN ELECTRIC POWER COMPANY ("AEP")?

A. As shown on page 1 of Exhibit JRW-4, KPC's parent, AEP, has a capitalization with a common equity ratio of 44.2% from investor-supplied capital.

Q. ARE YOU ADOPTING THE COMPANY'S CAPITAL STRUCTURE AND SENIOR CAPITAL COST RATES?

A. Yes.

V. THE COST OF COMMON EQUITY CAPITAL

A. Overview

Q. WHY MUST AN OVERALL COST OF CAPITAL OR FAIR RATE OF RETURN BE ESTABLISHED FOR A PUBLIC UTILITY?

A. In a competitive industry, the return on a firm's common equity capital is determined through the competitive market for its goods and services. Due to the capital requirements needed to provide utility services and the economic benefit to society from avoiding duplication of these services and the construction of utility infrastructure facilities, many public utilities are monopolies. Because of the lack of competition and the essential nature of their services, it is not appropriate to permit monopoly utilities to set their own prices. Thus, regulation seeks to establish prices that are fair to consumers and, at the same time, sufficient to meet the operating and capital costs of the utility, *i.e.*, provide an adequate return on capital to attract investors.

Q. PLEASE PROVIDE AN OVERVIEW OF THE COST OF CAPITAL IN THE CONTEXT OF THE THEORY OF THE FIRM.

A. The total cost of operating a business includes the cost of capital. The cost of common equity capital is the expected return on a firm's common stock that the marginal investor would deem sufficient to compensate for risk and the time value of money. In

equilibrium, the expected and required rates of return on a company's common stock are equal.

Normative economic models of a company or firm, developed under very restrictive assumptions, provide insight into the relationship between firm performance or profitability, capital costs, and the value of the firm. Under the economist's ideal model of perfect competition, where entry and exit are costless, products are undifferentiated, and there are increasing marginal costs of production, firms produce up to the point where price equals marginal cost. Over time, a long-run equilibrium is established where price equals average cost, including the firm's capital costs. In equilibrium, total revenues equal total costs, and because capital costs represent investors' required return on the firm's capital, actual returns equal required returns, and the market value must equal the book value of the firm's securities.

In a competitive market, firms can achieve competitive advantage due to product market imperfections. Most notably, companies can gain competitive advantage through product differentiation (adding real or perceived value to products) and by achieving economies of scale (decreasing marginal costs of production). Competitive advantage allows firms to price products above average cost and thereby earn accounting profits greater than those required to cover capital costs. When these profits are in excess of that required by investors, or when a firm earns a return on equity in excess of its cost of equity, investors respond by valuing the firm's equity in excess of its book value.

James M. McTaggart, founder of the international management consulting firm Marakon Associates, described this essential relationship between the return on equity, the cost of equity, and the market-to-book ratio in the following manner:

> Fundamentally, the value of a company is determined by the cash flow it generates over time for its owners, and the minimum acceptable rate of return required by capital investors. This "cost of equity capital" is used to discount the expected equity cash flow, converting it to a present value. The cash flow is, in turn, produced by the interaction of a company's return on equity and the annual rate of equity growth. High return on equity (ROE) companies in low-growth markets, such as Kellogg, are prodigious generators of cash flow, while low ROE companies in high-growth markets, such as Texas Instruments, barely generate enough cash flow to finance growth.
>
> A company's ROE over time, relative to its cost of equity, also determines whether it is worth more or less than its book value. If its ROE is consistently greater than the cost of equity capital (the investor's minimum acceptable return), the business is economically profitable and its market value will exceed book value. If, however, the business earns an ROE consistently less than its cost of equity, it is economically unprofitable and its market value will be less than book value. [19]

As such, the relationship between a firm's return on equity, cost of equity, and market-to-book ratio is relatively straightforward. A firm that earns a return on equity above its cost of equity will see its common stock sell at a price above its book value. Conversely, a firm that earns a return on equity below its cost of equity will see its common stock sell at a price below its book value.

Q. PLEASE PROVIDE ADDITIONAL INSIGHTS INTO THE RELATIONSHIP BETWEEN ROE AND MARKET-TO-BOOK RATIOS.

[19] James M. McTaggart, "The Ultimate Poison Pill: Closing the Value Gap," *Commentary* (Spring 1986), p.3.

A. This relationship is discussed in a classic Harvard Business School case study entitled "Note on Value Drivers." On page 2 of that case study, the author describes the relationship very succinctly:

> For a given industry, more profitable firms – those able to generate higher returns per dollar of equity– should have higher market-to-book ratios. Conversely, firms which are unable to generate returns in excess of their cost of equity should sell for less than book value.

Profitability	*Value*
If ROE > K	*then Market/Book > 1*
If ROE = K	*then Market/Book =1*
If ROE < K	*then Market/Book < 1*[20]

To assess the relationship by industry, as suggested above, I performed a regression study between estimated ROE and market-to-book ratios using natural gas distribution, electric utility, and water utility companies. I used all companies in these three industries that are covered by *Value Line* and have estimated ROE and market-to-book ratio data. The results are presented in Panels A-C of Exhibit JRW-6. The average R-squares for the electric, gas, and water companies are 0.77, 0.56, and 0.75, respectively.[21] This demonstrates the strong positive relationship between ROEs and market-to-book ratios for public utilities.

Q. WHAT ECONOMIC FACTORS HAVE AFFECTED THE COST OF EQUITY CAPITAL FOR PUBLIC UTILITIES?

[20] Benjamin Esty, "Note on Value Drivers," Harvard Business School, Case No. 9-297-082, April 7, 1997.

[21] R-square measures the percent of variation in one variable (e.g., market-to-book ratios) explained by another variable (e.g., expected ROE). R-squares vary between zero and 1.0, with values closer to 1.0 indicating a higher relationship between two variables.

A. Exhibit JRW-7 provides indicators of public utility equity cost rates over the past decade.

Page 1 shows the yields on long-term A-rated public utility bonds. These yields decreased from 2000 until 2003, and then hovered in the 5.50%-6.50% range from mid-2003 until mid-2008. These yields peaked in November 2008 at 7.75% and henceforth declined significantly. These yields have generally declined since then, dropping below 4.0% on three occasions - in late 2012, in the first quarter of 2015, and then again in the summer of 2016. These yields increased to about 4.25% after the U.S. presidential election but have since declined to about 4.0%.

Page 2 of Exhibit JRW-7 provides the dividend yields for electric utilities over the past decade. The dividend yields for this electric group have declined from the year 2000 to 2007, increased to 5.2% in 2009, and declined to about 3.75% in 2014 and 2015.

Average earned returns on common equity and market-to-book ratios for electric utilities are on page 3 of Exhibit JRW-7. For the electric group, earned returns on common equity have declined gradually since the year 2000 and have been in the 9.0% range in recent years. The average market-to-book ratios for this group peaked at 1.68X in 2007, declined to 1.07X in 2009, and have increased since that time. As of 2015, the average market-to-book for the group was 1.55X. This means that, for at least the last decade, returns on common equity have been greater than the cost of capital, or more than necessary to meet investors' required returns. This also means that customers have been paying more than necessary to support an appropriate profit level for regulated utilities.

Q. WHAT FACTORS DETERMINE INVESTORS' EXPECTED OR REQUIRED RATE OF RETURN ON EQUITY?

A. The expected or required rate of return on common stock is a function of market-wide as well as company-specific factors. The most important market factor is the time value of money as indicated by the level of interest rates in the economy. Common stock investor requirements generally increase and decrease with like changes in interest rates. The perceived risk of a firm is the predominant factor that influences investor return requirements on a company-specific basis. A firm's investment risk is often separated into business and financial risk. Business risk encompasses all factors that affect a firm's operating revenues and expenses. Financial risk results from incurring fixed obligations in the form of debt in financing its assets.

Q. HOW DOES THE INVESTMENT RISK OF UTILITIES COMPARE WITH THAT OF OTHER INDUSTRIES?

A. Due to the essential nature of their service as well as their regulated status, public utilities are exposed to a lesser degree of business risk than other, non-regulated businesses. The relatively low level of business risk allows public utilities to meet much of their capital requirements through borrowing in the financial markets, thereby incurring greater than average financial risk. Nonetheless, the overall investment risk of public utilities is below most other industries.

Exhibit JRW-8 provides an assessment of investment risk for 97 industries as measured by beta, which according to modern capital market theory, is the only

relevant measure of investment risk. These betas come from the *Value Line Investment Survey*. The study shows that the investment risk of utilities is very low. The average betas for electric, water, and gas utility companies are 0.69, 0.73, and 0.76, respectively. As such, the cost of equity for utilities is among the lowest of all industries in the U.S.

Q. WHAT IS THE COST OF COMMON EQUITY CAPITAL?

A. The costs of debt and preferred stock are normally based on historical or book values and can be determined with a great degree of accuracy. The cost of common equity capital, however, cannot be determined precisely and must instead be estimated from market data and informed judgment. This return requirement of the stockholder should be commensurate with the return requirement on investments in other enterprises having comparable risks.

According to valuation principles, the present value of an asset equals the discounted value of its expected future cash flows. Investors discount these expected cash flows at their required rate of return that, as noted above, reflects the time value of money and the perceived riskiness of the expected future cash flows. As such, the cost of common equity is the rate at which investors discount expected cash flows associated with common stock ownership.

Q. HOW CAN THE EXPECTED OR REQUIRED RATE OF RETURN ON COMMON EQUITY CAPITAL BE DETERMINED?

A. Models have been developed to ascertain the cost of common equity capital for a firm. Each model, however, has been developed using restrictive economic assumptions. Consequently, judgment is required in selecting appropriate financial valuation models to estimate a firm's cost of common equity capital, in determining the data inputs for these models, and in interpreting the models' results. All of these decisions must take into consideration the firm involved as well as current conditions in the economy and the financial markets.

Q. HOW DO YOU PLAN TO ESTIMATE THE COST OF EQUITY CAPITAL FOR KPC?

A. I rely primarily on the discounted cash flow ("DCF") model to estimate the cost of equity capital. Given the investment valuation process and the relative stability of the utility business, the DCF model provides the best measure of equity cost rates for public utilities. I have also performed a capital asset pricing model ("CAPM") study; however, I give these results less weight because I believe that risk premium studies, of which the CAPM is one form, provide a less reliable indication of equity cost rates for public utilities.

B. DCF Analysis

Q. PLEASE DESCRIBE THE THEORY BEHIND THE TRADITIONAL DCF MODEL.

A. According to the DCF model, the current stock price is equal to the discounted value of all future dividends that investors expect to receive from investment in the firm. As such, stockholders' returns ultimately result from current as well as future dividends. As owners of a corporation, common stockholders are entitled to a *pro rata* share of the firm's earnings. The DCF model presumes that earnings that are not paid out in the form of dividends are reinvested in the firm so as to provide for future growth in earnings and dividends. The rate at which investors discount future dividends, which reflects the timing and riskiness of the expected cash flows, is interpreted as the market's expected or required return on the common stock. Therefore, this discount rate represents the cost of common equity. Algebraically, the DCF model can be expressed as:

$$P = \frac{D_1}{(1+k)^1} + \frac{D_2}{(1+k)^2} + \ldots \frac{D_n}{(1+k)^n}$$

where P is the current stock price, D_n is the dividend in year n, and k is the cost of common equity.

Q. IS THE DCF MODEL CONSISTENT WITH VALUATION TECHNIQUES EMPLOYED BY INVESTMENT FIRMS?

A. Yes. Virtually all investment firms use some form of the DCF model as a valuation technique. One common application for investment firms is called the three-stage DCF or dividend discount model ("DDM"). The stages in a three-stage DCF model are presented in Exhibit JRW-9, Page 1 of 2. This model presumes that a company's dividend payout progresses initially through a growth stage, then proceeds through a

transition stage, and finally assumes a maturity (or steady-state) stage. The dividend-payment stage of a firm depends on the profitability of its internal investments which, in turn, is largely a function of the life cycle of the product or service.

1. Growth stage: Characterized by rapidly expanding sales, high profit margins, and an abnormally high growth in earnings per share. Because of highly profitable expected investment opportunities, the payout ratio is low. Competitors are attracted by the unusually high earnings, leading to a decline in the growth rate.

2. Transition stage: In later years, increased competition reduces profit margins and earnings growth slows. With fewer new investment opportunities, the company begins to pay out a larger percentage of earnings.

3. Maturity (steady-state) stage: Eventually, the company reaches a position where its new investment opportunities offer, on average, only slightly more attractive ROEs. At that time, its earnings growth rate, payout ratio, and ROE stabilize for the remainder of its life. The constant-growth DCF model is appropriate when a firm is in the maturity stage of the life cycle.

In using this model to estimate a firm's cost of equity capital, dividends are projected into the future using the different growth rates in the alternative stages, and then the equity cost rate is the discount rate that equates the present value of the future dividends to the current stock price.

Q. HOW DO YOU ESTIMATE STOCKHOLDERS' EXPECTED OR REQUIRED RATE OF RETURN USING THE DCF MODEL?

A. Under certain assumptions, including a constant and infinite expected growth rate, and constant dividend/earnings and price/earnings ratios, the DCF model can be simplified to the following:

$$P = \frac{D_1}{k - g}$$

where D_1 represents the expected dividend over the coming year and g is the expected growth rate of dividends. This is known as the constant-growth version of the DCF model. To use the constant-growth DCF model to estimate a firm's cost of equity, one solves for k in the above expression to obtain the following:

$$k = \frac{D_1}{P} + g$$

Q. IN YOUR OPINION, IS THE CONSTANT-GROWTH DCF MODEL APPROPRIATE FOR PUBLIC UTILITIES?

A. Yes. The economics of the public utility business indicate that the industry is in the steady-state or constant-growth stage of a three-stage DCF. The economics include the relative stability of the utility business, the maturity of the demand for public utility services, and the regulated status of public utilities (especially the fact that their returns on investment are effectively set through the ratemaking process). The DCF valuation procedure for companies in this stage is the constant-growth DCF. In the constant-growth version of the DCF model, the current dividend payment and stock price are directly observable. However, the primary problem and controversy in applying the

DCF model to estimate equity cost rates entails estimating investors' expected dividend growth rate.

Q. WHAT FACTORS SHOULD ONE CONSIDER WHEN APPLYING THE DCF METHODOLOGY?

A. One should be sensitive to several factors when using the DCF model to estimate a firm's cost of equity capital. In general, one must recognize the assumptions under which the DCF model was developed in estimating its components (the dividend yield and the expected growth rate). The dividend yield can be measured precisely at any point in time; however, it tends to vary somewhat over time. Estimation of expected growth is considerably more difficult. One must consider recent firm performance, in conjunction with current economic developments and other information available to investors, to accurately estimate investors' expectations.

Q. WHAT DIVIDEND YIELDS HAVE YOU REVIEWED?

A. I have calculated the dividend yields for the companies in the proxy group using the current annual dividend and the 30-day, 90-day, and 180-day average stock prices. These dividend yields are provided in Panel A of page 2 of Exhibit JRW-10. For the Electric Proxy Group, the median dividend yields using the 30-day, 90-day, and 180-day average stock prices range from 3.10% to 3.20%. I am using the average of the medians, 3.15%, as the dividend yield for the Electric Proxy Group. The dividend yields for the McKenzie Proxy Group are shown in Panel B of page 2 of Exhibit JRW-10. The median dividend yields range from 3.2% to 3.3% using the 30-day, 90-day,

and 180-day average stock prices. I am using the average of the medians, 3.25%, as the dividend yield for the McKenzie Proxy Group.

Q. PLEASE DISCUSS THE APPROPRIATE ADJUSTMENT TO THE SPOT DIVIDEND YIELD.

A. According to the traditional DCF model, the dividend yield term relates to the dividend yield over the coming period. As indicated by Professor Myron Gordon, who is commonly associated with the development of the DCF model for popular use, this is obtained by: (1) multiplying the expected dividend over the coming quarter by 4, and (2) dividing this dividend by the current stock price to determine the appropriate dividend yield for a firm that pays dividends on a quarterly basis.[22]

In applying the DCF model, some analysts adjust the current dividend for growth over the coming year as opposed to the coming quarter. This can be complicated because firms tend to announce changes in dividends at different times during the year. As such, the dividend yield computed based on presumed growth over the coming quarter as opposed to the coming year can be quite different. Consequently, it is common for analysts to adjust the dividend yield by some fraction of the long-term expected growth rate.

Q. GIVEN THIS DISCUSSION, WHAT ADJUSTMENT FACTOR DO YOU USE FOR YOUR DIVIDEND YIELD?

[22] *Petition for Modification of Prescribed Rate of Return*, Federal Communications Commission, Docket No. 79-05, Direct Testimony of Myron J. Gordon and Lawrence I. Gould at 62 (April 1980).

A. I adjust the dividend yield by one-half (1/2) of the expected growth so as to reflect growth over the coming year. The DCF equity cost rate ("K") is computed as:

$$K = [(D/P) * (1 + 0.5g)] + g$$

Q. PLEASE DISCUSS THE GROWTH RATE COMPONENT OF THE DCF MODEL.

A. There is debate as to the proper methodology to employ in estimating the growth component of the DCF model. By definition, this component is investors' expectation of the long-term dividend growth rate. Presumably, investors use some combination of historical and/or projected growth rates for earnings and dividends per share and for internal or book-value growth to assess long-term potential.

Q. WHAT GROWTH DATA HAVE YOU REVIEWED FOR THE PROXY GROUPS?

A. I have analyzed a number of measures of growth for companies in the proxy groups. I reviewed *Value Line's* historical and projected growth rate estimates for earnings per share ("EPS"), dividends per share ("DPS"), and book value per share ("BVPS"). In addition, I utilized the average EPS growth rate forecasts of Wall Street analysts as provided by Yahoo, Reuters and Zacks. These services solicit five-year earnings growth rate projections from securities analysts and compile and publish the means and medians of these forecasts. Finally, I also assessed prospective growth as measured by prospective earnings retention rates and earned returns on common equity.

Q. PLEASE DISCUSS HISTORICAL GROWTH IN EARNINGS AND DIVIDENDS AS WELL AS INTERNAL GROWTH.

A. Historical growth rates for EPS, DPS, and BVPS are readily available to investors and are presumably an important ingredient in forming expectations concerning future growth. However, one must use historical growth numbers as measures of investors' expectations with caution. In some cases, past growth may not reflect future growth potential. Also, employing a single growth rate number (for example, for five or ten years) is unlikely to accurately measure investors' expectations, due to the sensitivity of a single growth rate figure to fluctuations in individual firm performance as well as overall economic fluctuations (*i.e.*, business cycles). However, one must appraise the context in which the growth rate is being employed. According to the conventional DCF model, the expected return on a security is equal to the sum of the dividend yield and the expected long-term growth in dividends. Therefore, to best estimate the cost of common equity capital using the conventional DCF model, one must look to long-term growth rate expectations.

Internally generated growth is a function of the percentage of earnings retained within the firm (the earnings retention rate) and the rate of return earned on those earnings (the return on equity). The internal growth rate is computed as the retention rate times the return on equity. Internal growth is significant in determining long-run earnings and, therefore, dividends. Investors recognize the importance of internally generated growth and pay premiums for stocks of companies that retain earnings and earn high returns on internal investments.

Q. PLEASE DISCUSS THE SERVICES THAT PROVIDE ANALYSTS' EPS FORECASTS.

A. Analysts' EPS forecasts for companies are collected and published by a number of different investment information services, including Institutional Brokers Estimate System ("I/B/E/S"), Bloomberg, FactSet, Zacks, First Call and Reuters, among others. Thompson Reuters publishes analysts' EPS forecasts under different product names, including I/B/E/S, First Call, and Reuters. Bloomberg, FactSet, and Zacks each publish their own set of analysts' EPS forecasts for companies. These services do not reveal (1) the analysts who are solicited for forecasts or (2) the identity of the analysts who actually provide the EPS forecasts that are used in the compilations published by the services. I/B/E/S, Bloomberg, FactSet, and First Call are fee-based services. These services usually provide detailed reports and other data in addition to analysts' EPS forecasts. In contrast, Thompson Reuters and Zacks do provide limited EPS forecast data free-of-charge on the Internet. Yahoo finance (http://finance.yahoo.com) lists Thompson Reuters as the source of its summary EPS forecasts. The Reuters website (www.reuters.com) also publishes EPS forecasts from Thompson Reuters, but with more detail. Zacks (www.zacks.com) publishes its summary forecasts on its website. Zacks estimates are also available on other websites, such as msn.money (http://money.msn.com).

Q. PLEASE PROVIDE AN EXAMPLE OF THESE EPS FORECASTS.

A. The following example provides the EPS forecasts compiled by Reuters for Alliant Energy Corp. (stock symbol "LNT"). The figures are provided on page 2 of Exhibit JRW-9. Line one shows that one analyst has provided EPS estimates for the quarter

ending September 30, 2017. The mean, high and low estimates are $0.88, $0.96, and $0.85, respectively. The second line shows the quarterly EPS estimates for the quarter ending December 31, 2017 of $0.28 (mean), $0.31 (high), and $0.22 (low). Line three shows the annual EPS estimates for the fiscal year ending December 2017 ($2.01 (mean), $2.04 (high), and $2.00 (low) and for the fiscal year ending December 2018 ($2.13 (mean), $2.16 (high), and $2.10 (low). The quarterly and annual EPS forecasts in lines 1-4 are expressed in dollars and cents. As in the LNT case shown here, it is common for more analysts to provide estimates of annual EPS as opposed to quarterly EPS. The bottom line shows the projected long-term EPS growth rate, which is expressed as a percentage. For LNT, one analyst has provided a long-term EPS growth rate forecast, with mean, high, and low growth rates of 6.90%, 6.90%, and 6.90%.

Q. WHICH OF THESE EPS FORECASTS IS USED IN DEVELOPING A DCF GROWTH RATE?

A. The DCF growth rate is the long-term projected growth rate in EPS, DPS, and BVPS. Therefore, in developing an equity cost rate using the DCF model, the projected long-term growth rate is the projection used in the DCF model.

Q. WHY DO YOU NOT RELY EXCLUSIVELY ON THE EPS FORECASTS OF WALL STREET ANALYSTS IN ARRIVING AT A DCF GROWTH RATE FOR THE PROXY GROUP?

A. There are several issues with using the EPS growth rate forecasts of Wall Street analysts as DCF growth rates. First, the appropriate growth rate in the DCF model is

the dividend growth rate, not the earnings growth rate. Nonetheless, over the very long term, dividend and earnings will have to grow at a similar growth rate. Therefore, consideration must be given to other indicators of growth, including prospective dividend growth, internal growth, as well as projected earnings growth. Second, a recent study by Lacina, Lee, and Xu (2011) has shown that analysts' long-term earnings growth rate forecasts are not more accurate at forecasting future earnings than naïve random walk forecasts of future earnings.[23] Employing data over a twenty-year period, these authors demonstrate that using the most recent year's EPS figure to forecast EPS in the next 3-5 years proved to be just as accurate as using the EPS estimates from analysts' long-term earnings growth rate forecasts. In the authors' opinion, these results indicate that analysts' long-term earnings growth rate forecasts should be used with caution as inputs for valuation and cost of capital purposes. Finally, and most significantly, it is well known that the long-term EPS growth rate forecasts of Wall Street securities analysts are overly optimistic and upwardly biased. This has been demonstrated in a number of academic studies over the years.[24] Hence, using these growth rates as a DCF growth rate will provide an overstated equity cost rate. On this issue, a study by Easton and Sommers (2007) found that optimism in analysts' growth rate forecasts leads to an upward bias in estimates of the cost of equity capital of almost

[23] M. Lacina, B. Lee & Z. Xu, *Advances in Business and Management Forecasting (Vol. 8),* Kenneth D. Lawrence, Ronald K. Klimberg (ed.), Emerald Group Publishing Limited, pp.77-101.

[24] The studies that demonstrate analysts' long-term EPS forecasts are overly-optimistic and upwardly biased include: R.D. Harris, "The Accuracy, Bias, and Efficiency of Analysts' Long Run Earnings Growth Forecasts," *Journal of Business Finance & Accounting*, pp. 725-55 (June/July 1999); P. DeChow, A. Hutton, and R. Sloan, "The Relation Between Analysts' Forecasts of Long-Term Earnings Growth and Stock Price Performance Following Equity Offerings," *Contemporary Accounting Research (2000);* K. Chan, L., Karceski, J., & Lakonishok, J., "The Level and Persistence of Growth Rates," *Journal of Finance* pp. 643−684, (2003); M. Lacina, B. Lee and Z. Xu, *Advances in Business and Management Forecasting (Vol. 8),* Kenneth D. Lawrence, Ronald K. Klimberg (ed.), Emerald Group Publishing Limited, pp.77-101; and Marc H. Goedhart, Rishi Raj, and Abhishek Saxena, "Equity Analysts, Still Too Bullish," *McKinsey on Finance*, pp. 14-17, (Spring 2010).

3.0 percentage points.[25]

Q. IS IT YOUR OPINION THAT STOCK PRICES REFLECT THE UPWARD BIAS IN THE EPS GROWTH RATE FORECASTS?

A. Yes, I do believe that investors are well aware of the bias in analysts' EPS growth rate forecasts, and therefore stock prices reflect the upward bias.

Q. HOW DOES THAT AFFECT THE USE OF THESE FORECASTS IN A DCF EQUITY COST RATE STUDY?

A. According to the DCF model, the equity cost rate is a function of the dividend yield and expected growth rate. Because stock prices reflect the bias, it would affect the dividend yield. In addition, the DCF growth rate needs to be adjusted downward from the projected EPS growth rate to reflect the upward bias.

Q. PLEASE DISCUSS THE HISTORICAL GROWTH OF THE COMPANIES IN THE PROXY GROUPS, AS PROVIDED BY *VALUE LINE*.

A. Page 3 of Exhibit JRW-10 provides the 5- and 10- year historical growth rates for EPS, DPS, and BVPS for the companies in the two proxy groups, as published in the *Value Line Investment Survey*. The median historical growth measures for EPS, DPS, and BVPS for the Electric Proxy Group, as provided in Panel A, range from 3.5% to 5.5%, with an average of the medians of 4.3%. For the McKenzie Proxy Group, as shown in Panel B of page 3 of Exhibit JRW-10, the historical growth measures in EPS, DPS, and

[25] Peter D. Easton & Gregory A. Sommers, *Effect of Analysts' Optimism on Estimates of the Expected Rate of Return Implied by Earnings Forecasts*, 45 J. ACCT. RES. 983–1015 (2007).

BVPS, as measured by the medians, range from 4.0% to 5.0%, with an average of the medians of 4.3%.

Q. PLEASE SUMMARIZE *VALUE LINE'S* PROJECTED GROWTH RATES FOR THE COMPANIES IN THE PROXY GROUPS.

A. *Value Line's* projections of EPS, DPS, and BVPS growth for the companies in the proxy groups are shown on page 4 of Exhibit JRW-10. As stated above, due to the presence of outliers, the medians are used in the analysis. For the Electric Proxy Group, as shown in Panel A of page 4 of Exhibit JRW-10, the medians range from 4.0% to 5.5%, with an average of the medians of 4.8%. The range of the medians for the McKenzie Proxy Group, shown in Panel B of page 4 of Exhibit JRW-10, is from 3.8% to 6.0%, with an average of the medians of 4.9%.

Also provided on page 4 of Exhibit JRW-10 are the prospective sustainable growth rates for the companies in the two proxy groups as measured by *Value Line*'s average projected retention rate and return on shareholders' equity. As noted above, sustainable growth is a significant and a primary driver of long-run earnings growth. For the Electric and McKenzie Proxy Groups, the median prospective sustainable growth rates are 3.9% and 4.2%, respectively.

Q. PLEASE ASSESS GROWTH FOR THE PROXY GROUPS AS MEASURED BY ANALYSTS' FORECASTS OF EXPECTED 5-YEAR EPS GROWTH.

A. Yahoo, Zacks, and Reuters collect, summarize, and publish Wall Street analysts' long-term EPS growth rate forecasts for the companies in the proxy groups. These forecasts

are provided for the companies in the proxy groups on page 5 of Exhibit JRW-10. I have reported both the mean and median growth rates for the groups. Since there is considerable overlap in analyst coverage between the three services, and not all of the companies have forecasts from the different services, I have averaged the expected five-year EPS growth rates from the three services for each company to arrive at an expected EPS growth rate for each company. The mean/median of analysts' projected EPS growth rates for the Electric and McKenzie Proxy Groups are 4.4%/5.0% and 5.3%/5.4%, respectively.[26]

Q. PLEASE SUMMARIZE YOUR ANALYSIS OF THE HISTORICAL AND PROSPECTIVE GROWTH OF THE PROXY GROUPS.

A. Page 6 of Exhibit JRW-10 shows the summary DCF growth rate indicators for the proxy groups.

The historical growth rate indicators for my Electric Proxy Group imply a baseline growth rate of 4.3%. The average of the projected EPS, DPS, and BVPS growth rates from *Value Line* is 4.8%, and *Value Line*'s projected sustainable growth rate is 3.9%. The projected EPS growth rates of Wall Street analysts for the Electric Proxy Group are 4.4% and 5.0% as measured by the mean and median growth rates. The overall range for the projected growth rate indicators (ignoring historical growth) is 3.9% to 5.0%. Giving primary weight to the projected EPS growth rate of Wall Street analysts, I believe that the appropriate projected growth rate is 5.0%. This

[26] Given variation in the measures of central tendency of analysts' projected EPS growth rates proxy groups, I have considered both the means and medians figures in the growth rate analysis.

growth rate figure is in the upper end of the range of historic and projected growth rates for the Electric Proxy Group.

For the McKenzie Proxy Group, the historical growth rate indicators indicate a growth rate of 4.3%. The average of the projected EPS, DPS, and BVPS growth rates from *Value Line* is 4.9%, and *Value Line*'s projected sustainable growth rate is 4.2%. The projected EPS growth rates of Wall Street analysts are 5.3% and 5.4% as measured by the mean and median growth rates. The overall range for the projected growth rate indicators is 4.2% to 5.4%. Giving primary weight to the projected EPS growth rate of Wall Street analysts, I believe that the appropriate projected growth rate range is 5.30% to 5.40%. I will use the midpoint of this range, 5.35%, as the DCF growth rate for the McKenzie Group. This growth rate figure is in the upper end of the range of historic and projected growth rates for the McKenzie Proxy Group.

Q. BASED ON THE ABOVE ANALYSIS, WHAT ARE YOUR INDICATED COMMON EQUITY COST RATES FROM THE DCF MODEL FOR THE PROXY GROUPS?

A. My DCF-derived equity cost rates for the groups are summarized on page 1 of Exhibit JRW-10 and in Table 1 below.

Table 1
DCF-derived Equity Cost Rate/ROE

	Dividend Yield	1 + ½ Growth Adjustment	DCF Growth Rate	Equity Cost Rate
Electric Proxy Group	**3.15%**	**1.025000**	**5.00%**	**8.25%**
McKenzie Proxy Group	**3.25%**	**1.026750**	**5.35%**	**8.70%**

The result for the Electric Proxy Group is the 3.15% dividend yield, times the one and one-half growth adjustment of 1.025, plus the DCF growth rate of 5.0%, which results in an equity cost rate of 8.25%. The result for the McKenzie Proxy Group is 8.70%, which includes a dividend yield of 3.25%, an adjustment factor of 1.02675, and a DCF growth rate of 5.35%.

C. Capital Asset Pricing Model

Q. PLEASE DISCUSS THE CAPITAL ASSET PRICING MODEL ("CAPM").

A. The CAPM is a risk premium approach to gauging a firm's cost of equity capital. According to the risk premium approach, the cost of equity is the sum of the interest rate on a risk-free bond (R_f) and a risk premium (RP), as in the following:

$$k = R_f + RP$$

The yield on long-term U.S. Treasury securities is normally used as R_f. Risk premiums are measured in different ways. The CAPM is a theory of the risk and expected returns of common stocks. In the CAPM, two types of risk are associated with a stock: firm-specific risk or unsystematic risk, and market or systematic risk, which is measured by a firm's beta. The only risk that investors receive a return for bearing is systematic risk.

According to the CAPM, the expected return on a company's stock, which is also the equity cost rate (K), is equal to:

$$K = (R_f) + ß * [E(R_m) - (R_f)]$$

Where:

- *K* represents the estimated rate of return on the stock;

- $E(R_m)$ represents the expected return on the overall stock market. Frequently, the 'market' refers to the S&P 500;
- (R_f) represents the risk-free rate of interest;
- $[E(R_m) - (R_f)]$ represents the expected equity or market risk premium—the excess return that an investor expects to receive above the risk-free rate for investing in risky stocks; and
- *Beta*—(ß) is a measure of the systematic risk of an asset.

To estimate the required return or cost of equity using the CAPM requires three inputs: the risk-free rate of interest (R_f), the beta (ß), and the expected equity or market risk premium $[E(R_m) - (R_f)]$. R_f is the easiest of the inputs to measure – it is represented by the yield on long-term U.S. Treasury bonds. ß, the measure of systematic risk, is a little more difficult to measure because there are different opinions about what adjustments, if any, should be made to historical betas due to their tendency to regress to 1.0 over time. And finally, an even more difficult input to measure is the expected equity or market risk premium ($E(R_m) - (R_f)$). I will discuss each of these inputs below.

Q. PLEASE DISCUSS EXHIBIT JRW-11.

A. Exhibit JRW-11 provides the summary results for my CAPM study. Page 1 shows the results, and the following pages contain the supporting data.

Q. PLEASE DISCUSS THE RISK-FREE INTEREST RATE.

A. The yield on long-term U.S. Treasury bonds has usually been viewed as the risk-free rate of interest in the CAPM. The yield on long-term U.S. Treasury bonds, in turn, has been considered to be the yield on U.S. Treasury bonds with 30-year maturities.

Q. WHAT RISK-FREE INTEREST RATE ARE YOU USING IN YOUR CAPM?

A. As shown on page 2 of Exhibit JRW-11, the yield on 30-year U.S. Treasury bonds has been in the 2.5% to 4.0% range over the 2013–2017 time period. The 30-year Treasury yield is in the middle of this range. Given the recent range of yields and the possibility of higher interest rates, I use the higher end 4.0% as the risk-free rate, or R_f, in my CAPM.

Q. DOES YOUR 4.0% RISK-FREE INTEREST RATE TAKE INTO CONSIDERATION FORECASTS OF HIGHER INTEREST RATES?

A. No, it does not. As I stated before, forecasts of higher interest rates have been notoriously wrong for a decade. My 4.0% risk-free interest rate takes into account the range of interest rates in the past and effectively synchronizes the risk-free rate with the market risk premium ("MRP"). The risk-free rate and the MRP are interrelated in that the MRP is developed in relation to the risk-free rate. As discussed below, my MRP is based on the results of many studies and surveys that have been published over time. Therefore, my risk-free interest rate of 4.0% is effectively a normalized risk-free rate of interest.

Q. WHAT BETAS ARE YOU EMPLOYING IN YOUR CAPM?

A. Beta (ß) is a measure of the systematic risk of a stock. The market, usually taken to be the S&P 500, has a beta of 1.0. The beta of a stock with the same price movement as the market also has a beta of 1.0. A stock whose price movement is greater than that of the market, such as a technology stock, is riskier than the market and has a beta greater than 1.0. A stock with below average price movement, such as that of a regulated public utility, is less risky than the market and has a beta less than 1.0.

Estimating a stock's beta involves running a linear regression of a stock's return on the market return.

As shown on page 3 of Exhibit JRW-11, the slope of the regression line is the stock's ß. A steeper line indicates that the stock is more sensitive to the return on the overall market. This means that the stock has a higher ß and greater-than-average market risk. A less steep line indicates a lower ß and less market risk.

Several online investment information services, such as Yahoo and Reuters, provide estimates of stock betas. Usually these services report different betas for the same stock. The differences are usually due to: (1) the time period over which ß is measured; and (2) any adjustments that are made to reflect the fact that betas tend to regress to 1.0 over time. In estimating an equity cost rate for the proxy groups, I am using the betas for the companies as provided in the *Value Line Investment Survey*. As shown on page 3 of Exhibit JRW-11, the median betas for the companies in the Electric and McKenzie Proxy Groups are 0.65 and 0.65, respectively.

Q. PLEASE DISCUSS THE MARKET RISK PREMIUM.

A. The MRP is equal to the expected return on the stock market (e.g., the expected return on the S&P 500, $E(R_m)$ minus the risk-free rate of interest (R_f)). The MRP is the difference in the expected total return between investing in equities and investing in "safe" fixed-income assets, such as long-term government bonds. However, while the MRP is easy to define conceptually, it is difficult to measure because it requires an estimate of the expected return on the market - $E(R_m)$. As is discussed below, there are different ways to measure $E(R_m)$, and studies have come up with significantly different

magnitudes for $E(R_m)$. As Merton Miller, the 1990 Nobel Prize winner in economics indicated, $E(R_m)$ is very difficult to measure and is one of the great mysteries in finance.[27]

Q. PLEASE DISCUSS THE ALTERNATIVE APPROACHES TO ESTIMATING THE MRP.

A. Page 4 of Exhibit JRW-11 highlights the primary approaches to, and issues in, estimating the expected MRP. The traditional way to measure the MRP was to use the difference between historical average stock and bond returns. In this case, historical stock and bond returns, also called *ex post* returns, were used as the measures of the market's expected return (known as the *ex-ante* or forward-looking expected return). This type of historical evaluation of stock and bond returns is often called the "Ibbotson approach" after Professor Roger Ibbotson, who popularized this method of using historical financial market returns as measures of expected returns. Most historical assessments of the equity risk premium suggest an equity risk premium range of 5% to 7% above the rate on long-term U.S. Treasury bonds. However, this can be a problem because: (1) *ex post* returns are not the same as *ex ante* expectations; (2) market risk premiums can change over time, increasing when investors become more risk-averse and decreasing when investors become less risk-averse; and (3) market conditions can change such that *ex post* historical returns are poor estimates of *ex ante* expectations.

[27] Merton Miller, "The History of Finance: An Eyewitness Account," *Journal of Applied Corporate Finance*, 2000, P. 3.

The use of historical returns as market expectations has been criticized in numerous academic studies as discussed later in my testimony. The general theme of these studies is that the large equity risk premium discovered in historical stock and bond returns cannot be justified by the fundamental data. These studies, which fall under the category "*Ex Ante* Models and Market Data," compute *ex ante* expected returns using market data to arrive at an expected equity risk premium. These studies have also been called "Puzzle Research" after the famous study by Mehra and Prescott in which the authors first questioned the magnitude of historical equity risk premiums relative to fundamentals.[28]

In addition, there are a number of surveys of financial professionals regarding the MRP. There have also been several published surveys of academics on the equity risk premium. *CFO Magazine* conducts a quarterly survey of CFOs, which includes questions regarding their views on the current expected returns on stocks and bonds. Usually, over 500 CFOs participate in the survey.[29] Questions regarding expected stock and bond returns are also included in the Federal Reserve Bank of Philadelphia's annual survey of financial forecasters, which is published as the *Survey of Professional Forecasters*.[30] This survey of professional economists has been published for almost fifty years. In addition, Pablo Fernandez conducts annual surveys of financial analysts

[28] Rajnish Mehra & Edward C. Prescott, "The Equity Premium: A Puzzle," *Journal of Monetary Economics*, 145 (1985).

[29] *See* DUKE/CFO Magazine Global Business Outlook Survey, www.cfosurvey.org.

[30] Federal Reserve Bank of Philadelphia, *Survey of Professional Forecasters* (Feb, 2017). The Survey of Professional Forecasters was formerly conducted by the American Statistical Association ("ASA") and the National Bureau of Economic Research ("NBER") and was known as the ASA/NBER survey. The survey, which began in 1968, is conducted each quarter. The Federal Reserve Bank of Philadelphia, in cooperation with the NBER, assumed responsibility for the survey in June 1990.

and companies regarding the equity risk premiums they use in their investment and financial decision-making.[31]

Q. PLEASE PROVIDE A SUMMARY OF THE MRP STUDIES.

A. Derrig and Orr (2003), Fernandez (2007), and Song (2007) completed the most comprehensive review of the research on the MRP.[32] Derrig and Orr's study evaluated the various approaches to estimating MRPs, as well as the issues with the alternative approaches and summarized the findings of the published research on the MRP. Fernandez examined four alternative measures of the MRP – historical, expected, required, and implied. He also reviewed the major studies of the MRP and presented the summary MRP results. Song provides an annotated bibliography and highlights the alternative approaches to estimating the MRP.

Page 5 of Exhibit JRW-11 provides a summary of the results of the primary risk premium studies reviewed by Derrig and Orr, Fernandez, and Song, as well as other more recent studies of the MRP. In developing page 5 of Exhibit JRW-11, I have categorized the studies as discussed on page 4 of Exhibit JRW-11. I have also included the results of studies of the "Building Blocks" approach to estimating the equity risk premium. The Building Blocks approach is a hybrid approach employing elements of both historical and *ex ante* models.

[31] Pablo Fernandez, Alberto Ortiz and Isabel Fernandez Acín, "Market Risk Premium used in 71 countries in 2016: a survey with 6,932 answers: survey," May 9, 2016.

[32] *See* Richard Derrig & Elisha Orr, "Equity Risk Premium: Expectations Great and Small," Working Paper (version 3.0), Automobile Insurers Bureau of Massachusetts, (August 28, 2003); Pablo Fernandez, "Equity Premium: Historical, Expected, Required, and Implied," IESE Business School Working Paper, (2007); Zhiyi Song, "The Equity Risk Premium: An Annotated Bibliography," CFA Institute, (2007).

Q. PLEASE DISCUSS PAGE 5 OF EXHIBIT JRW-11.

A. Page 5 of Exhibit JRW-11 provides a summary of the results of the MRP studies that I have reviewed. These include the results of: (1) the various studies of the historical risk premium, (2) *ex ante* MRP studies, (3) MRP surveys of CFOs, financial forecasters, analysts, companies and academics, and (4) the Building Blocks approach to the MRP. There are results reported for over forty studies, and the median MRP is 4.63%.

Q. PLEASE HIGHLIGHT THE RESULTS OF THE MORE RECENT RISK PREMIUM STUDIES AND SURVEYS.

A. The studies cited on page 5 of Exhibit JRW-11 include every MRP study and survey I could identify that was published over the past decade and that provided an MRP estimate. Most of these studies were published prior to the financial crisis that began in 2008. In addition, some of these studies were published in the early 2000s at the market peak. It should be noted that many of these studies (as indicated) used data over long periods of time (as long as fifty years of data) and so were not estimating an MRP as of a specific point in time (e.g., the year 2001). To assess the effect of the earlier studies on the MRP, I have reconstructed page 5 of Exhibit JRW-11 on page 6 of Exhibit JRW-11; however, I have eliminated all studies dated before January 2, 2010. The median for this subset of studies is 4.95%.

Q. GIVEN THESE RESULTS, WHAT MRP ARE YOU USING IN YOUR CAPM?

A. Much of the data indicates that the market risk premium is in the 4.0% to 6.0% range. Several recent studies (such as Damodaran, American Appraisers, Duarte and Rosa, and Duff & Phelps) have suggested an increase in the market risk premium. Therefore, I will use 5.5%, which is in the upper end of the range, as the market risk premium or MRP.

Q. IS YOUR *EX ANTE* MRP CONSISTENT WITH THE MRPs USED BY CFOs?

A. Yes. In the June 2017 CFO survey conducted by *CFO Magazine* and Duke University, which included approximately 300 responses, the expected 10-year MRP was 3.85%.[33] Thus, my 5.5% value is a conservatively high estimate of the MRP.

Q. IS YOUR *EX ANTE* MRP CONSISTENT WITH THE MRPs OF PROFESSIONAL FORECASTERS?

A. The financial forecasters in the previously referenced Federal Reserve Bank of Philadelphia survey projected both stock and bond returns. In the February 2017 survey, the median long-term expected stock and bond returns were 5.60% and 3.68%, respectively. This provides an expected MRP of 1.92% (5.60%-3.68%). Again, my 5.5% value is a conservatively high estimate of the MRP.

Q. IS YOUR *EX ANTE* MRP CONSISTENT WITH THE MRPs OF FINANCIAL ANALYSTS AND COMPANIES?

[33] www.cfosurvey.org.

A. Yes. Pablo Fernandez published the results of his 2017 survey of academics, financial analysts, and companies.[34] This survey included over 4,000 responses. The median MRP employed by U.S. analysts and companies was 5.7%.

Q. IS YOUR *EX ANTE* MRP CONSISTENT WITH THE MRPs OF FINANCIAL ADVISORS?

A. Yes. Duff & Phelps is a well-known valuation and corporate finance advisor that publishes extensively on the cost of capital. As of 2017, Duff & Phelps recommended using a 5.5% MRP for the U.S, with a normalized risk-free interest rate of 3.5%.[35]

Q. WHAT EQUITY COST RATE IS INDICATED BY YOUR CAPM ANALYSIS?

A. The results of my CAPM study for the proxy groups are summarized on page 1 of Exhibit JRW-11 and in Table 2 below.

Table 2
CAPM-derived Equity Cost Rate/ROE
$K = (R_f) + ß * [E(R_m) - (R_f)]$

	Risk-Free Rate	Beta	Equity Risk Premium	Equity Cost Rate
Electric Proxy Group	**4.0%**	**0.65**	**5.5%**	**7.6%**
McKenzie Proxy Group	**4.0%**	**0.65**	**5.5%**	**7.6%**

For the Electric Proxy Group, the risk-free rate of 4.0% plus the product of the beta of 0.65 times the equity risk premium of 5.5% results in a 7.6% equity cost rate. For the McKenzie Proxy Group, the risk-free rate of 4.0% plus the product of the beta of 0.65 times the equity risk premium of 5.5% results in a 7.6% equity cost rate.

[34] *Ibid.* p. 3.
[35] *See* http://www.duffandphelps.com/insights/publications/cost-of-capital/index.

D. Equity Cost Rate Summary

Q. PLEASE SUMMARIZE THE RESULTS OF YOUR EQUITY COST RATE STUDIES.

A. My DCF analyses for the Electric and McKenzie Proxy Groups indicate equity cost rates of 8.25% and 8.70%, respectively. The CAPM equity cost rates for the Electric and McKenzie Proxy Groups are 7.6% and 769%.

Table 3
ROEs Derived from DCF and CAPM Models

	DCF	CAPM
Electric Proxy Group	**8.25%**	**7.60%**
McKenzie Proxy Group	**8.70%**	**7.60%**

Q. GIVEN THESE RESULTS, WHAT IS YOUR ESTIMATED EQUITY COST RATE FOR THE GROUPS?

A. Given these results, I conclude that the appropriate equity cost rate for companies in the Electric and McKenzie Proxy Groups is in the 7.60% to 8.70% range. Because I give primary weight to the DCF results, I believe that the appropriate equity cost rate range is 8.25% to 8.70%. Given this range, I will use 8.60%, as the equity cost rate of for KPC.

Q. **PLEASE INDICATE WHY AN 8.60% RETURN ON EQUITY IS APPROPRIATE FOR THE COMPANY AT THIS TIME**.

A. There are a number of reasons why an 8.60% return on equity is appropriate and fair for the Company in this case:

1. The investment risk of KPC, as indicated by the Company's S&P and Moody's issuer credit ratings, is on par with the proxy groups';

2. The electric and gas utility industries are among the lowest risk industries in the U.S. as measured by beta, as shown in Exhibit JRW-8. As such, the cost of equity capital for this industry is amongst the lowest in the U.S., according to the CAPM;

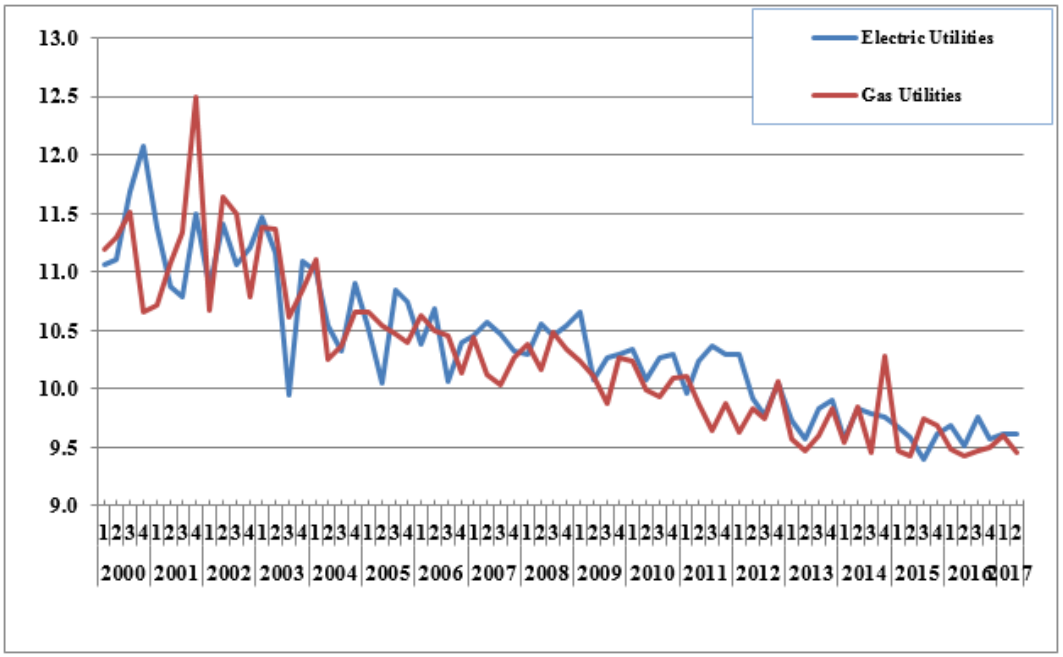
3. Capital costs for utilities, as indicated by long-term bond yields, remain at historically low levels. In addition, given low inflationary expectations and slow global economic growth, interest rates are likely to remain at low levels for some time; and

4. Authorized ROEs for electric and gas utilities have gradually decreased in recent years. The authorized ROEs for electric utilities have declined from 10.01% in 2012, to 9.8% in 2013, to 9.76% in 2014, 9.58% in 2015, 9.60% in 2016, and 9.61% in the first half of 2017, according to Regulatory Research Associates.[36]

Figure 5

Authorized ROEs for Electric Utility and Gas Distribution Companies
2000-2017

[36] *Regulatory Focus*, Regulatory Research Associates, July, 2017. The electric utility authorized ROEs exclude the authorized ROEs in Virginia, which include generation adders.



In my opinion, these authorized ROEs have lagged behind capital market cost rates, or in other words, authorized ROEs have been slow to reflect low capital market cost rates. This has been especially true in recent years as some state commissions have been reluctant to authorize ROEs below 10%. However, the trend has been towards lower ROEs, and the norm now is below ten percent. Hence, I believe that my recommended ROE reflects our present historically low capital cost rates, and these low capital cost rates are finally being recognized by state utility commissions.

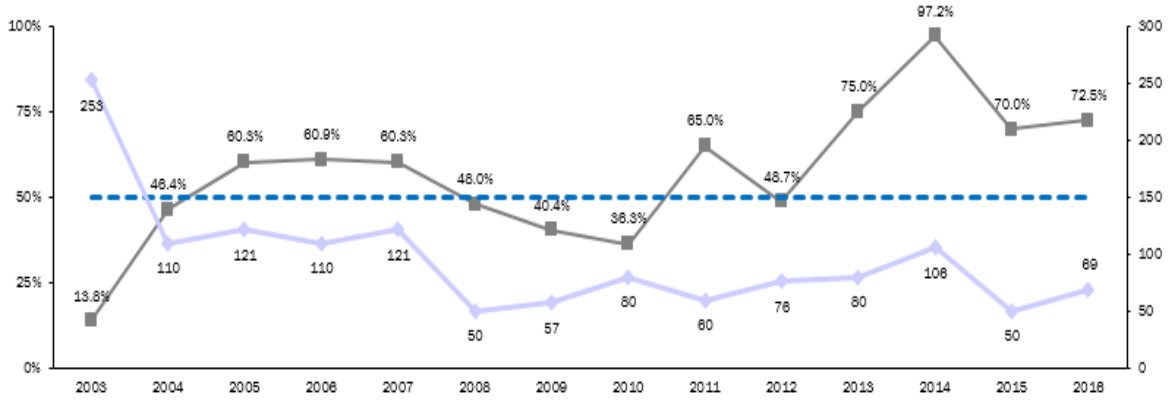
Q. DO YOU BELIEVE THAT YOUR RECOMMENDED ROE OF 8.60% MEETS *HOPE* AND *BLUEFIELD* STANDARDS?

A. Yes, my ROE recommendation meets the criteria established in the *Hope* and *Bluefield* decisions. As previously noted, according to the *Hope* and *Bluefield* decisions, returns on capital should be: (1) comparable to returns investors expect to earn on other

investments of similar risk; (2) sufficient to assure confidence in the company's financial integrity; and (3) adequate to maintain and support the company's credit and to attract capital.

Publicly-traded utilities have been earning ROEs of about 9.0% (on average) in recent years. The median earned ROE for the year 2016 for the companies in the Electric and McKenzie are 9.3% and 9.4%, respectively, as shown in Exhibit JRW-4. Yet, given this level of return, the credit ratings of utility companies are going up, as shown in Figure 6. The bottom line is the number of rating actions, and the top line is the percentage of upgrades. The percentage of upgrades have been at least 70% over the past four years, providing direct evidence that the investment risk of utility companies is low and declining.

Figure 6[37]
Electric Utility Rating Actions and Percentage of Credit Upgrades



[37] Source: Edison Electric Institute, 2017.
http://www.eei.org/resourcesandmedia/industrydataanalysis/industryfinancialanalysis/QtrlyFinancialUpdates/Pages/default.aspx

Q. PLEASE ALSO DISCUSS YOUR RECOMMENDATION IN LIGHT OF A MOODY'S PUBLICATION ON ROES AND CREDIT QUALITY.

A. Moody's recognizes that authorized ROEs for electric and gas companies are declining due to lower interest rates.[38] Moody's indicates that with the lower authorized ROEs, electric and gas companies are earning ROEs of 9.0% to 10.0%, yet this is not impairing their credit profiles and is not deterring them from raising record amounts of capital. Moody's also highlights that utilities are raising about $50 billion a year in debt capital, despite the lower ROEs.[39]

Q. HAVE THE LOWER ROES HURT THE STOCK PERFORMANCE OF UTILITY STOCKS?

A. No. The graph below shows the Dow Jones Utility Index ("DJU") versus the S&P 500 since January 1, 2017.[40] Both the DJU and the S&P 500 are near record levels, and the DJU has performed right along with the S&P 500 over this time period. As a result, with high stock prices, utility dividend yields and DCF equity cost rates are low.

[38] Moody's Investors Service, "Lower Authorized Equity Returns Will Not Hurt Near-Term Credit Profiles," March 10, 2015.
[39] *Ibid.*
[40] https://finance.yahoo.com/.

Figure 3
Dow Jones Utilities vs. S&P 500
2017

VI. CRITIQUE OF KPC'S RATE OF RETURN TESTIMONY

Q. PLEASE SUMMARIZE THE COMPANY'S COST OF CAPITAL RECOMMENDATION.

A. The Company's proposed a capital structure includes 0.0% short-term debt, 3.87% account receivable financing, 54.45% long-term debt, and 41.68% common equity. The Company has proposed a long-term debt cost rate of 4.36% and an account receivable financing rate of 1.95%. This rate of return recommendation is summarized on page 1 of Exhibit JRW-12.

Q. WHAT ISSUES DO YOU HAVE WITH THE COMPANY'S COST OF CAPITAL POSITION?

A. The primary areas of disagreement are: (1) our opposing views regarding the state of the markets and capital costs; (2) the DCF equity cost rate estimates, and in particular, (a) Mr. McKenzie's exclusion of a number of his low-end results, and (b) Mr. McKenzie's exclusive use of the earnings per share growth rates of Wall Street analysts and *Value Line*; (3) the base interest rate and market or equity risk premium in Mr. McKenzie's URP and CAPM approaches; (4) Mr. McKenzie's two non-traditional equity cost rate approaches – the Expected Earnings approach and his DCF applied to non-utilities; and (5) Mr. McKenzie's equity cost rate adjustments for company size and flotation costs.

There are several other less significant issues in Mr. McKenzie's equity cost rate analyses. In his CAPM analysis, he has: (1) used a projected risk-free rate that is above current market rates; and (2) employed the Empirical CAPM ("ECAPM") version of the CAPM, which makes inappropriate adjustments to the risk-free rate and the market risk premium.

The alternative views on the state of the capital markets was previously discussed. The discussion below focusses on Mr. McKenzie's recommended equity cost rate.

Q. PLEASE REVIEW MR. MCKENZIE'S EQUITY COST RATE APPROACHES AND RESULTS.

A. Mr. McKenzie has developed a proxy group of electric utility companies and employs DCF, CAPM, and URP equity cost rate approaches. Mr. McKenzie's equity cost rate estimates for KPC are summarized on pages 1 and 2 of Exhibit JRW-13. Based on these

figures, he concludes that the appropriate equity cost rate is 10.31% for KPC.

A. DCF Approach

Q. PLEASE SUMMARIZE MR. MCKENZIE'S DCF ESTIMATES.

A. On pages 46-50 of his direct testimony and in his Exhibit Nos. AMM-5 and AMM-6, Mr. McKenzie develops an equity cost rate by applying the DCF model to his proxy group. Mr. McKenzie's DCF results are summarized on page 1 of Exhibit JRW-13. In the traditional DCF approach, the equity cost rate is the sum of the dividend yield and expected growth. For the DCF growth rate, Mr. McKenzie uses four measures of projected EPS growth: the projected EPS growth of Wall Street analysts as compiled by IBES, Zack's, Bloomberg, S&P, and *Value Line's* projected EPS projected growth rate; and a measure of sustainable growth as computed by the sum of internal ("*br*") and by external ("*sv*") growth. The average of the mean DCF results is 9.5%.

Q. WHAT ARE THE ERRORS IN MR. MCKENZIE'S DCF ANALYSES?

A. The primary issues in Mr. McKenzie's DCF analyses are: (1) His asymmetric elimination of low-end DCF results, and (2) The excessive use of the overly optimistic and upwardly-biased EPS growth rate forecasts of Wall Street analysts as the growth rate in his DCF model.

1. The Asymmetric Elimination of Low-End DCF Results

Q. PLEASE ADDRESS MR. MCKENZIE'S ASYMMETRIC ELIMINATION OF

DCF RESULTS.

A. One significant error with Mr. McKenzie's DCF equity cost rate analyses is his asymmetric elimination of DCF results. In deriving a DCF equity cost rate, Mr. McKenzie has labeled certain equity cost rates as extreme outliers. All but one of the eliminated DCF results are on the low end. By eliminating low-end outliers while not eliminating the same number of high-end outliers, Mr. McKenzie biases his DCF equity cost rate study and reports a higher DCF equity cost rate than the data indicate. In my DCF analysis, I have used the median as a measure of central tendency so as to not give outlier results too much weight. This approach also avoids biasing the results by including all data in the analysis and not selectively eliminating outcomes.

On page 2 of Exhibit JRW-13, I have recalculated Mr. McKenzie's DCF equity cost rate for the utility group without eliminating the so-called extreme outliers. The actual mean and median DCF equity cost rates, using all observations in the analysis, are 9.3% and 9.5% for the group. As such, Mr. McKenzie's asymmetric elimination of low-end DCF results distorts his reported DCF ROEs.

2. Analysts' EPS Growth Rates

Q. PLEASE REVIEW MR. MCKENZIE'S DCF GROWTH RATE.

A. In his constant-growth DCF model, Mr. McKenzie's DCF growth rate is the average of the EPS growth rate forecasts of: (1) Wall Street analysts as compiled by IBES and Zacks; and (2) *Value Line*.

Q. PLEASE DISCUSS MR. MCKENZIE'S USE OF THE PROJECTED EPS GROWTH RATES OF WALL STREET ANALYSTS AND *VALUE LINE* IN HIS DCF MODELS.

A. A very significant issue with Mr. McKenzie's DCF analyses is his excessive reliance on the EPS growth rate forecasts of Wall Street analysts.

Q. WHY IS IT ERRONEOUS TO RELY EXCESSIVELY ON THE EPS FORECASTS OF WALL STREET ANALYSTS AND *VALUE LINE* IN ARRIVING AT A DCF GROWTH RATE?

A. There are several issues with using the EPS growth rate forecasts of Wall Street analysts as DCF growth rates. First, the appropriate growth rate in the DCF model is the dividend growth rate rather than the earnings growth rate. Therefore, in my opinion, consideration must be given to other indicators of growth, including historic growth, prospective dividend growth, internal growth, as well as projected earnings growth. Second, as previously discussed, it is well-known that the long-term EPS growth rate forecasts of Wall Street securities analysts are overly optimistic and upwardly biased.

B. CAPM Approach

Q. PLEASE DISCUSS MR. MCKENZIE'S CAPM.

A. On pages 50-54 of his direct testimony and in his Exhibit Nos. AMM-7 and AMM-8, Mr. McKenzie develops an equity cost rate by applying the CAPM model to his groups. Mr. McKenzie has used a traditional CAPM, as well as a variant, the Empirical CAPM

("ECAPM"). The CAPM approach requires an estimate of the risk-free interest rate, Beta, and the equity risk premium. Mr. McKenzie calculates a CAPM equity cost rate using the current long-term Treasury bond yield of 3.0% and a projected bond yield of 4.2% and Betas from *Value Line*. A market risk premium is computed for each risk-free rate, and both are based on an expected stock market return of 12.0%. He also adds a "size premium" to his CAPM equity cost rate. The ECAPM makes adjustments to the risk-free rate and the market risk premium in calculating an equity cost rate. Using current interest rates, Mr. McKenzie reports average unadjusted CAPM and ECAPM equity cost rates of 9.0% and 9.1%, and equity cost rates of 9.3% and 9.2% including a size adjustment. With a projected interest rate of 4.2%, Mr. McKenzie's average unadjusted CAPM and ECAPM equity cost rates are 9.4% and 9.5%, and 9.7% and 9.6% including a size adjustment.

Q. WHAT ARE THE ERRORS IN MR. MCKENZIE'S CAPM ANALYSIS?

A. The primary errors with Mr. McKenzie's ECAPM analysis are that he: (1) employed the Empirical CAPM ("ECAPM") version of the CAPM, which makes inappropriate adjustments to the risk-free rate and the market risk premium; (2) employed an inflated projected interest rate of 4.20%; (3) included an unwarranted size adjustment; and (4) most significantly, used an inflated market or equity risk premium that is excessive and does not reflect current market fundamentals.

1. ECAPM Approach

Q. WHAT ISSUES DO YOU HAVE WITH MR. MCKENZIE'S ECAPM?

A. In addition to the CAPM, Mr. McKenzie has employed a variation of the CAPM which he calls the "ECAPM." The ECAPM, as popularized by rate of return consultant Dr. Roger Morin, attempts to model the well-known finding of tests of the CAPM that have indicated the Security Market Line ("SML") is not as steep as predicted by the CAPM. As such, the ECAPM is nothing more than an ad hoc version of the CAPM. Moreover, the ECAPM has not been theoretically or empirically validated in refereed journals. The ECAPM provides for weights which are used to adjust the risk-free rate and market risk premium in applying the ECAPM. Mr. McKenzie uses 0.25 and 0.75 factors to boost the equity risk premium measure, but provides no empirical justification for those figures.

Beyond the lack of any theoretical or empirical validation of the ECAPM, there are two errors in Mr. McKenzie's ECAPM. First, I am not aware of any tests of the CAPM that use adjusted betas such as those used by Mr. McKenzie. Second, adjusted betas address the empirical issues with the CAPM noted above by increasing the expected returns for low beta stocks and decreasing the returns for high beta stocks.

2. Projected Risk-Free Interest Rate

Q. PLEASE DISCUSS THE BASE YIELD OF MR. MCKENZIE'S CAPM/ECAPM ANALYSES.

A. Mr. McKenzie uses a projected risk-free interest rate of 4.2% in his CAPM/ECAPM. This figure is more than 100 basis points above the current yield on long-term Treasury bonds.

3. Market Risk Premium

Q. PLEASE ASSESS MR. MCKENZIE'S MARKET RISK PREMIUMS DERIVED FROM APPLYING THE DCF MODEL TO THE S&P 500.

A. The primary problem with Mr. McKenzie's CAPM analysis is the magnitude of the MRP. Mr. McKenzie develops an expected market risk premium by: (1) applying the DCF model to the S&P 500 to get an expected market return; and (2) subtracting the risk-free rate of interest. Mr. McKenzie's estimated market return of 12.0% for the S&P 500 equals the sum of the dividend yield of 2.4% and expected EPS growth rate of 9.6%. The expected EPS growth rate is the average of the expected EPS growth rates from IBES. The primary error in this approach is Mr. McKenzie's expected DCF growth rate. As previously discussed, the expected EPS growth rates of Wall Street analysts are upwardly biased. In addition, as explained below, the projected growth rate is inconsistent with economic and earnings growth in the U.S.

Q. BEYOND YOUR PREVIOUS DISCUSSION OF THE UPWARD BIAS IN WALL STREET ANALYSTS' EPS GROWTH RATE FORECASTS, IS THERE OTHER EVIDENCE THAT INDICATES THAT MR. MCKENZIE'S S&P 500 GROWTH RATE IS EXCESSIVE?

A. Yes. A long-term EPS growth rate of 9.6% is not consistent with historic as well as projected economic and earnings growth in the U.S for several reasons: (1) long-term EPS and economic growth, as measured by GDP, is about one-third lower than Mr.

McKenzie's projected EPS growth rate of 9.6%; (2) more recent trends in GDP growth, as well as projections of GDP growth, suggest slower economic and earnings growth in the future; and (3) over time, EPS growth tends to lag behind GDP growth.

The long-term economic, earnings, and dividend growth rate in the U.S. has only been in the 5% to 7% range. I performed a study of the growth in nominal GDP, S&P 500 stock price appreciation, and S&P 500 EPS and DPS growth since 1960. The results are provided on page 1 of Exhibit JRW-14, and a summary is given in the table below.

Table 4
GDP, S&P 500 Stock Price, EPS, and DPS Growth
1960-Present

Nominal GDP	**6.51%**
S&P 500 Stock Price	**6.74%**
S&P 500 EPS	**6.56%**
S&P 500 DPS	**5.74%**
Average	**6.39%**

In sum, the historical long-run growth rates for GDP, S&P EPS, and S&P DPS are in the 5% to 7% range. By comparison, Mr. McKenzie's long-run growth rate projection of 9.6% is overstated. These estimates suggest that companies in the U.S. would be expected to: (1) increase their growth rate of EPS by almost 50% in the future and (2) maintain that growth indefinitely in an economy that is expected to grow at about one-half of his projected growth rates.

Q. DO MORE RECENT DATA SUGGEST THAT THE U.S. ECONOMY'S GROWTH IS FASTER OR SLOWER THAN THE LONG-TERM DATA?

A. The more recent trends suggest lower future economic growth than the long-term historic GDP growth. The historic GDP growth rates for 10-, 20-, 30-, 40- and 50- years, is presented in Panel A of page 2 of Exhibit JRW-14 and in the table below.

Table 5
Historic GDP Growth Rates

10-Year Average	**2.97%**
20-Year Average	**4.23%**
30-Year Average	**4.77%**
40-Year Average	**5.90%**
50-Year Average	**6.45%**

These data clearly suggest that nominal GDP growth in recent decades has slowed to the 3.0% to 5.0% area.

Q. ARE THE LOWER GDP GROWTH RATES OF RECENT DECADES CONSISTENT WITH THE FORECASTS OF GDP GROWTH?

A. Yes. A lower range is also consistent with long-term GDP forecasts. There are several forecasts of annual GDP growth that are available from economists and government agencies. These are listed in Panel B on page 2 of Exhibit JRW-14. The mean 10-year nominal GDP growth forecast (as of February 2017) by economists in the recent *Survey of Financial Forecasters* is 4.7%. The Energy Information Administration ("EIA"), in its projections used in preparing *Annual Energy Outlook,* forecasts long-term GDP growth of 4.2% for the period 2017-2050.[41] The Congressional Budget Office ("CBO"), in its forecasts for the period 2017 to 2047, projects a nominal GDP growth

[41]Energy Information Administration, A*nnual Energy Outlook,* https://www.eia.gov/outlooks/aeo/data/browser/#/?id=18-AEO2017&cases=ref2017&sourcekey=0

rate of 4.0%.[42] Finally, the Social Security Administration ("SSA"), in its Annual OASDI Report, provides a projection of nominal GDP from 2017-2095.[43] SSA's projected growth GDP growth rate over this period is 4.4%.

Q. WHY IS GDP GROWTH RELEVANT IN YOUR CRITIQUE OF MR. MCKENZIE'S USE OF THE LONG-TERM EPS GROWTH RATES IN DEVELOPING A MRP FOR HIS CAPM?

A. Because, as indicated in recent research, the long-term earnings growth rates of companies are limited to the growth rate in GDP.

Q. PLEASE HIGHLIGHT THE RESEARCH ON THE LINK BETWEEN ECONOMIC AND EARNINGS GROWTH AND EQUITY RETURNS.

A. In 2010, Brad Cornell of the California Institute of Technology published a study on GDP growth, earnings growth, and equity returns. He found that long-term EPS growth in the U.S. is directly related to GDP growth, with GDP growth providing an upward limit on EPS growth. In addition, he found that long-term stock returns are determined by long-term earnings growth. He concludes with the following observations:[44]

> The long-run performance of equity investments is fundamentally linked to growth in earnings. Earnings growth, in turn, depends on growth in real GDP. This article demonstrates that both theoretical research and empirical research in development economics suggest relatively strict limits on future growth. In particular, real GDP

[42]Congressional Budget Office, The *2017 Long-Term Budget Outlook*, March 2017. https://www.cbo.gov/system/files/115th-congress-2017-2018/reports/52480-ltbo.pdf (Table A-1, p. 30).

[43] Social Security Administration, 2017 Annual Report of the Board of Trustees of the Old-Age, Survivors, and Disability Insurance (OASDI) Program. https://www.ssa.gov/oact/tr/2017/tr2017.pdf, Table VI.G4, p. 211. The 4.4% represents the compounded growth rate in projected GDP from $19,455 trillion in 2017 to $564,614 trillion in 2095.

[44] Bradford Cornell, "Economic Growth and Equity Investing," *Financial Analysts Journal* (January- February, 2010), p. 63.

> growth in excess of 3 percent in the long run is highly unlikely in the developed world. In light of ongoing dilution in earnings per share, this finding implies that investors should anticipate real returns on U.S. common stocks to average no more than about 4–5 percent in real terms.

Given current inflation in the 2% to 3% range, the results imply nominal expected stock market returns in the 7% to 8% range. As such, Mr. McKenzie's projected earnings growth rates and implied expected stock market returns and equity risk premiums are not indicative of the realities of the U.S. economy and stock market. As such, his expected CAPM equity cost rate is significantly overstated.

Q. PLEASE PROVIDE A SUMMARY ASSESSMENT OF MR. MCKENZIE'S PROJECTED EQUITY RISK PREMIUM DERIVED FROM EXPECTED MARKET RETURNS.

A. Mr. McKenzie's market risk premium derived from his DCF application to the S&P 500 is inflated due to errors and bias in his study. Investment banks, consulting firms, and CFOs use the equity risk premium concept every day in making financing, investment, and valuation decisions. On this issue, the opinions of CFOs and financial forecasters are especially relevant. CFOs deal with capital markets on an ongoing basis since they must continually assess and evaluate capital costs for their companies. The CFOs in the June 2017 *CFO Magazine* – Duke University Survey of more than 300 CFOs shows an expected return on the S&P 500 of 6.10% over the next ten years. In addition, the financial forecasters in the February 2017 Federal Reserve Bank of Philadelphia survey expect an annual market return of 5.60% over the next ten years. With a more realistic equity or market risk premium, the appropriate equity cost rate

for a public utility should be in the 8.0% to 9.0% range and not in the 10.0% to 11.0% range.

4. Size Adjustment

Q. PLEASE DISCUSS MR. MCKENZIE'S SIZE ADJUSTMENT.

A. Mr. McKenzie includes a size adjustment in his CAPM approach for the size of the companies in the utility group. This adjustment is based on the historical stock market returns studies as performed by Morningstar (formerly Ibbotson Associates). There are numerous errors in using historical market returns to compute risk premiums. These errors provide inflated estimates of expected risk premiums. Among the errors are survivorship bias (only successful companies survive – poor companies do not) and unattainable return bias (the Ibbotson procedure presumes monthly portfolio rebalancing). The net result is that Ibbotson's size premiums are poor measures for risk adjustment to account for the size of a utility.

In addition, Professor Annie Wong has tested for a size premium in utilities and concluded that, unlike industrial stocks, utility stocks do not exhibit a significant size premium.[45] As explained by Professor Wong, there are several reasons why such a size premium would not be attributable to utilities. Utilities are regulated closely by state and federal agencies and commissions, and hence, their financial performance is monitored on an ongoing basis by both the state and federal governments. In addition, public utilities must gain approval from government entities for common financial transactions such as the sale of securities. Furthermore, unlike their industrial counterparts,

[45] Annie Wong, "Utility Stocks and the Size Effect: An Empirical Analysis," *Journal of the Midwest Finance Association*, pp. 95-101, (1993).

accounting standards and reporting are fairly standardized for public utilities. Finally, a utility's earnings are predetermined to a certain degree through the ratemaking process in which performance is reviewed by state commissions and other interested parties. Overall, in terms of regulation, government oversight, performance review, accounting standards, and information disclosure, utilities are much different than industrials, which could account for the lack of a size premium.

Q. PLEASE DISCUSS THE RESEARCH ON THE SIZE PREMIUM IN ESTIMATING THE EQUITY COST RATE.

A. As noted, there are errors in using historical market returns to compute risk premiums. With respect to the small firm premium, Richard Roll (1983) found that one-half of the historic return premium for small companies disappears once biases are eliminated and historic returns are properly computed. The error arises from the assumption of monthly portfolio rebalancing and the serial correlation in historic small firm returns.[46]

In another paper, Ching-Chih Lu (2009) estimated the size premium over the long-run. Lu acknowledges that many studies have demonstrated that smaller companies have historically earned higher stock market returns. However, Lu highlights that these studies rebalance the size portfolios on an annual basis. This means that at the end of each year the stocks are sorted based on size, split into deciles, and the returns are computed over the next year for each stock decile. This annual rebalancing creates the problem. Using a size premium in estimating a CAPM equity cost rate requires that a firm carry the extra size premium in its discount factor for an

[46] *See* Richard Roll, "On Computing Mean Returns and the Small Firm Premium," *Journal of Financial Economics*, pp. 371-86, (1983).

extended period of time, not just for one year, which is the presumption with annual rebalancing. Through an analysis of small firm stock returns for longer time periods (and without annual rebalancing), Lu finds that the size premium disappears within two years. Lu's conclusion with respect to the size premium is that "a small firm should not be expected to have a higher size premium going forward sheerly because it is small now":[47]

> However, an analysis of the evolution of the size premium will show that it is inappropriate to attach a fixed amount of premium to the cost of equity of a firm simply because of its current market capitalization. For a small stock portfolio which does not rebalance since the day it was constructed, its annual return and the size premium are all declining over years instead of staying at a relatively stable level. This confirms that a small firm should not be expected to have a higher size premium going forward sheerly because it is small now.

C. Utility Risk Premium ("URP") Approach

Q. PLEASE DISCUSS MR. MCKENZIE'S URP APPROACH.

A. On pages 54-64 of his direct testimony and in his Exhibit No. AMM-9, Mr. McKenzie develops an equity cost rate by applying the URP model to his group. Mr. McKenzie estimates equity cost rates of 10.0% and 11.1% using current and projected long-term utility bond yields. Mr. McKenzie develops an equity cost rate using the URP by: (1) regressing the annual authorized returns on equity for electric utility companies from the 1974 to 2015 time period Moody's long-term public utility bond yields; and (2) adding the appropriate risk premiums established in (1) to current and projected Moody's long-term public utility bond yields of 4.60% and 6.28%.

[47] Ching-Chih Lu, "The Size Premium in the Long Run," 2009 Working Paper, SSRN abstract no. 1368705.

Q. WHAT ARE THE ISSUES WITH MR. MCKENZIE'S URP APPROACH?

A. The base yield and the measurement and magnitude of the risk premium.

1. Base Interest Rate

Q. PLEASE DISCUSS THE BASE YIELD OF MR. MCKENZIE'S URP ANALYSIS.

A. The base yield in Mr. McKenzie's URP analyses is the prospective yield on long-term, 'Baa' rated public utility bonds. This is erroneous for two reasons. First, the 6.28% projected yield is about 150 basis points above current long-term utility bond yields. Second, using the yield on these securities inflates the required return on equity for the Company in two ways: (1) long-term bonds are subject to interest rate risk, a risk which does not affect common stockholders since dividend payments (unlike bond interest payments) are not fixed but tend to increase over time; and (2) the base yield in Mr. McKenzie's risk premium study is subject to credit risk since it is not default risk-free like an obligation of the U.S. Treasury. As a result, its yield-to-maturity includes a premium for default risk and therefore, is above its expected return. Hence, using a bond's yield-to-maturity as a base yield results in an overstatement of investors' return expectations.

2. Risk Premium

Q. WHAT ARE THE ISSUES WITH MR. MCKENZIE'S RISK PREMIUM?

A. The most important issue is that Mr. McKenzie's risk premium is not necessarily applicable to measure utility investors' required rate of return. Mr. McKenzie's URP approach is a gauge of *commission* behavior, not *investor* behavior. Capital costs are

determined in the marketplace through the financial decisions of investors and are reflected in such fundamental factors as dividend yields, expected growth rates, interest rates, and investors' assessment of the risk and expected return of different investments. Regulatory commissions evaluate capital market data in setting authorized ROEs, but also take into account other utility- and rate case-specific information in setting ROEs. As such, Mr. McKenzie's approach and results reflect other factors such as capital structure, credit ratings and other risk measures, service territory, capital expenditures, energy supply issues, rate design, investment and expense trackers, and other factors used by utility commissions in determining an appropriate ROE in addition to capital costs. This may be especially true when, due to the inherent compromises and trade-offs upon which settlements are made, the authorized ROE data includes the results of rate cases that are settled and not fully litigated.

Finally, Mr. McKenzie's methodology produces an inflated required rate of return since utilities have been selling at market-to-book ratios in excess of 1.0 for many years. This indicates that the authorized rates of return have been greater than the return that investors require. The relationship between ROE, the equity cost rate, and market-to-book ratios was previously explained in this testimony. In short, a market-to-book ratio above 1.0 indicates a company's ROE is above its equity cost rate. Therefore, the risk premium produced from the study is overstated as a measure of investor return requirements and produced an inflated equity cost rate.

D. Flotation Costs

Q. PLEASE DISCUSS MR. MCKENZIE'S ADJUSTMENT FOR FLOTATION COSTS.

A. Mr. McKenzie claims that an upward adjustment of 0.11% to the equity cost rate recommendation to account for flotation costs. This adjustment factor is erroneous for several reasons.

First and foremost, Mr. McKenzie has not identified *any* flotation costs for KPC. Therefore, KPC is requesting annual revenues in the form of a higher return on equity for flotation costs that have not been identified.

Second, it is commonly argued that a flotation cost adjustment (such as that used by the Company) is necessary to prevent the dilution of the existing shareholders. In this case, Mr. McKenzie justifies a flotation cost adjustment by referring to bonds and the manner in which issuance costs are recovered by including the amortization of bond flotation costs in annual financing costs. However, this is incorrect for several reasons:

(1) If an equity flotation cost adjustment is similar to a debt flotation cost adjustment, the fact that the market-to-book ratios for electric utility and gas distribution companies are over 1.5X actually suggests that there should be a flotation cost *reduction* (and not an increase) to the equity cost rate. This is because when (a) a bond is issued at a price in excess of face or book value, and (b) the difference between its market price and the book value is greater than the flotation or issuance costs, the cost of that debt is lower than the coupon rate of the debt. The amount by which market

values of electric utility and gas distribution companies are in excess of book values is much greater than flotation costs. Hence, if common stock flotation costs were exactly like bond flotation costs, and one was making an explicit flotation cost adjustment to the cost of common equity, the adjustment would be downward;

(2) If a flotation cost adjustment is needed to prevent dilution of existing stockholders' investment, then the reduction of the book value of stockholder investment associated with flotation costs can occur only when a company's stock is selling at a market price at or below its book value. As noted above, electric utility and gas distribution companies are selling at market prices well in excess of book value. Hence, when new shares are sold, existing shareholders realize an increase in the book value per share of their investment, not a decrease;

(3) Flotation costs consist primarily of the underwriting spread (or fee) rather than out-of-pocket expenses. On a per-share basis, the underwriting spread is the difference between the price the investment banker receives from investors and the price the investment banker pays to the company. Therefore, these are not expenses that must be recovered through the regulatory process. Furthermore, the underwriting spread is known to the investors who are buying the new issue of stock, and who are well aware of the difference between the price they are paying to buy the stock and the price that the company is receiving. The offering price which they pay is what matters when investors decide to buy a stock based on its expected return and risk prospects. Therefore, the Company is not entitled to an adjustment to the allowed return to account for those costs; and

(4) Flotation costs, in the form of the underwriting spread, are a form of a

transaction cost in the market. They represent the difference between the price paid by investors and the amount received by the issuing company. Whereas KPC believes that it should be compensated for these transaction costs, it has not accounted for *other* market transaction costs in determining its cost of equity. Most notably, brokerage fees that investors pay when they buy shares in the open market are another market transaction cost. Brokerage fees increase the effective stock price paid by investors to buy shares. If the Company had included these brokerage fees or transaction costs in its DCF analysis, the higher effective stock prices paid for stocks would lead to lower dividend yields and equity cost rates. This would result in a downward adjustment to their DCF equity cost rate.

E. Other Equity Cost Rate Methods

1. Expected Earnings Approach

Q. PLEASE DISCUSS MR. MCKENZIE'S EXPECTED EARNINGS ANALYSIS.

A. At pages 64-67 of his testimony and in Exhibit No. AMM-10, Mr. McKenzie estimates an equity cost rate of 11.8% for his group using an approach he calls the Expected Earnings ("EE") approach. His methodology simply involves using the expected ROE for the companies in the proxy group as estimated by *Value Line*. This approach is fundamentally flawed for several reasons. First, these ROE results include the profits associated with the unregulated operations of the utility proxy groups. More importantly, since Mr. McKenzie has not evaluated the market-to-book ratios for these

companies, they cannot indicate whether the past and projected returns on common equity are above or below investors' requirements. As shown in Panel B on page 1 of Exhibit JRW-4, the median market-to-book ratio is 1.89. This demonstrates that the earned returns on equity for the proxy group are above the cost of common equity, which is what we are trying to determine in this proceeding.

2. DCF Applied to Non-Utility Group

Q. PLEASE DISCUSS THE PROBLEM WITH MR. MCKENZIE'S NON-UTILITY PROXY GROUP.

A. At pages 73-77 of his testimony and in Exhibit No. AMM-11, Mr. McKenzie estimates an equity cost rate for the Company using a proxy group of twelve non-utility companies. This group includes such companies as Coca-Cola, General Mills, Kellogg, Kimberly-Clark, Procter & Gamble, and WalMart.

This approach is fundamentally flawed for two reasons. First, while many of these companies are large and successful, their lines of business are vastly different from the electric utility business and they do not operate in a highly regulated environment. In addition, and most importantly, the previously discussed upward bias in the EPS growth rate forecasts of Wall Street analysts is particularly severe for non-utility companies and therefore the DCF equity cost rate estimates for this group are particularly overstated.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

Electronic Application of Kentucky Power Company For (1) A General Adjustment of Its Rates for Electric Service; (2) An Order Approving Its 2017 Environmental Compliance Plan; (3) An Order Approving Its Tariffs and Riders; (4) An Order Approving Accounting Practices to Establish a Regulatory Asset or Liability Related to the Big Sandy 1 Operation Rider; and (5) An Order Granting All Other Required Approvals and Relief	)	CASE No. 2017-00179

AFFIDAVIT OF Dr. J. Randall Woolridge

Commonwealth of Pennsylvania)

Dr. J. Randall Woolridge, being first duly sworn, states the following: The prepared Pre-Filed Direct Testimony and the Schedules attached thereto constitute the direct testimony of Affiant in the above-styled case. Affiant states that he would give the answers set forth in the Pre-Filed Direct Testimony if asked the questions propounded therein. Affiant further states that, to the best of his knowledge, his statements made are true and correct. Further affiant saith not.

SUBSCRIBED AND SWORN to before me this 2nd day of October, 2017.

NOTARY PUBLIC

My Commission Expires: 11-10-2019

COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
RONALD E FLEBOTTE
Notary Public
STATE COLLEGE BORO, CENTRE COUNTY
My Commission Expires Nov 10, 2019

Appendix A
Educational Background, Research, and Related Business Experience
J. Randall Woolridge

J. Randall Woolridge is a Professor of Finance and the Goldman, Sachs & Co. and Frank P. Smeal Endowed Faculty Fellow in Business Administration in the College of Business Administration of the Pennsylvania State University in University Park, PA. In addition, Professor Woolridge is Director of the Smeal College Trading Room and President and CEO of the Nittany Lion Fund, LLC.

Professor Woolridge received a Bachelor of Arts degree in Economics from the University of North Carolina, a Master of Business Administration degree from the Pennsylvania State University, and a Doctor of Philosophy degree in Business Administration (major area-finance, minor area-statistics) from the University of Iowa. He has taught Finance courses including corporation finance, commercial and investment banking, and investments at the undergraduate, graduate, and executive MBA levels.

Professor Woolridge's research has centered on empirical issues in corporation finance and financial markets. He has published over 35 articles in the best academic and professional journals in the field, including the *Journal of Finance*, the *Journal of Financial Economics*, and the *Harvard Business Review*. His research has been cited extensively in the business press. His work has been featured in the *New York Times*, *Forbes*, *Fortune*, *The Economist*, *Barron's*, *Wall Street Journal*, *Business Week*, *Investors' Business Daily*, *USA Today*, and other publications. In addition, Dr. Woolridge has appeared as a guest to discuss the implications of his research on CNN's *Money Line*, CNBC's *Morning Call* and *Business Today*, and Bloomberg's *Morning Call*.

Professor Woolridge's stock valuation book, *The StreetSmart Guide to Valuing a Stock* (McGraw-Hill, 2003), was released in its second edition. He has also co-authored *Spinoffs and Equity Carve-Outs: Achieving Faster Growth and Better Performance* (Financial Executives Research Foundation, 1999) as well as a textbook entitled *Basic Principles of Finance* (Kendall Hunt, 2011).

Professor Woolridge has also consulted with corporations, financial institutions, and government agencies. In addition, he has directed and participated in university- and company-sponsored professional development programs for executives in 25 countries in North and South America, Europe, Asia, and Africa.

Over the past twenty-five years Dr. Woolridge has prepared testimony and/or provided consultation services in regulatory rate cases in the rate of return area in following states: Alaska, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Hawaii, Indiana, Kansas, Kentucky, Maryland, Massachusetts, Missouri, Montana, Nebraska, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, South Carolina, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Washington, D.C. He has also testified before the Federal Energy Regulatory Commission.

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Academic Experience

Professor of Finance, the Smeal College of Business Administration, the Pennsylvania State University (July 1, 1990 to the present).

President, Nittany Lion Fund LLC, (January 1, 2005 to the present)

Director, the Smeal College Trading Room (January 1, 2001 to the present)

Goldman, Sachs & Co. and Frank P. Smeal Endowed University Fellow in Business Administration (July 1, 1987 to the present).

Associate Professor of Finance, College of Business Administration, the Pennsylvania State University (July 1, 1984 to June 30, 1990).

Assistant Professor of Finance, College of Business Administration, the Pennsylvania State University (September, 1979 to June 30, 1984).

Education

Doctor of Philosophy in Business Administration, the University of Iowa (December, 1979). Major field: Finance.

Master of Business Administration, the Pennsylvania State University (December, 1975).

Bachelor of Arts, the University of North Carolina (May, 1973) Major field: Economics.

Books

James A. Miles and J. Randall Woolridge, *Spinoffs and Equity Carve-Outs: Achieving Faster Growth and Better Performance* (Financial Executives Research Foundation), 1999

Patrick Cusatis, Gary Gray, and J. Randall Woolridge, *The StreetSmart Guide to Valuing a Stock* (2nd Edition, McGraw-Hill), 2003.

J. Randall Woolridge and Gary Gray, *The New Corporate Finance, Capital Markets, and Valuation: An Introductory Text* (Kendall Hunt, 2003).

Research

Dr. Woolridge has published over 35 articles in the best academic and professional journals in the field, including the *Journal of Finance,* the *Journal of Financial Economics*, and the *Harvard Business Review*.