COLUMBIA STATEMENT NO. 8

COLUMBIA GAS OF PENNSYLVANIA, INC.

Direct Testimony

of

Paul R. Moul, Managing Consultant
P. Moul & Associates

Concerning

Cost of Equity and
Fair Rate of Return

DOCKET NO. R-2015-2468056

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Columbia Gas of Pennsylvania, Inc.
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GLOSSARY OF ACRONYMS AND DEFINED TERMS	
ACRONYM	**DEFINED TERM**
AFUDC	Allowance for Funds Used During Construction
β	Beta
b	Represents the retention rate that consists of the fraction of earnings that are not paid out as dividends
b x r	Represents internal growth
CAPM	Capital Asset Pricing Model
CCR	Corporate Credit Rating
CE	Comparable Earnings
CEG	Columbia Energy Group
CPA	Columbia Gas of Pennsylvania, Inc.
DCF	Discounted Cash Flow
FFO	Funds from Operations
FOMC	Federal Open Market Committee
FFRY	Fully Forecasted Rate Year
g	Growth rate
IGF	Internally Generated Funds
LDC	Local Distribution Companies
LEI	Leading Economic Indicators
Lev	Leverage modification
LIBOR	London Interbank Offered Rate
LT	Long Term
MLPs	Master Limited Partnerships
P-E	Price-earnings
PPUC	Pennsylvania Public Utility Commission
PUHCA	Public Utility Holding Company Act of 2005
PUC	Public Utility Commission
r	Represents the expected rate of return on common equity
Rf	Risk-free rate of return

GLOSSARY OF ACRONYMS AND DEFINED TERMS	
ACRONYM	**DEFINED TERM**
Rm	Market risk premium
RP	Risk Premium
s	Represents the new common shares expected to be issued by a firm
s x v	Represents external growth
S&P	Standard & Poor's
v	Represents the value that accrues to existing shareholders from selling stock at a price different from book value
WNA	Weather Normalization Adjustment Mechanism

INTRODUCTION AND SUMMARY OF RECOMMENDATIONS

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

A. My name is Paul Ronald Moul. My business address is 251 Hopkins Road, Haddonfield, New Jersey 08033-3062. I am Managing Consultant at the firm P. Moul & Associates, an independent financial and regulatory consulting firm. My educational background, business experience and qualifications are provided in Appendix A, which follows my direct testimony.

Q. What is the purpose of your direct testimony?

A. My testimony presents evidence, analysis, and a recommendation concerning the appropriate cost of common equity and overall rate of return that the Pennsylvania Public Utility Commission ("PPUC" or the "Commission") should recognize in the determination of the revenues that Columbia Gas of Pennsylvania, Inc. ("CPA" or the "Company") should realize as a result of this proceeding. My analysis and recommendation are supported by the detailed financial data contained in Exhibit No. 400, which is a multi-page document divided into fourteen (14) schedules.

Q. Based upon your analysis, what is your conclusion concerning the appropriate rate of return for the Company in this case?

A. Based upon my analysis of the Company and the superior performance of its management, as described in the testimony of Mr. Mark R. Kempic, President of the Company (Columbia Statement No. 1), it is my opinion that the rate of return on common equity should be set at 10.95%. As shown on page 1 of Schedule 1, I have presented the weighted average cost of capital for the

Company, which is calculated with the December 31, 2016 Fully Forecasted Rate Year ("FFRY"). The Company's proposed rate of return is shown below:

Type of Capital	Ratios	Cost Rate	Weighted Cost Rate
Long-Term Debt	42.65%	5.31%	2.27%
Short Term Debt	5.14%	2.86%	0.15%
Total Debt	47.79%		2.42%
Common Equity	52.21%	10.95%	5.72%
Total	100.00%		8.14%

The resulting overall cost of capital, which is the product of weighting the individual capital costs by the proportion of each respective type of capital, should establish a compensatory level of return for the use of capital and, if achieved, will provide the Company with the ability to attract capital on reasonable terms.

Q. What background information have you considered in reaching a conclusion concerning the Company's cost of capital?

A. The Company is a wholly-owned subsidiary of NiSource Gas Distribution Group, which is a wholly-owned subsidiary of NiSource Inc. ("NiSource"). NiSource is a holding company under the Public Utility Holding Company Act of 2005 ("PUHCA") and also owns Northern Indiana Public Service Company (a combination gas and electric utility), Bay State Gas Company, d/b/a Columbia Gas of Massachusetts, and other energy investments.

The Company provides natural gas distribution service to approximately 421,000 customers located in south-central and western

Pennsylvania. Throughput to its customers for the twelve-months ended November 30, 2014 was represented by approximately 43% to sales customers and approximately 57% to transportation customers. CPA obtains its gas supplies from producers and marketers and has transportation arrangements through connections with six interstate pipelines. The Company has storage arrangements with three suppliers to supplement flowing gas.

Q. How have you determined the cost of common equity in this case?

A. The cost of common equity is established using capital market and financial data relied upon by investors to assess the relative risk, and hence the cost of equity, for a gas distribution utility, such as the Company. In this regard, I have considered four (4) well-recognized models. These methods include: the Discounted Cash Flow ("DCF") model, the Risk Premium ("RP") analysis, the Capital Asset Pricing Model ("CAPM"), and the Comparable Earnings ("CE") approach. The results of a variety of approaches indicate that the Company's rate of return on common equity is 10.95%.

Q. In your opinion, what factors should the Commission consider when determining the Company's cost of capital in this proceeding?

A. The Commission's rate of return allowance must be set to cover the Company's interest and dividend payments, provide a reasonable level of earnings retention, produce an adequate level of internally generated funds to meet capital requirements, be commensurate with the risk to which the Company's capital is exposed, assure confidence in the financial integrity of the Company, support reasonable credit quality, and allow the Company to

raise capital on reasonable terms. The return that I propose fulfills these established standards of a fair rate of return set forth by the landmark Bluefield and Hope cases.[1] That is to say, my proposed rate of return is commensurate with returns available on investments having corresponding risks.

Q. How have you measured the cost of equity in this case?

A. The models that I used to measure the cost of common equity for the Company were applied with market and financial data developed from a group of nine (9) gas companies. The companies are identified on page 2 of Schedule 3. I will refer to these companies as the "Gas Group" throughout my testimony.

Q. Please explain the selection process used to assemble the Gas Group?

A. I began with all of the gas utilities contained in The Value Line Investment Survey, which consists of eleven companies. Value Line is an investment advisory service that is a widely used source in public utility rate cases. Through the application of my screening process, I eliminated two companies, which were NiSource and UGI Corporation. The eliminations were attributed to operational differences and diversification, as identified in page 2 of Schedule 3. The remaining nine companies are included in my Gas Group.

Q. How have you performed your cost of equity analysis with the market data for the Gas Group?

[1] Bluefield Water Works & Improvement Co. v. P.S.C. of West Virginia, 262 U.S. 679 (1923) and F.P.C. v. Hope Natural Gas Co., 320 U.S. 591 (1944).

A. I have applied the models/methods for estimating the cost of equity using the average data for the Gas Group. I have not measured separately the cost of equity for the individual companies within the Gas Group, because the determination of the cost of equity for an individual company can be problematic. The use of group average data will reduce the effect of potentially anomalous results for an individual company if a company-by-company approach were utilized.

Q. Please summarize your cost of equity analysis.

A. My cost of equity determination was derived from the results of the methods/models identified above. In general, the use of more than one method provides a superior foundation to arrive at the cost of equity. At any point in time, a single method can provide an incomplete measure of the cost of equity. The specific application of these methods/models will be described later in my testimony. The following table provides a summary of the indicated costs of equity using each of these approaches.

DCF	10.05%
RP	11.75%
CAPM	11.90%
CE	13.55%

As I will discuss later, CPA has more risk than the Gas Group attributed to its weaker credit quality, its smaller size, and other factors. To the extent that these higher risk factors can be quantified, they are reflected in the results shown above. From these measures, I recommend a cost of equity of 10.95% with recognition of the exemplary performance of the Company's management. Mr. Kempic has shown that the Company ranks high in

customer service and management efficiency. In recognition of its outstanding performance, the Company should be granted an opportunity to earn a 10.95% rate of return on common equity. The 10.95% rate of return on common equity, which includes 25 basis points for recognition of the exemplary performance of the Company's management, is well with the range of the market-based measures (i.e., DCF, RP and CAPM) of the cost of equity that extend up to 11.90% (the results of the Comparable Earnings method is higher). To obtain new capital and retain existing capital, the rate of return on common equity must be high enough to satisfy investors' requirements. Indeed, in a study dated December 9, 2008, prepared for the American Gas Foundation, it was noted that allowed equity returns below the level required by investors may lessen a utility's ability to maintain and develop systems that are necessary to provide natural gas service efficiently. Furthermore, the report specifically found that returns below 10% would trigger broad disenchantment with LDC investment.[2]

NATURAL GAS RISK FACTORS

Q. What factors currently affect the business risk of natural gas utilities?

A. Gas utilities face risks arising from competition, economic regulation, the business cycle, and customer usage patterns. Today, they operate in a more complex environment with time frames for decision-making considerably shortened. Their business profile is influenced by market-oriented pricing for

[2] American Gas Foundation, Regulatory Policy of Return on Equity [Review and Analysis of the Natural Gas Utility Sector] (2008)

the commodity distributed to customers and open access for the transportation of natural gas for customers.

Natural gas utilities have focused increased attention on safety and reliability issues and on conservation. In order to address these issues and to comply with new and pending pipeline safety regulations, natural gas companies are now allocating more of their resources to addressing aging infrastructure issues. The testimony of Mr. Kempic and other Company witnesses discuss the investments that the Company will make to address these issues.

The Company also faces a series of risks that impact its cost of equity. In the western area of Pennsylvania, the Company operates in a unique situation with overlapping service territories, which enable other gas utilities to compete with one another for customers. Further, there are six interstate pipelines that traverse the Company's service territory. This situation exposes the Company to bypass for certain large volume customers. Finally, the existence of local gas production provides a bypass threat to the Company. This situation will only become more intense with increasing production from the Marcellus Shale formation. Indeed, the Commission has established a generic proceeding (Docket No. I-2012-2320323) to investigate the issues of NGDC competition in Pennsylvania. CPA has actively participated in that proceeding. The Commission has not yet issued a decision in the case. It is not possible to determine at this time what effect a decision may have on continued service to these customers with competitive options. In addition, with the consolidation of several formerly competing LDCs in western

Pennsylvania, CPA could potentially face additional threats from the stronger LDC competitor that remains. Overall, the Company's risk of competition is considerably higher than that faced by many LDCs, including the members of the Gas Group that I used to measure the Company's cost of equity.

Q. Are there other features of the Company's business that should be considered when assessing the Company's risk?

A. Yes. Most of the Company's residential and commercial customers use natural gas for space heating purposes. This indicates that a large proportion of the Company's residential and commercial customers present a low load factor profile and their energy demands are significantly influenced by temperature conditions, over which the Company has absolutely no control. To deal with this issue, CPA has a weather normalization adjustment mechanism ("WNA") as part of its tariff. The WNA is applicable only to residential customers, and has a 5% deadband. This means that the Company's revenues continue to be subject to variation due to weather, albeit less than formerly. I am advised that in the first year of operation, the Company refunded approximately $9.36 million to customers under the WNA. This tariff provision will function as a pilot program during a minimum three-year period that continues until a final order in the first rate case that is filed after May 31, 2016.

Q. Does your cost of equity analysis and recommendation take into account the WNA rate design that the Company is using?

A. Yes. The Company operates with a WNA tariff provision on a pilot basis. All but one company in my Gas Group has some form of WNA mechanism. The

sole exception is Laclede Gas, which has a weather mitigated rate design that recovers its fixed costs more evenly during the heating season. Therefore, the market prices of the companies in my Gas Group reflect the expectations of investors that these companies' revenues are stabilized to some extent by a WNA mechanism. Therefore my analysis reflects the impacts of WNA on investor expectations through the use of market-determined models. If the Company is unable to continue with its WNA rate design beyond 2016, its risk will increase above that of the Gas Group that serves as a basis to measure the Company's cost of equity, i.e., the Gas Group's cost of equity will then understate the return that is appropriate for the Company.

Q. Are you aware that there is a DSIC available to natural gas and electric utilities in Pennsylvania, and does the DSIC affect the Company's cost of capital?

A. I am aware that the Company has utilized the DSIC for certain periods of time in the past, and that it may be able to use it in the future. The cost of capital for CPA, however, is not be affected by the DSIC. I say this because most of the proxy group companies (i.e., seven of nine companies) whose data has been used to develop the cost of equity for CPA in this proceeding have a DSIC or similar infrastructure rehabilitation mechanisms. Indeed, AGL Resources, Atmos Energy, Laclede Group, New Jersey Resources, Northwest Natural Gas, Piedmont Natural Gas and South Jersey Industries make use of a DSIC or similar infrastructure rehabilitation mechanisms. Hence, whatever the benefit of a DSIC, or other regulatory mechanisms, that impact is already reflected in the market evidence of the cost of equity for the proxy group. The

DSIC represents a positive step that will align the Company with many of the companies that make up my proxy group.

Q. How does the Company's throughput to large volume users or those with competitive alternatives affect its risk profile?

A. The Company's risk profile is influenced by natural gas delivered to its large industrial and commercial customers and those customers with competitive alternatives, as demonstrated by the fact that gas throughput to the Company's 176 major account customers represents approximately 29% of the Company's total throughput. In addition, the ten largest customers by volume represent approximately 10.2 million Dth of throughput during the twelve months ended November 30, 2014. Generally speaking, there are four primary threats to throughput to the Company's largest volume users. First, the Company can and has experienced attrition in this large customer group. Second, the Company's largest customers, which have traditionally used transportation service, have the ability to bypass the Company's system to other gas supply sources such as interstate pipelines, other local distribution companies, or nonregulated pipeline contractors providing access to local supplies. In this regard, the Company has identified 19.4 million Dth per year of customer throughput that is susceptible to such bypass. Of course the number that CPA has identified is only a subset of the total load at risk since it is almost certain that the Company has not identified all customers who have competitive alternatives. Third, in addition to the bypass threat, a material portion of the large customer throughput is also exposed to fuel switching to coal, oil, propane, bio fuels, or other energy sources depending on the

fluctuating costs of these different fuels in comparison with natural gas. Finally, in its effort to retain load, the Company is vulnerable to the impacts of business cycles, competition within its customers' industries, and other external factors that can result in shifts of production to customer facilities that are not served by the Company. All of these risks put fixed cost recovery for this class of customers at risk.

Q. Please indicate how the Company's construction program affects its risk profile.

A. The Company is faced with the requirement to undertake investments to maintain and upgrade existing facilities in its service territory. To maintain safe and reliable service to existing customers, the Company must invest to upgrade its infrastructure. The rehabilitation of the Company's infrastructure represents a non-revenue producing use of capital. Although the Company has made significant strides in reducing its percentage of cast iron and unprotected steel pipe, these facilities still represent 1,631.9 miles (or approximately 22%) of its distribution mains as of year-end 2014. The Company also has 56,770 (or approximately 13%) of its services constructed of unprotected steel. For the future, the Company expects its net capital expenditures to be:

Year	Capital Expenditures
2015	$196,872,000
2016	$210,572,000
2017	$230,803,000
2018	$224,523,000
2019	$218,856,000
Total	$1,081,626,000

The Company's total capital expenditures over the next five years will represent approximately 85% ($1,081,626,000 ÷ $1,269,694,248) of the net utility plant in service at December 31, 2014.

Q. How should the Commission respond to the issues facing the natural gas utilities and in particular CPA?

A. The Commission should recognize and take into account the need to replace infrastructure and the competitive environment in the natural gas business in determining the cost of capital for the Company, and provide a reasonable opportunity for the Company to actually achieve its cost of capital. A fair rate of return also represents a key to a financial profile that will provide the Company with the ability to raise the capital necessary to meet its capital needs on reasonable terms.

FUNDAMENTAL RISK ANALYSIS

Q. Is it necessary to conduct a fundamental risk analysis to provide a framework for a determination of a utility's cost of equity?

A. Yes, it is. It is necessary to establish a company's relative risk position within its industry through a fundamental analysis of various quantitative and

qualitative factors that bear upon investors' assessment of overall risk. The qualitative factors that bear upon Company risk have already been discussed previously. The quantitative risk analysis follows. The items that influence investors' evaluation of risk and their required returns were described above. For this purpose, I compared the Company to the S&P Public Utilities, an industry-wide proxy consisting of various regulated businesses, and to the Gas Group.

Q. What are the components of the S&P Public Utilities?

A. The S&P Public Utilities is a widely recognized index that is comprised of electric power and natural gas companies. These companies are identified on page 3 of Schedule 4.

Q. What companies comprise the gas group?

A. My Gas Group consists of the following companies: AGL Resources, Inc., Atmos Energy Corp., Laclede Group, Inc., New Jersey Resources Corp., Northwest Natural Gas Co., Piedmont Natural Gas Co., South Jersey Industries, Inc., Southwest Gas Corporation, and WGL Holdings, Inc.

Q. Is knowledge of a utility's bond rating an important factor in assessing its risk and cost of capital?

A. Yes. Knowledge of a company's credit quality rating is important because the cost of each type of capital is directly related to the associated risk of the firm. So while a company's credit quality risk is shown directly by the rating and yield on its bonds, these relative risk assessments also bear upon the cost of equity. This is because a firm's cost of equity is represented by its borrowing

cost plus compensation to recognize the higher risk of an equity investment compared to debt.

Q. How do the credit quality ratings compare for the Company, the Gas Group, and the S&P Public Utilities?

A. The Company obtains its external capital not funded by internal sources from NiSource Finance Corp. Presently, the NiSource credit quality ratings are Baa2 from Moody's Investors Service ("Moody's") and BBB- from Standard & Poor's Corporation ("S&P"). These ratings for NiSource represent the Long Term ("LT") issuer rating by Moody's and the corporate credit rating ("CCR") designation by S&P, which focuses upon the credit quality of the issuer of the debt rather than upon the debt obligation itself.

For the Gas Group, the average LT issuer rating is A2 by Moody's and the average CCR is A- by S&P, as displayed on page 2 of Schedule 3. For the S&P Public Utilities, the average credit quality rating is A3 by Moody's and BBB+ by S&P, as displayed on page 3 of Schedule 4. Many of the financial indicators that I will subsequently discuss are considered during the rating process.

Q. How do the financial data compare for the Company, the Gas Group, and the S&P Public Utilities?

A. The broad categories of financial data that I will discuss are shown on Schedules 2, 3, and 4. The data cover the five-year period 2009-2013. The important categories of relative risk may be summarized as follows:

Size. In terms of capitalization, the Company is smaller than the average size of the Gas Group, and smaller still than the average size of the

S&P Public Utilities. All other things being equal, a smaller company is riskier than a larger company because a given change in revenue and expense has a proportionately greater impact on a small firm. As I will demonstrate later, the size of a firm can impact its cost of equity.

Market Ratios. Market-based financial ratios, such as earnings/price ratios and dividend yields, provide a partial measure of the investor-required cost of equity. If all other factors are equal, investors will require a higher rate of return for companies that exhibit greater risk, in order to compensate for that risk. That is to say, a firm that investors perceive to have higher risks will experience a lower price per share in relation to expected earnings.[3]

There are no market ratios available for the Company because its stock is owned by NiSource. The five-year average price-earnings multiple was similar for the Gas Group and to the S&P Public Utilities. The five-year average dividend yield was lower for the Gas Group as compared to the S&P Public Utilities. The five-year average market-to-book ratio was somewhat higher for the Gas Group as compared to the S&P Public Utilities.

Common Equity Ratio. The level of financial risk is measured by the proportion of long-term debt and other senior capital that is contained in a company's capitalization. Financial risk is also analyzed by comparing common equity ratios (the complement of the ratio of debt and other senior capital). That is to say, a firm with a high common equity ratio has lower

[3]For example, two otherwise similarly situated firms each reporting $1.00 in earnings per share would have different market prices at varying levels of risk (i.e., the firm with a higher level of risk will have a lower share value, while the firm with a lower risk profile will have a higher share value).

financial risk, while a firm with a low common equity ratio has higher financial risk. The five-year average common equity ratios, based on permanent capital, were 54.9% for CPA, 55.4% for the Gas Group, and 45.3% for the S&P Public Utilities. The common equity ratios were similar for CPA and the Gas Group, thereby indicating similar financial risk.

Return on Book Equity. Greater variability (i.e., uncertainty) of a firm's earned returns signifies relatively greater levels of risk, as shown by the coefficient of variation (standard deviation ÷ mean) of the rate of return on book common equity. The higher the coefficients of variation, the greater degree of variability. For the five-year period, the coefficients of variation were 0.140 (1.7% ÷ 12.1%) for the Company, 0.077 (0.8% ÷ 10.4%) for the Gas Group, and 0.102 (1.0% ÷ 9.8%) for the S&P Public Utilities. The variability of the Company's rates of return was higher than the Gas Group and the S&P Public Utilities, thereby signifying higher risk for the Company.

Operating Ratios. I have also compared operating ratios (the percentage of revenues consumed by operating expense, depreciation, and taxes other than income).[4] The five-year average operating ratios were 86.4% for the Company, 87.7% for the Gas Group, and 81.7% for the S&P Public Utilities. The Company's operating ratios were not appreciably different from the Gas Group.

Coverage. The level of fixed charge coverage (i.e., the multiple by which available earnings cover fixed charges, such as interest expense)

[4]The complement of the operating ratio is the operating margin which provides a measure of profitability. The higher the operating ratio, the lower the operating margin.

provides an indication of the earnings protection for creditors. Higher levels of coverage, and hence earnings protection for fixed charges, are usually associated with superior grades of creditworthiness. Excluding Allowance for Funds Used During Construction ("AFUDC"), the five-year average pre-tax interest coverage was 3.47 times for the Company, 4.45 times for the Gas Group, and 3.09 times for the S&P Public Utilities. The average interest coverages were highest for the Gas Group, followed by CPA and the S&P Public Utilities.

Quality of Earnings. Measures of earnings quality usually are revealed by the percentage of AFUDC related to income available for common equity, the effective income tax rate, and other cost deferrals. These measures of earnings quality usually influence a firm's internally generated funds because poor quality of earnings would not generate high levels of cash flow. Quality of earnings has not been a significant concern for the Company, the Gas Group and the S&P Public Utilities.

Internally Generated Funds. Internally generated funds ("IGF") provide an important source of new investment capital for a utility and represent a key measure of credit strength. Historically, the five-year average percentage of IGF to capital expenditures was 74.7% for the Company, 91.3% for the Gas Group and 90.6% for the S&P Public Utilities. The Company's average IGF to construction percentage has lagged that of the Gas Group, thereby signifying higher risk created by the greater need to raise capital externally.

Betas. The financial data that I have been discussing relate primarily to company-specific risks. Market risk for firms with publicly-traded stock is measured by beta coefficients. Beta coefficients attempt to identify systematic risk, i.e., the risk associated with changes in the overall market for common equities.[5] Value Line publishes such a statistical measure of a stock's relative historical volatility to the rest of the market. A comparison of market risk is shown by the Value Line beta of 0.78 as the average for the Gas Group (see page 2 of Schedule 3) and 0.77 as the average for the S&P Public Utilities (see page 3 of Schedule 4).

Q. Please summarize your risk evaluation.

A. In several aspects, principally related to its smaller size, its more variable equity returns, and its lower IGF to construction, CPA's risk is higher than the Gas Group. The bond rating of NiSource, the Company's ultimate parent, is below that of the Gas Group, which indicates higher credit quality risk. Its common equity ratio and operating ratio have been fairly similar to the Gas Group. On balance, the cost of equity measured with the Gas Group data will provide an understatement of the Company's cost of equity, due principally to the lower credit quality of the CPA's parent company.

[5]Beta is a relative measure of the historical sensitivity of the stock's price to overall fluctuations in the New York Stock Exchange Composite Index. The "Beta coefficient" is derived from a regression analysis of the relationship between weekly percentage changes in the price of a stock and weekly percentage changes in the NYSE Index over a period of five years. The betas are adjusted for their long-term tendency to converge toward 1.00. A common stock that has a beta less than 1.0 is considered to have less systematic risk than the market as a whole and would be expected to rise and fall more slowly than the rest of the market. A stock with a beta above 1.0 would have more systematic risk.

CAPITAL STRUCTURE RATIOS

Q. Please explain the selection of capital structure ratios for CPA.

A. In this case, the capital structure ratios of CPA have been proposed to calculate the rate of return. I will show that the Company's capital structure ratios proposed in this case are reasonable. Furthermore, consistency requires that the embedded cost rate of the Company's senior securities also be employed.

Q. Does Schedule 5 provide the Company's capitalization and capital structure ratios?

A. Yes. Schedule 5 presents the Company's capitalization and related capital structure ratios. The November 30, 2014 capitalization corresponds with the end of the historic test year in this case. The November 30, 2015 capital structure is estimated at the end of the future test year, and the December 31, 2016 capital structure is estimated at the end of the fully forecasted rate year. Prior to the end of the fully forecasted rate year, the Company plans to issue $195.000 million of new long-term debt, a portion of which will be used to redeem at maturity $65.875 million of long-term debt. Of these amounts, $30.000 million was actually issued on December 18, 2014 and $60.000 million will be issued in March 2015. The maturities will occur in November of 2015 and 2016 and additional new issues will occur in September 2015 and March 2016. Pursuant to Paragraph 26 of the approved settlement in Columbia's 2014 base rate case (Docket No. R-2014-2406274), I am including, as Exhibit PRM-1 to my testimony, the Treasury Yield as reported in the Federal Reserve Statistical Release, H. 15 Selected Interest Rates and

the yield spread as reported by Reuters Corporate spreads as of the December 2014 debt issuance.

Q. How do the capital structure ratios compare for CPA and the Gas Group?

A. I have verified the reasonableness of the Company's common equity ratio by considering the historical comparison to the Gas Group. For the historical comparison, the Gas Group had a 54.0% common equity ratio at year-end 2013 calculated without short-term debt. Over the past five years, the average common equity ratio for the Gas Group has been 54.0% to 56.7%. My comparison of these ratios rests on a calculation without short-term debt because the Company uses a twelve-month average for ratesetting purposes, while the GAAP financial reports for the Gas Group use fiscal year-end balances of short-term debt. For the Company, its FFRY common equity ratio is 55.0% ($661,674,000 ÷ $1,202,189,000) computed without short-term debt, thereby indicating that the Company's common equity ratio is reasonable.

Q. What capital structure ratios do you recommend be adopted for rate of return purposes in this proceeding?

A. Since ratesetting is prospective, the rate of return should, at a minimum, reflect known or reasonably foreseeable changes which will occur during the course of the fully forecasted rate year. As a result, I will adopt the Company's fully forecast rate year capital structure ratios of 42.65% long-term debt, 5.14% short-term debt and 52.21% common equity at December 31, 2016. For short-term debt, I have used a twelve-month average for the fully forecasted rate year. These capital structure ratios are the best approximation of the mix

of capital the Company will employ to finance its rate base during the period new rates are in effect.

COSTS OF SENIOR CAPITAL

Q. What cost rate have you assigned to the debt portion of CPA's capital structure?

A. The determination of the long-term debt cost rate is essentially an arithmetic exercise. This is due to the fact that the Company has contracted for the use of this capital for a specific period of time at a specified cost rate. As shown on page 1 of Schedule 6, I have computed the actual embedded cost rate of debt at November 30, 2014. On page 2 of Schedule 6, I have shown the estimated embedded cost rate of debt at November 30, 2015. And on page 3 of Schedule 6, the embedded cost of debt is shown at December 31, 2016. For the new issues of long-term debt, I have used a cost of 4.16% for the issue in March 2015, 4.21% for the issue in September 2015, and 4.22% for the issue in March 2016. These rates compare to the 4.43% that the Company paid to obtain debt in December 2014.

I will adopt the 5.31% embedded cost of long-term debt at December 31, 2016, as shown on page 3 of Schedule 6. This rate is related to the amount of long-term debt shown on Schedule 5 which provides the basis for the 42.65% long-term debt ratio.

Q. What cost rate have you assigned to the short-term debt?

A. I have used a cost of short-term debt of 2.86%, which represents the Company's estimate for the fully forecast rate year. The Company obtains its

short-term debt from the NiSource money pool, which has a credit facility with a syndicate of banks. The interest rate is established as the one-month LIBOR plus 127.5 basis points. Hence, the Company's estimate is comprised of the 1.583% LIBOR plus the spread, i.e., 1.583% + 1.275% = 2.858%, or rounded to 2.86%.

Q. What overall debt cost rate have you determined for rate of return purposes?

A. As shown on page 3 of Schedule 6, the combined cost of long- and short-term debt is 5.05% for the fully forecast rate year.

COST OF EQUITY – GENERAL APPROACH

Q. Please describe the process you employed to determine the cost of equity for CPA.

A. Although my fundamental financial analysis provides the required framework to establish the risk relationships among CPA, the Gas Group, and the S&P Public Utilities, the cost of equity must be measured by standard financial models that I identified above. Differences in risk traits, such as size, business diversification, geographical diversity, regulatory policy, financial leverage, and bond ratings must be considered when analyzing the cost of equity.

It is also important to reiterate that no one method or model of the cost of equity can be applied in an isolated manner. Rather, informed judgment must be used to take into consideration the relative risk traits of the firm. It is for this reason that I have used more than one method to measure the Company's cost of equity. As I describe below, each of the methods used to measure the cost of equity contains certain incomplete and/or overly

restrictive assumptions and constraints that are not optimal. Therefore, I favor considering the results from a variety of methods. In this regard, I applied each of the methods with data taken from the Gas Group and arrived at a rate of return on common equity of 10.95%, which includes recognition of the exemplary performance of the Company's management as explained by Mr. Kempic.

DISCOUNTED CASH FLOW ANALYSIS

Q. Please describe your use of the Discounted Cash Flow approach to determine the cost of equity.

A. The DCF model seeks to explain the value of an asset as the present value of future expected cash flows discounted at the appropriate risk-adjusted rate of return. In its simplest form, the DCF return on common stock consists of a current cash (dividend) yield and future price appreciation (growth) of the investment. The dividend discount equation is the familiar DCF valuation model and assumes future dividends are systematically related to one another by a constant growth rate. The DCF formula is derived from the standard valuation model: $P = D/(k-g)$, where P = price, D = dividend, k = the cost of equity, and g = growth in cash flows. By rearranging the terms, we obtain the familiar DCF equation: $k = D/P + g$. All of the terms in the DCF equation represent investors' assessment of expected future cash flows that they will receive in relation to the value that they set for a share of stock (P). The DCF

equation is sometimes referred to as the "Gordon" model.[6] My DCF results are provided on page 2 of Schedule 1 for the Gas Group. The DCF return is 10.05%.

Among other limitations of the model, there is a certain element of circularity in the DCF method when applied in rate cases. This is because investors' expectations for future returns depend upon regulatory decisions. In turn, when regulators depend upon the DCF model to set the cost of equity, they rely upon investor expectations that include an assessment of how regulators will decide rate cases. Due to this circularity, the DCF model may not fully reflect the true risk of a utility.

Q. Please explain the dividend yield component of a DCF analysis.

A. The DCF methodology requires the use of an expected dividend yield to establish the investor-required cost of equity. The monthly dividend yields for the twelve months ended December 2014 are shown on Schedule 7 and capture an adjustment to the month-end prices to reflect the buildup of the dividend in the price that has occurred since the last ex-dividend date (i.e., the date by which a shareholder must own the shares to be entitled to the dividend payment – usually about two to three weeks prior to the actual payment).

For the twelve months ended December 2014, the average dividend yield was 3.52% for the Gas Group based upon a calculation using annualized dividend payments and adjusted month-end stock prices. The dividend yields

[6]Although the popular application of the DCF model is often attributed to the work of Myron J. Gordon in the mid-1950's, J. B. Williams exposited the DCF model in its present form nearly two decades earlier.

for the more recent six- and three-month periods were 3.48% and 3.33%, respectively. I have used, for the purpose of the DCF model, the six-month average dividend yield of 3.48% for the Gas Group. The use of this dividend yield will reflect current capital costs, while avoiding spot yields. For the purpose of a DCF calculation, the average dividend yield must be adjusted to reflect the prospective nature of the dividend payments, i.e., the higher expected dividends for the future. Recall that the DCF is an expectational model that must reflect investor anticipated cash flows for the Gas Group. I have adjusted the six-month average dividend yield in three different, but generally accepted, manners and used the average of the three adjusted values as calculated in the lower panel of data presented on Schedule 7. This adjustment adds nine basis points to the six-month average historical yield, thus producing the 3.58% adjusted dividend yield for the Gas Group.

Q. Turning to the growth component of the DCF analysis, please explain the underlying factors that influence investors' growth expectations.

A. As noted previously, investors are interested principally in the future growth of their investment (i.e., the price per share of the stock). Future earnings per share growth represent the DCF model's primary focus because under the constant price-earnings multiple assumption of the model, the price per share of stock will grow at the same rate as earnings per share. In conducting a growth rate analysis, a wide variety of variables can be considered when reaching a consensus of prospective growth, including: earnings, dividends, book value, and cash flows stated on a per share basis. Historical values for these variables can be considered, as well as analysts' forecasts that are widely

available to investors. A fundamental growth rate analysis is sometimes represented by the internal growth ("b x r"), where "r" represents the expected rate of return on common equity and "b" is the retention rate that consists of the fraction of earnings that are not paid out as dividends. To be complete, the internal growth rate should be modified to account for sales of new common stock -- this is called external growth ("s x v"), where "s" represents the new common shares expected to be issued by a firm and "v" represents the value that accrues to existing shareholders from selling stock at a price different from book value. Fundamental growth, which combines internal and external growth, provides an explanation of the factors that cause book value per share to grow over time.

Growth also can be expressed in multiple stages. This expression of growth consists of an initial "growth" stage where a firm enjoys rapidly expanding markets, high profit margins, and abnormally high growth in earnings per share. Thereafter, a firm enters a "transition" stage where fewer technological advances and increased product saturation begin to reduce the growth rate and profit margins come under pressure. During the "transition" phase, investment opportunities begin to mature, capital requirements decline, and a firm begins to pay out a larger percentage of earnings to shareholders. Finally, the mature or "steady-state" stage is reached when a firm's earnings growth, payout ratio, and return on equity stabilizes at levels where they remain for the life of a firm. The three stages of growth assume a step-down of high initial growth to lower sustainable growth. Even if these three stages of growth can be envisioned for a firm, the third "steady-state"

growth stage, which is assumed to remain fixed in perpetuity, represents an unrealistic expectation because the three stages of growth can be repeated. That is to say, the stages can be repeated where growth for a firm ramps-up and ramps-down in cycles over time. It is quite apparent that the Company is going through an expansion stage, because of substantial new investment.

Q. What investor-expected growth rate is appropriate in a DCF calculation?

A. Investors consider both company-specific variables and overall market sentiment (i.e., level of inflation rates, interest rates, economic conditions, etc.) when balancing their capital gains expectations with their dividend yield requirements. I follow an approach that is not rigidly formatted because investors are not influenced by a single set of company-specific variables weighted in a formulaic manner. In my opinion, all relevant growth rate indicators using a variety of techniques must be evaluated when formulating a judgment of investor-expected growth.

Q. What data for the proxy group have you considered in your growth rate analysis?

A. I have considered the growth in the financial variables shown on Schedules 8 and 9. The historical growth rates were taken from the Value Line publication that provides this data. As shown on Schedule 8, the historical growth of earnings per share was in the range of 2.78% to 5.22% for the Gas Group.

Schedule 9 provides projected earnings per share growth rates taken from analysts' forecasts compiled by IBES/First Call, Zacks, Morningstar, SNL, and Value Line. IBES/First Call, Zacks, Morningstar, and SNL represent reliable authorities of projected growth upon which investors rely. The

IBES/First Call, Zacks, and SNL growth rates are consensus forecasts taken from a survey of analysts that make projections of growth for these companies. The IBES/First Call, Zacks, Morningstar, and SNL estimates are obtained from the Internet and are widely available to investors. First Call probably is quoted most frequently in the financial press when reporting on earnings forecasts. The Value Line forecasts also are widely available to investors and can be obtained by subscription or free-of-charge at most public and collegiate libraries. The IBES/First Call, Zacks, Morningstar, and SNL forecasts are limited to earnings per share growth, while Value Line makes projections of other financial variables. The Value Line forecasts of dividends per share, book value per share, and cash flow per share have also been included on Schedule 9 for the Gas Group.

Q. What specific evidence have you considered in the DCF growth analysis?

A. As to the five-year forecast growth rates, Schedule 9 indicates that the projected earnings per share growth rates for the Gas Group are 5.11% by IBES/First Call, 5.11% by Zacks, 5.19% by Morningstar, 5.04% by SNL, and 6.94% by Value Line. The Value Line projections indicate that earnings per share for the Gas Group will grow prospectively at a more rapid rate (i.e., 6.94%) than the dividends per share (i.e., 4.44%), which translates into a declining dividend payout ratio for the future. As noted earlier, with the constant price-earnings multiple assumption of the DCF model, growth for these companies will occur at the higher earnings per share growth rate, thus producing the capital gains yield expected by investors.

Q. What conclusion have you drawn from these data regarding the applicable growth rate to be used in the DCF model?

A. A variety of factors should be examined to reach a conclusion on the DCF growth rate. However, certain growth rate variables should be emphasized when reaching a conclusion on an appropriate growth rate. First, historical and projected earnings per share, dividends per share, book value per share, cash flow per share, and retention growth represent indicators that could be used to provide an assessment of investor growth expectations for a firm. However, although history cannot be ignored, it cannot receive primary emphasis. This is because an analyst, when developing a forecast of future earnings growth, would first apprise himself/herself of the historical performance of a company. Hence, there is no need to count historical growth rates separately, because historical performance already is reflected in analysts' forecasts. Second, from the various alternative measures of growth identified above, earnings per share should receive greatest emphasis. Earnings per share growth are the primary determinant of investors' expectations regarding their total returns in the stock market. This is because the capital gains yield (i.e., price appreciation) will track earnings growth with a constant price earnings multiple (a key assumption of the DCF model). Moreover, earnings per share (derived from net income) are the source of dividend payments and are the primary driver of retention growth and its surrogate, i.e., book value per share growth. As such, under these circumstances, greater emphasis must be placed upon projected earnings per share growth. In this regard, it is worthwhile to note that Professor Myron

Gordon, the foremost proponent of the DCF model in rate cases, concluded that the best measure of growth in the DCF model is a forecast of earnings per share growth.[7] Hence, to follow Professor Gordon's findings, projections of earnings per share growth, such as those published by IBES/First Call, Zacks, Morningstar, and Value Line, represent a reasonable assessment of investor expectations.

The forecasts of earnings per share growth, as shown on Schedule 9, provide a range of average growth rates of 5.04% to 6.94%. Although the DCF growth rates cannot be established solely with a mathematical formulation, it is my opinion that an investor-expected growth rate of 5.25% is a reasonable growth rate before consideration of increased growth rate for Columbia generated by accelerated investment in infrastructure. For the Gas Group, the annual average forecast capital expenditures will represent 11.8% of its existing net plant. For CPA, the equivalent percentage is 19.6%. This means that the Company will experience more growth prospectively than is indicated for the Gas Group. Thus, the Gas Group's future growth rate will understate the growth for CPA. In addition, projected growth rates are likely understated because they do not fully recognize the growth in earnings that will occur due to the substantial increase in plant investment. Growth rates today should reflect the expectation of growth generated by accelerated investment in infrastructure by public utilities. Moreover, the stock market is one of the ten components of the Leading Economic Indicators ('LEI") compiled by The

[7]Gordon, Gordon & Gould, "Choice Among Methods of Estimating Share Yield," The Journal of Portfolio Management (Spring 1989).

Conference Board. The LEI is designed to signal peaks and troughs in the business cycle. "In the six-month period ending September 2014, the leading economic index increased 3.5 percent (about a 7.1 percent annual rate), faster than the growth of 2.7 percent (about a 5.6 percent annual rate) during the previous six months. Also, the strengths among the components became more widespread than weaknesses in the past six months."[8] This improving economic growth argues for a higher DCF growth rate.

Q. Are the dividend yield and growth components of the DCF adequate to explain the rate of return on common equity when it is used in the calculation of the weighted average cost of capital?

A. Only if the capital structure ratios are measured with the market value of debt and equity. In the case of the Gas Group, those average capital structure ratios are 34.27% long-term debt, 0.11% preferred stock, and 65.62% common equity, as shown on Schedule 10. If book values are used to compute the capital structure ratios, then an adjustment is required.

Q. Please explain why.

A. If regulators use the results of the DCF (which are based on the market price of the stock of the companies analyzed) to compute the weighted average cost of capital based on a book value capital structure used for ratesetting purposes, the utility will not, by definition, recover its risk-adjusted capital cost. This is because market valuations of equity are based on market value

[8]The Conference Board U.S. Business Cycle Indicators -The Conference Board Leading Economic Index (LEI) for the U.S. and Related Composite Economic Indexes for September 2014 [Press Release].Retrieved from http://www.conference-board.org/data/bci.cfm dated October 23, 2014.

capital structures, which in general have more equity and less debt and therefore reflect less risk than book value capital structures (see Schedule 10 for the comparison). The utility's risk-adjusted cost of equity will necessarily be lower with the less risky market value capital structure than with the book value capital structure. The difference represents that portion of the utility's cost of equity that it will not recover unless either the market value cost of equity is applied to the utility's market value capital structure or it is adjusted to reflect the higher risk associated with the book value capital structure. By the same token, if the utility's market value capital structure is less than its book value structure, then the utility's market cost of equity should be adjusted downward to reflect the lower risk associated with the book value capital structure, or else the utility will over-recover its total cost of equity.

This shortcoming of the DCF has persuaded the Commission to adjust the DCF determined cost of equity upward to make the return consistent with the book value capital structure. Specific adjustments to recognize this risk difference were made in the following cases:

Date	Company	Docket Number	Basis Points
January 10, 2002	Pennsylvania-American Water Co.	Docket No. R-00016339	60 basis points
August 1, 2002	Philadelphia Suburban Water Co.	Docket No. R-00016750	80 basis points
January 29, 2004	Pennsylvania-American Water Co.	Docket No. R-00038304 (affirmed by the Commonwealth Court on November 8, 2004)	60 basis points
August 5, 2004	Aqua Pennsylvania, Inc.	Docket No. R-00038805	60 basis points
December 22, 2004	PPL Electric Utilities Corp.	Docket No. R-00049255	45 basis points
February 8, 2007	PPL Gas Utilities Corp.	Docket No. R-00061398	70 basis points

In order to make the DCF results relevant to the capitalization measured at book value (as is done for rate setting purposes), the market-derived cost rate cannot be used without modification.

Q. Is your leverage adjustment dependent upon the market valuation or book valuation from an investor's perspective?

A. The only perspective that is important to investors is the return that they can realize on the market value of their investment. As I have measured the DCF, the simple yield (D/P) plus growth (g) provides a return applicable strictly to the price (P) that an investor is willing to pay for a share of stock. The need for the leverage adjustment arises when the results of the DCF model (k) are to be applied to a capital structure that is different than indicated by the market price (P). From the market perspective, the financial risk of the Gas Group is accurately measured by the capital structure ratios calculated from the market capitalization of a firm. If the ratesetting process utilized the market capitalization ratios, then no additional analysis or adjustment would be required, and the simple yield (D/P) plus growth (g) components of the DCF would satisfy the financial risk associated with the market value of the equity capitalization. Because the ratesetting process uses a different set of ratios calculated from the book value capitalization, further analysis is required to synchronize the financial risk of the book capitalization with the required return on the book value of the equity. This adjustment is developed through precise mathematical calculations, using well recognized analytical procedures that are widely accepted in the financial literature. To arrive at that return, the rate of return on common equity is the unleveraged cost of

capital (or equity return at 100% equity) plus one or more terms reflecting the increase in financial risk resulting from the use of leverage in the capital structure. The calculations presented in the lower panel of data shown on Schedule 10, under the heading "M&M," provides a return of 7.63% when applicable to a capital structure with 100% common equity.

Q. How is the DCF-determined cost of equity adjusted for the financial risk associated with the book value of the capitalization?

A. In pioneering work, Nobel laureates Modigliani and Miller developed several theories about the role of leverage in a firm's capital structure. As part of that work, Modigliani and Miller established that, as the borrowing of a firm increases, the expected return on stockholders' equity also increases. This principle is incorporated into my leverage adjustment, which recognizes that the expected return on equity increases to reflect the increased risk associated with the higher financial leverage shown by the book value capital structure, as compared to the market value capital structure that contains lower financial risk. Modigliani and Miller proposed several approaches to quantify the equity return associated with various degrees of debt leverage in a firm's capital structure. These formulas point toward an increase in the equity return associated with the higher financial risk of the book value capital structure. Simply stated, the leverage adjustment contains no factor for a particular market-to-book ratio. It merely expresses the cost of equity as the unleveraged return plus compensation for the additional risk of introducing debt and/or preferred stock into the capital structure. There can be no

dispute that a firm's financial risk varies with the relative amount of leverage contained in its capital structure.

Q. Is the leverage adjustment that you propose designed to transform the market return into one that is designed to produce a particular market-to-book ratio?

A. No, it is not. The adjustment that I label as a "leverage adjustment" is merely a convenient way of showing the amount that must be added to (or subtracted from) the result of the simple DCF model (i.e., D/P + g), in the context of a return that applies to the capital structure used in ratemaking, which is computed with book value weights rather than market value weights, in order to arrive at the utility's total cost of equity. I specify a separate factor, which I call the leverage adjustment, but there is no need to do so other than providing identification for this factor. If I expressed my return solely in the context of the book value weights that we use to calculate the weighted average cost of capital, and ignore the familiar D/P + g expression entirely, then there would be no separate element to reflect the financial leverage change from market value to book value capitalization. As shown in the bottom panel of data on Schedule 10, the equity return applicable to the book value common equity ratio is equal to 7.63%, which is the return for the Gas Group applicable to its equity with no debt in its capital structure (i.e., the cost of capital is equal to the cost of equity with a 100% equity ratio) plus 1.91% compensation for having a 45.53% debt ratio, plus 0.01% for having a 0.17% preferred stock ratio. The sum of the parts is 9.55% (7.63% + 1.91% + 0.01%) and there is no need to even address the cost of equity in terms of D/P + g. To express this same return in the context of the familiar DCF model, I

summed the 3.58% dividend yield, the 5.25% growth rate, and the 0.72% for the leverage adjustment in order to arrive at the same 9.55% (3.58% + 5.25% + 0.72%) return. I know of no means to mathematically solve for the 0.72% (9.55% - 8.83%) leverage adjustment by expressing it in the terms of any particular relationship of market price to book value. The 0.72% adjustment is merely a convenient way to compare the 9.55% return computed directly with the Modigliani & Miller formulas to the 8.83% return generated by the DCF model based on a market value capital structure. My point is that when we use a market-determined cost of equity developed from the DCF model, it reflects a level of financial risk that is different (in this case, lower) from the capital structure stated at book value. This process has nothing to do with targeting any particular market-to-book ratio.

Q. Please provide the DCF return based upon your preceding discussion of dividend yield, growth, and leverage.

A. As explained previously, I have utilized a six-month average dividend yield ("D_1/P_0") adjusted in a forward-looking manner for my DCF calculation. This dividend yield is used in conjunction with the growth rate ("g") previously developed. The DCF also includes the leverage modification ("lev.") required when the book value equity ratio is used in determining the weighted average cost of capital in the ratesetting process rather than the market value equity ratio related to the price of stock.

	D_1/P_0	+	g	+	*lev.*	=	K
Gas Group	3.58%	+	5.25%	+	0.72%	=	9.55%

The DCF result shown above represents the simplified (i.e., Gordon) form of the model that contains a constant growth assumption. I should reiterate, however, that the DCF-indicated cost rate provides an explanation of the rate of return on common stock market prices without regard to the prospect of a change in the price-earnings multiple. An assumption that there will be no change in the price-earnings multiple is not supported by the realities of the equity market, because price-earnings multiples do not remain constant. This is one of the constraints of this model that makes it important to consider other model results when determining a company's cost of equity. For this reason, the DCF cost rate I have developed for the Gas Group understates the cost of equity. As noted previously, CPA has weaker credit quality as compared to the Gas Group. A generally accepted tenet of corporate finance is that risk and return are linked. Here, weaker credit quality adds to risk. As a consequence, an upward adjustment to the DCF results is required to accommodate the risk of CPA vis-á-vis the Gas Group.

Q. What is the adjustment to recognize the weaker credit quality of CPA?

A. The DCF returns that are produced for the Gas Group relate to the average credit quality of that group, which is A2/A- as shown on page 2 of Schedule 3. In order to provide recognition of the additional return that is required to compensate CPA for its higher risk in this regard, I have reviewed the difference in yields on A-rated and Baa-rated public utility debt. The yield difference is related to the additional return required when risk increases, i.e., generally bond yields increase as credit quality declines. The yield difference

between A-rated and Baa-rated public utility bonds is used as a proxy for quantifying this additional risk.

As shown by the data presented on page 1 of Schedule 11, the difference in yields between Baa-rated and A-rated public utility bonds was 0.58% (4.70% - 4.12%) for the six-months ended December 2014. Based on this difference in yields, I propose that a one-half percentage point (i.e., the interest rate difference rounded to 0.50%) be added to the DCF calculation for the Gas Group to provide recognition for the higher risk of CPA due to its weaker credit quality risk. As such, the DCF return requires adjustment to 10.05% (9.55% + 0.50%) to recognize the higher risk of CPA.

I also note that the 5.25% growth rate for the gas group understates growth for CPA, given CPA's significantly higher projected construction program. This suggests that other equity cost rate models should be given weight in arriving at the cost of equity.

RISK PREMIUM ANALYSIS

Q. Please describe your use of the Risk Premium approach to determine the cost of equity.

A. With the Risk Premium approach, the cost of equity capital is determined by corporate bond yields plus a premium to account for the fact that common equity is exposed to greater investment risk than debt capital. The result of my Risk Premium study is shown on page 2 of Schedule 1. That result is 11.75% including the credit quality adjustment. As with other models used to determine the cost of equity, the Risk Premium approach has its limitations,

including potential imprecision in the assessment of the future cost of corporate debt and the measurement of the risk-adjusted common equity premium.

Q. What long-term public utility debt cost rate did you use in your Risk Premium analysis?

A. In my opinion, a 4.75% yield represents a reasonable estimate of the prospective yield on long-term A-rated public utility bonds.

Q. What forecasts of interest rates have you considered in your analysis?

A. I have determined the prospective yield on A-rated public utility debt by using the Blue Chip Financial Forecasts ("Blue Chip") along with the spread in the yields that I describe below. The Blue Chip is a reliable authority and contains consensus forecasts of a variety of interest rates compiled from a panel of banking, brokerage, and investment advisory services. In early 1999, Blue Chip stopped publishing forecasts of yields on A-rated public utility bonds because the Federal Reserve deleted these yields from its Statistical Release H.15. To independently project a forecast of the yields on A-rated public utility bonds, I have combined the forecast yields on long-term Treasury bonds published on January 1, 2014, and a yield spread of 1.00%, derived from historical data.

Q. What historical data have you analyzed?

A. I have analyzed the historical yields on the Moody's index of long-term public utility debt as shown on page 1 of Schedule 11. For the twelve months ended December 2014, the average monthly yield on Moody's index of A-rated public utility bonds was 4.28%. For the six and three-month periods ended

December 2014, the yields were 4.12% and 4.03%, respectively. During the twelve-months ended December 2014, the range of the yields on A-rated public utility bonds was 3.95% to 4.63%. Page 2 of Schedule 11 shows the long-run spread in yields between A-rated public utility bonds and long-term Treasury bonds. As shown on page 3 of Schedule 10, the yields on A-rated public utility bonds have exceeded those on Treasury bonds by 0.94% on a twelve-month average basis, 1.00% on a six-month average basis, and 1.06% on a the three-month average basis. From these averages, 1.00% represents a reasonable spread for the yield on A-rated public utility bonds over Treasury bonds.

Q. How have you used these data to project the yield on a-rated public utility bonds for the purpose of your Risk Premium analyses?

A. Shown below is my calculation of the prospective yield on A-rated public utility bonds using the building blocks discussed above, i.e., the Blue Chip forecast of Treasury bond yields and the public utility bond yield spread. For comparative purposes, I also have shown the Blue Chip forecasts of Aaa-rated and Baa-rated corporate bonds. These forecasts are:

		Blue Chip Financial Forecasts				
		Corporate		30-Year	A-rated Public Utility	
Year	Quarter	Aaa-rated	Baa-rated	Treasury	Spread	Yield
2015	First	4.0%	4.9%	3.1%	1.00%	4.10%
2015	Second	4.2%	5.1%	3.3%	1.00%	4.30%
2015	Third	4.3%	5.3%	3.5%	1.00%	4.50%
2015	Fourth	4.6%	5.5%	3.7%	1.00%	4.70%
2016	First	4.8%	5.7%	3.9%	1.00%	4.90%
2016	Second	5.0%	5.8%	4.0%	1.00%	5.00%

Q. Are there additional forecasts of interest rates that extend beyond those shown above?

A. Yes. Twice yearly, Blue Chip provides long-term forecasts of interest rates. In its December 1, 2014 publication, Blue Chip published longer-term forecasts of interest rates, which were reported to be:

	Blue Chip Financial Forecasts		
	Corporate		30-Year
Averages	Aaa-rated	Baa-rated	Treasury
2016-20	5.8%	6.6%	4.9%
2021-25	6.1%	7.0%	5.1%

Given these forecasted interest rates, a 4.75% yield on A-rated public utility bonds represents a reasonable expectation.

Q. What equity Risk Premium have you determined for this case?

A. To develop an appropriate equity risk premium, I analyzed the results from Stocks, Bonds, Bills and Inflation ("SBBI") 2014 Classic Yearbook published by Ibbotson Associates that is part of Morningstar. My investigation reveals that the equity risk premium varies according to the level of interest rates. That is to say, the equity risk premium increases as interest rates decline and it declines as interest rates increase. This inverse relationship is revealed by the summary data presented below and shown on page 1 of Schedule 11.

Common Equity Risk Premiums

Low Interest Rates	7.60%
Average Across All Interest Rates	5.79%
High Interest Rates	3.98%

Based on my analysis of the historical data, the equity risk premium was 7.60% when the marginal cost of long-term government bonds was low (i.e., 3.01%, which was the average yield during periods of low rates). Conversely,

when the yield on long-term government bonds was high (i.e., 7.28% on average during periods of high interest rates) the spread narrowed to 3.98%. Over the entire spectrum of interest rates, the equity risk premium was 5.79% when the average government bond yield was 5.15%. With the forecast indicating an upward movement of interest rates that I described above from historically low levels, I have utilized a 6.50% equity risk premium. This equity risk premium is between the 7.60% premium related to periods of low interest rates and the 5.79% premium related to average interest rates across all levels.

Q. What common equity cost rate did you determine based on your risk premium analysis?

A. The cost of equity (i.e., "k") is represented by the sum of the prospective yield for long-term public utility debt (i.e., "i"), and the equity risk premium (i.e., "RP"). The Risk Premium approach provides a cost of equity of:

	i	+	*RP*	=	*k*
Gas Group	4.75%	+	6.50%	=	11.25%

As I noted previously, NiSource carries a Baa2/BBB- rating on its debt. This means that the Risk Premium cost rate shown above would understate the Company's cost of equity by one-half percentage point, because the 11.25% shown above is based on the yield on A-rated public utility debt. As such, the Risk Premium cost rate for CPA is 11.75% (11.25% + 0.50%).

CAPITAL ASSET PRICING MODEL

Q. What are the features of the CAPM as you have used it?

A. The CAPM uses the yield on a risk-free interest bearing obligation plus a rate of return premium that is proportional to the systematic risk of an investment. As shown on page 2 of Schedule 1, the result of the CAPM is 11.90%. To compute the cost of equity with the CAPM, three components are necessary: a risk-free rate of return (*"Rf"*), the beta measure of systematic risk (*"β"*), and the market risk premium (*"Rm-Rf"*) derived from the total return on the market of equities reduced by the risk-free rate of return. The CAPM specifically accounts for differences in systematic risk (i.e., market risk as measured by the beta) between an individual firm or group of firms and the entire market of equities.

Q. What betas have you considered in the CAPM?

A. For my CAPM analysis, I initially considered the Value Line betas. As shown on page 2 of Schedule 3, the average beta is 0.78 for the Gas Group.

Q. What betas have you used in the CAPM determined cost of equity?

A. The betas must be reflective of the financial risk associated with the ratesetting capital structure that is measured at book value. Therefore, Value Line betas cannot be used directly in the CAPM, unless the cost rate developed using those betas is applied to a capital structure measured with market values. To develop a CAPM cost rate applicable to a book-value capital structure, the Value Line (market value) betas have been unleveraged and releveraged for the book value common equity ratios using the Hamada formula,[9] as follows:

[9]Robert S. Hamada, "The Effects of the Firm's Capital Structure on the Systematic Risk of Common Stocks" *The Journal of Finance* Vol. 27, No. 2, Papers and Proceedings of the Thirtieth

$$\beta l = \beta u\,[1 + (1 - t)\,D/E + P/E]$$

where ßl = the leveraged beta, ßu = the unleveraged beta, t = income tax rate, D = debt ratio, P = preferred stock ratio, and E = common equity ratio. The betas published by Value Line have been calculated with the market price of stock and are related to the market value capitalization. By using the formula shown above and the capital structure ratios measured at market value, the beta would become 0.58 for the Gas Group if it employed no leverage and was 100% equity financed. Those calculations are shown on Schedule 10 under the section labeled "Hamada," who is credited with developing those formulas. With the unleveraged beta as a base, I calculated the leveraged beta of 0.90 for the book value capital structure of the Gas Group. The book value leveraged beta that I will employ in the CAPM cost of equity is 0.90 for the Gas Group.

Q. What risk-free rate have you used in the CAPM?

A. As shown on page 1 of Schedule 13, I provided the historical yields on Treasury notes and bonds. For the twelve months ended December 2014, the average yield on 30-year Treasury bonds was 3.34%. For the six- and three-months ended December 2014, the yields on 30-year Treasury bonds were 3.12% and 2.97%, respectively. During the twelve-months ended December 2014, the range of the yields on 30-year Treasury bonds was 2.83% to 3.77%. The low yields that existed during recent periods can be traced to the financial crisis and its aftermath commonly referred to as the Great Recession. The

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Annual Meeting of the American Finance Association, New Orleans, Louisiana, December 27-29, 1971. (May 1972), pp.435-452.

resulting decline in the yields on Treasury obligations was attributed to a number of factors, including: the sovereign debt crisis in the euro zone, the potential for deflation, and the Federal Reserve's large balance sheet that was expanded through the purchase of Treasury obligations and mortgage-backed securities (also known as QEI, QEII, and QEIII), and the reinvestment of the proceeds from maturing obligations and the lengthening of the maturity of the Fed's bond portfolio through the sale of short-term Treasuries and the purchase of long-term Treasury obligations (also known as "operation twist"). Essentially, low interest rates were the product of the policy of the FOMC in its attempt to deal with stagnant job growth, which is part of its dual mandate. In 2014, the FOMC began reducing its bond purchasing program. The term commonly used to describe this reduction in bond purchases is called "tapering." The FOMC completed its tapering program by ending its quantitative easing in October 2014. As shown on page 2 of Schedule 12, forecasts published by Blue Chip on January 1, 2015 indicate that the yields on long-term Treasury bonds are expected to be in the range of 3.1% to 4.0% during the next six quarters. The longer term forecasts described previously show that the yields on 30-year Treasury bonds will average 4.9% from 2016 through 2020 and 5.1% from 2021 to 2025. For the reasons explained previously, forecasts of interest rates should be emphasized at this time in selecting the risk-free rate of return in CAPM. Hence, I have used a 3.75% risk-free rate of return for CAPM purposes, which considers not only the Blue Chip forecasts, but also the recent yields on long-term Treasury bonds.

Q. What market premium have you used in the CAPM?

A. As shown in the lower panel of data presented on page 2 of Schedule 13, the market premium is derived from historical data and the Value Line and S&P 500 returns. For the historically based market premium, I have used the arithmetic mean obtained from the data presented on page 1 of Schedule 12. On that schedule, the market return was 12.17% on large stocks during periods of low interest rates. During those periods, the yield on long-term government bonds was 3.01% when interest rates were low. As I describe above, interest rates are forecast to trend upward in the future. To recognize that trend, I have given weight to the average returns and yields that existed across all interest rate levels. As such, I carried over to page 2 of Schedule 13 the average large common stock returns of 12.11% (12.17% + 12.05% = 24.22% ÷ 2) and the average yield on long-term government bonds of 4.08% (3.01% + 5.15% = 8.16% ÷ 2). These financial returns rest between those experienced during periods of low interest rates and those experienced across all levels of interest rates. The resulting market premium is 8.03% (12.11% - 4.08%) based on historical data, as shown on page 2 of Schedule 13. For the forecast returns, I calculated a 10.88% total market return from the Value Line data and a DCF return of 11.72% for the S&P 500. With the average forecast return of 11.30% (10.88% + 11.72% = 22.60% ÷ 2), I calculated a market premium of 7.55% (11.30% - 3.75%) using forecast data. The market premium applicable to the CAPM derived from these sources equals 7.79% (7.55% + 8.03% = 15.58% ÷ 2).

Q. Are there adjustments to the CAPM that are necessary to fully reflect the rate of return on common equity?

A. Yes. The technical literature supports an adjustment relating to the size of the company or portfolio for which the calculation is performed. As the size of a firm decreases, its risk and required return increases. Moreover, in his discussion of the cost of capital, Professor Brigham has indicated that smaller firms have higher capital costs than otherwise similar larger firms.[10] Also, the Fama/French study (see "The Cross-Section of Expected Stock Returns"; The Journal of Finance, June 1992) established that the size of a firm helps explain stock returns. In an October 15, 1995 article in Public Utility Fortnightly, entitled "Equity and the Small-Stock Effect," it was demonstrated that the CAPM could understate the cost of equity significantly according to a company's size. Indeed, it was demonstrated in the SBBI Yearbook that the returns for stocks in lower deciles (i.e., smaller stocks) had returns in excess of those shown by the simple CAPM. In this regard, the Gas Group has a market-based average equity capitalization of $2,561 million. For my CAPM analysis, I have adopted a mid-cap adjustment of 1.14%, as shown on page 3 of Schedule 13.

Q. What CAPM result have you determined?

A. Using the 3.75% risk-free rate of return, the leverage adjusted beta of 0.90 for the Gas Group, the 7.79% market premium, and the 1.14% size adjustment, I derived the following CAPM-indicated cost of equity:

	Rf	+	*ß*	x	(*Rm-Rf*)	+	*size*	=	*k*
Gas Group	3.75%	+	0.90	x	(7.79%)	+	1.14%	=	11.90%

[10]See Fundamentals of Financial Management, Fifth Edition, at 623.

While I have adjusted for the size of the Gas Group, the Company's risk is even greater because it is smaller than the Gas Group.

COMPARABLE EARNINGS APPROACH

Q. How have you applied the Comparable Earnings approach in this case?

A. The Comparable Earnings approach determines the equity return based upon results from non-regulated companies. It is the oldest of all rate of return methods, having been around for about one-century. Because regulation is a substitute for competitively determined prices, the returns realized by non-regulated firms with comparable risks to a public utility provide useful insight into a fair rate of return. In order to identify the appropriate return, it is necessary to analyze returns earned (or realized) by other firms within the context of the Comparable Earnings standard. The firms selected for the Comparable Earnings approach should be companies whose prices are not subject to cost-based price ceilings (i.e., non-regulated firms) so that circularity is avoided.

There are two avenues available to implement the Comparable Earnings approach. One method involves the selection of another industry (or industries) with comparable risks to the public utility in question, and the results for all companies within that industry serve as a benchmark. The second approach requires the selection of parameters that represent similar risk traits for the public utility and the comparable risk companies. Using this approach, the business lines of the comparable companies become unimportant. The latter approach is preferable with the further qualification

that the comparable risk companies exclude regulated firms in order to avoid the circular reasoning implicit in the use of the achieved earnings/book ratios of other regulated firms. The United States Supreme Court has held that:

> A public utility is entitled to such rates as will permit it to earn a return on the value of the property which it employs for the convenience of the public equal to that generally being made at the same time and in the same general part of the country on investments in other business undertakings which are attended by corresponding risks and uncertainties.... The return should be reasonably sufficient to assure confidence in the financial soundness of the utility and should be adequate, under efficient and economical management, to maintain and support its credit and enable it to raise the money necessary for the proper discharge of its public duties. Bluefield Water Works vs. Public Service Commission, 262 U.S. 668 (1923).

It is important to identify the returns earned by firms that compete for capital with a public utility. This can be accomplished by analyzing the returns of non-regulated firms that are subject to the competitive forces of the marketplace.

Q. How have you implemented the Comparable Earnings Approach?

A. In order to implement the Comparable Earnings approach, non-regulated companies were selected from The Value Line Investment Survey for Windows that have six categories of comparability designed to reflect the risk of the Gas Group. These screening criteria were based upon the range as defined by the rankings of the companies in the Gas Group. The items considered were: Timeliness Rank, Safety Rank, Financial Strength, Price Stability, Value Line betas, and Technical Rank. The definition for these parameters is provided on page 3 of Schedule 14. The identities of the

companies comprising the Comparable Earnings group and their associated rankings within the ranges are identified on page 1 of Schedule 14.

Value Line data was relied upon because it provides a comprehensive basis for evaluating the risks of the comparable firms. As to the returns calculated by Value Line for these companies, there is some downward bias in the figures shown on page 2 of Schedule 14, because Value Line computes the returns on year-end rather than average book value. If average book values had been employed, the rates of return would have been slightly higher. Nevertheless, these are the returns considered by investors when taking positions in these stocks. Because many of the comparability factors, as well as the published returns, are used by investors in selecting stocks, and the fact that investors rely on the Value Line service to gauge returns, it is an appropriate database for measuring comparable return opportunities.

Q. What data have you used in your Comparable Earnings analysis?

A. I have used both historical realized returns and forecasted returns for non-utility companies. As noted previously, I have not used returns for utility companies in order to avoid the circularity that arises from using regulatory-influenced returns to determine a regulated return. It is appropriate to consider a relatively long measurement period in the Comparable Earnings approach in order to cover conditions over an entire business cycle. A ten-year period (five historical years and five projected years) is sufficient to cover an average business cycle. Unlike the DCF and CAPM, the results of the Comparable Earnings method can be applied directly to the book value capitalization. In other words, the Comparable Earnings approach does not

contain the potential misspecification contained in market models when the market capitalization and book value capitalization diverge significantly. A point of demarcation was chosen to eliminate the results of highly profitable enterprises, which the Bluefield case stated were not the type of returns that a utility was entitled to earn. For this purpose, I used 20% as the point where those returns could be viewed as highly profitable and should be excluded from the Comparable Earnings approach. The historical rate of return on book common equity was 13.5% using only the returns that were less than 20%, as shown on page 2 of Schedule 14. The forecast rates of return as published by Value Line are shown by the 13.6% also using values less than 20%, as provided on page 2 of Schedule 13. Using these data my Comparable Earnings result is 13.55%, as shown on page 2 of Schedule 1.

CONCLUSION ON COST OF EQUITY

Q. What is your conclusion regarding the Company's cost of common equity?

A. Based upon the application of the variety of methods and models described previously, I recommend that the Commission set the Company's rate of return on common equity at 10.95%. The proposed rate of return on common equity of 10.95% would provide recognition of the exemplary performance of the Company's management and the high quality of service provided to its customers as explained in the testimony of Mr. Kempic. It is essential that the Commission employ a variety of techniques to measure the Company's cost of equity because of the limitations/infirmities that are inherent in each method.

Q. Does this conclude your direct testimony at this time?

A. Yes, it does.

EDUCATIONAL BACKGROUND, BUSINESS EXPERIENCE AND QUALIFICATIONS

I was awarded a degree of Bachelor of Science in Business Administration by Drexel University in 1971. While at Drexel, I participated in the Cooperative Education Program which included employment, for one year, with American Water Works Service Company, Inc., as an internal auditor, where I was involved in the audits of several operating water companies of the American Water Works System and participated in the preparation of annual reports to regulatory agencies and assisted in other general accounting matters.

Upon graduation from Drexel University, I was employed by American Water Works Service Company, Inc., in the Eastern Regional Treasury Department where my duties included preparation of rate case exhibits for submission to regulatory agencies, as well as responsibility for various treasury functions of the thirteen New England operating subsidiaries.

In 1973, I joined the Municipal Financial Services Department of Betz Environmental Engineers, a consulting engineering firm, where I specialized in financial studies for municipal water and wastewater systems.

In 1974, I joined Associated Utility Services, Inc., now known as AUS Consultants. I held various positions with the Utility Services Group of AUS Consultants, concluding my employment there as a Senior Vice President.

In 1994, I formed P. Moul & Associates, an independent financial and regulatory consulting firm. In my capacity as Managing Consultant and for the past twenty-nine years, I have continuously studied the rate of return requirements for cost of service-regulated firms. In this regard, I have supervised the preparation of

rate of return studies, which were employed, in connection with my testimony and in the past for other individuals. I have presented direct testimony on the subject of fair rate of return, evaluated rate of return testimony of other witnesses, and presented rebuttal testimony.

My studies and prepared direct testimony have been presented before thirty-seven (37) federal, state and municipal regulatory commissions, consisting of: the Federal Energy Regulatory Commission; state public utility commissions in Alabama, Alaska, California, Colorado, Connecticut, Delaware, Florida, Georgia, Hawaii, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, New Jersey, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Virginia, West Virginia, Wisconsin, and the Philadelphia Gas Commission, and the Texas Commission on Environmental Quality. My testimony has been offered in over 200 rate cases involving electric power, natural gas distribution and transmission, resource recovery, solid waste collection and disposal, telephone, wastewater, and water service utility companies. While my testimony has involved principally fair rate of return and financial matters, I have also testified on capital allocations, capital recovery, cash working capital, income taxes, factoring of accounts receivable, and take-or-pay expense recovery. My testimony has been offered on behalf of municipal and investor-owned public utilities and for the staff of a regulatory commission. I have also testified at an Executive Session of the State of New Jersey Commission of Investigation concerning the BPU regulation of solid waste collection and disposal.

I was a co-author of a verified statement submitted to the Interstate Commerce Commission concerning the 1983 Railroad Cost of Capital (Ex Parte No. 452). I was also co-author of comments submitted to the Federal Energy Regulatory Commission regarding the Generic Determination of Rate of Return on Common Equity for Public Utilities in 1985, 1986 and 1987 (Docket Nos. RM85-19-000, RM86-12-000, RM87-35-000 and RM88-25-000). Further, I have been the consultant to the New York Chapter of the National Association of Water Companies, which represented the water utility group in the Proceeding on Motion of the Commission to Consider Financial Regulatory Policies for New York Utilities (Case 91-M-0509). I have also submitted comments to the Federal Energy Regulatory Commission in its Notice of Proposed Rulemaking (Docket No. RM99-2-000) concerning Regional Transmission Organizations and on behalf of the Edison Electric Institute in its intervention in the case of Southern California Edison Company (Docket No. ER97-2355-000). Also, I was a member of the panel of participants at the Technical Conference in Docket No. PL07-2 on the Composition of Proxy Groups for Determining Gas and Oil Pipeline Return on Equity.

In late 1978, I arranged for the private placement of bonds on behalf of an investor-owned public utility. I have assisted in the preparation of a report to the Delaware Public Service Commission relative to the operations of the Lincoln and Ellendale Electric Company. I was also engaged by the Delaware P.S.C. to review and report on the proposed financing and disposition of certain assets of Sussex Shores Water Company (P.S.C. Docket Nos. 24-79 and 47-79). I was a co-author of a Report on Proposed Mandatory Solid Waste Collection Ordinance prepared for the Board of County Commissioners of Collier County, Florida.

I have been a consultant to the Bucks County Water and Sewer Authority concerning rates and charges for wholesale contract service with the City of Philadelphia. My municipal consulting experience also included an assignment for Baltimore County, Maryland, regarding the City/County Water Agreement for Metropolitan District customers (Circuit Court for Baltimore County in Case 34/153/87-CSP-2636).

Selected Interest Rates (Daily) - H.15

Daily Update

Release Date: December 19, 2014

The weekly release is posted on Monday. Daily updates of the weekly release are posted Tuesday through Friday on this site. If Monday is a holiday, the weekly release will be posted on Tuesday after the holiday and the daily update will not be posted on that Tuesday.

December 19, 2014
Selected Interest Rates

Yields in percent per annum

Instruments	2014 Dec 15	2014 Dec 16	2014 Dec 17	2014 Dec 18
Federal funds (effective) [1] [2] [3]	0.11	0.12	0.13	0.13
Commercial Paper [3] [4] [5] [6]				
Nonfinancial				
1-month	0.08	0.09	0.13	0.12
2-month	0.10	0.10	0.14	0.14
3-month	0.11	0.12	0.14	0.17
Financial				
1-month	n.a.	0.09	0.09	n.a.
2-month	0.15	0.12	0.14	n.a.
3-month	0.16	0.15	0.16	0.15
Eurodollar deposits (London) [3] [7]				
1-month	0.17	0.17	0.17	0.17
3-month	0.24	0.24	0.24	0.30
6-month	0.36	0.36	0.36	0.35
Bank prime loan [2] [3] [8]	3.25	3.25	3.25	3.25
Discount window primary credit [2] [9]	0.75	0.75	0.75	0.75
U.S. government securities				
Treasury bills (secondary market) [3] [4]				
4-week	0.02	0.03	0.03	0.04

3-month	0.04	0.03	0.03	0.04
6-month	0.11	0.11	0.11	0.12
1-year	0.21	0.20	0.22	0.24
Treasury constant maturities				
Nominal [10]				
1-month	0.02	0.03	0.03	0.04
3-month	0.04	0.03	0.03	0.04
6-month	0.11	0.11	0.11	0.12
1-year	0.22	0.21	0.23	0.25
2-year	0.60	0.58	0.62	0.67
3-year	1.03	0.99	1.06	1.10
5-year	1.58	1.53	1.61	1.68
7-year	1.90	1.85	1.93	2.01
10-year	2.12	2.07	2.14	2.22
20-year	2.45	2.40	2.46	2.54
30-year	2.74	2.69	2.74	2.82
Inflation indexed [11]				
5-year	0.41	0.32	0.39	0.48
7-year	0.47	0.38	0.44	0.56
10-year	0.50	0.42	0.49	0.57
20-year	0.69	0.62	0.67	0.77
30-year	0.84	0.77	0.81	0.91
Inflation-indexed long-term average [12]	0.70	0.62	0.67	0.77
Interest rate swaps [13]				
1-year	0.40	0.39	0.40	0.42
2-year	0.82	0.79	0.80	0.86
3-year	1.21	1.18	1.19	1.27
4-year	1.51	1.47	1.49	1.58
5-year	1.71	1.68	1.69	1.80
7-year	1.99	1.95	1.96	2.09
10-year	2.25	2.21	2.21	2.35
30-year	2.73	2.68	2.67	2.78
Corporate bonds				
Moody's seasoned				
Aaa [14]	3.70	3.70	3.75	3.80

Baa	4.68	4.67	4.74	4.78
State & local bonds [15]				3.65
Conventional mortgages [16]				3.80

n.a. Not available.

Footnotes

1. The daily effective federal funds rate is a weighted average of rates on brokered trades.

2. Weekly figures are averages of 7 calendar days ending on Wednesday of the current week; monthly figures include each calendar day in the month.

3. Annualized using a 360-day year or bank interest.

4. On a discount basis.

5. Interest rates interpolated from data on certain commercial paper trades settled by The Depository Trust Company. The trades represent sales of commercial paper by dealers or direct issuers to investors (that is, the offer side). The 1-, 2-, and 3-month rates are equivalent to the 30-, 60-, and 90-day dates reported on the Board's Commercial Paper Web page (www.federalreserve.gov/releases/cp/).

6. Financial paper that is insured by the FDIC's Temporary Liquidity Guarantee Program is not excluded from relevant indexes, nor is any financial or nonfinancial commercial paper that may be directly or indirectly affected by one or more of the Federal Reserve's liquidity facilities. Thus the rates published after September 19, 2008, likely reflect the direct or indirect effects of the new temporary programs and, accordingly, likely are not comparable for some purposes to rates published prior to that period.

7. Source: Bloomberg and CTRB ICAP Fixed Income & Money Market Products.

8. Rate posted by a majority of top 25 (by assets in domestic offices) insured U.S.-chartered commercial banks. Prime is one of several base rates used by banks to price short-term business loans.

9. The rate charged for discounts made and advances extended under the Federal Reserve's primary credit discount window program, which became effective January 9, 2003. This rate replaces that for adjustment credit, which was discontinued after January 8, 2003. For further information, see www.federalreserve.gov/boarddocs/press/bcreg/2002/20021031 2/default.htm. The rate reported is that for the Federal Reserve Bank of New York. Historical series for the rate on adjustment credit as well as the rate on primary credit are available at www.federalreserve.gov/releases/h15/data.htm.

10. Yields on actively traded non-inflation-indexed issues adjusted to constant maturities. The 30-year Treasury constant maturity series was discontinued on February 18, 2002, and reintroduced on February 9, 2006. From February 18, 2002, to February 9, 2006, the U.S. Treasury published a factor for adjusting the daily nominal 20-year constant maturity in order to estimate a 30-year nominal rate. The historical adjustment factor can be found at www.treasury.gov/resource-center/data-chart-center/interest-rates/. Source: U.S. Treasury.

11. Yields on Treasury inflation protected securities (TIPS) adjusted to constant maturities. Source: U.S. Treasury. Additional information on both nominal and inflation-indexed yields may be found at www.treasury.gov/resource-center/data-chart-

center/interest-rates/.

12. Based on the unweighted average bid yields for all TIPS with remaining terms to maturity of more than 10 years.

13. International Swaps and Derivatives Association (ISDA®) mid-market par swap rates. Rates are for a Fixed Rate Payer in return for receiving three month LIBOR, and are based on rates collected at 11:00 a.m. Eastern time by Thomson Reuters and published on Thomson Reuters Page ISDAFIX®1. ISDAFIX is a registered service mark of ISDA®. Source: Thomson Reuters.

14. Moody's Aaa rates through December 6, 2001, are averages of Aaa utility and Aaa industrial bond rates. As of December 7, 2001, these rates are averages of Aaa industrial bonds only. Data obtained from Bloomberg Finance L.P.

15. Bond Buyer Index, general obligation, 20 years to maturity, mixed quality; Thursday quotations. Data obtained from Bloomberg Finance L.P.

16. Contract interest rates on commitments for 30-year fixed-rate first mortgages. Source: Primary Mortgage Market Survey® data provided by Freddie Mac.

Note: Weekly and monthly figures on this release, as well as annual figures available on the Board's historical H.15 web site (see below), are averages of business days unless otherwise noted.

Current and historical H.15 data are available on the Federal Reserve Board's web site (www.federalreserve.gov/). For information about individual copies or subscriptions, contact Publications Services at the Federal Reserve Board (phone 202-452-3244, fax 202-728-5886).

Description of the Treasury Nominal and Inflation-Indexed Constant Maturity Series

Yields on Treasury nominal securities at "constant maturity" are interpolated by the U.S. Treasury from the daily yield curve for non-inflation-indexed Treasury securities. This curve, which relates the yield on a security to its time to maturity, is based on the closing market bid yields on actively traded Treasury securities in the over-the-counter market. These market yields are calculated from composites of quotations obtained by the Federal Reserve Bank of New York. The constant maturity yield values are read from the yield curve at fixed maturities, currently 1, 3, and 6 months and 1, 2, 3, 5, 7, 10, 20, and 30 years. This method provides a yield for a 10-year maturity, for example, even if no outstanding security has exactly 10 years remaining to maturity. Similarly, yields on inflation-indexed securities at "constant maturity" are interpolated from the daily yield curve for Treasury inflation protected securities in the over-the-counter market. The inflation-indexed constant maturity yields are read from this yield curve at fixed maturities, currently 5, 7, 10, 20, and 30 years.

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REUTERS CORPORATE BOND SPREAD TABLES

Reuters Corporate Spreads for Utilities
12/18/2014

Rating	1 yr	2 yr	3 yr	5 yr	7 yr	10 yr	30 yr
Aaa/AAA	10	14	19	26	37	51	70
Aa1/AA+	17	23	29	36	46	58	78
Aa2/AA	24	31	38	46	55	66	86
Aa3/AA-	31	40	47	56	64	74	95
A1/A+	38	49	57	66	74	81	103
A2/A	45	58	66	76	83	89	111
A3/A-	45	61	70	81	88	96	120
Baa1/BBB+	65	83	94	107	115	125	153
Baa2/BBB	71	90	100	114	123	132	161
Baa3/BBB-	93	125	144	167	183	199	250
Ba1/BB+	203	217	231	247	259	272	287
Ba2/BB	233	248	264	281	294	308	324
Ba3/BB-	263	279	296	314	328	344	361
B1/B+	298	315	333	352	368	385	403
B2/B	328	346	365	386	403	421	440
B3/B-	357	377	397	419	437	456	477
Caa/CCC+	392	413	434	457	476	497	519
US Treasury Yield	0.25	0.67	1.10	1.68	2.01	2.22	2.82

Spread values represent basis points (bps) over a US Treasury security of the same maturity, or the closest matching maturity.

Methodology:
Reuters Pricing Service (RPS) has eight experienced evaluators responsible for pricing approximately 20,000 investment grade corporate bonds. Corporate bonds are segregated into four industry sectors; industrial, financial, transports and utilities. RPS prices corporate bonds at a spread above an underlying treasury issue. The evaluators obtain the spreads from brokers and traders at various firms. A generic spread for each sector is created using input from street contacts and the evaluator's expertise. A matrix is then developed based on sector, rating, and maturity.

US Treasury Yields for this date are available in the BondsOnline Chart Center

Save to Portfolio | Export to Spreadsheet | Re-Run this Request