

DOCKET NO. W-354, SUB 356**TESTIMONY OF CALVIN C. CRAIG, III
ON BEHALF OF THE PUBLIC STAFF
NORTH CAROLINA UTILITIES COMMISSION****September 19, 2017**

1 **Q. PLEASE STATE YOUR NAME, POSITION, AND BUSINESS**
2 **ADDRESS FOR THE RECORD.**

3 **A.** My name is Calvin C Craig, III. I am a Financial Analyst in the
4 Economic Research Division of the Public Staff of the North
5 Carolina Utilities Commission (Public Staff), representing the using
6 and consuming public. My business address is 430 North Salisbury
7 Street, Raleigh, North Carolina 27603.

8

9 **Q. PLEASE OUTLINE YOUR EDUCATIONAL BACKGROUND AND**
10 **RELEVANT EMPLOYMENT EXPERIENCE.**

11 **A.** I received a Bachelor of Science degree in Industrial Relations from
12 the University of North Carolina at Chapel Hill in 1985, an MBA
13 degree from East Carolina University in 1993, and a Juris Doctor
14 degree from North Carolina Central University in 2006. Since
15 joining the Public Staff in November 1995, I have been involved
16 with natural gas expansion projects, have conducted rate of return
17 studies, testified in rate of return proceedings, and have filed
18 affidavits assessing financial viability and a fair rate of return in
19 numerous water and wastewater utility rate cases.

1 Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS
2 PROCEEDING?

3 A. The purpose of my testimony in this proceeding is to address the
4 fair rate of return of 7.84%, specifically the return on equity
5 component of 9.60%, agreed to in the Stipulation between Carolina
6 Water Service, Inc. of North Carolina (CWSNC or Company), a
7 wholly owned subsidiary of Utilities, Inc., and the Public Staff, and
8 to provide support for the Public Staff's position that the return on
9 equity component is just and reasonable for use as a basis for
10 adjusting the water and sewer rates of the Company's systems
11 involved in this docket.
12

13 Q. HOW IS YOUR TESTIMONY STRUCTURED?

14 A. My testimony is presented in the following five sections:
15 I. Legal and Economic Guidelines for Fair Rate of Return
16 II. Present Financial Market Conditions
17 III. Appropriate Capital Structure and Cost of Long Term Debt
18 IV. The Cost of Common Equity
19 V. Overall Recommended Cost of Capital
20

1 I. LEGAL AND ECONOMIC GUIDELINES FOR FAIR RATE OF RETURN

2 Q. ARE THERE ANY LEGAL AND ECONOMIC GUIDELINES TO
3 FOLLOW WHEN DETERMINING THE COST OF CAPITAL TO A
4 PUBLIC UTILITY?

5 A. Yes. In Federal Power Comm'n v. Hope Natural Gas Co.,

6 320 U.S. 591 (1944), the U.S. Supreme Court stated:

7 [T]he return to the equity owner should be
8 commensurate with returns on investments in other
9 enterprises having corresponding risks. That return,
10 moreover, should be sufficient to assure confidence in
11 the financial integrity of the enterprise, so as to
12 maintain its credit and to attract capital. Id. at 603.

13 In Bluefield Water Works & Improvement Co. v. Public Serv.
14 Comm'n of West Virginia, 262 U.S. 679 (1923), the U S. Supreme
15 Court stated:

16 A public utility is entitled to such rates as will permit it
17 to earn a return on the value of the property which it
18 employs for the convenience of the public equal to
19 that generally being made at the same time and in the
20 same general part of the country on investments in
21 other business undertakings which are attended by
22 corresponding risks and uncertainties; but it has no
23 constitutional right to profits such as are realized or

1 anticipated in highly profitable enterprises or
2 speculative ventures. The return should be
3 reasonably sufficient to assure confidence in the
4 financial soundness of the utility and should be
5 adequate, under efficient and economical
6 management, to maintain and support its credit and
7 enable it to raise the money necessary for the proper
8 discharge of its public duties. A rate of return may be
9 reasonable at one time and become too high or too
10 low by changes affecting opportunities for investment,
11 the money market and business conditions generally.

12 Id. at 692-93.

13 These two decisions recognize that utilities are competing for the
14 capital of investors and provide legal guidelines as to how the
15 allowed rate of return should be set. The decisions specifically
16 speak to the standards or criteria of capital attraction, financial
17 integrity, and comparable earnings. The Hope decision, in
18 particular, recognizes that the cost of common equity is
19 commensurate with risk relative to investments in other enterprises.
20 In competitive capital markets, the required return on common
21 equity will be the expected return foregone by not investing in
22 alternative investments of comparable risk. For the utility to attract
23 capital, possess financial integrity, and exhibit comparable

1 earnings, the return allowed on a utility's common equity should be
2 that return required by investors for stocks with comparable risk.

3 It is widely recognized that a public utility should be allowed a rate
4 of return on capital which, under prudent management, will allow
5 the utility to meet the criteria or standards referenced by the Hope
6 and Bluefield decisions. If the allowed rate of return is set too high,
7 consumers are burdened with excessive costs, current investors
8 receive a windfall, and the utility has an incentive to overinvest. If
9 the return is set too low, and the utility is not able to attract capital
10 on reasonable terms to invest in capital improvements for its
11 service area, its future service obligations may be impaired.
12 Because a public utility is capital intensive, the cost of capital is a
13 very large part of its overall revenue requirement and is a crucial
14 issue for a company and its ratepayers.

15
16 **Q. WHAT IS A FAIR RATE OF RETURN?**

17 A. The fair rate of return is simply a percentage, which, when
18 multiplied by a utility's rate base investment, will yield the dollars of
19 net operating income a utility should have the opportunity to earn.
20 This dollar amount of net operating income is available to pay the
21 interest cost on a utility's debt and a return to the common equity
22 investor. The fair rate of return multiplied by the utility's rate base

1 yields the dollars a utility needs to recover in order to earn for
2 investors the cost of capital.

3

4 **Q. HOW DID YOU DETERMINE THE FAIR RATE OF RETURN THAT**
5 **YOU RECOMMEND IN THIS PROCEEDING?**

6 A. To determine the fair rate of return that I recommend, I performed a
7 cost of capital study consisting of three steps. First, I determined
8 the appropriate capital structure for ratemaking purposes, i.e., the
9 proper proportions of each form of financial capital. Utilities
10 normally finance assets with debt and common equity. Because
11 each of these forms of capital have different costs, especially after
12 income tax considerations, the relative amounts of each form
13 employed to finance the assets can have a significant influence on
14 the overall cost of capital, revenue requirements, and rates. Thus,
15 the determination of the appropriate capital structure for ratemaking
16 purposes is important to the utility and to ratepayers.

17 Second, I determined the cost rate of each form of financial capital.
18 The individual debt issues have contractual agreements explicitly
19 stating the cost of each issue. The embedded annual cost of debt
20 may be calculated by simply considering these agreements and the
21 utility's books and records. The cost of common equity is more
22 difficult to determine, however, because it reflects common equity
23 investors' expectations. Various economic and financial models or

1 methods are available to measure the cost of common equity.
2 Third, by combining the appropriate capital structure ratios for
3 ratemaking purposes with the associated cost rates, I calculated an
4 overall weighted cost of capital or fair rate of return to the utility.

5

6 **II. PRESENT FINANCIAL MARKET CONDITIONS**

7 **Q. CAN YOU BRIEFLY DESCRIBE CURRENT FINANCIAL MARKET**
8 **CONDITIONS?**

9 A. Yes. After dropping several hundred basis points since 2009, the cost
10 of financing has remained relatively stable over the past seven
11 years. According to the issue of Credit Trends by Moody's Investors
12 Service, Inc., yields on long-term "A" rated public utility bonds are
13 3.86% for the month-ending August, 2017; as compared to 4.40%
14 average yield for 2015, 4.23% for 2014, and 4.68% for 2013 as
15 shown in Exhibit CCC-1.

16

17 **Q. HOW DO THESE LOWER INTEREST RATES AFFECT THE**
18 **FINANCING COSTS OF A COMPANY?**

19 A. In simple terms, the current lower interest rates and stable
20 inflationary environment of today, relative to the early 1990's,
21 indicate that borrowers are paying less for the time value of money.
22 This finding is significant since utility stocks and utility costs of capital

1 are highly interest rate-sensitive relative to most industries within the
2 securities markets.

3
4 III. APPROPRIATE CAPITAL STRUCTURE AND COST OF LONG
5 TERM DEBT

6 **Q. WHY IS THE ISSUE OF THE APPROPRIATE CAPITAL**
7 **STRUCTURE IMPORTANT FOR RATEMAKING PURPOSES?**

8 A. For companies that do not have monopoly power, the price that an
9 individual company charges for its products or services is set in a
10 competitive market and that price is generally not influenced by the
11 company's capital structure. However, the capital structure that is
12 determined appropriate for a regulated public utility has a direct
13 bearing on the fair rate of return, revenue requirements, and,
14 therefore, the prices charged to captive ratepayers.

15
16 **Q. PLEASE EXPLAIN THE TERM CAPITAL STRUCTURE AND**
17 **HOW THE CAPITAL STRUCTURE APPROVED FOR**
18 **RATEMAKING PURPOSES AFFECTS RATES.**

19 A. The capital structure is simply a representation of how a utility's
20 assets are financed. It is the relative proportions or ratios of debt
21 and common equity to the total of these forms of capital. It is
22 important to note at this point that debt and common equity have
23 different costs. Common equity is far more expensive than debt for

1 ratemaking purposes for two reasons. First, and most important,
2 are income tax considerations. Interest on debt is deductible for
3 purposes of calculating income taxes. The cost of common equity
4 must be "grossed up" to allow the utility sufficient revenue to pay
5 income taxes and to earn its cost of common equity on a net or
6 after-tax basis. Therefore, the amount of revenue the utility must
7 collect from ratepayers to meet income tax obligations is directly
8 related to both the common equity ratio in the capital structure and
9 cost of common equity. A second reason for this cost difference is
10 that the cost of common equity must be set at a marginal or current
11 cost rate. Conversely, the cost of debt is set at an embedded rate,
12 because the utility is incurring only the costs previously established
13 in contracts with senior security holders.

14 Because the Commission has the duty to promote economical
15 utility service, it must decide whether or not a utility's requested
16 capital structure is appropriate for ratemaking purposes. Each
17 dollar of its common equity and long term debt which supports the
18 retail rate base has the following approximate annual costs
19 (including income tax and regulatory fee expense) to CWSNC's
20 ratepayers:

- 21 (1) Each \$1 of common equity costs ratepayers 15 cents per
22 year.
- 23 (2) Each \$1 of long term debt costs ratepayers 6 cents per year.

1 Q. WHAT IS YOUR RECOMMENDED CAPITAL STRUCTURE AND
2 RECOMMENDED EMBEDDED COST OF LONG TERM DEBT?

3 A. The Company's application listed its capital structure as consisting
4 of 47.11% long term debt and 52.89% common equity. In this
5 proceeding, through discovery, it was determined that the Company
6 was in position to update its capital structure to 47.32% long term
7 debt and 52.68% common equity. As part of the overall Stipulation,
8 the Company agreed to a lower cost capital structure consisting of
9 48% long term debt and 52% common equity. I recommend use of
10 a hypothetical capital structure to set rates for CWSNC in this
11 proceeding. The recommended capital structure for CWSNC as of
12 December 31, 2016, and embedded cost of long term debt are as
13 follows:

14

15	<u>Component</u>	<u>Ratio</u>	<u>Cost Rate</u>
16	Long Term Debt	48.00%	5.93%
17	<u>Common Equity</u>	<u>52.00%</u>	
18	Total	100.00%	

19

20 IV. THE COST OF COMMON EQUITY

21 Q. HOW DID YOU DETERMINE THE COST OF COMMON EQUITY
22 CAPITAL FOR THE COMPANY?

23 A. I have employed the discounted cash flow (DCF) model for water

utility companies and the risk premium method using a regression analysis of allowed returns for water utilities.

Q. WOULD YOU PLEASE DESCRIBE THE DCF MODEL?

A. The discounted cash flow model is a method of evaluating the expected cash flows from an investment by giving appropriate consideration to the time value of money. The theory dictates that the price of the investment will equal the discounted cash flows of returns. The return to an equity investor comes in the form of expected future dividends and price appreciation. However, as the new price will again be the sum of the discounted cash flows, price appreciation can be ignored and attention focused on the expected stream of dividends. Mathematically, this relationship may be expressed as follows:

Let D_1 = expected dividends per share over the next twelve months;

g = expected growth rate of dividends;

k = cost of equity capital; and

P = price of stock or present value of the future income stream.

Then,

$$P = \frac{D_1}{1+k} + \frac{D_1(1+g)}{(1+k)^2} + \frac{D_1(1+g)^2}{(1+k)^3} + \dots + \frac{D_1(1+g)^{t-1}}{(1+k)^t}$$

This equation represents the amount an investor would be willing to pay for a share of common equity with a dividend stream over the future periods. Using the formula for a sum of an infinite geometric series, this equation may be reduced to:

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

Solving for k yields the DCF equation:

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

Therefore, the rate of return on equity capital required by investors is the sum of the dividend yield (D_1/P) plus the expected long term growth rate in dividends (g).

Q. DID YOU APPLY THE DCF METHOD DIRECTLY TO CWSNC?

A. No, because the common equity of CWSNC is not publically traded. As such, I applied the DCF method to a comparable group of water utilities followed by Value Line Investment Survey (Value Line) and that exhibit comparable measures of investor-related risk measures as shown in Exhibit CCC-2.

Q. WHY DID YOU CONSIDER THE COST OF EQUITY FOR A GROUP OF COMPANIES COMPARABLE IN RISK TO CWSNC?

A. The cost of equity capital is a cost borne by firms whose equity shares are considered to be risk-comparable investments. In order to estimate the investor required rate of return for CWSNC, I performed a DCF analysis on comparable risk companies. Use of a comparable risk group reduces the possibility of error in

1 judgment, can be used as a check, and also insures that the
2 standards and criteria of the Hope and Bluefield cases are met.

3

4 **Q. HOW DID YOU DETERMINE THE DIVIDEND YIELD**
5 **COMPONENT OF THE DCF?**

6 A. I calculated the dividend yield by using the Value Line estimate of
7 dividends to be declared over the next 12 months divided by the
8 price of the stock as reported in the Value Line Summary and Index
9 sections for each week of the 13-week period from June 16, 2017
10 through September 8, 2017. A 13-week averaging period tends to
11 smooth out short-term variations in the stock prices. This process
12 resulted in a 2.0% average dividend yield for the comparable group
13 of water utilities as shown in Exhibit CCC-3.

14

15 **Q. HOW DID YOU DETERMINE THE EXPECTED GROWTH RATE**
16 **COMPONENT OF THE DCF?**

17 A. I employed the growth rates of the comparable group in earnings
18 per share (EPS), dividend per share (DPS), and book value per
19 share (BPS) as reported in Value Line over the past five and ten
20 years. They apply a smoothing process in an attempt to avoid the
21 distortion that may be associated with choosing an
22 unrepresentative high or low beginning or ending point.
23 Secondly, I employed the forecasts of the growth rates of the

1 comparable group in EPS, DPS, and BPS as also reported in Value
2 Line. These forecasts are prepared by analysts of an independent
3 advisory service. This service is widely available to investors and
4 should also provide an estimate of investor expectations.

5 Thirdly, I incorporated the consensus of various analysts' forecasts
6 of five-year EPS growth rates projections as reported in Yahoo
7 Finance. On Exhibit CCC-3, I have presented the dividend yields
8 and growth rates as described above for each of the companies
9 individually as well as average for the group.

10

11 **Q. WHAT IS YOUR CONCLUSION REGARDING THE COST OF**
12 **COMMON EQUITY TO THE COMPANY BASED ON THE DCF**
13 **METHOD?**

14 A. Based upon the DCF results for the comparable group of water
15 utilities, I determined that the cost of common equity is within the
16 range of 8.3% to 9.7%. This range is consistent with a dividend
17 yield of 2.0% and an expected growth rate of 6.3% to 7.7%.

18

19 **Q. PLEASE DESCRIBE THE RISK PREMIUM METHOD BASED ON**
20 **COMMISSION APPROVED ALLOWED RETURNS OF EQUITY.**

21 A. I used a regression analysis to analyze the historical relationship
22 between approved returns on common equity for water utilities and
23 yields on utility bonds. The regression analysis incorporates annual

1 average allowed returns as reported by Regulatory Research and
2 Associates (RRA) and the annual average single 'A' rated public
3 utility bond yields as reported by Moody's Investor Service
4 (Moody's). Using the last three months of 'A' rated bond yields, the
5 regression analysis generates a prediction of the current allowed
6 return of equity and the associated risk premium.

7 The method was relied upon by this Commission in Docket No.
8 E-22, Sub 333, a 1993 general rate case of North Carolina Power,
9 and Docket No. G-5, Sub 327, a 1994 general rate case of Public
10 Service Company of North Carolina. This method has been used in
11 filings by the Public Staff in previous general rate cases that were
12 ultimately settled. The method has been used in annual formula
13 rate plans for LDCs¹ regulated by the Mississippi Public Service
14 Commission for over ten years and the method has used in filings
15 by the Staff of the Federal Energy Regulatory Commission in
16 litigated rate cases.

17

18 **Q. WHAT DID YOU CONCLUDE FROM THE ANALYSIS OF**
19 **ALLOWED RETURNS AND UTILITY BOND YIELDS?**

20 **A.** Based on current Moody's single "A" rated utility bond yields and the
21 regression equation, the predicted return on common equity is

¹ Mississippi Valley Gas, Docket No. 92-UN-230; Willmut Gas & Oil Co., Docket 01UN0524.

1 9.65%, as shown in Exhibit CCC-4, page 2 of 2. This result is
2 derived by adding the value for the intercept coefficient
3 (0.086778646) to the value of the x-variable coefficient
4 (0.247358711), and multiplying the result by the average bond yield
5 for "A" rated bonds during the past 90 days (3.93%).
6

7 **Q. BASED UPON YOUR DCF AND RISK PREMIUM METHODS,**
8 **WHAT IS YOUR RECOMMENDED COST OF EQUITY FOR**
9 **CWSNC?**

10 A. Based on the results of the two methods, I conclude that a
11 reasonable range of estimates for the cost of equity is between
12 8.30% and 9.70%.
13

14 **Q. TO WHAT EXTENT DOES YOUR RECOMMENDED RATE OF**
15 **RETURN ON COMMON EQUITY TAKE INTO CONSIDERATION**
16 **THE IMPACT OF A WSIC/SSIC MECHANISM PURSUANT TO**
17 **G.S. 62-133.12 ON THE COMPANY'S FINANCIAL RISK?**

18 A. I believe the ability for enhanced recovery of the eligible
19 WSIC/SSIC capital improvements reduces regulatory lag and is
20 seen by investors as supportive regulation that mitigates risk.
21 However, a clear method does not exist to quantify the reduction in
22 risk and the return on equity from the investor perspective.

1 As such, I believe that this mechanism supports the
2 reasonableness of my recommendation.

3

4 **Q DID YOU SUPPORT SETTLING WITH THE COMPANY AT 9.60%**
5 **RATE OF RETURN ON COMMON EQUITY?**

6 A. Yes. While the results of my study support a cost of equity between
7 8.30% and 9.70% with a mid-point estimate of 9.00%, which would
8 be my recommendation if cost of capital were fully litigated, I
9 believe that the 9.60% return on common equity in the Stipulation
10 represents a reasonable compromise. The 9.60% should enable
11 CWSNC by sound management to produce a fair return for its
12 shareholders, considering economic conditions and other factors,
13 as they now exist, to maintain its facilities and services in
14 accordance with the reasonable requirements of its customers in
15 the territories covered by its franchises, and to compete in the
16 market for capital funds which are reasonable and which are fair to
17 the customers and to its existing investors.

18

19 **V. OVERALL RECOMMENDED COST OF CAPITAL**

20 **Q. WHAT IS YOUR RECOMMENDED OVERALL RATE OF**
21 **RETURN?**

22 A. The recommended cost of capital is 7.84%, as shown in Exhibit
23 CCC-5.

1 Q. DID YOU PERFORM ANY TESTS OF REASONABLENESS WITH
2 YOUR RECOMMENDED RETURN OF EQUITY AND OVERALL
3 COST OF CAPITAL?

4 A. In regard to reasonableness assessment with financial risk, I
5 considered the pre-tax interest coverage ratio as a result of my cost
6 of capital recommendation. Based on the recommended capital
7 structure, cost of debt, and equity return of 9.60%, the pre-tax
8 interest coverage ratio is approximately 3.7 times. This level of pre-
9 tax interest coverage should allow the Company to qualify for a
10 "BBB" bond rating.

11

12 Q. TO WHAT EXTENT DOES THE RETURN ON EQUITY AGREED
13 TO IN THE STIPULATION TAKE INTO CONSIDERATION THE
14 IMPACT OF CHANGING ECONOMIC CONDITIONS ON THE
15 CWSNC CUSTOMERS?

16 A. I am aware of no clear numerical basis for quantifying the impact of
17 changing economic conditions on customers in determining an
18 appropriate return on equity in setting rates for a public utility.
19 Rather, the impact of changing economic conditions nationwide is
20 inherent in the methods and data used in my study to determine the
21 cost of equity for utilities that are comparable in risk to CWSNC. In
22 addition, customer testimony at the public hearings in this
23 proceeding focused on the amount of proposed rate increases in

1 the various service areas. There was no customer testimony on the
2 impact of changing economic conditions on the Company's cost of
3 equity capital.

4 In order to obtain information on the economic conditions in the
5 area served by CWSNC, I conducted a review of the data on total
6 personal income for the years 2013 through 2015 as compiled by
7 the Bureau of Economic Analysis (BEA) and data on the
8 unemployment rate published by the North Carolina Department of
9 Commerce for the counties within the Company's service area
10 which have the greatest number of CWSNC customers. The
11 Company's service area, which stretches from the mountains to the
12 coast, consists of thirty-eight counties and includes nine of the ten
13 most populous counties in North Carolina.

14 The three largest counties within the Company's service area,
15 Forsyth, Mecklenburg, and Wake, experienced average growth in
16 personal income of more than 3.7% annually during the years 2013
17 through 2015, while the statewide average was 3.5%. Most of the
18 counties within its service area experienced growth in personal
19 income from 2013 through 2015, and the overall annual average for
20 these counties was 3.5%.

21 The average unemployment rate of the 38 counties in the CWSNC
22 service territory was 5.0% at the end of 2016, which was virtually
23 identical to North Carolina's statewide unemployment rate of 4.9%

1 at the end of 2016. From 2014 through 2016, the unemployment
2 rate in the Company's service territory fell from 5.6% in 2014 to
3 5.0%, while the state unemployment rate fell from 5.4% in 2014 to
4 4.9%. The falling unemployment rate in the Company's service
5 territory demonstrates the continued improvement in North
6 Carolina's economy and the economy of the service territory of
7 CWSNC.

8 The determination of the rate of return for regulatory proposes must
9 be based on the requirements of capital markets. However, as
10 noted by the North Carolina Supreme Court in recent decisions, it is
11 necessary to consider the impact of changing economic conditions
12 on consumers in general rate cases. As noted in the discussion on
13 present economic conditions, there are reasons to believe that the
14 economic conditions in the nation and in North Carolina will
15 continue to improve which should provide a benefit for many
16 CWSNC customers.

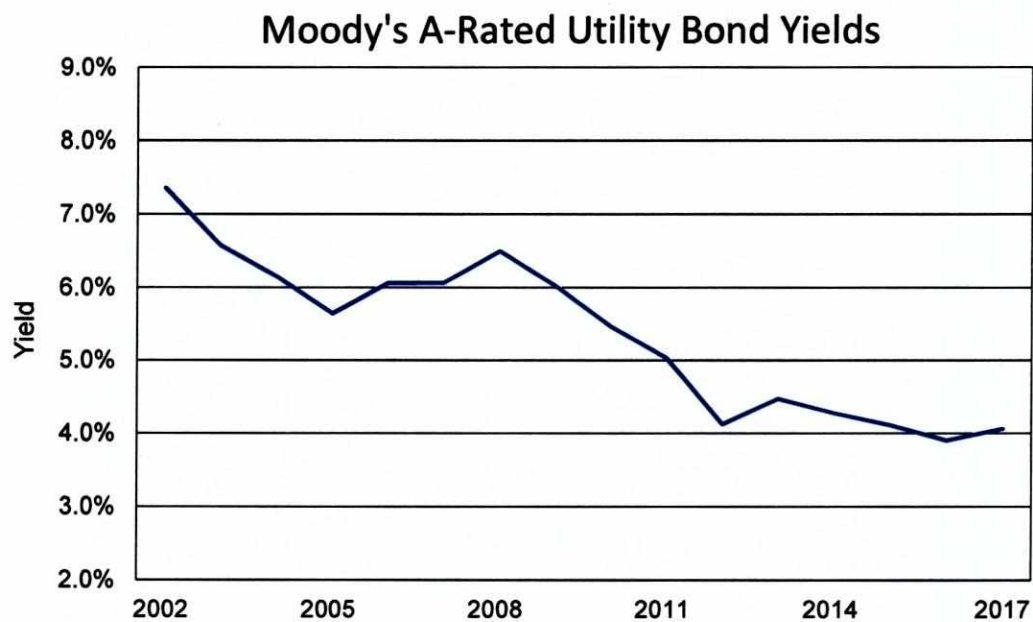
17 In any event, the Commission's duty to set rates as low as
18 reasonably possible consistent with constitutional constraints is the
19 same regardless of the customer's ability to pay, and this was the
20 principle underlying the Stipulation.

21

22 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

23 **A. Yes.**

Exhibit CCC-1



Source: Moody's Credit Trends with yield data as of August, 2017.

RISK MEASURES Group of Water Companies

Company Name	Value Line ¹				
	Safety	Beta	Financial Strength	Earnings Predict.	Price Stability
1 American States Water	2	0.75	A	90	80
2 American Water Works	3	0.60	B+	95	100
3 Aqua America	2	0.70	A	90	95
4 California Water	3	0.75	B++	70	85
5 Connecticut Water	3	0.65	B+	90	90
6 Middlesex Water	2	0.75	B++	85	80
7 SJW Corp.	3	0.70	B+	45	75
8 York Water	3	0.75	B+	95	75
Average	3	0.71		83	85

Source:

¹ Value Line Investment Survey, July 14, 2017.

DCF ANALYSIS

Group of Water Utility Companies

		Value Line ²						Value Line Forecast			Yahoo ³	
		EPS	DPS	BPS	EPS	DPS	BPS	EPS	DPS	BPS	EPS	
Company Name	Yield ¹	10-Yr	10-Yr	10-Yr	5-Yr	5-Yr	5-Yr	5-Yr	5-Yr	5-Yr	5-Yr	
American States Water	2.0	10.0	7.0	5.5	9.0	10.5	5.0	6.5	7.5	4.0	5.1	
American Water Works	2.1	NA	NA	1.5	11.0	9.0	4.0	8.5	10.0	5.5	7.7	
Aqua America	2.4	8.5	8.0	7.0	11.0	8.0	7.5	7.0	9.0	6.5	5.3	
California Water	1.9	4.0	1.5	5.0	3.0	2.0	5.0	9.0	6.5	3.0	9.7	
Connecticut Water	2.1	8.0	2.5	6.0	12.0	3.0	9.0	4.5	4.5	3.0	5.2	
Middlesex Water	2.2	5.0	1.5	4.0	8.0	1.5	3.0	8.5	4.5	4.5	2.7	
SJW Corp.	1.7	8.0	4.0	5.5	20.5	3.0	6.5	3.0	6.0	4.0	14.0	
York Water	1.8	5.5	3.5	5.0	6.0	3.0	3.5	7.0	7.0	4.5	4.9	
Average		2.0	7.0	4.0	4.9	10.1	5.0	5.4	6.8	6.9	4.4	6.8
DCF Result		9.0	6.0	6.9	12.1	7.0	7.4	8.8	8.9	6.4	8.8	

Sources:

¹ Value Line Investment Survey, Summary and Index.² Value Line Investment Survey Reports, as of July 14, 2017.³ Yahoo Finance, downloaded on May 19, 2017.

REGRESSION ANALYSIS OF ALLOWED RETURNS ON EQUITY

	[A]	[B]	[C]=[A]-[B]
	Water Utility Approved Returns on Equity ¹	Moody's A-Rated Bond Yields ²	Water Utility Risk Premium
Year			
2006	10.23%	6.16%	4.07%
2007	10.07%	6.05%	4.02%
2008	10.24%	6.51%	3.73%
2009	10.18%	6.04%	4.15%
2010	10.18%	5.47%	4.71%
2011	10.04%	5.04%	5.00%
2012	9.90%	4.13%	5.77%
2013	9.73%	4.48%	5.25%
2014	9.60%	4.28%	5.32%
2015	9.78%	4.11%	5.67%
2016	9.68%	3.90%	5.78%
2017	9.43%	4.18%	5.25%

Source:

¹. SNL Energy, Regulatory Research Associates, June 8, 2017.

². Moody's Cred Trends, Various issues.

Regression Analysis of Allowed Returns on Equity

<i>Regression Statistics of 2006-2017 data</i>	
<i>Regression Statistics</i>	
Multiple R	0.870490429
R Square	0.757753587
Adjusted R Square	0.733528945
Standard Error	0.001415208
Observations	12

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	6.26485E-05	6.2649E-05	31.28028	0.000229952
Residual	10	2.00281E-05	2.0028E-06		
Total	11	8.26767E-05			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	0.086778646	0.002261117	38.3786703	3.44E-12
X Variable 1	0.247358711	0.044227449	5.5928777	0.00023

	Moody's A-Rated Bond Yield
June, 2017	3.94%
July, 2017	3.99%
August, 2017	3.86%
Average	3.93%

Predicted Cost of Equity	9.65%
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Note:

$$9.65\% = 0.08677 + 0.0393 \times 0.24735.$$

**CAROLINA WATER SERVICE, INC. OF NC
COST OF CAPITAL**

Item	Amount	Ratios	Cost Rate	Weighted Cost Rate	Pre-Tax Cost of Capital
Long-Term Debt	\$61,185,874	48.00%	5.93%	2.85%	2.85%
Common Equity	\$66,284,697	52.00%	9.60%	4.99%	8.05%
Total	\$127,470,571	100.00%		7.84%	9.92%

Pre-Tax Interest Coverage 3.7

One Dollar Costs per per year	Tax Retention Factors
6	1.0000
15	0.6200