

**COMMONWEALTH OF KENTUCKY**

**BEFORE THE PUBLIC SERVICE COMMISSION**

**IN THE MATTER OF:**

**APPLICATION OF COLUMBIA GAS )  
OF KENTUCKY, INC. FOR AN ) CASE NO. 2016-00162  
ADJUSTMENT IN RATES )**

**DIRECT TESTIMONY**

**AND EXHIBITS**

**OF**

**RICHARD A. BAUDINO**

**ON BEHALF OF THE**

**OFFICE OF THE ATTORNEY GENERAL**

**J. Kennedy and Associates, Inc.  
570 Colonial Park Drive, Suite 305  
Roswell, GA 30075**

**SEPTEMBER 2, 2016**

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DIRECT TESTIMONY OF RICHARD A. BAUDINO

I. QUALIFICATIONS AND SUMMARY

1 Q. Please state your name and business address.

2 A. My name is Richard A. Baudino. My business address is J. Kennedy and Associates,  
3 Inc. (“Kennedy and Associates”), 570 Colonial Park Drive, Suite 305, Roswell,  
4 Georgia 30075.

5 Q. What is your occupation and by whom are you employed?

6 A. I am a consultant with Kennedy and Associates.

7 Q. Please describe your education and professional experience.

8 A. I received my Master of Arts degree with a major in Economics and a minor in  
9 Statistics from New Mexico State University in 1982. I also received my Bachelor  
10 of Arts Degree with majors in Economics and English from New Mexico State in  
11 1979.

12

13 I began my professional career with the New Mexico Public Service Commission  
14 Staff in October 1982 and was employed there as a Utility Economist. During my  
15 employment with the Staff, my responsibilities included the analysis of a broad range  
16 of issues in the ratemaking field. Areas in which I testified included cost of service,

1 rate of return, rate design, revenue requirements, analysis of sale/leasebacks of  
2 generating plants, utility finance issues, and generating plant phase-ins.

3  
4 In October 1989, I joined the utility consulting firm of Kennedy and Associates as a  
5 Senior Consultant where my duties and responsibilities covered substantially the  
6 same areas as those during my tenure with the New Mexico Public Service  
7 Commission Staff. I became Manager in July 1992 and was named Director of  
8 Consulting in January 1995. Currently, I am a consultant with Kennedy and  
9 Associates.

10  
11 Exhibit \_\_\_\_ (RAB-1) summarizes my expert testimony experience.

12 **Q. On whose behalf are you testifying?**

13 A. I am testifying on behalf of the Office of the Attorney General of the Commonwealth  
14 of Kentucky ("AG").

15 **Q. What is the purpose of your Direct Testimony?**

16 A. The purpose of my Direct Testimony is to address the allowed return on equity for  
17 Columbia Gas of Kentucky, Inc. ("Columbia" or "Company"). I will also address the  
18 Company's requested cost of short-term debt. Finally, I will respond to the Direct  
19 Testimony of Mr. Paul Moul, witness for the Company.

20 **Q. Please summarize your conclusions and recommendations.**

21 A. My conclusions and recommendations are as follows.

22

1 First, I recommend that the Kentucky Public Service Commission ("Commission")  
2 adopt a fair rate of return on equity of 9.0% for Columbia. My recommended return  
3 on equity ("ROE") is based on a Discounted Cash Flow ("DCF") analysis using a  
4 comparison group of regulated gas distribution companies. My recommended 9.0%  
5 ROE is completely consistent with current stock market data, expected growth rates,  
6 and today's low interest rate environment.

7  
8 Second, I recommend that the Commission reject Columbia's requested cost of short-  
9 term debt. Columbia requested a short-term debt cost of 2.50%. This requested  
10 interest cost greatly exceeds the cost associated with NiSource Inc.'s ("NiSource")  
11 short-term credit facilities. NiSource reported in its 2015 10-K report that its cost of  
12 commercial paper for 2015 was 1.0% and 0.82% for 2014. Instead, I recommend  
13 that the Commission adopt a cost of short-term debt for Columbia of 1.0%.

14  
15 Third, I recommend that the Commission reject Mr. Moul's recommended 11.0%  
16 cost of equity. For reasons that I shall explain in Section IV of my testimony, a cost  
17 of equity of 11.0% is grossly overstated, inconsistent with current market required  
18 returns, and would result in an excessive and burdensome revenue requirement for  
19 Columbia's Kentucky ratepayers.

20

## II. REVIEW OF ECONOMIC AND FINANCIAL CONDITIONS

1  
2 **Q. Mr. Baudino, what has the trend been in long-term capital costs over the last**  
3 **few years?**

4 A. Generally speaking, interest rates have declined over the last few years. Exhibit  
5 \_\_\_\_ (RAB-2) presents a graphic depiction of the trend in interest rates from January  
6 2008 through July 2016. The interest rates shown in this exhibit are for the 20-year  
7 U.S. Treasury Bond and the average public utility bond from the Mergent Bond  
8 Record. In January 2008, the average public utility bond yield was 6.08% and the  
9 20-year Treasury Bond yield was 4.35%. As of July 2016 the average public utility  
10 bond yield was 3.70%, representing a decline of 238 basis points, or 2.38 percentage  
11 points, from January 2008. Likewise, the 20-year Treasury bond declined to 1.82%  
12 in July 2016, a decline of 2.53 percentage points (253 basis points) from January  
13 2008.

14 **Q. Was there a significant change in Federal Reserve policy during the historical**  
15 **period shown in Exhibit \_\_\_\_ (RAB-2)?**

16 A. Yes. In response to the 2007 financial crisis and severe recession that followed in  
17 December 2007, the Federal Reserve ("Fed") undertook a series of steps to stabilize  
18 the economy, ease credit conditions, and lower unemployment and interest rates.  
19 These steps are commonly known as Quantitative Easing ("QE") and were  
20 implemented in three distinct stages: QE1, QE2, and QE3. The Fed's stated purpose

1 of QE was "to support the liquidity of financial institutions and foster improved  
2 conditions in financial markets."<sup>1</sup>

3  
4 QE1 was implemented from November 2008 through approximately March 2010.  
5 During this time, the Fed cut its key Federal Funds Rate to nearly 0% and purchased  
6 \$1.25 trillion of mortgage-backed securities and \$175 billion of agency debt  
7 purchases.

8  
9 QE2 was implemented in November 2010 with the Fed announcing that it would  
10 purchase an additional \$600 billion of Treasury securities by the second quarter of  
11 2011.<sup>2</sup>

12  
13 Beginning in September 2011, the Federal Reserve initiated a "maturity extension  
14 program" in which it sold or redeemed \$667 billion of shorter-term Treasury  
15 securities and used the proceeds to buy longer-term Treasury securities. This  
16 program, also known as "Operation Twist" was designed by the Federal Reserve to  
17 lower long-term interest rates and support the economic recovery.

18  
19 QE3 began in September 2012 with the Fed announcing an additional bond  
20 purchasing program of \$40 billion per month of agency mortgage backed securities.

---

<sup>1</sup> [http://www.federalreserve.gov/monetarypolicy/bst\\_crisisresponse.htm](http://www.federalreserve.gov/monetarypolicy/bst_crisisresponse.htm)

<sup>2</sup> <http://www.federalreserve.gov/newsevents/press/monetary/20101103a.htm>

1 On June 19, 2013, the Federal Open Market Committee (“FOMC”) issued a press  
2 release indicating that it intended to extend "Operation Twist." In its press release,  
3 the Federal Reserve stated:

4 To support a stronger economic recovery and to help ensure  
5 that inflation, over time, is at the rate most consistent with its  
6 dual mandate, the Committee decided to continue purchasing  
7 additional agency mortgage-backed securities at a pace of \$40  
8 billion per month and longer-term Treasury securities at a pace  
9 of \$45 billion per month. The Committee is maintaining its  
10 existing policy of reinvesting principal payments from its  
11 holdings of agency debt and agency mortgage-backed  
12 securities in agency mortgage-backed securities and of rolling  
13 over maturing Treasury securities at auction. Taken together,  
14 these actions should maintain downward pressure on longer-  
15 term interest rates, support mortgage markets, and help to  
16 make broader financial conditions more accommodative.

17 More recently, the Federal Reserve began to pare back its purchases of securities.  
18 For example, on January 29, 2014 the Federal Reserve stated that beginning in  
19 February 2014 it would reduce its purchases of long-term Treasury securities to \$35  
20 billion per month. The Federal Reserve continued to reduce these purchases  
21 throughout the year and in a press release issued October 29, 2014 announced that it  
22 decided to close this asset purchase program in October.<sup>3</sup>

23 **Q. Since the Federal Reserve's announcements of scaling back and finally ending**  
24 **its purchases of long-term Treasury securities, what has the trend been in long-**  
25 **term Treasury yields from 2014 through 2016?**

26 A. The yield on the 20-year Treasury bond has actually declined since the beginning of  
27 2014. The January 2014 yield on the 20-year Treasury bond was 3.52%. The

---

<sup>3</sup> <http://www.federalreserve.gov/newsevents/press/monetary/20141029a.htm>



1 closing yield for July 2016 was 1.82%, a decline of 170 basis points since January  
2 2014.

3 **Q. Has the Federal Reserve recently indicated any important changes to its**  
4 **monetary policy?**

5 A. Yes. Recently the Federal Reserve raised its target range for the federal funds rate to  
6 1/4% to 1/2% from 0% to 1/4%. The Federal Reserve also issued a press release  
7 dated June 15, 2016 from the Federal Open Market Committee stating the following:

8 Consistent with its statutory mandate, the Committee seeks to  
9 foster maximum employment and price stability. The  
10 Committee currently expects that, with gradual adjustments in  
11 the stance of monetary policy, economic activity will expand  
12 at a moderate pace and labor market indicators will strengthen.  
13 Inflation is expected to remain low in the near term, in part  
14 because of earlier declines in energy prices, but to rise to 2  
15 percent over the medium term as the transitory effects of past  
16 declines in energy and import prices dissipate and the labor  
17 market strengthens further. The Committee continues to  
18 closely monitor inflation indicators and global economic and  
19 financial developments.

20 Against this backdrop, the Committee decided to maintain the  
21 target range for the federal funds rate at 1/4 to 1/2 percent. The  
22 stance of monetary policy remains accommodative, thereby  
23 supporting further improvement in labor market conditions  
24 and a return to 2 percent inflation.

25 Note that the stance of the Federal Reserve is one of accommodation and that it  
26 decided to maintain short-term interest rates at their present levels. This continues to  
27 favor lower expected returns on the part of investors for lower risk and higher  
28 yielding regulated utility stocks.

29 **Q. Why is it important to understand the Fed's actions with respect to monetary**  
30 **policy since 2007?**

1 A. The Fed's monetary policy actions since 2007 were deliberately undertaken to lower  
2 interest rates and support economic recovery. The Fed's actions have been quite  
3 successful in lowering interest rates given that the 20-year Treasury Bond yield in  
4 June 2007 was 5.29% and the public utility bond yield was 6.34%. The U.S.  
5 economy is currently in a low interest rate environment that, in my opinion, will  
6 likely continue at least through this year. As I will demonstrate later in my  
7 testimony, low interest rates have also significantly lowered investors' required  
8 return on equity for the stocks of regulated utilities.

9 **Q. Are current interest rates indicative of investor expectations regarding future**  
10 **policy actions by the Federal Reserve?**

11 A. Yes. Securities markets are efficient and most likely reflect investors' expectations  
12 about future interest rates. As Dr. Roger Morin pointed out in *New Regulatory*  
13 *Finance*:

14 "A considerable body of empirical evidence indicates that U.S. capital  
15 markets are efficient with respect to a broad set of information, including  
16 historical and publicly available information."<sup>4</sup>  
17

18 I acknowledge that the U.S. economy is operating in a low interest rate environment.  
19 It is likely at some point in the near future that the Federal Reserve will raise short-  
20 term interest rates further. However, the timing and the level of any such move are  
21 not known at this time. It is important to realize that investor expectations of higher  
22 interest rates, if any, are already embodied in current securities prices, which include  
23 debt securities and stock prices.

---

<sup>4</sup> Morin, Roger A., *New Regulatory Finance*, Public Utilities Reports, Inc. (2006) at 279.

1

2

The current low interest rate environment favors lower risk regulated utilities. As I

3

shall demonstrate in Section III, all the market evidence I examined suggests that

4

investors require lower rates of return on equity on regulated utility stocks.

5

**Q. Has the Federal Reserve recently signaled its intentions as to whether it will increase interest rates this year?**

6

7

A. The Federal Reserve Open Market Committee noted the following in its Minutes of

8

the Meeting of July 26 - 27, 2016:

9

"Against this backdrop, the Committee decided to maintain the target range for the federal funds rate at  $\frac{1}{4}$  to  $\frac{1}{2}$  percent. The stance of monetary policy remains accommodative, thereby supporting further improvement in labor market conditions and a return to 2 percent inflation.

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In determining the timing and size of future adjustments to the target range for the federal funds rate, the Committee will assess realized and expected economic conditions relative to its objectives of maximum employment and 2 per-cent inflation. This assessment will take into account a wide range of information, including measures of labor market conditions, indicators of inflation pressures and inflation expectations, and readings on financial and international developments. In light of the current shortfall of inflation from 2 percent, the Committee will carefully monitor actual and expected progress toward its inflation goal. The Committee expects that economic conditions will evolve in a manner that will warrant only gradual increases in the federal funds rate; the federal funds rate is likely to remain, for some time, below levels that are expected to prevail in the longer run. However, the actual path of the federal funds rate will depend on the economic outlook as informed by incoming data."<sup>5</sup>

28

My reading of this recent statement indicates that the Federal Reserve will continue

29

30

its accommodative stance toward monetary policy and will not increase interest rates

---

<sup>5</sup>

*Minutes of the Federal Open Market Committee, July 26 - 27, 2016, pages 13 and 14.*

1 at this time. However, future increases are likely to be gradual and the target Federal  
2 Funds Rate will continue to remain low for the near future.

3 **Q. How does the investment community regard the regulated gas distribution**  
4 **industry as a whole?**

5 A. The Value Line Investment Survey's June 3, 2016 summary report on the Natural  
6 Gas Utility industry noted the following:

7 "Stocks within the Natural Gas Utility Industry ought to attract the interest of  
8 income-focused investors with a conservative bent, given that a number of these  
9 issues are ranked favorably for Safety and boast high marks for Price Stability.  
10 Those seeking outstanding short-term investment performance should find  
11 something to like here, too, such as Atmos Energy, Southwest Gas, UGI Corp. and  
12 Spire Inc. (formerly Laclede Group). It is important to mention that companies  
13 owning larger nonregulated operations might offer a higher potential for returns, but  
14 profits could be more volatile than for companies with a greater emphasis on the  
15 more stable utility segment."

16 **Q. What do you conclude from the aforementioned quote from Value Line?**

17 A. Utilities in general and gas utilities in particular continue to be safe, solid stock  
18 choices for investors. Even with uncertainty regarding the Federal Reserve's future  
19 moves on interest rates, utilities' stock prices have made solid gains since the  
20 beginning of 2016. For example, the Dow Jones utility average opened January  
21 2016 at 574.51 and closed at 711.42 on July 31, 2016. This represents a gain of  
22 23.8% since the beginning of this year.

23  
24 It appears that the Fed will continue a relatively accommodating stance with respect  
25 to monetary policy in 2016 and has signaled that it does not intend to raise short-term  
26 interest rates at this time. The volatile economic conditions that were present in the  
27 2008 - 2009 period are over and the U.S. economy continues to recover from the  
28 recession of 2007-2008.

1 **Q. Briefly describe Columbia Gas.**

2 A. Columbia Gas of Kentucky, Inc. is part of the Gas Distribution Operations segment  
 3 of NiSource, Inc. According to NiSource's Form 10-K for the period ending  
 4 12/31/2015, its Gas Distribution Operations "serves approximately 3.4 million  
 5 customers in seven states and operate approximately 59,000 miles of pipeline."<sup>6</sup>  
 6 Columbia Gas is one of seven regulated gas utility companies owned by NiSource.  
 7 Columbia Gas of Kentucky serves 135,000 customers within Kentucky through  
 8 approximately 2,600 miles of distribution mains.

9

10 Table 1 below provides several descriptive statistics illustrating recent financial data  
 11 for Columbia. This data was derived from Schedule K of the Company's filing and  
 12 from Columbia's response to AG 1-27.

| <b>TABLE 1</b>                                                  |             |             |             |             |             |
|-----------------------------------------------------------------|-------------|-------------|-------------|-------------|-------------|
| <b>Columbia Gas of Kentucky</b>                                 |             |             |             |             |             |
| <b>Selected Statistics</b>                                      |             |             |             |             |             |
|                                                                 | <u>2015</u> | <u>2014</u> | <u>2013</u> | <u>2012</u> | <u>2011</u> |
| Net Plant in Service (000s)                                     | 252,682     | 228,421     | 202,629     | 187,268     | 174,577     |
| Return on Equity (%)                                            | 9.83%       | 11.25%      | 10.78%      | 9.20%       | 11.78%      |
| AFUDC - % of Net Income                                         | 0.95%       | 1.26%       | 0.95%       | 0.49%       | 0.17%       |
| Embedded Cost of Short-term Debt                                | 0.72%       | 0.81%       | 0.71%       | 1.28%       | 1.62%       |
| Embedded Cost of Long-term Debt                                 | 5.82%       | 5.82%       | 5.89%       | 5.68%       | 5.88%       |
| Sources: Schedule K, Columbia Response to AG 1-27, Attachment A |             |             |             |             |             |

13  
14

---

<sup>6</sup> NiSource, Inc. Form 10-K, filed 02/18/16 for the Period Ending 12/31/15, page 6.

1 Since 2011, Columbia increased its net plant in service by 44.7%. The Commission-  
2 approved Accelerated Main Replacement Program ("AMRP") has supported this  
3 increase. On page 12 of his Direct Testimony, Company witness Herbert Miller  
4 noted that since the program began in 2008, Columbia replaced more than 108 miles  
5 of its priority pipe and associated services and appurtenances using the AMRP.  
6 Total return on equity over the last five years has ranged from 9.83% to 11.78%.<sup>7</sup>  
7 The amount of Allowance for Funds Used During Construction as a percentage of  
8 Columbia's net income has been low, ranging from 0.17% to 1.26%.

9 **Q. Does Columbia have its own credit and bond ratings?**

10 A. No. As part of the Gas Distribution Operations segment, Columbia does not have its  
11 own credit ratings.

12 **Q. What are the current credit ratings for NiSource?**

13 A. NiSource currently carries a BBB+ credit rating from Standard and Poor's ("S&P"), a  
14 Baa2 rating from Moody's, and a BBB rating from Fitch.

15  
16 Effective July 1, 2015 NiSource effectuated a corporate separation of Columbia  
17 Pipeline Group. NiSource and Columbia Pipeline are now two separate publicly  
18 traded companies. This separation resulted in S&P raising NiSource's Issuer Credit

---

<sup>7</sup> Columbia noted the following in its response to AG 1-27: "Please note that the calculation of ROE is based on actual unadjusted net income and common equity as shown in Columbia's financial statements and, therefore, includes items that are non-utility in nature and, accordingly, are not included in the determination of a revenue requirement for the purposes of developing base rates."

1 Rating ("ICR") from BBB- to BBB+, an upgrade of two notches. In its June 18,  
2 2015 report on NiSource, S&P noted the following:

3 NiSource is nearing the spin-off of the higher-risk pipeline and midstream energy  
4 business, Columbia Pipeline Group (CPG), resulting in sufficient improvement in  
5 business risk to revise the company's business risk profile to "excellent" from  
6 "strong". Following this divestiture, NiSource's pro forma operating earnings will be  
7 about two-thirds low-risk regulated natural gas distribution utility operations and  
8 one-third vertically integrated electric utility operations. The "excellent" business  
9 risk assessment incorporates NiSource's focus only on regulated utility operations  
10 where there is geographical and operating diversity with numerous utilities that serve  
11 more than 3.3 million natural gas distribution customers in seven states from Indiana  
12 to Massachusetts and 450,000 electricity customers in northern Indiana."

13  
14 We base our assessment of NiSource's business risk profile on the company's  
15 "strong" competitive position and "very low" industry risk derived from the  
16 regulated utility industry and the "very low" country risk of the U.S. where the  
17 company operates. NiSource's competitive position partly reflects the stable  
18 regulatory framework of the low-risk regulated utility operations. We consider the  
19 company's gas distribution operations to be above average, characterized by ample  
20 geographic diversity and integration with the company's gas transmission network,  
21 which provides operational flexibility. Nearly all of the gas distribution subsidiaries'  
22 needs are contracted, with roughly 70% of peak gas needs met with storage gas. This  
23 bolsters service reliability, thereby supporting the business risk profile. Cash flow  
24 variability is also low given material revenue stabilization and cost-tracking  
25 mechanisms.<sup>8</sup>  
26

27 Moody's June 18, 2015 report on NiSource noted the following rating drivers:

- 28 • "NiSource set to become a fully regulated utility company on 1 July 2015
- 29 • Persistent high debt balance and elevated investment spend weigh on  
30 financial profile
- 31 • Stability of cash flows underpinned by supportive regulatory constructs that  
32 largely offset high leverage

---

<sup>8</sup> Columbia response to AG 1-26, Attachment O, pages 2 and 3.

- 1           • Regulated utility assets carry low business risk"<sup>9</sup>

2   **Q.    What is your overall assessment of Columbia's riskiness?**

3   A.    Columbia is a low-risk regulated gas distribution company that adds revenue and  
4       earnings stability to NiSource. The Commission-approved AMRP has successfully  
5       supported Columbia's capital expenditures since 2008. The Company's return on  
6       equity has been supported by excellent earnings quality, with AFUDC being a small  
7       percentage of its total net income.

8  
9       In terms of the investor required return on equity for Columbia, it is reasonable to  
10      rely on a comparison group of regulated gas distribution utilities. In my opinion and  
11      based on my review of the credit rating reports for NiSource, Columbia's overall risk  
12      profile is reasonably comparable to an average gas distribution company.

13  

---

<sup>9</sup> Columbia response to AG 1-26, Attachment P, page 2.



### III. DETERMINATION OF FAIR RATE OF RETURN

1  
2 **Q. Please describe the methods you employed in estimating a fair rate of return for**  
3 **Columbia.**

4 A. I employed a Discounted Cash Flow (“DCF”) analysis using a group of regulated gas  
5 distribution utilities. In my opinion, they form a reasonable basis for estimating the  
6 investor required return on equity for Columbia.

7  
8 My DCF analysis is my standard constant growth form of the model that employs  
9 four different growth rate forecasts from the Value Line Investment Survey, IBES,  
10 and Zacks. I also employed Capital Asset Pricing Model (“CAPM”) analyses using  
11 both historical and forward-looking data. Although I did not rely on the CAPM for  
12 my recommended 9.0% ROE for Columbia, the results from the CAPM tend to  
13 support this recommendation.

14 **Q. What are the main guidelines to which you adhere in estimating the cost of**  
15 **equity for a firm?**

16 A. Generally speaking, the estimated cost of equity should be comparable to the returns  
17 of other firms with similar risk structures and should be sufficient for the firm to  
18 attract capital. These are the basic standards set out by the United States Supreme  
19 Court in Federal Power Comm'n v. Hope Natural Gas Co., 320 U.S. 591 (1944) and  
20 Bluefield W.W. & Improv. Co. v. Public Service Comm'n, 262 U.S. 679 (1922).

21  
22 From an economist’s perspective, the notion of “opportunity cost” plays a vital role  
23 in estimating the return on equity. One measures the opportunity cost of an  
24 investment equal to what one would have obtained in the next best alternative. For

1 example, let us suppose that an investor decides to purchase the stock of a publicly  
2 traded electric utility. That investor made the decision based on the expectation of  
3 dividend payments and perhaps some appreciation in the stock's value over time;  
4 however, that investor's opportunity cost is measured by what she or he could have  
5 invested in as the next best alternative. That alternative could have been another  
6 utility stock, a utility bond, a mutual fund, a money market fund, or any other  
7 number of investment vehicles.

8  
9 The key determinant in deciding whether to invest, however, is based on  
10 comparative levels of risk. Our hypothetical investor would not invest in a particular  
11 electric company stock if it offered a return lower than other investments of similar  
12 risk. The opportunity cost simply would not justify such an investment. Thus, the  
13 task for the rate of return analyst is to estimate a return that is equal to the return  
14 being offered by other risk-comparable firms.

15 **Q. What are the major types of risk faced by utility companies?**

16 A. In general, risk associated with the holding of common stock can be separated into  
17 three major categories: business risk, financial risk, and liquidity risk. Business risk  
18 refers to risks inherent in the operation of the business. Volatility of the firm's sales,  
19 long-term demand for its product(s), the amount of operating leverage, and quality of  
20 management are all factors that affect business risk. The quality of regulation at the  
21 state and federal levels also plays an important role in business risk for regulated  
22 utility companies.

23

1 Financial risk refers to the impact on a firm's future cash flows from the use of debt  
2 in the capital structure. Interest payments to bondholders represent a prior call on the  
3 firm's cash flows and must be met before income is available to the common  
4 shareholders. Additional debt means additional variability in the firm's earnings,  
5 leading to additional risk.

6  
7 Liquidity risk refers to the ability of an investor to quickly sell an investment without  
8 a substantial price concession. The easier it is for an investor to sell an investment  
9 for cash, the lower the liquidity risk will be. Stock markets, such as the New York  
10 and American Stock Exchanges, help ease liquidity risk substantially. Investors who  
11 own stocks that are traded in these markets know on a daily basis what the market  
12 prices of their investments are and that they can sell these investments fairly quickly.  
13 Many regulated utility stocks are traded on the New York Stock Exchange and are  
14 considered liquid investments.

15 **Q. Are there any sources available to investors that quantify the total risk of a**  
16 **company?**

17 **A.** Bond and credit ratings are tools that investors use to assess the risk comparability of  
18 firms. Bond rating agencies such as Moody's and Standard and Poor's perform  
19 detailed analyses of factors that contribute to the risk of a particular investment. The  
20 end result of their analyses is a bond and/or credit rating that reflect these risks.

### 21 **Discounted Cash Flow ("DCF") Model**

22 **Q. Please describe the basic DCF approach.**

1 A. The basic DCF approach is rooted in valuation theory. It is based on the premise that  
 2 the value of a financial asset is determined by its ability to generate future net cash  
 3 flows. In the case of a common stock, those future cash flows generally take the  
 4 form of dividends and appreciation in stock price. The value of the stock to  
 5 investors is the discounted present value of future cash flows. The general equation  
 6 then is:

$$V = \frac{R}{(1+r)} + \frac{R}{(1+r)^2} + \frac{R}{(1+r)^3} + \dots + \frac{R}{(1+r)^n}$$

7           Where:        *V = asset value*  
 8                                *R = yearly cash flows*  
 9                                *r = discount rate*

10 This is no different from determining the value of any asset from an economic point  
 11 of view; however, the commonly employed DCF model makes certain simplifying  
 12 assumptions. One is that the stream of income from the equity share is assumed to  
 13 be perpetual; that is, there is no salvage or residual value at the end of some maturity  
 14 date (as is the case with a bond). Another important assumption is that financial  
 15 markets are reasonably efficient; that is, they correctly evaluate the cash flows  
 16 relative to the appropriate discount rate, thus rendering the stock price efficient  
 17 relative to other alternatives. Finally, the model I typically employ also assumes a  
 18 constant growth rate in dividends. The fundamental relationship employed in the  
 19 DCF method is described by the formula:

$$k = D_1/P_0 + g$$

1                   Where:        *D*<sub>1</sub> = the next period dividend  
 2                                    *P*<sub>0</sub> = current stock price  
 3                                    *g* = expected growth rate  
 4                                    *k* = investor-required return

5                   Embodied in this formula, it is assumed that “k” reflects the investors’ expected  
 6                   return. Use of the DCF method to determine an investor-required return is  
 7                   complicated by the need to express investors’ expectations relative to dividends,  
 8                   earnings, and book value over an infinite time horizon. Financial theory suggests  
 9                   that stockholders purchase common stock on the assumption that there will be some  
 10                  change in the rate of dividend payments over time. We assume that the rate of  
 11                  growth in dividends is constant over the assumed time horizon, but the model could  
 12                  easily handle varying growth rates if we knew what they were. Finally, the relevant  
 13                  time frame is prospective rather than retrospective.

14   **Q.    What was your first step in conducting your DCF analysis for Columbia?**

15   A.    My first step was to construct a comparison group of companies with a risk profile  
 16           that is reasonably similar to Columbia. As a part of NiSource, Columbia is not a  
 17           publicly traded company and, therefore, has no stock price and growth forecasts to  
 18           use in a DCF analysis. Therefore, a group of natural gas distribution companies  
 19           must be employed to estimate an investor required ROE for Columbia.

20  
 21           For purposes of this case, I will adopt the gas distribution group that Company  
 22           witness Paul Moul employed. Mr. Moul's group provides a reasonable basis for  
 23           estimating the cost of equity for Columbia.

1 **Q. What was your first step in determining the DCF return on equity for the**  
2 **comparison groups of regulated gas utilities?**

3 A. I first determined the current dividend yield,  $D_1/P_0$ , from the basic equation. My  
4 general practice is to use six months as the most reasonable period over which to  
5 estimate the dividend yield. The six-month period I used covered the months from  
6 February through July 2016. I obtained historical prices and dividends from Yahoo!  
7 Finance. The annualized dividend divided by the average monthly price represents  
8 the average dividend yield for each month in the period.

9

10 The resulting average dividend yield for the gas distribution group is 2.78%. These  
11 calculations are shown in Exhibit \_\_\_\_ (RAB-3).

12 **Q. Having established the average dividend yield, how did you determine the**  
13 **investors' expected growth rate for the comparison groups?**

14 A. The investors' expected growth rate, in theory, correctly forecasts the constant rate  
15 of growth in dividends. The dividend growth rate is a function of earnings growth  
16 and the payout ratio, neither of which is known precisely for the future. We refer to  
17 a perpetual growth rate since the DCF model has no arbitrary cut-off point. We must  
18 estimate the investors' expected growth rate because there is no way to know with  
19 absolute certainty what investors expect the growth rate to be in the short term, much  
20 less in perpetuity.

21

22 For my analysis in this proceeding, I used three major sources of analysts' forecasts  
23 for growth. These sources are The Value Line Investment Survey, Zacks, and

1 Thomson/IBES. This is the method I typically use for estimating growth for my  
2 DCF calculations.

3 **Q. Please briefly describe Value Line, Zacks, and Thomson/IBES.**

4 A. The Value Line Investment Survey is a widely used and respected source of investor  
5 information that covers approximately 1,700 companies in its Standard Edition and  
6 several thousand in its Plus Edition. It is updated quarterly and probably represents  
7 the most comprehensive of all investment information services. It provides both  
8 historical and forecasted information on a number of important data elements. Value  
9 Line neither participates in financial markets as a broker nor works for the utility  
10 industry in any capacity of which I am aware.

11  
12 Zacks gathers opinions from a variety of analysts on earnings growth forecasts for  
13 numerous firms including regulated gas utilities. The estimates of the analysts  
14 responding are combined to produce consensus average estimates of earnings  
15 growth. I obtained Zacks' earnings growth forecasts from its web site.

16  
17 Like Zacks, Thomson/IBES also compiles and reports consensus analysts' forecasts  
18 of earnings growth. I obtained these forecasts from Yahoo! Finance.

19 **Q. Why did you rely on analysts' forecasts in your analysis?**

20 A. Return on equity analysis is a forward-looking process. Five-year or ten-year  
21 historical growth rates may not accurately represent investor expectations for future  
22 dividend growth. Analysts' forecasts for earnings and dividend growth provide  
23 better proxies for the expected growth component in the DCF model than historical

1 growth rates. Analysts' forecasts are also widely available to investors and one can  
2 reasonably assume that they influence investor expectations.

3 **Q. Please explain how you used analysts' dividend and earnings growth forecasts in**  
4 **your constant growth DCF analysis.**

5 Q. Columns (1) through (5) of Exhibit \_\_\_\_ (RAB-4) shows the forecasted dividend,  
6 earnings, and retention growth rates from Value Line and the earnings growth  
7 forecasts from Thomson/IBES and Zacks for the companies in the gas distribution  
8 group. In my analysis I used four of these growth rates: dividend and earnings  
9 growth from Value Line and earnings growth from Zacks and Thomson/IBES. It is  
10 important to include dividend growth forecasts in the DCF model since the model  
11 calls for forecasted cash flows. Value Line is the only source of which I am aware  
12 that forecasts dividend growth and my approach gives this forecast equal weight with  
13 each of the three earnings growth forecasts.

14 **Q. How did you proceed to determine the DCF return on equity for the two**  
15 **comparison groups?**

16 A. To estimate the expected dividend yield ( $D_1$ ), the current dividend yield must be  
17 moved forward in time to account for dividend increases over the next twelve  
18 months. I estimated the expected dividend yield by multiplying the current dividend  
19 yield by one plus one-half the expected growth rate.

20  
21 Exhibit \_\_\_\_ (RAB-4) presents my standard method of calculating dividend yields,  
22 growth rates, and return on equity for the gas distribution group of companies. The  
23 DCF Return on Equity Calculation section shows the application of each of four  
24 growth rates I used in my analysis to the current group dividend yield of 2.78% to



1 calculate the expected dividend yield. I then added the expected growth rates to the  
2 expected dividend yield. My DCF return on equity was calculated using two  
3 different methods. Method 1 uses the average growth rates and Method 2 utilizes the  
4 median growth rates.

5 **Q. What are the results of your constant growth DCF model?**

6 A. The results for Method 1 range from 7.66% to 9.17%, with the average of these  
7 results being 8.42%. The results for Method 2 range from 7.60% to 9.37%, with the  
8 average of these results being 8.71%.

9 **Capital Asset Pricing Model**

10 **Q. Briefly summarize the Capital Asset Pricing Model ("CAPM") approach.**

11 A. The theory underlying the CAPM approach is that investors, through diversified  
12 portfolios, may combine assets to minimize the total risk of the portfolio.  
13 Diversification allows investors to diversify away all risks specific to a particular  
14 company and be left only with market risk that affects all companies. Thus, the  
15 CAPM theory identifies two types of risks for a security: company-specific risk and  
16 market risk. Company-specific risk includes such events as strikes, management  
17 errors, marketing failures, lawsuits, and other events that are unique to a particular  
18 firm. Market risk includes inflation, business cycles, war, variations in interest rates,  
19 and changes in consumer confidence. Market risk tends to affect all stocks and  
20 cannot be diversified away. The idea behind the CAPM is that diversified investors  
21 are rewarded with returns based on market risk.

22

1 Within the CAPM framework, the expected return on a security is equal to the risk-  
2 free rate of return plus a risk premium that is proportional to the security's market, or  
3 non-diversifiable, risk. Beta is the factor that reflects the inherent market risk of a  
4 security and measures the volatility of a particular security relative to the overall  
5 market for securities. For example, a stock with a beta of 1.0 indicates that if the  
6 market rises by 15%, that stock will also rise by 15%. This stock moves in tandem  
7 with movements in the overall market. Stocks with a beta of 0.5 will only rise or fall  
8 50% as much as the overall market. So with an increase in the market of 15%, this  
9 stock will only rise 7.5%. Stocks with betas greater than 1.0 will rise and fall more  
10 than the overall market. Thus, beta is the measure of the relative risk of individual  
11 securities vis-à-vis the market.

12  
13 Based on the foregoing discussion, the equation for determining the return for a  
14 security in the CAPM framework is:

$$K = Rf + \beta(MRP)$$

15           Where:        *K*     = *Required Return on equity*  
16                            *Rf*    = *Risk-free rate*  
17                            *MRP* = *Market risk premium*  
18                            *β*     = *Beta*

19 This equation tells us about the risk/return relationship posited by the CAPM.  
20 Investors are risk averse and will only accept higher risk if they expect to receive  
21 higher returns. These returns can be determined in relation to a stock's beta and the  
22 market risk premium. The general level of risk aversion in the economy determines  
23 the market risk premium. If the risk-free rate of return is 3.0% and the required  
24 return on the total market is 15%, then the risk premium is 12%. Any stock's

1 required return can be determined by multiplying its beta by the market risk  
2 premium. Stocks with betas greater than 1.0 are considered riskier than the overall  
3 market and will have higher required returns. Conversely, stocks with betas less than  
4 1.0 will have required returns lower than the market as a whole.

5 **Q. In general, are there concerns regarding the use of the CAPM in estimating the**  
6 **return on equity?**

7 A. Yes. There is some controversy surrounding the use of the CAPM.<sup>10</sup> There is  
8 evidence that beta is not the primary factor for determining the risk of a security. For  
9 example, Value Line's "Safety Rank" is a measure of total risk, not its calculated  
10 beta coefficient. Beta coefficients usually describe only a small amount of total  
11 investment risk.

12  
13 There is also substantial judgment involved in estimating the required market return.  
14 In theory, the CAPM requires an estimate of the return on the total market for  
15 investments, including stocks, bonds, real estate, etc. It is nearly impossible for the  
16 analyst to estimate such a broad-based return. Often in utility cases, a market return  
17 is estimated using the S&P 500 or the return on Value Line's stock market  
18 composite. However, these are limited sources of information with respect to  
19 estimating the investor's required return for all investments. In practice, the total  
20 market return estimate faces significant limitations to its estimation and, ultimately,  
21 its usefulness in quantifying the investor required ROE.

---

<sup>10</sup> For a more complete discussion of some of the controversy surrounding the use of the CAPM, refer to *A Random Walk Down Wall Street* by Burton Malkiel, pp. 206 - 211, 2007 edition.

1

2

In the final analysis, a considerable amount of judgment must be employed in determining the risk-free rate and market return portions of the CAPM equation.

3

4

The analyst's application of judgment can significantly influence the results obtained

5

from the CAPM. My past experience with the CAPM indicates that it is prudent to

6

use a wide variety of data in estimating investor-required returns. Of course, the

7

range of results may also be wide, indicating the difficulty in obtaining a reliable

8

estimate from the CAPM.

9 **Q.**

**How did you estimate the market return portion of the CAPM?**

10 A.

The first source I used was the Value Line Investment Analyzer, Plus Edition, for

11

August 16, 2016. This edition covers several thousand stocks. The Value Line

12

Investment Analyzer provides a summary statistical report detailing, among other

13

things, forecasted growth rates for earnings and book value for the companies Value

14

Line follows as well as the projected total annual return over the next 3 to 5 years. I

15

present these growth rates and Value Line's projected annual return on page 2 of

16

Exhibit \_\_\_\_ (RAB-5). I included median earnings and book value growth rates.

17

The estimated market returns using Value Line's market data range from 9.84% to

18

10.0%. The average of these two market returns is 9.92%.

19 **Q.**

**Please continue with your market return analysis.**

20 A.

I also considered a supplemental check to the Value Line projected market return

21

estimates. Morningstar publishes a study of historical returns on the stock market in

22

its *Ibbotson SBBI 2015 Classic Yearbook*. Some analysts employ this historical data

23

to estimate the market risk premium of stocks over the risk-free rate. The

1 assumption is that a risk premium calculated over a long period of time is reflective  
2 of investor expectations going forward. Exhibit \_\_\_\_ (RAB-6) presents the  
3 calculation of the market returns using the historical data.

4 **Q. Please explain how this historical risk premium is calculated.**

5 A. Exhibit \_\_\_\_ (RAB-6) shows both the geometric and arithmetic average of yearly  
6 historical stock market returns over the historical period from 1926 - 2014. The  
7 average annual income return for 20-year Treasury bond is subtracted from these  
8 historical stocks returns to obtain the historical market risk premium of stock returns  
9 over long-term Treasury bond income returns. The historical market risk premium  
10 range is 5.03% - 7.03%.

11 **Q. Did you add an additional measure of the historical risk premium in this case?**

12 A. Yes. Morningstar reported the results of a study by Dr. Roger Ibbotson and Dr. Peng  
13 Chen indicating that the historical risk premium of stock returns over long-term  
14 government bond returns has been significantly influenced upward by substantial  
15 growth in the price/earnings ("P/E") ratio for stocks from 1980 through 2001.<sup>11</sup>  
16 Morningstar recommended adjusting this growth in the P/E ratio for stocks out of the  
17 historical risk premium because "it is not believed that P/E will continue to increase  
18 in the future." Morningstar's adjusted historical arithmetic market risk premium is  
19 6.19%, which I have also included in Exhibit \_\_\_\_ (RAB-6).

---

<sup>11</sup> 2015 Ibbotson S&P Classic Yearbook, Morningstar, pp. 156 - 158.

1 **Q. How did you determine the risk free rate?**

2 A. I used the average yields on the 20-year Treasury bond and five-year Treasury note  
3 over the six-month period from February through July 2016. The 20-year Treasury  
4 bond may be used as a proxy for the risk-free rate, but it contains a significant  
5 amount of interest rate risk. The five-year Treasury note carries less interest rate risk  
6 than the 20-year bond and is more stable than three-month Treasury bills. Therefore,  
7 I have employed both of these securities as proxies for the risk-free rate of return.  
8 This approach provides a reasonable range over which the CAPM return on equity  
9 may be estimated.

10 **Q. How did you determine the value for beta?**

11 A. I obtained the betas for the companies in the gas distribution group from most recent  
12 Value Line reports. The average of the Value Line betas for the comparison group is  
13 0.73.

14 **Q. Please summarize the CAPM results.**

15 A. For my forward-looking CAPM return on equity estimates, the CAPM results are  
16 7.53% - 7.77%. Using historical risk premiums, the CAPM results are 5.77% -  
17 7.22%.

18 **ROE Conclusions and Recommendations**

19 **Q. Please summarize the cost of equity results for your DCF and CAPM analyses.**

20 A. Table 2 below summarizes my return on equity results using the DCF and CAPM for  
21 my comparison group of companies.

**TABLE 2**  
**COLUMBIA GAS OF KY.**  
**ROE RESULTS SUMMARY**

DCF Results:

**Average Growth Rates, Gas Group**

|           |       |
|-----------|-------|
| - High    | 9.17% |
| - Low     | 7.66% |
| - Average | 8.42% |

**Median Growth Rates, Gas Group**

|           |       |
|-----------|-------|
| - High    | 9.63% |
| - Low     | 7.60% |
| - Average | 8.71% |

**CAPM:**

|                         |               |
|-------------------------|---------------|
| - 5-Year Treasury Bond  | 7.53%         |
| - 20-Year Treasury Bond | 7.77%         |
| - Historical Returns    | 5.77% - 7.22% |

1

2 **Q. What is your recommended return on equity for Columbia?**

3 A. I recommend that the Commission adopt a 9.0% return on equity for Columbia. My  
4 recommendation is consistent with the middle of the range of DCF results that  
5 employed earnings growth forecasts for the gas distribution group (8.25% - 9.63%).  
6 Based on current market evidence, a 9.0% return on equity is fair and reasonable,  
7 even generous for a regulated natural gas distribution company such as Columbia  
8 Gas.

9 **Q. Mr. Baudino, are you concerned that your recommended cost of equity is too**  
10 **low?**

11 A. No, not at all. All of the market evidence I examined fully supports my ROE  
12 recommendation for Columbia in this proceeding. As I described in Section II of my  
13 testimony, the U. S. economy is in a low interest rate environment, one that has been

1 supported in a deliberate and considered fashion by Federal Reserve monetary  
2 policy. Both my DCF and CAPM ROE estimates show that the investor required  
3 ROE for Columbia, as well as other regulated gas and water utilities, reflects this low  
4 interest rate environment. A 9.0% ROE recommendation for Columbia is by no  
5 means too low in the current economic and financial environment and is higher than  
6 the average DCF results.

7 **Q. Please explain why you chose to move to the upper end of your range of DCF**  
8 **results in this particular proceeding.**

9 A. There are good reasons for recommending the upper end of my DCF results for  
10 Columbia at this time in this particular case.

11  
12 First, the dividend growth forecasts for my gas company comparison group are  
13 significantly lower than the earnings growth forecasts at this point in time. Referring  
14 to Exhibit \_\_\_\_ (RAB-4), the DCF ROE estimates using dividend growth range from  
15 7.60% to 7.66%. If these rather low DCF estimates are excluded from the averages,  
16 then the average DCF for Method 1 is 8.68% and the average DCF for Method 2 is  
17 9.08%.

18  
19 Second, in my opinion it is likely that interest rates may increase at some point in the  
20 near future. One cannot say when or by how much rates will go up at this time, but  
21 the Federal Reserve has signaled its willingness to raise rates later this year and into  
22 next year if conditions warrant. Of course, the Federal Reserve did not increase  
23 interest rates in July and August, but in my view it stands ready to do so if economic  
24 conditions warrant such an increase. Given this readiness on the part of the Federal



1 Reserve to raise interest rates, I believe that a modest upward adjustment to my  
2 return on equity recommendation is reasonable in this case.

3

4 Taking these two points into consideration and using my professional judgment, a  
5 9.0% ROE is a reasonable and appropriate recommendation for Columbia in this  
6 case.

7 **Q. Mr. Moul concluded that Columbia's capital costs are higher due to its greater**  
8 **risk.<sup>12</sup> Please respond to Mr. Moul's conclusion.**

9 A. I disagree with Mr. Moul. The Moody's and S&P ratings reports for NiSource cite to  
10 the low risk regulated gas operations as support for NiSource's ratings. The lower  
11 credit quality of NiSource relative to the Gas Group is due in part to its higher  
12 corporate leverage. The Value Line Investment Survey's June 3, 2016 report on  
13 NiSource reported that its 2015 equity ratio was 39.3% and its expected 2016  
14 common equity ratio was 38.0%. This is substantially lower than the 50.80%  
15 common equity ratio for Columbia, which Mr. Kollen recommends in his Direct  
16 Testimony. Columbia contributes both lower leverage and lower risk gas operations  
17 to NiSource, which in my opinion is in an overall riskier position than Columbia.

18 **Q. How does Mr. Kollen's recommended common equity ratio compare to the gas**  
19 **company comparison group you used to estimate the DCF cost of equity?**

---

<sup>12</sup> Moul Direct Testimony at page 20, lines 8 through 16.

- 1 A. Table 3 presents the 2015 common equity ratios for the companies in the gas  
 2 comparison group. Table 3 shows the average for the group and the average  
 3 excluding Chesapeake Utilities.

| <b>TABLE 3</b>                       |       |
|--------------------------------------|-------|
| <b>GAS UTILITY GROUP</b>             |       |
| <b>2015 COMMON EQUITY RATIOS</b>     |       |
| Atmos Energy                         | 56.5% |
| Chesapeake Utilities                 | 70.6% |
| New Jersey Resources                 | 56.8% |
| Northwest Natural Gas                | 57.5% |
| South Jersey Industries              | 50.8% |
| Southwest Gas                        | 50.7% |
| Spire Inc.                           | 47.0% |
| WGL Holdings                         | 56.1% |
| Average                              | 55.8% |
| Average Excluding Chesapeake         | 53.6% |
| Source: Value Line Investment Survey |       |

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Mr. Kollen's recommended common equity ratio falls within the range of the gas utility group. For comparison purposes, it is important to exclude Chesapeake from the group average due to its excessive 70.6% common equity ratio. Clearly, this equity ratio is not appropriate for ratemaking purposes for a regulated gas utility company and including it would skew the group average upward.

#### 11 **Cost of Short-Term Debt**

12 **Q. Please explain how you adjusted Columbia's requested cost of short-term debt.**

13 A. My recommended cost of short-term debt is based on Columbia's most recent  
 14 embedded cost of short-term debt. Table 1 shows that Columbia's embedded cost of

1 short-term debt was 0.81% in 2014 and 0.72% in 2015. In 2016 interest rates remain  
2 low. Therefore, I recommend that the Commission adopt a short-term debt cost rate  
3 for Columbia of 1.0%. This cost rate is slightly higher than Columbia's 2015  
4 embedded cost of short-term debt and reasonably allows for the possibility that  
5 short-term interest rates may rise later this year and early next year.

6 **Q. Please explain why the Commission should reject Columbia's requested short-**  
7 **term debt cost rate of 2.50%.**

8 A. The 2.50% cost of short-term debt recommended by Mr. Moul is inconsistent with  
9 Columbia's embedded cost of short-term debt compared to 2015 and, in fact, is far  
10 higher than any year since at least 2011. Mr. Moul based this recommendation on a  
11 forecasted one-month London Interbank Offer Rate ("LIBOR") of 1.425% and a  
12 credit facility spread of 1.075%.<sup>13</sup> However, NiSource reported in its 2015 Form 10-  
13 K that its cost of short-term debt was 1.0% for 2015 and 0.82% for 2014.<sup>14</sup> These  
14 actual short-term rates are far lower than the 2.50% rate Mr. Moul recommends.

15 **Q. What is the revised weighted cost of capital based on your recommendations?**

16 A. Mr. Lane Kollen presents the revised weighted cost of capital on behalf of the  
17 Attorney General in his Direct Testimony.

---

<sup>13</sup> Moul Direct Testimony at page 25, lines 1 - 2.

<sup>14</sup> NiSource, Inc. 2015 Form 10-K, page 26.

1                   **IV. RESPONSE TO COLUMBIA GAS ROE TESTIMONY**

2   **Q.    Have you reviewed the Direct Testimony of Mr. Moul?**

3   A.    Yes.

4   **Q.    Please summarize your conclusions with respect to Mr. Moul's testimony and**  
5       **approach to return on equity.**

6   A.    Based on my review of Mr. Moul's return on equity analyses, my conclusions are as  
7       follows:

8       1.    With respect to this DCF analysis, Mr. Moul included a leverage adjustment  
9           to his DCF analysis that is inappropriate and led to a significant  
10          overstatement of his recommended DCF result. Mr. Moul also chose the  
11          high end of the range of expected growth rates he examined, which further  
12          inflated his DCF ROE recommendation.

13       2.   Mr. Moul's risk premium model suffers from an improper analysis of  
14          historical stock market returns and risk premiums. For this reason, his risk  
15          premium result of 11.70% cannot be relied upon in this case.

16       3.   Mr. Moul's recommended CAPM result of 11.45% is excessive due to an  
17          inappropriate beta adjustment, a small size adjustment that should be  
18          rejected, and his use of forecasted interest rates.

19       4.   Mr. Moul's Comparable Earnings analysis is not applicable for ratemaking  
20          purposes and should be rejected. Further, the Commission has rejected the  
21          comparable earnings approach in a past case.

22   **Q.    Before you proceed to your critique of Mr. Moul's four methods of estimating**  
23       **the return on equity for Columbia, do you have any observations regarding the**  
24       **results from his analyses?**

1 A. Yes. The results from Mr. Moul's risk premium model, CAPM, and comparable  
 2 earnings model are so grossly in excess of recently allowed Commission returns that  
 3 they should be rejected out of hand. Table 4 shows the latest allowed ROEs for the  
 4 gas distribution group that Mr. Moul and I used in our ROE analyses. This data  
 5 came from *AUS Monthly Utility Reports*, August 2016.

6

|                         | <u>ROE</u> | <u>Order Date</u> |
|-------------------------|------------|-------------------|
| Atmos Energy            | 9.81%      | 9/9/2014          |
| Chesapeake Utilities    | N/A        |                   |
| New Jersey Resources    | 10.30%     | 10/1/2008         |
| Northwest Natural Gas   | 9.80%      | 11/1/2013         |
| South Jersey Industries | 9.75%      | 10/1/2014         |
| Southwest Gas           | 9.75%      | 8/12/2014         |
| Spire Inc.              | N/A        |                   |
| WGL Holdings            | 9.58%      | 11/22/2013        |

Source: *AUS Monthly Utility Reports*, August 2016

7

8

9 Allowed ROEs for the utilities in the group range from 9.58% to 10.30%. The  
 10 results Mr. Moul recommended from the risk premium, CAPM, and comparable  
 11 earnings analyses range from 11.45% to 12.2%. Clearly, these ROE results cannot  
 12 be considered reasonable in the context of recent Commission-allowed returns and in  
 13 the current low interest rate environment. The Commission should give them no  
 14 weight in its evaluation of a reasonable ROE for Columbia.

1 **Discounted Cash Flow Model**

2 **Q. Please summarize Mr. Moul's DCF analysis.**

3 A. Mr. Moul applied a constant growth DCF analysis to his Gas Group beginning on  
4 Attachment PRM-7. Mr. Moul explained that he considered both historical and  
5 projected growth rates that were presented in his Attachments PRM-8 and PRM-9.<sup>15</sup>  
6 Historical growth rates ranged from 4.88% to 5.88%. The forecasted growth rates  
7 ranged from 4.63% (Value Line dividend growth) to 5.94% (Value Line earnings per  
8 share growth). Mr. Moul recommended a 6.0% growth rate for his DCF model.

9

10 Mr. Moul also included a "leverage adjustment" in his DCF calculation. Mr. Moul  
11 began his discussion of the leverage adjustment on page 38 of his Direct Testimony.  
12 The calculation is shown as Attachment PRM-10. Mr. Moul testified that this  
13 adjustment accounts for the financial risk difference between market value and book  
14 value capital structures.<sup>16</sup> Mr. Moul presented his DCF analysis including the  
15 leverage adjustment on page 44 of his Direct Testimony. The constant growth DCF  
16 result, 9.11%, plus the leverage adjustment of 0.82% results in Mr. Moul's  
17 recommended DCF return on equity of 9.93%.

18 **Q. Is Mr. Moul's leverage adjustment to his DCF result appropriate?**

19 A. No. Mr. Moul's leverage adjustment is inappropriate, inflates his recommended DCF  
20 result, and should be rejected by the Commission.

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<sup>15</sup> Moul Direct Testimony, page 31, lines 16 - 20.

<sup>16</sup> Moul Direct Testimony at page 38, line 9-14.

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First, setting the allowed cost of capital for ratemaking purposes properly utilizes book values of common equity, preferred stock, and long-term debt. The actual book values of capitalization support the utility's investment in plant in service. With respect to the allowed return on common equity, commissions utilize market returns on book value in order to fairly compensate the equity investor for the use of his or her capital. Market-based returns are used for common equity because, unlike debt, there is no contractual cost for common equity. Thus, the return on equity must be determined using current market data, and then applied to the percentage of equity in the capital structure based on book value.

It is inappropriate to inflate market-based ROE calculations from the DCF with the leverage adjustment Mr. Moul proposed. Market prices can deviate from book value for any number of reasons. For example, investors may expect utilities to earn more than their required rate of return on equity, which would cause an increase in market stock prices above book value per share. In uncertain times, investors may view regulated utilities as safe investments, causing a flight to quality and thereby bidding up stock prices. Further, in the current low interest rate environment investors find the higher dividend yields of relatively lower risk utility stocks attractive alternatives to bonds.

Market based cost of equity estimates applied to the book value of equity is the appropriate means in setting a fair rate of return on invested capital for a regulated

1 utility. Results from the DCF should not be adjusted upward to account for or to  
2 prop up high market-to-book ratios, as Mr. Moul has done in this case.

3 In addition, it is highly doubtful that investors would take the complicated and  
4 circuitous route to measuring their required returns on equity that Mr. Moul proposed  
5 in his Direct Testimony. Instead, it is much more likely that investors would take a  
6 more direct approach and use market data on stock prices and expected growth to  
7 estimate a DCF return on equity.

8  
9 Finally, I would note that bond rating agencies and securities analysts do not assess a  
10 utility company's risk based on the market value of its capital structure, but on the  
11 book value of its common equity. It is reasonable to assume that investors assess  
12 capital structure risk in the same manner. Mr. Moul provided no evidence that  
13 investors assess financial risk based on the market value of a firm's common equity.

14 **Q. Are there other concerns with Mr. Moul's DCF analysis?**

15 A. Yes. Mr. Moul selected a growth rate, 6.0%, which is slightly greater than the high  
16 end of the growth rates he considered in his analysis. If one considers the range of  
17 projected growth rates he used - 4.63% to 5.94% - the midpoint of this range is 5.3%.  
18 This is 0.70% lower than his recommended growth rate and would lower his  
19 recommended DCF return on equity to approximately 8.4%. If one then added Mr.  
20 Moul's leverage adjustment to this 8.4% result, his adjusted DCF ROE would be  
21 9.2%.

22



1 Combining both the leverage adjustment and the excessive growth rate resulted in a  
2 significant overstatement of Mr. Moul's DCF ROE.

3 **Risk Premium Analyses**

4 **Q. Briefly summarize Mr. Moul's risk premium analyses.**

5 A. Mr. Moul's risk premium analysis employed a prospective yield on a long-term A-  
6 rated utility bond and an expected risk premium based on his analysis of historical  
7 risk premiums from the SBBI 2015 Classic Yearbook.

8

9 Mr. Moul concluded that a 5.0% prospective yield was reasonable for the long-term  
10 A-rated utility bond. His approach is described on pages 46 - 49 of his Direct  
11 Testimony. Mr. Moul developed an array of forecasted A-rated bond yields that is  
12 shown on page 48 of his Direct Testimony.

13

14 Mr. Moul's historical risk premium was developed from historical common equity  
15 risk premiums during periods of what he described as low, average, and high interest  
16 rates. This is presented on page 50 of his Direct Testimony. From this data, Mr.  
17 Moul used a risk premium of 6.5%.

18 **Q. Is it appropriate to use forecasted interest rates in a risk premium analysis?**

19 A. Definitely not. Current interest rates and bond yields embody all of the relevant  
20 market data and expectations of investors, including expectations of changing future  
21 interest rates. The forecasted bond yields used by Mr. Moul are speculative at best  
22 and may never come to pass. Current interest rates provide tangible and verifiable  
23 market evidence of investor return requirements today, and these are the interest

1 rates and bond yields that should be used in both the risk premium and CAPM  
2 analyses. To the extent that investors give forecasted interest rates any weight at all,  
3 they are already incorporated in current securities prices.  
4

5 Mr. Moul's projected A-rated bond yield of 5.0% is grossly excessive in comparison  
6 to current A-rated bond yields. For example, as of July 2016, the Mergent Bond  
7 Record reported that the average A-rated utility bond yield was 3.57%. The highest  
8 A-rated bond yield for 2016 was in January, when the yield was 4.27%. Mr. Moul's  
9 projected A-rated utility bond yield serves to inflate his risk premium ROE result.

10 **Q. Is Mr. Moul's historical risk premium analysis reasonable?**

11 A. No. First, I described the problem with using historical risk premiums earlier in my  
12 testimony. This approach naively assumes that earned returns and the resulting risk  
13 premiums in an historical period reflect current investor expectations. Such  
14 assumptions should be viewed with a good deal of caution and skepticism. Although  
15 historical risk premiums may provide rough guides to estimating current required  
16 returns, I believe that it is preferable to place the greatest weight on DCF calculations  
17 that employ current, rather than historic data.  
18

19 Secondly, Mr. Moul's analysis of historical risk premiums is not applicable to public  
20 utilities. Rather, the historical stock returns used by Mr. Moul are for the S&P 500  
21 Composite. Thus, Mr. Moul assumes without foundation that investors expect the  
22 return of regulated public utility stocks to be the same as the S&P 500. This is not  
23 correct. Investors expect higher returns for the unregulated stocks in the S&P 500

1 than they would for the stocks of regulated public utilities. This is borne out by the  
 2 CAPM, used by both Mr. Moul and myself, which adjusts the market risk premium  
 3 by the lower betas of utility stocks to estimate the ROE. Generally speaking,  
 4 investors are willing to accept lower returns for utility stocks in return for their  
 5 greater safety. Using the earned returns on the S&P 500 as Mr. Moul did would  
 6 overstate the expected returns for regulated public utilities.

7 **Q. Does the common equity risk premium analysis in Mr. Moul's Attachment**  
 8 **PRM-13 make economic sense?**

9 A. No. Table 5 presents Mr. Moul's common equity risk premium results from  
 10 Attachment PRM-13.

| <b>TABLE 5</b>                          |                                            |                                          |                                |
|-----------------------------------------|--------------------------------------------|------------------------------------------|--------------------------------|
| <b>MOUL COMMON EQUITY RISK PREMIUMS</b> |                                            |                                          |                                |
|                                         | <u>Large Common<br/>Stocks<br/>Returns</u> | <u>Long-Term<br/>Corporate<br/>Bonds</u> | <u>Equity<br/>Risk Premium</u> |
| Low Interest Rates                      | 12.21%                                     | 4.85%                                    | 7.36%                          |
| Average Across All Int. Rates           | 12.07%                                     | 6.38%                                    | 5.69%                          |
| High Interest Rates                     | 11.93%                                     | 7.95%                                    | 3.98%                          |

11  
 12  
 13 Table 5 shows that no matter which set of interest rates are used, the return on large  
 14 common stocks changes very little. The difference in large common stock returns  
 15 for low interest rates and high interest rates is only 28 basis points, or 0.28%. The  
 16 returns for long-term corporate bonds, however, show substantial variation, going  
 17 from 4.85% to 7.95%, a difference of 310 basis points, or 3.10%. Although the  
 18 historical earned returns for large common stock varied little over the time periods  
 19 examined by Mr. Moul, it is highly unlikely that investors' required returns would

1 have remained virtually unchanged in low and high interest rate environments given  
2 the large changes in interest rates in his analysis. This casts significant doubt on the  
3 reliability of Mr. Moul's risk premium analysis.

#### 4 **Capital Asset Pricing Model**

##### 5 **Q. Briefly summarize Mr. Moul's CAPM analyses.**

6 A. In formulating his CAPM ROE, Mr. Moul employed an unlevered beta, the formula  
7 for which may be found on page 53 of his Direct Testimony. Mr. Moul claimed that  
8 Value Line betas couldn't be used to directly estimate the CAPM when the market  
9 value of common stock is greater than its book value. Mr. Moul's leverage  
10 adjustment increased his Gas Group beta from 0.76 to 0.88.

11  
12 For the risk-free rate of return, Mr. Moul used 3.75%, which considered the Blue  
13 Chip forecasts.<sup>17</sup>

14  
15 For the market premium, Mr. Moul used the arithmetic mean of historical market  
16 performance and a forecasted return from Value Line and S&P, resulting in a market  
17 premium of 7.27%.<sup>18</sup>

18  
19 Finally, Mr. Moul added a size adjustment of 1.10% to compensate for the smaller  
20 size of his Gas Group. Mr. Moul's recommended CAPM ROE was 11.45%.<sup>19</sup>

---

<sup>17</sup> Moul Direct Testimony at page 55, lines 10 - 12.

<sup>18</sup> Moul Direct Testimony at page 56, lines 18-19.

1

2 **Q. Please respond to Mr. Moul's CAPM analyses.**

3 A. Mr. Moul's CAPM result is overstated and should be rejected by the Commission.

4

5 First, the Commission should reject Mr. Moul's reformulated beta estimate. The  
6 appropriate beta to use in the CAPM is one that investors expect based on a stock's  
7 relative price movements with the overall market. Mr. Moul introduced a highly  
8 questionable adjustment to published Value Line betas based on differences between  
9 market and book value capital structures. His claim that a leveraged beta should be  
10 used in the CAPM for ratemaking purposes is erroneous. He provided absolutely no  
11 evidence that investors in utility company stocks use the calculation of beta he  
12 presented in his testimony. It is more reasonable to assume that, to the extent investors  
13 rely on the CAPM model at all, they also are more likely to rely on widely published  
14 beta estimates from Value Line and other sources.

15

16 Second, Mr. Moul's size premium of 1.10% should be rejected as well. I  
17 acknowledge that the SBBI 2015 Classic Yearbook discusses the phenomenon of  
18 firm size and return extensively. However, the extent to which there is a firm size  
19 effect with respect to regulated gas companies is not evaluated or discussed. The  
20 Decile 3 through 5 companies that constitute mid-cap market capitalization have  
21 aggregate historical betas of 1.12 and obviously include many unregulated

---

<sup>19</sup> Moul Direct Testimony at page 58, lines 8-9.

1 companies that carry far greater risk than Columbia. These betas are greatly in  
2 excess of Mr. Moul's group beta of 0.76. Therefore, a size premium of 1.10% is  
3 completely unwarranted and merely serves to inflate Mr. Moul's already overstated  
4 CAPM results.

5  
6 Third, Mr. Moul should have used the current yield on 30-year Treasury Bonds,  
7 rather than a forecasted yield for the same reasons I stated in my response to his risk  
8 premium analysis. Current 30-year Treasury yields as July 2016 were 2.23%,  
9 according to the historical data provided by the Board of Governors of the Federal  
10 Reserve System. As of August 18, the yield on the 30-year Treasury Bond was  
11 2.26%. Clearly, Mr. Moul's forecasted 30-year Treasury Bond yield of 3.75% is  
12 overstated.

13 **Q. What is Mr. Moul's CAPM result if you remove the size adjustment and use the**  
14 **Value Line beta for his Electric Group?**

15 A. The CAPM result is as follows:

$$3.75\% (RF Rate) + .76 \times (7.27\%) = 9.275\%$$

17 I note that this result would be even lower if recent 30-year Treasury bond yields are  
18 used. However, this example illustrates how much Mr. Moul overstated the CAPM  
19 results by including the beta and size adjustments in his analysis.

## 20 **Comparable Earnings**

21 **Q. Briefly comment on Mr. Moul's comparable earnings analysis.**

22 A. Mr. Moul performed a comparable earnings analysis on a group of unregulated  
23 companies from Value Line that was selected based on several criteria included in

1 his Attachment PRM-15. Forecasted and historical rates of return were obtained  
2 from Value Line and then averaged. The resulting ROE was 12.2%.

3  
4 I recommend that the Commission reject Mr. Moul's comparable earnings analysis.  
5 Forecasted earned returns on book equity are not reasonable proxies for investor  
6 expectations in the marketplace. Near-term book accounting returns do not  
7 necessarily reflect investor requirements and/or expected market returns.  
8 Accounting returns are not necessarily tied to current market forces such as interest  
9 rates and stock prices. Thus, they are poor indicators of investors' current required  
10 returns. A properly specified and estimated DCF model, which uses current stock  
11 prices, is a far more reasonable and accurate gauge of investor requirements.

12  
13 Further, expected returns on book equity for unregulated companies have nothing to  
14 do with investor expected returns for lower-risk regulated gas utilities such as  
15 Columbia. And Mr. Moul's 12.2% comparable earnings ROE result is far greater  
16 than any Commission-allowed return in recent memory and fails the test of  
17 reasonableness on its face. I recommend that the Commission reject Mr. Moul's  
18 comparable earnings analyses.

19 **Q. Has the Commission rejected the comparable earnings approach?**

20 A. Yes. The Commission's Order in Case No. 98-474 discusses the comparable  
21 earnings approach on pages 97 and 98. The Commission stated the following in its  
22 Order:

23 "The Commission finds KU's use of unregulated non-electric companies to be  
24 inappropriate for use as comparison companies in its DCF and other analyses for

1           ratemaking purposes. Unregulated non-electric companies do not properly represent  
2           the environment in which KU operates. KU correctly states that it must compete with  
3           all companies, regulated or otherwise, to attract equity capital, not just with other  
4           electric utilities. However, investors do not look at Safety Rankings alone when  
5           deciding how to invest their money and are fully aware of risk differentials between  
6           regulated and unregulated companies. KU operates in an environment where it has  
7           an inalienable right to charge a rate that covers all its reasonable and prudent costs  
8           and provides its investors an opportunity to earn a reasonable return. Unregulated  
9           companies have no such right. A more appropriate set of comparison companies in  
10          analyzing investments with similar risk would be other electric utilities."

11   **Q.    Does this complete your Direct Testimony?**

12   A.    Yes.

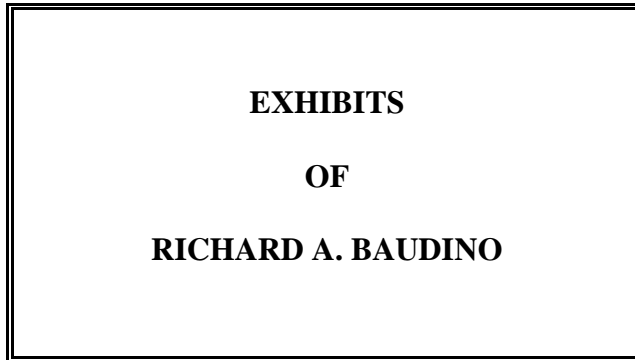


**COMMONWEALTH OF KENTUCKY**

**BEFORE THE PUBLIC SERVICE COMMISSION**

**IN THE MATTER OF:**

**APPLICATION OF COLUMBIA GAS )  
OF KENTUCKY, INC. FOR AN ) CASE NO. 2016-00162  
ADJUSTMENT IN RATES )**



**ON BEHALF OF THE  
OFFICE OF THE ATTORNEY GENERAL**

**J. Kennedy and Associates, Inc.  
570 Colonial Park Drive, Suite 305  
Roswell, GA 30075**

**SEPTEMBER 2, 2016**

## **RESUME OF RICHARD A. BAUDINO**

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### **EDUCATION**

#### **New Mexico State University, M.A.**

Major in Economics  
Minor in Statistics

#### **New Mexico State University, B.A.**

Economics  
English

Thirty-two years of experience in utility ratemaking and the application of principles of economics to the regulation of electric, gas, and water utilities. Broad based experience in revenue requirement analysis, cost of capital, rate of return, cost and revenue allocation, and rate design.

### **REGULATORY TESTIMONY**

Preparation and presentation of expert testimony in the areas of:

Cost of Capital for Electric, Gas and Water Companies  
Electric, Gas, and Water Utility Cost Allocation and Rate Design  
Revenue Requirements  
Gas and Electric industry restructuring and competition  
Fuel cost auditing  
Ratemaking Treatment of Generating Plant Sale/Leasebacks

## RESUME OF RICHARD A. BAUDINO

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### EXPERIENCE

**1989 to**

**Present:** **Kennedy and Associates: Consultant** - Responsible for consulting assignments in the area of revenue requirements, rate design, cost of capital, economic analysis of generation alternatives, electric and gas industry restructuring/competition and water utility issues.

**1982 to**

**1989:** **New Mexico Public Service Commission Staff: Utility Economist** - Responsible for preparation of analysis and expert testimony in the areas of rate of return, cost allocation, rate design, finance, phase-in of electric generating plants, and sale/leaseback transactions.

### CLIENTS SERVED

#### Regulatory Commissions

Louisiana Public Service Commission  
Georgia Public Service Commission  
New Mexico Public Service Commission

#### Other Clients and Client Groups

|                                                           |                                                 |
|-----------------------------------------------------------|-------------------------------------------------|
| Ad Hoc Committee for a Competitive Electric Supply System | Large Power Intervenors (Minnesota)             |
| Air Products and Chemicals, Inc.                          | Tyson Foods                                     |
| Arkansas Electric Energy Consumers                        | West Virginia Energy Users Group                |
| Arkansas Gas Consumers                                    | The Commercial Group                            |
| AK Steel                                                  | Wisconsin Industrial Energy Group               |
| Armco Steel Company, L.P.                                 | South Florida Hospital and Health Care Assn.    |
| Assn. of Business Advocating Tariff Equity                | PP&L Industrial Customer Alliance               |
| CF&I Steel, L.P.                                          | Philadelphia Area Industrial Energy Users Gp.   |
| Climax Molybdenum Company                                 | West Penn Power Intervenors                     |
| Cripple Creek & Victor Gold Mining Co.                    | Duquesne Industrial Intervenors                 |
| General Electric Company                                  | Met-Ed Industrial Users Gp.                     |
| Holcim (U.S.) Inc.                                        | Penelec Industrial Customer Alliance            |
| IBM Corporation                                           | Penn Power Users Group                          |
| Industrial Energy Consumers                               | Columbia Industrial Intervenors                 |
| Kentucky Industrial Utility Consumers                     | U.S. Steel & Univ. of Pittsburg Medical Ctr.    |
| Kentucky Office of the Attorney General                   | Multiple Intervenors                            |
| Lexington-Fayette Urban County Government                 | Maine Office of Public Advocate                 |
| Large Electric Consumers Organization                     | Missouri Office of Public Counsel               |
| Newport Steel                                             | University of Massachusetts - Amherst           |
| Northwest Arkansas Gas Consumers                          | WCF Hospital Utility Alliance                   |
| Maryland Energy Group                                     | West Travis County Public Utility Agency        |
| Occidental Chemical                                       | Steering Committee of Cities Served by Oncor    |
| PSI Industrial Group                                      | Utah Office of Consumer Services                |
|                                                           | Healthcare Council of the National Capital Area |
|                                                           | Vermont Department of Public Service            |

**Expert Testimony Appearances  
of  
Richard A. Baudino  
As of September 2016**

| <b>Date</b> | <b>Case</b>   | <b>Jurisdict.</b> | <b>Party</b>                                          | <b>Utility</b>                      | <b>Subject</b>                                                                                    |
|-------------|---------------|-------------------|-------------------------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------------------|
| 10/83       | 1803,<br>1817 | NM                | New Mexico Public<br>Service Commission               | Southwestern Electric<br>Coop.      | Rate design.                                                                                      |
| 11/84       | 1833          | NM                | New Mexico Public<br>Service Commission<br>Palo Verde | El Paso Electric Co.                | Service contract approval,<br>rate design, performance standards for<br>nuclear generating system |
| 1983        | 1835          | NM                | New Mexico Public<br>Service Commission               | Public Service Co. of NM            | Rate design.                                                                                      |
| 1984        | 1848          | NM                | New Mexico Public<br>Service Commission               | Sangre de Cristo<br>Water Co.       | Rate design.                                                                                      |
| 02/85       | 1906          | NM                | New Mexico Public<br>Service Commission               | Southwestern<br>Public Service Co.  | Rate of return.                                                                                   |
| 09/85       | 1907          | NM                | New Mexico Public<br>Service Commission               | Jornada Water Co.                   | Rate of return.                                                                                   |
| 11/85       | 1957          | NM                | New Mexico Public<br>Service Commission               | Southwestern<br>Public Service Co.  | Rate of return.                                                                                   |
| 04/86       | 2009          | NM                | New Mexico Public<br>Service Commission               | El Paso Electric Co.                | Phase-in plan, treatment of<br>sale/leaseback expense.                                            |
| 06/86       | 2032          | NM                | New Mexico Public<br>Service Commission               | El Paso Electric Co.                | Sale/leaseback approval.                                                                          |
| 09/86       | 2033          | NM                | New Mexico Public<br>Service Commission               | El Paso Electric Co.                | Order to show cause, PVNGS<br>audit.                                                              |
| 02/87       | 2074          | NM                | New Mexico Public<br>Service Commission               | El Paso Electric Co.                | Diversification.                                                                                  |
| 05/87       | 2089          | NM                | New Mexico Public<br>Service Commission               | El Paso Electric Co.                | Fuel factor adjustment.                                                                           |
| 08/87       | 2092          | NM                | New Mexico Public<br>Service Commission               | El Paso Electric Co.                | Rate design.                                                                                      |
| 10/87       | 2146          | NM                | New Mexico Public<br>Service Commission               | Public Service Co.<br>of New Mexico | Financial effects of<br>restructuring, reorganization.                                            |
| 07/88       | 2162          | NM                | New Mexico Public<br>Service Commission               | El Paso Electric Co.                | Revenue requirements, rate<br>design, rate of return.                                             |

**Expert Testimony Appearances  
of  
Richard A. Baudino  
As of September 2016**

| <b>Date</b> | <b>Case</b>      | <b>Jurisdct.</b> | <b>Party</b>                                                                                       | <b>Utility</b>                   | <b>Subject</b>                                    |
|-------------|------------------|------------------|----------------------------------------------------------------------------------------------------|----------------------------------|---------------------------------------------------|
| 01/89       | 2194             | NM               | New Mexico Public Service Commission                                                               | Plains Electric G&T Cooperative  | Economic development.                             |
| 1/89        | 2253             | NM               | New Mexico Public Service Commission                                                               | Plains Electric G&T Cooperative  | Financing.                                        |
| 08/89       | 2259             | NM               | New Mexico Public Service Commission                                                               | Homestead Water Co.              | Rate of return, rate design.                      |
| 10/89       | 2262             | NM               | New Mexico Public Service Commission                                                               | Public Service Co. of New Mexico | Rate of return.                                   |
| 09/89       | 2269             | NM               | New Mexico Public Service Commission                                                               | Ruidoso Natural Gas Co.          | Rate of return, expense from affiliated interest. |
| 12/89       | 89-208-TF        | AR               | Arkansas Electric Energy Consumers                                                                 | Arkansas Power & Light Co.       | Rider M-33.                                       |
| 01/90       | U-17282          | LA               | Louisiana Public Service Commission                                                                | Gulf States Utilities            | Cost of equity.                                   |
| 09/90       | 90-158           | KY               | Kentucky Industrial Utility Consumers                                                              | Louisville Gas & Electric Co.    | Cost of equity.                                   |
| 09/90       | 90-004-U         | AR               | Northwest Arkansas Gas Consumers                                                                   | Arkansas Western Gas Co.         | Cost of equity, transportation rate.              |
| 12/90       | U-17282 Phase IV | LA               | Louisiana Public Service Commission                                                                | Gulf States Utilities            | Cost of equity.                                   |
| 04/91       | 91-037-U         | AR               | Northwest Arkansas Gas Consumers                                                                   | Arkansas Western Gas Co.         | Transportation rates.                             |
| 12/91       | 91-410-EL-AIR    | OH               | Air Products & Chemicals, Inc., Armco Steel Co., General Electric Co., Industrial Energy Consumers | Cincinnati Gas & Electric Co.    | Cost of equity.                                   |
| 05/92       | 910890-EI        | FL               | Occidental Chemical Corp.                                                                          | Florida Power Corp.              | Cost of equity, rate of return.                   |
| 09/92       | 92-032-U         | AR               | Arkansas Gas Consumers                                                                             | Arkansas Louisiana Gas Co.       | Cost of equity, rate of return, cost-of-service.  |
| 09/92       | 39314            | ID               | Industrial Consumers for Fair Utility Rates                                                        | Indiana Michigan Power Co.       | Cost of equity, rate of return.                   |

**Expert Testimony Appearances  
of  
Richard A. Baudino  
As of September 2016**

| <b>Date</b> | <b>Case</b>     | <b>Jurisdict.</b> | <b>Party</b>                                                                   | <b>Utility</b>                                 | <b>Subject</b>                                                                                   |
|-------------|-----------------|-------------------|--------------------------------------------------------------------------------|------------------------------------------------|--------------------------------------------------------------------------------------------------|
| 09/92       | 92-009-U        | AR                | Tyson Foods                                                                    | General Waterworks                             | Cost allocation, rate design.                                                                    |
| 01/93       | 92-346          | KY                | Newport Steel Co.                                                              | Union Light, Heat & Power Co.                  | Cost allocation.                                                                                 |
| 01/93       | 39498           | IN                | PSI Industrial Group                                                           | PSI Energy                                     | Refund allocation.                                                                               |
| 01/93       | U-10105         | MI                | Association of Businesses Advocating Tariff Equality (ABATE)                   | Michigan Consolidated Gas Co.                  | Return on equity.                                                                                |
| 04/93       | 92-1464-EL-AIR  | OH                | Air Products and Chemicals, Inc., Armco Steel Co., Industrial Energy Consumers | Cincinnati Gas & Electric Co.                  | Return on equity.                                                                                |
| 09/93       | 93-189-U        | AR                | Arkansas Gas Consumers                                                         | Arkansas Louisiana Gas Co.                     | Transportation service terms and conditions.                                                     |
| 09/93       | 93-081-U        | AR                | Arkansas Gas Consumers                                                         | Arkansas Louisiana Gas Co.                     | Cost-of-service, transportation rates, rate supplements; return on equity; revenue requirements. |
| 12/93       | U-17735         | LA                | Louisiana Public Service Commission Staff                                      | Cajun Electric Power Cooperative               | Historical reviews; evaluation of economic studies.                                              |
| 03/94       | 10320           | KY                | Kentucky Industrial Utility Customers                                          | Louisville Gas & Electric Co.                  | Trimble County CWIP revenue refund.                                                              |
| 4/94        | E-015/GR-94-001 | MN                | Large Power Intervenors                                                        | Minnesota Power Co.                            | Evaluation of the cost of equity, capital structure, and rate of return.                         |
| 5/94        | R-00942993      | PA                | PG&W Industrial Intervenors                                                    | Pennsylvania Gas & Water Co.                   | Analysis of recovery of transition costs.                                                        |
| 5/94        | R-00943001      | PA                | Columbia Industrial Intervenors                                                | Columbia Gas of Pennsylvania charge proposals. | Evaluation of cost allocation, rate design, rate plan, and carrying                              |
| 7/94        | R-00942986      | PA                | Armco, Inc., West Penn Power Industrial Intervenors                            | West Penn Power Co.                            | Return on equity and rate of return.                                                             |
| 7/94        | 94-0035-E-42T   | WV                | West Virginia Energy Users' Group                                              | Monongahela Power Co.                          | Return on equity and rate of return.                                                             |

**Expert Testimony Appearances  
of  
Richard A. Baudino  
As of September 2016**

| <b>Date</b> | <b>Case</b>         | <b>Jurisdict.</b> | <b>Party</b>                                             | <b>Utility</b>                                                                                   | <b>Subject</b>                                               |
|-------------|---------------------|-------------------|----------------------------------------------------------|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| 8/94        | 8652                | MD                | Westvaco Corp.<br>Co.                                    | Potomac Edison                                                                                   | Return on equity and rate of return.                         |
| 9/94        | 930357-C            | AR                | West Central Arkansas<br>Gas Consumers                   | Arkansas Oklahoma<br>Gas Corp.                                                                   | Evaluation of transportation service.                        |
| 9/94        | U-19904             | LA                | Louisiana Public<br>Service Commission                   | Gulf States<br>Utilities                                                                         | Return on equity.                                            |
| 9/94        | 8629                | MD                | Maryland Industrial<br>Group                             | Baltimore Gas<br>& Electric Co.                                                                  | Transition costs.                                            |
| 11/94       | 94-175-U            | AR                | Arkansas Gas<br>Consumers                                | Arkla, Inc.                                                                                      | Cost-of-service, rate design,<br>rate of return.             |
| 3/95        | RP94-343-<br>000    | FERC              | Arkansas Gas<br>Consumers                                | NorAm Gas<br>Transmission                                                                        | Rate of return.                                              |
| 4/95        | R-00943271          | PA                | PP&L Industrial<br>Customer Alliance                     | Pennsylvania Power<br>& Light Co.                                                                | Return on equity.                                            |
| 6/95        | U-10755             | MI                | Association of<br>Businesses Advocating<br>Tariff Equity | Consumers Power Co.                                                                              | Revenue requirements.                                        |
| 7/95        | 8697                | MD                | Maryland Industrial<br>Group                             | Baltimore Gas<br>& Electric Co.                                                                  | Cost allocation and rate design.                             |
| 8/95        | 95-254-TF<br>U-2811 | AR                | Tyson Foods, Inc.                                        | Southwest Arkansas<br>Electric Cooperative                                                       | Refund allocation.                                           |
| 10/95       | ER95-1042<br>-000   | FERC              | Louisiana Public<br>Service Commission                   | Systems Energy<br>Resources, Inc.                                                                | Return on Equity.                                            |
| 11/95       | I-940032            | PA                | Industrial Energy<br>Consumers of<br>Pennsylvania        | State-wide -<br>all utilities                                                                    | Investigation into<br>Electric Power Competition.            |
| 5/96        | 96-030-U            | AR                | Northwest Arkansas<br>Gas Consumers                      | Arkansas Western<br>Gas Co.                                                                      | Revenue requirements, rate of<br>return and cost of service. |
| 7/96        | 8725                | MD                | Maryland Industrial<br>Group                             | Baltimore Gas<br>& Electric Co., Potomac<br>Electric Power Co. and<br>Constellation Energy Corp. | Return on Equity.                                            |
| 7/96        | U-21496             | LA                | Louisiana Public<br>Service Commission                   | Central Louisiana<br>Electric Co.                                                                | Return on equity, rate of return.                            |
| 9/96        | U-22092             | LA                | Louisiana Public<br>Service Commission                   | Entergy Gulf<br>States, Inc.                                                                     | Return on equity.                                            |

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|-------------|--------------|-------------------|------------------------------------------------------------------------|----------------------------------------------------|------------------------------------------------------------------------|
| 1/97        | RP96-199-000 | FERC              | The Industrial Gas Users Conference                                    | Mississippi River Transmission Corp.               | Revenue requirements, rate of return and cost of service.              |
| 3/97        | 96-420-U     | AR                | West Central Arkansas Gas Corp.                                        | Arkansas Oklahoma Gas Corp.                        | Revenue requirements, rate of return, cost of service and rate design. |
| 7/97        | U-11220      | MI                | Association of Business Advocating Tariff Equity                       | Michigan Gas Co. and Southeastern Michigan Gas Co. | Transportation Balancing Provisions.                                   |
| 7/97        | R-00973944   | PA                | Pennsylvania American Water Large Users Group                          | Pennsylvania-American Water Co.                    | Rate of return, cost of service, revenue requirements.                 |
| 3/98        | 8390-U       | GA                | Georgia Natural Gas Group and the Georgia Textile Manufacturers Assoc. | Atlanta Gas Light                                  | Rate of return, restructuring issues, unbundling, rate design issues.  |
| 7/98        | R-00984280   | PA                | PG Energy, Inc. Intervenors                                            | PGE Industrial                                     | Cost allocation.                                                       |
| 8/98        | U-17735      | LA                | Louisiana Public Service Commission                                    | Cajun Electric Power Cooperative                   | Revenue requirements.                                                  |
| 10/98       | 97-596       | ME                | Maine Office of the Public Advocate                                    | Bangor Hydro-Electric Co.                          | Return on equity, rate of return.                                      |
| 10/98       | U-23327      | LA                | Louisiana Public Service Commission                                    | SWEPCO, CSW and AEP                                | Analysis of proposed merger.                                           |
| 12/98       | 98-577       | ME                | Maine Office of the Public Advocate                                    | Maine Public Service Co.                           | Return on equity, rate of return.                                      |
| 12/98       | U-23358      | LA                | Louisiana Public Service Commission                                    | Entergy Gulf States, Inc.                          | Return on equity, rate of return.                                      |
| 3/99        | 98-426       | KY                | Kentucky Industrial Utility Customers, Inc.                            | Louisville Gas and Electric Co                     | Return on equity.                                                      |
| 3/99        | 99-082       | KY                | Kentucky Industrial Utility Customers, Inc.                            | Kentucky Utilities Co.                             | Return on equity.                                                      |
| 4/99        | R-984554     | PA                | T. W. Phillips Users Group                                             | T. W. Phillips Gas and Oil Co.                     | Allocation of purchased gas costs.                                     |
| 6/99        | R-0099462    | PA                | Columbia Industrial Intervenors                                        | Columbia Gas of Pennsylvania                       | Balancing charges.                                                     |
| 10/99       | U-24182      | LA                | Louisiana Public Service Commission                                    | Entergy Gulf States, Inc.                          | Cost of debt.                                                          |



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| 10/99       | R-00994782                                                                                 | PA                    | Peoples Industrial<br>Intervenors                             | Peoples Natural<br>Gas Co.              | Restructuring issues.                                                           |
| 10/99       | R-00994781                                                                                 | PA                    | Columbia Industrial<br>Intervenors                            | Columbia Gas<br>of Pennsylvania         | Restructuring, balancing<br>charges, rate flexing, alternate fuel.              |
| 01/00       | R-00994786                                                                                 | PA                    | UGI Industrial<br>Intervenors                                 | UGI Utilities, Inc.                     | Universal service costs,<br>balancing, penalty charges, capacity<br>Assignment. |
| 01/00       | 8829                                                                                       | MD<br>& United States | Maryland Industrial Gr.                                       | Baltimore Gas &<br>Electric Co.         | Revenue requirements, cost allocation,<br>rate design.                          |
| 02/00       | R-00994788                                                                                 | PA                    | Penn Fuel Transportation                                      | PFG Gas, Inc., and                      | Tariff charges, balancing provisions.                                           |
| 05/00       | U-17735                                                                                    | LA                    | Louisiana Public<br>Service Comm.                             | Louisiana Electric<br>Cooperative       | Rate restructuring.                                                             |
| 07/00       | 2000-080                                                                                   | KY                    | Kentucky Industrial<br>Utility Consumers                      | Louisville Gas<br>and Electric Co.      | Cost allocation.                                                                |
| 07/00       | U-21453<br>U-20925 (SC),<br>U-22092 (SC)<br>(Subdocket E)                                  | LA                    | Louisiana Public<br>Service Commission                        | Southwestern<br>Electric Power Co.      | Stranded cost analysis.                                                         |
| 09/00       | R-00005654                                                                                 | PA                    | Philadelphia Industrial<br>And Commercial Gas<br>Users Group. | Philadelphia Gas<br>Works               | Interim relief analysis.                                                        |
| 10/00       | U-21453<br>U-20925 (SC),<br>U-22092 (SC)<br>(Subdocket B)                                  | LA                    | Louisiana Public<br>Service Commission                        | Entergy Gulf<br>States, Inc.            | Restructuring, Business Separation Plan.                                        |
| 11/00       | R-00005277<br>(Rebuttal)                                                                   | PA                    | Penn Fuel<br>Transportation Customers                         | PFG Gas, Inc. and<br>North Penn Gas Co. | Cost allocation issues.                                                         |
| 12/00       | U-24993                                                                                    | LA                    | Louisiana Public<br>Service Commission                        | Entergy Gulf<br>States, Inc.            | Return on equity.                                                               |
| 03/01       | U-22092                                                                                    | LA                    | Louisiana Public<br>Service Commission                        | Entergy Gulf<br>States, Inc.            | Stranded cost analysis.                                                         |
| 04/01       | U-21453<br>U-20925 (SC),<br>U-22092 (SC)<br>(Subdocket B)<br>(Addressing Contested Issues) | LA                    | Louisiana Public<br>Service Commission                        | Entergy Gulf<br>States, Inc.            | Restructuring issues.                                                           |
| 04/01       | R-00006042                                                                                 | PA                    | Philadelphia Industrial and<br>Commercial Gas Users Group     | Philadelphia Gas Works                  | Revenue requirements, cost allocation<br>and tariff issues.                     |

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| 11/01       | U-25687              | LA                | Louisiana Public Service Commission                                                               | Entergy Gulf States, Inc.           | Return on equity.                                                 |
| 03/02       | 14311-U              | GA                | Georgia Public Service Commission                                                                 | Atlanta Gas Light                   | Capital structure.                                                |
| 08/02       | 2002-00145           | KY                | Kentucky Industrial Utility Customers                                                             | Columbia Gas of Kentucky            | Revenue requirements.                                             |
| 09/02       | M-00021612           | PA                | Philadelphia Industrial And Commercial Gas Users Group                                            | Philadelphia Gas Works              | Transportation rates, terms, and conditions.                      |
| 01/03       | 2002-00169           | KY                | Kentucky Industrial Utility Customers                                                             | Kentucky Power                      | Return on equity.                                                 |
| 02/03       | 02S-594E             | CO                | Cripple Creek & Victor Gold Mining Company                                                        | Aquila Networks – WPC               | Return on equity.                                                 |
| 04/03       | U-26527              | LA                | Louisiana Public Service Commission                                                               | Entergy Gulf States, Inc.           | Return on equity.                                                 |
| 10/03       | CV020495AB           | GA                | The Landings Assn., Inc.                                                                          | Utilities Inc. of GA                | Revenue requirement & overcharge refund                           |
| 03/04       | 2003-00433           | KY                | Kentucky Industrial Utility Customers                                                             | Louisville Gas & Electric           | Return on equity, Cost allocation & rate design                   |
| 03/04       | 2003-00434           | KY                | Kentucky Industrial Utility Customers                                                             | Kentucky Utilities                  | Return on equity                                                  |
| 4/04        | 04S-035E             | CO                | Cripple Creek & Victor Gold Mining Company, Goodrich Corp., Holcim (U.S.) Inc., and The Trane Co. | Aquila Networks – WPC               | Return on equity.                                                 |
| 9/04        | U-23327, Subdocket B | LA                | Louisiana Public Service Commission                                                               | Southwestern Electric Power Company | Fuel cost review                                                  |
| 10/04       | U-23327 Subdocket A  | LA                | Louisiana Public Service Commission                                                               | Southwestern Electric Power Company | Return on Equity                                                  |
| 06/05       | 050045-EI            | FL                | South Florida Hospital and HealthCare Assoc.                                                      | Florida Power & Light Co.           | Return on equity                                                  |
| 08/05       | 9036                 | MD                | Maryland Industrial Group                                                                         | Baltimore Gas & Electric Co.        | Revenue requirement, cost allocation, rate design, Tariff issues. |
| 01/06       | 2005-0034            | KY                | Kentucky Industrial Utility Customers, Inc.                                                       | Kentucky Power Co.                  | Return on equity.                                                 |

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| 03/06       | 05-1278-E-PC-PW-42T                                             | WV                | West Virginia Energy Users Group                | Appalachian Power Company                      | Return on equity.                           |
| 04/06       | U-25116 Commission                                              | LA                | Louisiana Public Service                        | Entergy Louisiana, LLC                         | Transmission Issues                         |
| 07/06       | U-23327 Commission                                              | LA                | Louisiana Public Service                        | Southwestern Electric Power Company            | Return on equity, Service quality           |
| 08/06       | ER-2006-0314                                                    | MO                | Missouri Office of the Public Counsel           | Kansas City Power & Light Co.                  | Return on equity, Weighted cost of capital  |
| 08/06       | 06S-234EG                                                       | CO                | CF&I Steel, L.P. & Climax Molybdenum            | Public Service Company of Colorado             | Return on equity, Weighted cost of capital  |
| 01/07       | 06-0960-E-42T Users Group                                       | WV                | West Virginia Energy                            | Monongahela Power & Potomac Edison             | Return on Equity                            |
| 01/07       | 43112                                                           | AK                | AK Steel, Inc.                                  | Vectren South, Inc.                            | Cost allocation, rate design                |
| 05/07       | 2006-661                                                        | ME                | Maine Office of the Public Advocate             | Bangor Hydro-Electric                          | Return on equity, weighted cost of capital. |
| 09/07       | 07-07-01                                                        | CT                | Connecticut Industrial Energy Consumers         | Connecticut Light & Power                      | Return on equity, weighted cost of capital  |
| 10/07       | 05-UR-103                                                       | WI                | Wisconsin Industrial Energy Group, Inc.         | Wisconsin Electric Power Co.                   | Return on equity                            |
| 11/07       | 29797                                                           | LA                | Louisiana Public Service Commission             | Cleco Power :LLC & Southwestern Electric Power | Lignite Pricing, support of settlement      |
| 01/08       | 07-551-EL-AIR                                                   | OH                | Ohio Energy Group                               | Ohio Edison, Cleveland Electric, Toledo Edison | Return on equity                            |
| 03/08       | 07-0585, 07-0585, 07-0587, 07-0588, 07-0589, 07-0590, (consol.) | IL                | The Commercial Group                            | Ameren                                         | Cost allocation, rate design                |
| 04/08       | 07-0566                                                         | IL                | The Commercial Group                            | Commonwealth Edison                            | Cost allocation, rate design                |
| 06/08       | R-2008-2011621                                                  | PA                | Columbia Industrial Intervenors                 | Columbia Gas of PA                             | Cost and revenue allocation, Tariff issues  |
| 07/08       | R-2008-2028394                                                  | PA                | Philadelphia Area Industrial Energy Users Group | PECO Energy                                    | Cost and revenue allocation, Tariff issues  |

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| 07/08       | R-2008-2039634  | PA                | PPL Gas Large Users Group                                                                     | PPL Gas                                                                      | Retainage, LUFG Pct.                                       |
| 08/08       | 6680-UR-116     | WI                | Wisconsin Industrial Energy Group                                                             | Wisconsin P&L                                                                | Cost of Equity                                             |
| 08/08       | 6690-UR-119     | WI                | Wisconsin Industrial Energy Group                                                             | Wisconsin PS                                                                 | Cost of Equity                                             |
| 09/08       | ER-2008-0318    | MO                | The Commercial Group                                                                          | AmerenUE                                                                     | Cost and revenue allocation                                |
| 10/08       | R-2008-2029325  | PA                | U.S. Steel & Univ. of Pittsburgh Med. Ctr.                                                    | Equitable Gas Co.                                                            | Cost and revenue allocation                                |
| 10/08       | 08-G-0609       | NY                | Multiple Intervenors                                                                          | Niagara Mohawk Power                                                         | Cost and Revenue allocation                                |
| 12/08       | 27800-U         | GA                | Georgia Public Service Commission                                                             | Georgia Power Company                                                        | CWIP/AFUDC issues, Review financial projections            |
| 03/09       | ER08-1056       | FERC              | Louisiana Public Service Commission                                                           | Entergy Services, Inc.                                                       | Capital Structure                                          |
| 04/09       | E002/GR-08-1065 | MN                | The Commercial Group                                                                          | Northern States Power                                                        | Cost and revenue allocation and rate design                |
| 05/09       | 08-0532         | IL                | The Commercial Group                                                                          | Commonwealth Edison                                                          | Cost and revenue allocation                                |
| 07/09       | 080677-EI       | FL                | South Florida Hospital and Health Care Association                                            | Florida Power & Light                                                        | Cost of equity, capital structure, Cost of short-term debt |
| 07/09       | U-30975         | LA                | Louisiana Public Service Commission                                                           | Cleco LLC, Southwestern Public Service Co.                                   | Lignite mine purchase                                      |
| 10/09       | 4220-UR-116     | WI                | Wisconsin Industrial Energy Group                                                             | Northern States Power                                                        | Class cost of service, rate design                         |
| 10/09       | M-2009-2123945  | PA                | PP&L Industrial Customer Alliance                                                             | PPL Electric Utilities                                                       | Smart Meter Plan cost allocation                           |
| 10/09       | M-2009-2123944  | PA                | Philadelphia Area Industrial Energy Users Group                                               | PECO Energy Company                                                          | Smart Meter Plan cost allocation                           |
| 10/09       | M-2009-2123951  | PA                | West Penn Power Industrial Intervenors                                                        | West Penn Power                                                              | Smart Meter Plan cost allocation                           |
| 11/09       | M-2009-2123948  | PA                | Duquesne Industrial Intervenors                                                               | Duquesne Light Company                                                       | Smart Meter Plan cost allocation                           |
| 11/09       | M-2009-2123950  | PA                | Met-Ed Industrial Users Group<br>Penelec Industrial Customer Alliance, Penn Power Users Group | Metropolitan Edison,<br>Pennsylvania Electric Co.,<br>Pennsylvania Power Co. | Smart Meter Plan cost allocation                           |

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| 03/10       | 09-1352-                 | WV<br>E-42T       | West Virginia Energy Users Group                | Monongahela Power                                  | Return on equity, rate of return<br>Potomac Edison                |
| 03/10       | E015/GR-<br>09-1151      | MN                | Large Power Intervenors                         | Minnesota Power                                    | Return on equity, rate of return                                  |
| 04/10       | 2009-00459               | KY                | Kentucky Industrial Utility Consumers           | Kentucky Power                                     | Return on equity                                                  |
| 04/10       | 2009-00548<br>2009-00549 | KY                | Kentucky Industrial Utility Consumers           | Louisville Gas and Electric,<br>Kentucky Utilities | Return on equity.                                                 |
| 05/10       | 10-0261-E-<br>GI         | WV                | West Virginia Energy Users Group                | Appalachian Power Co./<br>Wheeling Power Co.       | EE/DR Cost Recovery,<br>Allocation, & Rate Design                 |
| 05/10       | R-2009-<br>2149262       | PA                | Columbia Industrial Intervenors                 | Columbia Gas of PA                                 | Class cost of service &<br>cost allocation                        |
| 06/10       | 2010-00036               | KY                | Lexington-Fayette Urban County Government       | Kentucky American Water Company                    | Return on equity, rate of return,<br>revenue requirements         |
| 06/10       | R-2010-<br>2161694       | PA                | PP&L Industrial Customer Alliance               | PPL Electric Utilities                             | Rate design, cost allocation                                      |
| 07/10       | R-2010-<br>2161575       | PA                | Philadelphia Area Industrial Energy Users Group | PECO Energy Co.                                    | Return on equity                                                  |
| 07/10       | R-2010-<br>2161592       | PA                | Philadelphia Area Industrial Energy Users Group | PECO Energy Co.                                    | Cost and revenue allocation                                       |
| 07/10       | 9230                     | MD                | Maryland Energy Group                           | Baltimore Gas and Electric                         | Electric and gas cost and revenue<br>allocation; return on equity |
| 09/10       | 10-70                    | MA                | University of Massachusetts-Amherst             | Western Massachusetts Electric Co.                 | Cost allocation and rate design                                   |
| 10/10       | R-2010-<br>2179522       | PA                | Duquesne Industrial Intervenors                 | Duquesne Light Company                             | Cost and revenue allocation,<br>rate design                       |
| 11/10       | P-2010-<br>2158084       | PA                | West Penn Power Industrial Intervenors          | West Penn Power Co.                                | Transmission rate design                                          |
| 11/10       | 10-0699-<br>E-42T        | WV                | West Virginia Energy Users Group                | Appalachian Power Co. &<br>Wheeling Power Co.      | Return on equity, rate of<br>Return                               |
| 11/10       | 10-0467                  | IL                | The Commercial Group                            | Commonwealth Edison                                | Cost and revenue allocation and<br>rate design                    |
| 04/11       | R-2010-<br>2214415       | PA                | Central Pen Gas Large Users Group               | UGI Central Penn Gas, Inc.                         | Tariff issues,<br>revenue allocation                              |
| 07/11       | R-2011-<br>2239263       | PA                | Philadelphia Area Energy Users Group            | PECO Energy                                        | Retainage rate                                                    |

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| 08/11       | R-2011-2232243           | PA                | AK Steel                                             | Pennsylvania-American Water Company             | Rate Design                                                                          |
| 08/11       | 11AL-151G                | CO                | Climax Molybdenum                                    | PS of Colorado                                  | Cost allocation                                                                      |
| 09/11       | 11-G-0280                | NY                | Multiple Intervenors                                 | Corning Natural Gas Co.                         | Cost and revenue allocation                                                          |
| 10/11       | 4220-UR-117              | WI                | Wisconsin Industrial Energy Group                    | Northern States Power                           | Cost and revenue allocation, rate design                                             |
| 02/12       | 11AL-947E                | CO                | Climax Molybdenum, CF&I Steel                        | Public Service Company of Colorado              | Return on equity, weighted cost of capital                                           |
| 07/12       | 120015-EI                | FL                | South Florida Hospitals and Health Care Association  | Florida Power and Light Co.                     | Return on equity, weighted cost of capital                                           |
| 07/12       | 12-0613-E-PC             | WV                | West Virginia Energy Users Group                     | American Electric Power/APCo                    | Special rate proposal for Century Aluminum                                           |
| 07/12       | R-2012-2290597           | PA                | PP&L Industrial Customer Alliance                    | PPL Electric Utilities Corp.                    | Cost allocation                                                                      |
| 09/12       | 05-UR-106                | WI                | Wisconsin Industrial Energy Group                    | Wisconsin Electric Power Co.                    | Class cost of service, cost and revenue allocation, rate design                      |
| 09/12       | 2012-00221<br>2012-00222 | KY                | Kentucky Industrial Utility Consumers                | Louisville Gas and Electric, Kentucky Utilities | Return on equity.                                                                    |
| 10/12       | 9299                     | MD                | Maryland Energy Group                                | Baltimore Gas & Electric                        | Cost and revenue allocation, rate design<br>Cost of equity, weighted cost of capital |
| 10/12       | 4220-UR-118              | WI                | Wisconsin Industrial Energy Group                    | Northern States Power Company                   | Class cost of service, cost and revenue allocation, rate design                      |
| 10/12       | 473-13-0199              | TX                | Steering Committee of Cities Served by Oncor         | Cross Texas Transmission, LLC                   | Return on equity, capital structure                                                  |
| 01/13       | R-2012-2321748 et al.    | PA                | Columbia Industrial Intervenors                      | Columbia Gas of Pennsylvania                    | Cost and revenue allocation                                                          |
| 02/13       | 12AL-1052E               | CO                | Cripple Creek & Victor Gold Mining, Holcim (US) Inc. | Black Hills/Colorado Electric Utility Company   | Cost and revenue allocations                                                         |
| 06/13       | 8009                     | VT                | IBM Corporation                                      | Vermont Gas Systems                             | Cost and revenue allocation, rate design                                             |
| 07/13       | 130040-EI                | FL                | WCF Hospital Utility Alliance                        | Tampa Electric Co.                              | Return on equity, rate of return                                                     |
| 08/13       | 9326                     | MD                | Maryland Energy Group                                | Baltimore Gas and Electric                      | Cost and revenue allocation, rate design, special rider                              |

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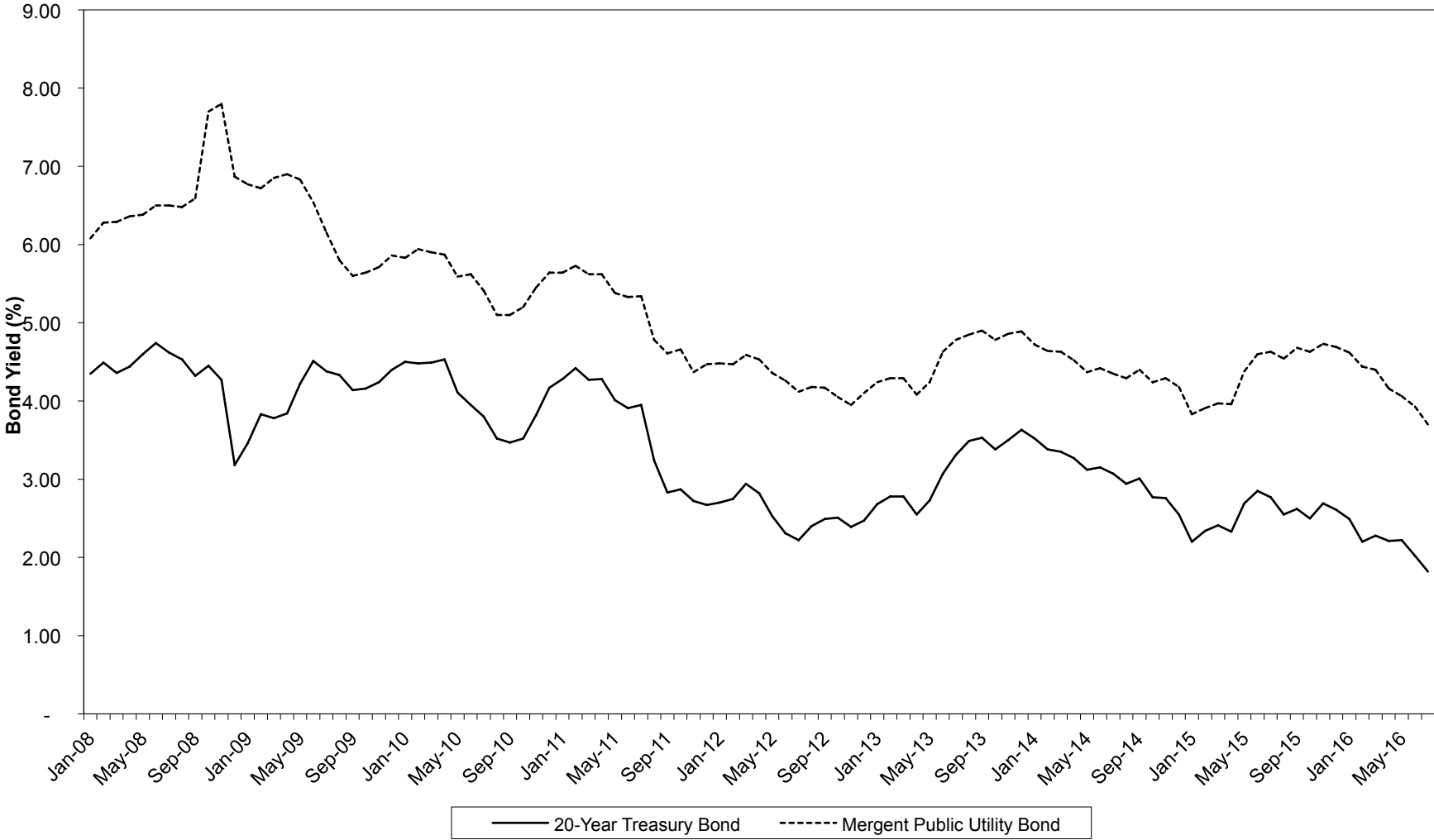
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| 08/13       | P-2012-2325034           | PA                | PP&L Industrial Customer Alliance            | PPL Electric Utilities, Corp.                   | Distribution System Improvement Charge                                |
| 09/13       | 4220-UR-119              | WI                | Wisconsin Industrial Energy Group            | Northern States Power Co.                       | Class cost of service, cost and revenue allocation, rate design       |
| 11/13       | 13-1325-E-PC             | WV                | West Virginia Energy Users Group             | American Electric Power/APCo                    | Special rate proposal, Felman Production                              |
| 06/14       | R-2014-2406274           | PA                | Columbia Industrial Intervenors              | Columbia Gas of Pennsylvania                    | Cost and revenue allocation, rate design                              |
| 08/14       | 05-UR-107                | WI                | Wisconsin Industrial Energy Group            | Wisconsin Electric Power Co.                    | Cost and revenue allocation, rate design                              |
| 10/14       | ER13-1508 et al.         | FERC              | Louisiana Public Service Comm.               | Entergy Services, Inc.                          | Return on equity                                                      |
| 11/14       | 14AL-0660E               | CO                | Climax Molybdenum Co. and CFI Steel, LP      | Public Service Co. of Colorado                  | Return on equity, weighted cost of capital                            |
| 11/14       | R-2014-2428742           | PA                | AK Steel                                     | West Penn Power Company                         | Cost and revenue allocation                                           |
| 12/14       | 42866                    | TX                | West Travis Co. Public Utility Agency        | Travis County Municipal Utility District No. 12 | Response to complain of monopoly power                                |
| 3/15        | 2014-00371<br>2014-00372 | KY                | Kentucky Industrial Utility Customers        | Louisville Gas & Electric, Kentucky Utilities   | Return on equity, cost of debt, weighted cost of capital              |
| 3/15        | 2014-00396               | KY                | Kentucky Industrial Utility Customers        | Kentucky Power Co.                              | Return on equity, weighted cost of capital                            |
| 6/15        | 15-0003-G-42T            | WV                | West Virginia Energy Users Gp.               | Mountaineer Gas Co.                             | Cost and revenue allocation, Infrastructure Replacement Program       |
| 9/15        | 15-0676-W-42T            | WV                | West Virginia Energy Users Gp.               | West Virginia-American Water Company            | Appropriate test year, Historical vs. Future                          |
| 9/15        | 15-1256-G-390P           | WV                | West Virginia Energy Users Gp.               | Mountaineer Gas Co.                             | Rate design for Infrastructure Replacement and Expansion Program      |
| 10/15       | 4220-UR-121              | WI                | Wisconsin Industrial Energy Gp.              | Northern States Power Co.                       | Class cost of service, cost and revenue allocation, rate design       |
| 12/15       | 15-1600-G-390P           | WV                | West Virginia Energy Users Gp.               | Dominion Hope                                   | Rate design and allocation for Pipeline Replacement & Expansion Prog. |
| 12/15       | 45188                    | TX                | Steering Committee of Cities Served by Oncor | Oncor Electric Delivery Co.                     | Ring-fence protections for cost of capital                            |

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| 2/16        | 9406                   | MD                | Maryland Energy Group                              | Baltimore Gas & Electric                       | Cost and revenue allocation, rate design, proposed Rider 5       |
| 3/16        | 39971                  | GA                | GA Public Service Comm. Staff                      | Southern Company / AGL Resources               | Credit quality and service quality issues                        |
| 04/16       | 2015-00343             | KY                | Kentucky Office of the Attorney General            | Atmos Energy                                   | Cost of equity, cost of short-term debt, capital structure       |
| 05/16       | 16-G-0058<br>16-G-0059 | NY                | City of New York                                   | Brooklyn Union Gas Co., KeySpan Gas East Corp. | Cost and revenue allocation, rate design, service quality issues |
| 06/16       | 16-0073-E-C            | WV                | Constellium Rolled Products Ravenswood, LLC        | Appalachian Power Co.                          | Complaint; security deposit                                      |
| 07/16       | 9418                   | MD                | Healthcare Council of the National Capital Area    | Potomac Electric Power Co.                     | Cost of equity, cost of service, Cost and revenue allocation     |
| 07/16       | 160021-EI              | FL                | South Florida Hospital and Health Care Association | Florida Power and Light Co.                    | Return on equity, cost of debt, capital structure                |
| 07/16       | 16-057-01              | UT                | Utah Office of Consumer Svcs.                      | Dominion Resources, Questar Gas Co.            | Credit quality and service quality issues                        |
| 08/16       | 8710                   | VT                | Vermont Dept. of Public Service                    | Vermont Gas Systems                            | Return on equity, cost of debt, cost of capital                  |
| 08/16       | R-2016-2537359         | PA                | AK Steel Corp.                                     | West Penn Power Co.                            | Cost and revenue allocation                                      |
| 09/16       | 2016-00162             | KY                | Kentucky Office of the Attorney General            | Columbia Gas of Ky.                            | Return on equity, cost of short-term debt                        |



### HISTORICAL BOND YIELDS AVERAGE PUBLIC UTILITY BOND VS 20-YEAR TREASURY BOND



**COLUMBIA GAS OF KENTUCKY  
GAS DISTRIBUTION COMPANY GROUP  
AVERAGE PRICE, DIVIDEND AND DIVIDEND YIELD**

|                                |                 | Jul-16 | Jun-16 | May-16 | Apr-16 | Mar-16 | Feb-16 |
|--------------------------------|-----------------|--------|--------|--------|--------|--------|--------|
| <b>Atmos Energy</b>            | High Price (\$) | 81.970 | 81.350 | 75.100 | 74.860 | 74.600 | 71.900 |
|                                | Low Price (\$)  | 78.390 | 72.420 | 70.840 | 70.410 | 68.600 | 67.940 |
|                                | Avg. Price (\$) | 80.180 | 76.885 | 72.970 | 72.635 | 71.600 | 69.920 |
|                                | Dividend (\$)   | 0.420  | 0.420  | 0.420  | 0.420  | 0.420  | 0.420  |
|                                | Mo. Avg. Div.   | 2.10%  | 2.19%  | 2.30%  | 2.31%  | 2.35%  | 2.40%  |
|                                | 6 mos. Avg.     | 2.27%  |        |        |        |        |        |
| <b>Chesapeake Utilities</b>    | High Price (\$) | 67.500 | 66.190 | 63.950 | 63.280 | 63.840 | 67.360 |
|                                | Low Price (\$)  | 63.120 | 57.430 | 56.560 | 58.970 | 56.100 | 61.450 |
|                                | Avg. Price (\$) | 65.310 | 61.810 | 60.255 | 61.125 | 59.970 | 64.405 |
|                                | Dividend (\$)   | 0.305  | 0.305  | 0.288  | 0.288  | 0.288  | 0.288  |
|                                | Mo. Avg. Div.   | 1.87%  | 1.97%  | 1.91%  | 1.88%  | 1.92%  | 1.79%  |
|                                | 6 mos. Avg.     | 1.89%  |        |        |        |        |        |
| <b>New Jersey Resources</b>    | High Price (\$) | 38.920 | 38.560 | 37.170 | 36.880 | 36.850 | 36.570 |
|                                | Low Price (\$)  | 36.270 | 35.140 | 33.910 | 34.550 | 33.320 | 33.370 |
|                                | Avg. Price (\$) | 37.595 | 36.850 | 35.540 | 35.715 | 35.085 | 34.970 |
|                                | Dividend (\$)   | 0.240  | 0.240  | 0.240  | 0.240  | 0.240  | 0.240  |
|                                | Mo. Avg. Div.   | 2.55%  | 2.61%  | 2.70%  | 2.69%  | 2.74%  | 2.75%  |
|                                | 6 mos. Avg.     | 2.67%  |        |        |        |        |        |
| <b>Northwest Natural Gas</b>   | High Price (\$) | 66.170 | 64.840 | 57.950 | 54.290 | 54.510 | 53.880 |
|                                | Low Price (\$)  | 63.260 | 55.060 | 51.120 | 49.460 | 48.900 | 49.410 |
|                                | Avg. Price (\$) | 64.715 | 59.950 | 54.535 | 51.875 | 51.705 | 51.645 |
|                                | Dividend (\$)   | 0.468  | 0.468  | 0.468  | 0.468  | 0.468  | 0.468  |
|                                | Mo. Avg. Div.   | 2.89%  | 3.12%  | 3.43%  | 3.61%  | 3.62%  | 3.62%  |
|                                | 6 mos. Avg.     | 3.38%  |        |        |        |        |        |
| <b>South Jersey Industries</b> | High Price (\$) | 32.000 | 31.640 | 28.970 | 28.550 | 29.140 | 26.940 |
|                                | Low Price (\$)  | 30.870 | 28.520 | 26.290 | 27.170 | 25.270 | 24.540 |
|                                | Avg. Price (\$) | 31.435 | 30.080 | 27.630 | 27.860 | 27.205 | 25.740 |
|                                | Dividend (\$)   | 0.264  | 0.264  | 0.264  | 0.264  | 0.264  | 0.264  |
|                                | Mo. Avg. Div.   | 3.36%  | 3.51%  | 3.82%  | 3.79%  | 3.88%  | 4.10%  |
|                                | 6 mos. Avg.     | 3.74%  |        |        |        |        |        |
| <b>Southwest Gas</b>           | High Price (\$) | 79.580 | 79.430 | 70.510 | 66.600 | 67.290 | 62.430 |
|                                | Low Price (\$)  | 75.500 | 69.180 | 64.390 | 62.750 | 59.490 | 58.070 |
|                                | Avg. Price (\$) | 77.540 | 74.305 | 67.450 | 64.675 | 63.390 | 60.250 |
|                                | Dividend (\$)   | 0.450  | 0.450  | 0.450  | 0.405  | 0.405  | 0.405  |
|                                | Mo. Avg. Div.   | 2.32%  | 2.42%  | 2.67%  | 2.50%  | 2.56%  | 2.69%  |
|                                | 6 mos. Avg.     | 2.53%  |        |        |        |        |        |

**COLUMBIA GAS OF KENTUCKY  
GAS DISTRIBUTION COMPANY GROUP  
AVERAGE PRICE, DIVIDEND AND DIVIDEND YIELD**

|                                       |                 | Jul-16 | Jun-16 | May-16 | Apr-16 | Mar-16 | Feb-16 |
|---------------------------------------|-----------------|--------|--------|--------|--------|--------|--------|
| <b>Spire Inc.</b>                     | High Price (\$) | 71.210 | 70.870 | 66.200 | 68.400 | 68.790 | 66.430 |
|                                       | Low Price (\$)  | 67.670 | 63.150 | 61.000 | 62.650 | 64.390 | 63.310 |
|                                       | Avg. Price (\$) | 69.440 | 67.010 | 63.600 | 65.525 | 66.590 | 64.870 |
|                                       | Dividend (\$)   | 0.490  | 0.490  | 0.490  | 0.490  | 0.490  | 0.490  |
|                                       | Mo. Avg. Div.   | 2.82%  | 2.92%  | 3.08%  | 2.99%  | 2.94%  | 3.02%  |
|                                       | 6 mos. Avg.     | 2.96%  |        |        |        |        |        |
| <b>WGL Holdings</b>                   | High Price (\$) | 72.180 | 70.810 | 70.090 | 72.840 | 74.100 | 69.200 |
|                                       | Low Price (\$)  | 69.310 | 65.100 | 63.060 | 65.000 | 67.230 | 62.930 |
|                                       | Avg. Price (\$) | 70.745 | 67.955 | 66.575 | 68.920 | 70.665 | 66.065 |
|                                       | Dividend (\$)   | 0.488  | 0.488  | 0.488  | 0.488  | 0.463  | 0.463  |
|                                       | Mo. Avg. Div.   | 2.76%  | 2.87%  | 2.93%  | 2.83%  | 2.62%  | 2.80%  |
|                                       | 6 mos. Avg.     | 2.80%  |        |        |        |        |        |
| <b>6-month Average Dividend Yield</b> |                 | 2.78%  |        |        |        |        |        |

Source: Yahoo! Finance

**COLUMBIA GAS OF KENTUCKY  
GAS DISTRIBUTION COMPANY GROUP  
DCF Growth Rate Analysis**

| Company                 | (1)<br>Value Line<br>DPS | (2)<br>Value Line<br>EPS | (3)<br>Value Line<br>B x R | (4)<br>Zacks | (5)<br>Thomson/<br>IBES |
|-------------------------|--------------------------|--------------------------|----------------------------|--------------|-------------------------|
| Atmos Energy            | 6.50%                    | 6.50%                    | 5.50%                      | 7.20%        | 7.30%                   |
| Chesapeake Utilities    | 6.00%                    | 8.50%                    | 8.00%                      | N/A          | 3.00%                   |
| New Jersey Resources    | 3.00%                    | 1.00%                    | 5.00%                      | 6.50%        | 6.50%                   |
| Northwest Natural Gas   | 2.00%                    | 7.00%                    | 3.50%                      | 4.00%        | 4.00%                   |
| South Jersey Industries | 6.50%                    | 3.00%                    | 1.50%                      | 10.00%       | 6.00%                   |
| Southwest Gas           | 8.50%                    | 7.00%                    | 6.00%                      | 4.50%        | 4.00%                   |
| Spire Inc.              | 3.50%                    | 9.00%                    | 5.00%                      | 4.60%        | 4.78%                   |
| WGL Holdings            | <u>2.50%</u>             | <u>3.50%</u>             | <u>3.50%</u>               | <u>7.30%</u> | <u>8.00%</u>            |
| Average Growth Rates    | 4.81%                    | 5.69%                    | 4.75%                      | 6.30%        | 5.45%                   |
| Median Growth Rates     | 4.75%                    | 6.75%                    | 5.00%                      | 6.50%        | 5.39%                   |

**Sources: Zack's and Thomson Earnings Reports, retrieved August 24, 2016  
Value Line Investment Survey, September 2, 2016**

**COLUMBIA GAS OF KENTUCKY  
GAS DISTRIBUTION COMPANY GROUP  
DCF RETURN ON EQUITY CALCULATION**

|                      | (1)<br>Value Line<br>Dividend Gr. | (2)<br>Value Line<br>Earnings Gr. | (3)<br>Zack's<br>Earning Gr. | (4)<br>Thomson<br>Earning Gr. | (5)<br>Average of<br>All Gr. Rates |
|----------------------|-----------------------------------|-----------------------------------|------------------------------|-------------------------------|------------------------------------|
| Method 1:            |                                   |                                   |                              |                               |                                    |
| Dividend Yield       | 2.78%                             | 2.78%                             | 2.78%                        | 2.78%                         | 2.78%                              |
| Average Growth Rate  | 4.81%                             | 5.69%                             | 6.30%                        | 5.45%                         | 5.56%                              |
| Expected Div. Yield  | <u>2.85%</u>                      | <u>2.86%</u>                      | <u>2.87%</u>                 | <u>2.86%</u>                  | <u>2.86%</u>                       |
| DCF Return on Equity | <b>7.66%</b>                      | <b>8.55%</b>                      | <b>9.17%</b>                 | <b>8.31%</b>                  | <b>8.42%</b>                       |
| Method 2:            |                                   |                                   |                              |                               |                                    |
| Dividend Yield       | 2.78%                             | 2.78%                             | 2.78%                        | 2.78%                         | 2.78%                              |
| Median Growth Rate   | 4.75%                             | 6.75%                             | 6.50%                        | 5.39%                         | 5.85%                              |
| Expected Div. Yield  | <u>2.85%</u>                      | <u>2.88%</u>                      | <u>2.87%</u>                 | <u>2.86%</u>                  | <u>2.86%</u>                       |
| DCF Return on Equity | <b>7.60%</b>                      | <b>9.63%</b>                      | <b>9.37%</b>                 | <b>8.25%</b>                  | <b>8.71%</b>                       |

**COLUMBIA GAS OF KENTUCKY  
Capital Asset Pricing Model Analysis**

**20-Year Treasury Bond, Value Line Beta**

| Line No. |                                                 | Value Line |
|----------|-------------------------------------------------|------------|
| 1        | Market Required Return Estimate                 | 9.92%      |
| 2        | Risk-free Rate of Return, 20-Year Treasury Bond |            |
| 3        | Average of Last Six Months                      | 2.13%      |
| 4        | Risk Premium                                    |            |
| 5        | (Line 1 minus Line 3)                           | 7.79%      |
| 6        | Comparison Group Beta                           | 0.73       |
| 7        | Comparison Group Beta * Risk Premium            |            |
| 8        | (Line 5 * Line 6)                               | 5.65%      |
| 9        | CAPM Return on Equity                           |            |
| 10       | (Line 3 plus Line 8)                            | 7.77%      |

**5-Year Treasury Bond, Value Line Beta**

|    |                                                |       |
|----|------------------------------------------------|-------|
| 1  | Market Required Return Estimate                | 9.92% |
| 2  | Risk-free Rate of Return, 5-Year Treasury Bond |       |
| 3  | Average of Last Six Months                     | 1.23% |
| 4  | Risk Premium                                   |       |
| 5  | (Line 1 minus Line 3)                          | 8.68% |
| 6  | Comparison Group Beta                          | 0.73  |
| 7  | Comparison Group Beta * Risk Premium           |       |
| 8  | (Line 5 * Line 6)                              | 6.30% |
| 9  | CAPM Return on Equity                          |       |
| 10 | (Line 3 plus Line 8)                           | 7.53% |

**COLUMBIA GAS OF KENTUCKY**  
**Capital Asset Pricing Model Analysis**

**Supporting Data for CAPM Analyses**

20 Year Treasury Bond Data

|             | <u>Avg. Yield</u> |
|-------------|-------------------|
| February-16 | 2.20%             |
| March-16    | 2.28%             |
| April-16    | 2.21%             |
| May-16      | 2.22%             |
| June-16     | 2.02%             |
| July-16     | <u>1.82%</u>      |

6 month average

2.13%

Source: [www.federalreserve.gov](http://www.federalreserve.gov), Selected Interest Rates (Daily) - H.15

5 Year Treasury Bond Data

|             | <u>Avg. Yield</u> |
|-------------|-------------------|
| February-16 | 1.22%             |
| March-16    | 1.38%             |
| April-16    | 1.26%             |
| May-16      | 1.30%             |
| June-16     | 1.17%             |
| July-16     | <u>1.07%</u>      |

6 month average

1.23%

Value Line Market Return Data:

Forecasted Data:

Value Line Median Growth Rates:

|                         |              |
|-------------------------|--------------|
| Earnings                | 11.00%       |
| Book Value              | <u>7.00%</u> |
| Average                 | 9.00%        |
| Average Dividend Yield  | <u>0.80%</u> |
| Estimated Market Return | 9.84%        |

Value Line Projected 3-5 Yr.

Median Annual Total Return 10.00%

Average of Projected Mkt.

Returns 9.92%

Source: Value Line Investment Survey  
for Windows retrieved August 16, 2016

Gas Distribution Company Group Betas

|                         |             |
|-------------------------|-------------|
| Atmos Energy            | 0.75        |
| Chesapeake Utilities    | 0.60        |
| New Jersey Resources    | 0.80        |
| Northwest Natural Gas   | 0.65        |
| South Jersey Industries | 0.80        |
| Southwest Gas           | 0.75        |
| Spire, Inc.             | 0.70        |
| WGL Holdings            | <u>0.75</u> |

Average 0.73

Source: Value Line Investment Survey,  
June 3, 2016

**CAPITAL ASSET PRICING MODEL ANALYSIS**  
**Historic Market Premium**

|                                                          | <u>Geometric<br/>Mean</u> | <u>Arithmetic<br/>Mean</u> | <u>Adjusted<br/>Arithmetic<br/>Mean</u> |
|----------------------------------------------------------|---------------------------|----------------------------|-----------------------------------------|
| Long-Term Annual Return on Stocks                        | 10.10%                    | 12.10%                     |                                         |
| Long-Term Annual Income Return on Long-Term Treas. Bonds | <u>5.07%</u>              | <u>5.07%</u>               |                                         |
| Historical Market Risk Premium                           | 5.03%                     | 7.03%                      | 6.19%                                   |
| Gas Distribution Group Beta, Value Line                  | <u>0.73</u>               | <u>0.73</u>                | <u>0.73</u>                             |
| Beta * Market Premium                                    | 3.65%                     | 5.10%                      | 4.49%                                   |
| Current 20-Year Treasury Bond Yield                      | <u>2.13%</u>              | <u>2.13%</u>               | <u>2.13%</u>                            |
| <b>CAPM Cost of Equity, Value Line Beta</b>              | <b><u>5.77%</u></b>       | <b><u>7.22%</u></b>        | <b><u>6.61%</u></b>                     |

Source: *Ibbotson S&P 2015 Classic Yearbook*, Morningstar, pp. 39, 40, 152, 157 - 158