BEFORE THE TENNESSEE PUBLIC UTILITY COMMISSION
NASHVILLE, TENNESSEE

August 3, 2018

IN RE:	**)**	
	)	
CHATTANOOGA GAS COMPANY	**)**	
PETITION FOR APPROVAL OF	**)**	
AN ADJUSTMENT IN RATES AND	**)**	**Docket No.**
TARIFF; THE RECOVERY OF	**)**	**18-00017**
THE AUA MECHANISM	**)**	
REVENUE DEFICIENCY; AND	**)**	
THE IMPLEMENTATION OF	**)**	
ALTERNATIVE REGULATORY	**)**	
METHODS	**)**	

REBUTTAL TESTIMONY OF

DR. JAMES H. VANDER WEIDE

ON BEHALF OF

CHATTANOOGA GAS COMPANY

I. INTRODUCTION AND PURPOSE

Q. What is your name and business address?

A. My name is James H. Vander Weide. I am President of Financial Strategy Associates, a firm that provides strategic and financial consulting services to business clients. My business address is 3606 Stoneybrook Drive, Durham, North Carolina 27705.

Q. Please describe your educational background and prior academic experience.

A. I graduated from Cornell University with a Bachelor's Degree in Economics and from Northwestern University with a Ph.D. in Finance. After joining the faculty of the School of Business at Duke University, I was named Assistant Professor, Associate Professor, Professor, and then Research Professor. I have published research in the areas of finance and economics and taught courses in these fields at Duke for more than thirty-five years. I am now retired from my teaching duties at Duke. (A summary of my research, teaching, and other professional experience was presented with my direct testimony, Exhibit JVW-2, Appendix 1.)

Q. Are you the same James Vander Weide who previously filed direct testimony in this proceeding?

A. Yes, I am.

Q. What is the purpose of your rebuttal testimony?

A. I have been asked by Chattanooga Gas Company ("CGC") to review the direct testimony of Dr. Christopher C. Klein and to respond to his comments and recommendations regarding the appropriate cost of capital for CGC. Dr. Klein's testimony is presented on behalf of the Tennessee Attorney General Consumer Protection and Advocate Division.

II. SUMMARY OF DR. KLEIN'S COST OF EQUITY AND CAPITAL STRUCTURE RECOMMENDATIONS

Q. What is Dr. Klein's recommended cost of equity for CGC?

A. Dr. Klein recommends at page 6 a cost of equity for CGC equal to 9.0 percent.

Q. How does Dr. Klein arrive at his recommended 9.0 percent cost of equity for CGC?

A. Dr. Klein at page 3 of his Exhibit arrives at his recommended 9.0 percent cost of equity for CGC by applying the Discounted Cash Flow ("DCF") model and the Capital Asset Pricing Model ("CAPM") to a proxy group of five combination electric/natural gas utilities, including Dominion Energy, Duke Energy, Exelon Corp., Sempra Energy, and the Southern Company.

Q. What capital structure does Dr. Klein recommend for CGC?

A. Dr. Klein recommends at page 2 of his Exhibit a capital structure containing 8.55 percent short-term debt, 56.79 percent long-term debt, and 34.66 percent common equity.

Q. What weighted average cost of capital does Dr. Klein recommend for CGC?

A. Using a double leverage approach, Dr. Klein at page 22 recommends a weighted average cost of capital for CGC equal to 5.93 percent.

Q. What conclusions do you reach from your analysis of Dr. Klein's cost of equity studies and his cost of capital recommendation?

A. I conclude that Dr. Klein's recommended cost of equity and cost of capital estimates are well below a reasonable range of cost of equity and cost of capital estimates for CGC. As explained below, Dr. Klein's underestimates of the cost of equity and cost of capital arise from: (1) his choice of inputs in his cost of equity

studies; (2) his recommendation to set rates based on a double leverage capital structure that contains significantly more debt and less equity than CGC/Southern Company Gas's actual capital structure; (3) his failure to adjust his cost of equity estimate to reflect the significantly greater financial risk in his recommended double leverage capital structure compared to the lower financial risk reflected in CGC/Southern Company Gas's actual capital structure; and (4) his use of debt costs that are lower than CGC/Southern Company Gas's actual debt costs.

Q. Is the double leverage approach to setting a utility's capital structure consistent with the basic economic principles of financial economics?

A. No. While the Commission may have applied the double leverage approach in the past to certain utilities, as I discuss below, the double leverage approach to utility rate making as applied in this proceeding violates the fundamental principles of financial economics that the required rate of return on an equity investment: (1) is equal to the required rate of return on other investments of comparable risk; (2) depends only on the risk of that investment, not on the risk of the owner's other business activities; and (3) depends only on the business and financial risks of that investment, not on how the owner finances the equity portion of the investment. If the Commission wishes to apply the double leverage approach by increasing the percentage of debt in the capital structure, then the Commission must also increase the cost of equity to reflect the higher financial risk associated with the higher percentage of debt in the capital structure.

Q. What conclusions do you reach from your analysis of Dr. Klein's recommended capital structure for CGC?

A. I conclude that Dr. Klein's recommended capital structure for CGC contains significantly more debt and less equity than both CGC/Southern Company Gas's forecasted actual capital structure and the average capital structure of comparable risk natural gas utilities. Because investors in companies with highly-leveraged or debt heavy capital structures experience greater financial risk than investors in companies with less leveraged capital structures, and investors demand a higher return on investments of greater risk, Dr. Klein should have adjusted his cost of equity estimate for CGC upward to reflect the greater financial risk associated with his debt-heavy recommended capital structure. Instead, Dr. Klein inconsistently recommends for CGC: (1) a cost of equity equal to his estimate of the cost of equity for his proxy companies; and (2) a capital structure that reflects significantly greater financial risk than either CGC/Southern Company Gas's actual capital structure or the average capital structure of the Value Line natural gas utilities.

III. PROXY COMPANIES

Q. What proxy companies does Dr. Klein use to estimate CGC's cost of equity?

A. As noted above, Dr. Klein uses a group of five combination electric/natural gas utilities followed by Value Line, including Dominion Energy, Duke Energy, Exelon Corp., Sempra Energy, and Southern Company.

Q. How does Dr. Klein select his proxy group of combination electric/natural gas utilities?

A. Dr. Klein selects the combination electric/natural gas utilities that: (1) are covered by Value Line's "Ratings and Reports"; and (2) have total capital between 0.5 and 1.5 times that of the Southern Company (Klein at 12 – 13).

Q. You note that Dr. Klein uses a group of large publicly-traded combination electric/natural gas utilities as proxies for the risk of investing in CGC. Is CGC a large combination electric/natural gas utility?

A. No. CGC is a small natural gas utility that serves approximately 66,000 customers in Hamilton and Bradley counties in southeast Tennessee. In contrast, Dr. Klein's combination electric/natural gas companies serve millions of customers in multi-state regions.

Q. Why does Dr. Klein select a proxy group of combination electric/natural gas utilities rather than a group of natural gas utilities to estimate CGC's cost of equity?

A. Dr. Klein chooses a group of large combination electric/natural gas utilities to estimate CGC's cost of equity because he applies the double leverage approach to estimate CGC's cost of capital. As a result of his double leverage approach, Dr. Klein applies his cost of equity methods to a proxy group of combination electric/natural gas utilities that, in his opinion, are comparable to CGC's ultimate parent, Southern Company, rather than to proxy natural gas utilities that are comparable in risk to CGC and its immediate parent, Southern Company Gas.

Q. What proxy companies do you use to estimate CGC's cost of equity?

A. I use a proxy group of natural gas distribution utilities followed by Value Line that are comparable in business and financial risk to CGC and Southern Company Gas.

Q. What criteria do you use to select your proxy group of natural gas distribution utilities?

A. As discussed in my direct testimony, I select all natural gas utilities in Value Line's Standard edition that: (1) paid dividends during every quarter of the last two years; (2) did not decrease dividends during any quarter of the past two years; (3) have an available positive I/B/E/S long-term growth forecast; (4) have an investment grade bond rating and a Value Line Safety Rank of 1, 2, or 3, where 1 is the highest Safety Rank (that is, lowest risk) of the Value Line universe of companies, and 5 is the lowest Safety Rank (that is, highest risk); and (5) are not the subject of a merger offer that has not been completed (Vander Weide Direct at 29).

Q. Do you have any evidence that your proxy group of natural gas distribution utilities is a reasonable proxy for the risk of investing in CGC and Southern Company Gas?

A. Yes. In addition to being in the same business as CGC and Southern Company Gas, my proxy group of natural gas utilities has an average Standard & Poor's bond rating of "A," an average Value Line Safety Rank of 1.78, and an average capital structure with 48 percent equity. In contrast, Southern Company has a Standard & Poor's bond rating of "A-," a Value Line Safety Rank of 2, and a capital structure containing approximately 35 percent equity. Thus, my proxy group is a conservative proxy for the risk of investing in CGC and Southern Company Gas, whereas Southern Company is not because it has a significantly lower equity ratio than Southern Company Gas. (Value Line describes its Safety Rank as "a measurement of potential risk associated with individual common stocks," with Safety Ranks ranging from 1 to 5, with the safest rating being a 1.)

IV. DR. KLEIN'S DCF RESULTS

Q. What cost of equity result does Dr. Klein report from his application of his DCF model to his proxy utility group?

A. Dr. Klein reports two DCF results, an average result equal to 10.62 percent based on recent dividend yields reported by Value Line, and an average result equal to 10.51 percent based on spot dividend yields at June 12, 2018 (Klein at 13, and Klein Exhibit, page 3 of 17).

Q. What DCF model does Dr. Klein use to estimate CGC's cost of equity?

A. Dr. Klein uses an annual DCF model of the form, $k = D_0/P_0 + g$, where k is the cost of equity, D_0 is the most recent annualized dividend, P_0 is the current stock price, and g is the average expected future growth in the company's earnings and dividends.

Q. What are the basic assumptions of the annual DCF model?

A. The annual DCF model is based on the assumptions that: (1) a company's stock price is equal to the present value of the future dividends investors expect to receive from their investment in the company; (2) dividends are paid annually; (3) dividends, earnings, and book values are expected to grow at the same constant rate forever; and (4) the first dividend is received one year from the date of the analysis.

Q. Do you agree with Dr. Klein's use of an annual DCF model to estimate CGC's cost of equity?

A. No. Dr. Klein's annual DCF model is based on the assumption that companies pay dividends only at the end of each year. Since Dr. Klein's proxy companies all pay

dividends quarterly, Dr. Klein should have used the quarterly DCF model to estimate CGC's cost of equity.

Q. Why is it unreasonable to use an annual DCF model to estimate the cost of equity for companies that pay dividends quarterly?

A. It is unreasonable to apply an annual DCF model to companies that pay dividends quarterly because: (1) the DCF model is based on the assumption that a company's stock price is equal to the present value of the expected future dividends associated with investing in the company's stock; and (2) the annual DCF model is an incorrect mathematical expression for the present value of future dividends when dividends are paid quarterly.

Q. Recognizing your disagreement with Dr. Klein's use of an annual DCF model, does Dr. Klein apply the annual DCF model correctly?

A. No. The annual DCF model is based on the assumption that dividends are paid annually and are expected to grow at the same rate forever. Under the assumption that dividends are paid annually and will grow at the same rate forever, the cost of equity is given by the equation, $k = D_0 (1 + g) / P_0 + g$, where D_0 is the current annualized dividend, P_0 is the stock price, and g is the expected constant annual growth rate. Thus, the correct first period dividend in the annual DCF model is the current annualized dividend multiplied by the factor, (*1 + growth rate*). Instead, Dr. Klein simply uses the current annual dividend in his DCF model without any adjustment for growth in the first year. Dr. Klein's failure to multiply the current dividend yield by the term, $1 + g$, reduces his DCF cost of equity estimate by approximately 25 basis points.

Q. You note that Dr. Klein obtains average DCF results of 10.62 percent and 10.51 percent for his proxy group of combination electric/natural gas utilities. Does an average DCF result equal to 10.62 percent or 10.51 percent support Dr. Klein's recommended 9.0 percent cost of equity for CGC?

A. No. Dr. Klein's DCF results suggest that his recommended 9.0 percent cost of equity understates CGC's base cost of equity by at least 150 - 160 basis points (10.62 – 9.0 = 162 basis points, 10.51 – 9.0 = 151 basis points). If Dr. Klein had correctly adjusted the dividend yield for expected growth during the first period, Dr. Klein's 9.0 percent recommendation understates CGC's base cost of equity by 170 to 185 basis points.

V. CAPITAL ASSET PRICING MODEL

Q. What is the CAPM?

A. The CAPM is an equilibrium model of the security markets in which the expected or required return on a given security is equal to the risk-free rate of interest, plus the company equity "beta," times the market risk premium:

Cost of equity = Risk-free rate + (Equity beta x Market risk premium)

The risk-free rate in this equation is the expected rate of return on a risk-free government security, the equity beta is a measure of the company's risk relative to the market as a whole, and the market risk premium is the premium investors require to invest in the market basket of all securities compared to the risk-free security.

Q. How does Dr. Klein use the CAPM to estimate CGC's cost of equity?

A. The CAPM requires estimates of the risk-free rate, the company-specific risk factor, or beta, and either the required return on an investment in the market portfolio, or the risk premium on the market portfolio compared to an investment in risk-free government securities. For the risk-free rate, Dr. Klein uses the recent 3.04 percent yield on 20-year Treasury bonds (Klein Exhibit, page 4 of 17); for the company-specific risk factor or beta, Dr. Klein uses the average Value Line beta for his proxy companies; and for the required risk premium on the market portfolio, based on data from Ibbotson® SBBI®, Dr. Klein uses the 6.9 percent difference between the return on common stocks and the income return on 20-year Treasury bonds over the years 1926 through 2016 (Klein Exhibit, page 4 of 17).

Q. What CAPM result does Dr. Klein report for his proxy companies?

A. Dr. Klein reports CAPM results in the range 6.49 percent to 8.56 percent (Klein Exhibit, page 4 of 17).

Q. Does Dr. Klein's CAPM analysis produce a reasonable estimate of CGC's cost of equity at this time?

A. No. There are several reasons why Dr. Klein's CAPM analysis produces unreasonably low cost of equity results for his proxy utilities. First, Dr. Klein fails to acknowledge that current interest rates understate investors' interest rate expectations because investors recognize that interest rates are heavily influenced by Federal Reserve monetary policy, and the Federal Reserve's monetary policy has become significantly tighter in recent months as the Federal Reserve has begun to unwind its unprecedented efforts to stimulate the economy through enormous increases in the money supply. In March 2018, the Federal Reserve raised its

benchmark interest rate for the sixth increase since 2015, forecasted two additional rate increases in 2018, and forecasted three additional rate hikes in 2019. Economists now project that the Federal Reserve will raise the federal funds rate four times in 2018 (see, for example, "Economists See Fed Raising Rates in June, then September, Forecasters surveyed by WSJ increasingly expect four Federal Reserve rate increases in 2018" *The Wall Street Journal*, May 10, 2018). As investors had expected, the Federal Reserve increased the federal funds rate June 13, 2018, and signaled that it will likely raise rates at least twice more during 2018. Given these statements from the Federal Reserve, it is not surprising that investors are expecting over the next several years that long-term Treasury bond yields will exceed the 3.04 percent rate Dr. Klein uses in his studies.

Second, Dr. Klein uses a beta of 0.65 in his CAPM analysis (Klein Exhibit, page 4 of 17), whereas the average beta for the Value Line natural gas utilities at this time is ten basis points higher, 0.75. Further, as I discuss in my direct testimony, the CAPM tends to underestimate the cost of equity for companies whose equity beta is less than 1.0 and to overestimate the cost of equity for companies whose equity beta is greater than 1.0, and Dr. Klein fails to adjust for this tendency.

Third, Dr. Klein fails to use the most recent estimate of the risk premium on the market portfolio reported by Ibbotson® SBBI®, 7.1 percent, instead using a risk premium estimate of 6.9 percent that is approximately 20 basis points lower than the most recent market risk premium.

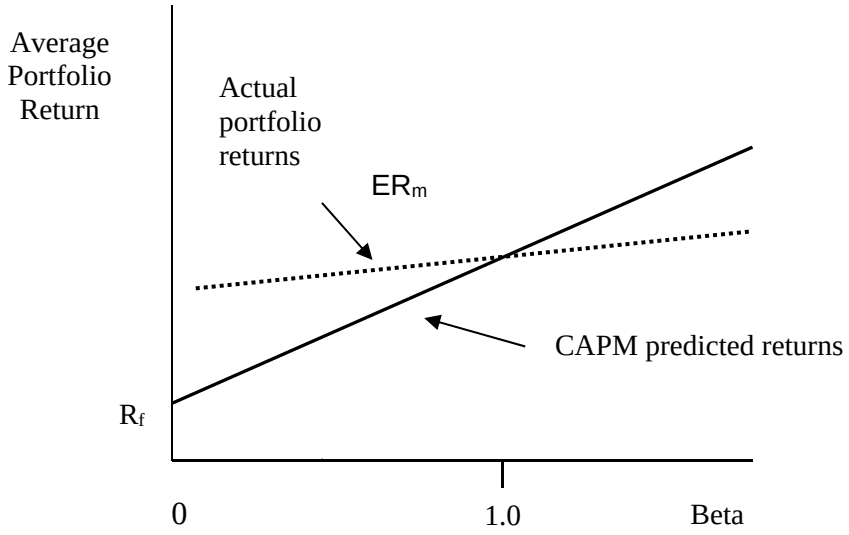
Q. Can you briefly summarize the evidence that the CAPM underestimates the required returns for securities or portfolios with betas less than 1.0 and overestimates required returns for securities or portfolios with betas greater than 1.0?

A. Yes. The CAPM conjectures that security returns increase with increases in security betas in line with the equation

$$ER_i = R_f + \beta_i \left[ER_m - R_f \right],$$

where ER_i is the expected return on security or portfolio i, R_f is the risk-free rate, $ER_m - R_f$ is the expected risk premium on the market portfolio, and β_i is a measure of the risk of investing in security or portfolio i. If the CAPM correctly predicts the relationship between risk and return in the marketplace, then the realized returns on portfolios of securities and the corresponding portfolio betas should lie on the solid straight line with intercept R_f and slope $[R_m - R_f]$ shown below.

FIGURE 1
AVERAGE RETURNS COMPARED TO BETA
FOR PORTFOLIOS FORMED ON PRIOR BETA



Financial scholars have found that the relationship between realized returns and betas is inconsistent with the relationship posited by the CAPM. As described in Fama and French (1992) and Fama and French (2004), the actual relationship between portfolio betas and returns is shown by the dotted line in the figure above. Although financial scholars disagree on the reasons why the return/beta relationship looks more like the dotted line in the figure than the solid line, they generally agree that the dotted line lies above the solid line for portfolios with betas less than 1.0 and below the solid line for portfolios with betas greater than 1.0. Thus, in practice, scholars generally agree that the CAPM underestimates portfolio returns for companies with betas less than 1.0, and overestimates portfolio returns for portfolios with betas greater than 1.0.

Q. What conclusions do you reach from your review of the literature on the CAPM to predict the relationship between risk and return in the marketplace?

A. I conclude that the financial literature strongly supports the proposition that the standard CAPM underestimates the cost of equity for companies such as Dr. Klein's proxy utilities with betas less than 1.0. Because the CAPM significantly underestimates the cost of equity for companies with betas less than 1.0, and both Dr. Klein's and my proxy companies have betas that are significantly less than 1.0, I further conclude that the Commission should give little or no weight to the results of Dr. Klein's application of the standard CAPM at this time.

Q. Does Dr. Klein acknowledge that the standard CAPM may underestimate the cost of equity for companies with betas less than 1.0?

A. Yes. Dr. Klein states that "there is some evidence that the CAPM may underestimate the cost of equity for companies with betas less than one" (Klein at 15 – 16). However, Dr. Klein fails to acknowledge that the CAPM results he reports are not adjusted for the evidence that the CAPM may underestimate the cost of equity for companies with betas less than 1.0.

Q. Did you adjust your CAPM results to reflect the evidence that the CAPM underestimates the cost of equity for companies with betas less than 1.0?

A. Yes, I perform additional CAPM analyses to correct for this tendency of the CAPM (see Vander Weide Direct at 48, and Schedule 7, Schedule 8, and Schedule 9).

Q. Are there other problems with Dr. Klein's CAPM analysis?

A. Yes. The CAPM is based on the assumption that the investor's required risk premium is constant; that is, the risk premium does not change when interest rates

change. However, numerous studies indicate that, contrary to the CAPM assumption of a constant risk premium, the risk premium is inversely related to the level of interest rates. That is, the risk premium is higher when interest rates are less than average and lower when interest rates are higher than average. That interest rates are currently significantly less than their long-run average, that the risk premium is inversely related to interest rates, and that Dr. Klein did not adjust his CAPM estimates of the cost of equity to account for the low interest rate environment, are additional reasons to give Dr. Klein's CAPM results little or no weight at his time.

Q. Does Dr. Klein acknowledge that the investor's required risk premium moves inversely with the level of interest rates?

A. Yes. In his discussion of factors that can affect a CAPM cost of equity estimate, Dr. Klein states:

> The pertinent factor at this time is the tendency for the risk premium to expand when interest rates and bond yields are low and shrink when interest rates and bond yields are high. Consequently, because short term interest rates are near zero, the CAPM cost of equity estimates may underestimate the current cost of equity. [Klein at page 15]

However, as noted above, Dr. Klein does not adjust his CAPM cost of equity estimates to reflect the inverse relationship between the risk premium and the level of interest rates.

Q. Did you provide evidence in your direct testimony that investors' required risk premium moves inversely to the level of interest rates?

A. Yes. The ex ante risk premium study in my direct testimony provides convincing evidence that investors' required risk premium is higher when interest rates are

below average, and lower when interest rates are above average (see Vander Weide Direct at pp.32 - 33). Thus, the required risk premium moves inversely with the level of interest rates.

Q. Dr. Klein also shows a CAPM cost of equity equal to 9.94 percent, calculated using a beta of 1.0 (Klein Exhibit, page 4 of 17). Dr. Klein concludes from this evidence that his 9.94 percent CAPM cost of equity estimate "offsets the possibility that the CAPM underestimates the cost of equity when interest rates are low or for firms with a beta less than one" (Klein at 16). Does Dr. Klein give any weight to his 9.94 percent CAPM result in arriving at his recommended 9.0 percent cost of equity for CGC?

A. No. Dr. Klein's 9.0 percent cost of equity recommendation is the midpoint of his 7.51 percent unadjusted CAPM estimate (Klein Exhibit, page 4 of 17) and his 10.5 percent DCF cost of equity estimate (Klein Exhibit, page 3 of 17, DCF cost of equity estimate based on June 12, 2018, spot dividend yield).

Q. Because Dr. Klein gives no weight to his 9.94 percent CAPM result in arriving at his recommended 9.0 percent cost of equity for CGC, is it fair to say, as Dr. Klein states, that his 9.94 percent CAPM cost of equity estimate "offsets the possibility that the CAPM underestimates the cost of equity when interest rates are low or for firms with a beta less than one"?

A. No. Dr. Klein's 9.94 percent CAPM cost of equity estimate could only "offset" the impact of low interest rates and low betas if Dr. Klein gave some weight to the 9.94 percent CAPM result. However, because Dr. Klein gives no weight to his 9.94 percent CAPM cost of equity estimate in determining his recommended cost

of equity, there is no reason for Dr. Klein to claim that his CAPM results "offset" the impact of low interest rates or low betas.

Q. What cost of equity conclusion would Dr. Klein have reached if he had averaged his 9.94 percent CAPM cost of equity estimate with either his 10.51 percent or his 10.62 percent DCF cost of equity estimates for his proxy utilities?

A. Dr. Klein would have concluded that CGC's cost of equity is 10.3 percent if he had averaged his 9.94 percent CAPM cost of equity estimate with his 10.62 percent DCF cost of equity estimate, or 10.2 percent if he had averaged his 9.94 percent CAPM cost of equity estimate with his 10.51 percent DCF cost of equity estimate.

Q. Dr. Klein's CAPM analysis uses an investor required risk premium equal to 6.9 percent. Is 6.9 percent the most recent Ibbotson® SBBI® required risk premium?

A. No. The 6.9 percent risk premium is derived from data for the years 1926 through 2016. Using the most recent Ibbotson® SBBI® data, which now includes data for the years 1926 through year-end 2017, the required risk premium is 7.1 percent. Thus, Dr. Klein's CAPM cost of equity estimates would be approximately 15 basis points higher if he had used the most recent required risk premium equal to 7.1 percent.

VI. DR. KLEIN'S RECOMMENDED CAPITAL STRUCTURE

Q. What capital structure does Dr. Klein recommend for CGC?

A. As noted above, Dr. Klein recommends a capital structure containing 8.55 percent short-term debt, 56.79 percent long-term debt, and 34.66 percent common equity.

Q. What capital structure does CGC recommend in this proceeding?

A. CGC Witness Mr. Tucker recommends a capital structure for CGC containing 6.30 percent short-term debt, 44.47 percent long-term debt, and 49.23 percent common equity.

Q. Does Dr. Klein compare CGC's recommended capital structure to the historical capital structure of Southern Company Gas and AGL Resources?

A. Yes.

Q. What does Dr. Klein conclude from his comparison?

A. Dr. Klein concludes that CGC's recommended capital structure is reasonable, but he disagrees with CGC's failure to recognize the parent/subsidiary relationship between CGC/Southern Company Gas and Southern Company:

> Consequently, I find Mr. Tucker's recommended capital structure of SCG and its cost rates to be reasonable, except for ignoring the parent subsidiary relationship between SCG and TSC. [Klein at 8]

Q. If Dr. Klein believes CGC's recommended capital structure is reasonable, why does Dr. Klein recommend a capital structure with a significantly lower percentage of equity?

A. Dr. Klein recommends a capital structure with a significantly lower percentage of equity for CGC because he believes that CGC's recommended capital structure does not consider the parent/subsidiary relationship between CGC/Southern Company Gas and Southern Company. Thus, Dr. Klein arrives at his recommended capital structure for CGC by: (1) calculating the historical average capital structure for Southern Company; and (2) imputing Southern Company's forecasted parent-only capital structure to the equity portion of CGC's requested capital structure

(Klein at 9 and Klein Exhibit, page 2 of 17). Economists refer to such an approach as the "double leverage" approach to capital structure calculation.

Q. You note that Dr. Klein recommends a capital structure for CGC that contains significantly more debt and less equity than CGC/Southern Company Gas's forecasted capital structure. Does the risk of investing in a company's stock depend on its capital structure?

A. Yes. The risk of investing in a company's stock depends on the percentage of debt in the company's capital structure. The greater the percentage of debt in the capital structure, the greater the risk of investing in the company's stock.

Q. Why does a higher percentage of debt in a company's capital structure increase the risk of investing in the company's stock?

A. A higher percentage of debt in a company's capital structure increases the risk of investing in the company's stock because it increases the expected variability in the investor's return on equity.

Q. Dr. Klein recommends a lower percentage of equity for CGC, 34.66 percent, than Southern Company Gas's forecasted capital structure, which contains 49.23 percent equity, because of Dr. Klein's views regarding the parent/subsidiary relationship between Southern Company Gas and Southern Company. Does Dr. Klein adjust his estimated 9.0 percent required return on equity to reflect the higher financial risk associated with his recommended 34.66 percent equity capital structure compared to CGC's recommended 49.23 percent equity capital structure, which Dr. Klein has found to be reasonable?

A. No.

Q. Does the finance literature provide a method for adjusting Dr. Klein's 9.0 percent estimate of CGC's required return to account for Dr. Klein's recommended reduction in the percent of equity for CGC?

A. Yes. According to the well-known Modigliani-Miller theorem which describes the relationship between the investor's required return on equity and the percentage of equity in the company's capital structure, the investor's required return on equity will change in response to a change in the company's capital structure by an amount that is just sufficient to keep the company's weighted average cost of capital constant. Thus, when Dr. Klein reduces the percentage of equity he recommends for CGC's capital structure to reflect his application of double leverage, Dr. Klein should have increased his 9.0 percent estimate of CGC's cost of equity by an amount that would produce the same weighted average cost of capital as that produced by CGC/Southern Company Gas's 49.23 percent forecasted capital structure.

Q. Have you applied the Modigliani-Miller theorem to estimate the extent to which Dr. Klein should have increased his 9.0 percent cost of equity estimate to reflect the higher financial risk associated with his recommended capital structure for CGC/Southern Company Gas compared to the financial risk associated with CGC's/Southern Company Gas's actual capital structure?

A. Yes. The higher financial risk associated with Dr. Klein's recommended 34.66 percent equity ratio compared to the 49.23 percent equity ratio of CGC/Southern Company Gas would require an upward adjustment to Dr. Klein's

recommended cost of equity of approximately 230 basis points, from 9.0 percent to 11.28 percent (see TABLE 1 below).

TABLE 1
REQUIRED ADJUSTMENT TO DR. KLEIN'S 9.0 PERCENT COST OF EQUITY TO ACCOUNT FOR THE HIGHER FINANCIAL RISK ASSOCIATED WITH DR. KLEIN'S RECOMMENDED EQUITY RATIO COMPARED TO CGC/SCG'S ACTUAL EQUITY RATIO

1. CCG's Cost of Capital using Dr. Klein's Recommended Cost of Equity			
Source of Capital	Percent of Total	Cost Rate	Weighted Cost
Debt	50.77%	4.51%	2.29%
Equity	49.23%	9.00%	4.43%
TOTAL	100.00%		6.72%
2. Dr. Klein's Recommended Cost of Capital			
Source of Capital	% Total	Cost Rate	Weighted Cost
Debt	65.34%	4.30%	2.81%
Equity	34.66%	9.00%	3.12%
Total	100.00%		5.93%
3. Adjusted Cost of Equity to Achieve Same Overall Required Return			
Source of Capital	Percent of Total	Cost Rate	Weighted Cost
Debt	65.34%	4.30%	2.81%
Equity	34.66%	11.28%	3.91%
TOTAL	100.00%		6.72%

Q. In Table 1 above, the cost of equity adjustment reflects Dr. Klein's 4.30 percent composite cost of debt, which is a blended cost rate for the debt of CGC/Southern Company Gas and Southern Company, as well as Dr. Klein's double leverage capital structure. What debt cost does CGC recommend in this proceeding?

A. As shown above, CGC recommends a composite debt cost of 4.51 percent.

Q. What adjusted cost of equity would be produced using a 4.51 percent cost rate for debt as well as the double leverage capital structure?

A. Using a debt cost rate of 4.51 percent and adjusting for the higher debt in Dr. Klein's recommended capital structure would increase the cost of equity by approximately 190 basis points, from 9.0 percent to 10.89 percent.

Q. Is there any way to test the reasonableness of Dr. Klein's recommended 34.66 percent equity ratio for a regulated utility such as CGC?

A. Yes. One can test the reasonableness of Dr. Klein's recommended 34.66 percent equity ratio by comparing the 34.66 percent equity ratio to the average allowed equity ratio for electric and natural gas utilities.

Q. How does Dr. Klein's recommended 34.66 percent equity ratio for CGC in this proceeding compare to the average allowed equity ratios for electric and natural gas utilities in decisions made in 2017 and to date in 2018?

A. The average allowed equity ratio for electric and natural gas utilities in decisions made in 2017 and 2018 to date is 50.65 percent. Thus, Dr. Klein's recommended equity ratio is significantly lower—34.66 percent versus 50.65 percent, nearly 16 percentage points—than the average allowed equity ratio awarded in decisions during 2017 and 2018 to date (see TABLE 2).

Q. What is Dr. Klein's recommended weighted average cost of capital for CGC?

A. As noted above, Dr. Klein recommends a weighted average cost of capital for CGC equal to 5.93 percent.

Q. How does Dr. Klein's recommended weighted average cost of capital for CGC compare to the average allowed overall return for natural gas and electric utilities in 2017 and 2018?

A. Dr. Klein's recommended 5.93 percent weighted average cost of capital for CGC is 145 basis points lower than the average allowed overall return for natural gas and electric utilities in 2017 and 2018 (see TABLE 2).

TABLE 2
AVERAGE ALLOWED OVERALL RETURN AND COMMON EQUITY RATIO FOR NATURAL GAS AND ELECTRIC UTILITIES IN 2017 AND 2018 YEAR TO DATE COMPARED TO CAPD RECOMMENDATION (DATA FROM SNL FINANCIAL RRA AT JULY 6, 2018)

	OVERALL RETURN	PERCENT EQUITY
Average Electric	7.42	50.43
Average Gas Utility	7.33	50.87
Average All	7.38	50.65
Company Request	7.83	49.23
CAPD Recommendation	5.93	34.66

Q. How does Dr. Klein's recommended 34.66 percent equity ratio compare to the average market value equity ratio of the Value Line natural gas utilities?

A. Dr. Klein's recommended 34.66 percent equity ratio is far lower than the 66 percent average market value equity ratio for the Value Line natural gas utilities.

Q. Why do you report the average market value equity ratio for the Value Line natural gas utilities, as well as average book value equity ratios for these companies?

A. I report both average market value and book value equity ratios for the Value Line natural gas utilities because investors measure financial risk using market equity ratios, whereas regulators typically measure financial risk using book value equity ratios.

Q. What conclusion do you reach from your analysis of Dr. Klein's capital structure recommendation?

A. I conclude that Dr. Klein's capital structure recommendation is fundamentally inconsistent with his return on equity recommendation. To be consistent, Dr. Klein must either recommend a higher return on equity that compensates investors for the higher financial risk of his recommended capital structure or a recommended a capital structure that is comparable to CGC/Southern Company Gas's actual capital structure.

VII. DOUBLE LEVERAGE

Q. You note that Dr. Klein uses the double leverage approach to estimate CGC's weighted average cost of capital. What is double leverage?

A. Economists use the term "double leverage" to refer to a situation in which a parent company uses debt, in addition to equity, to finance its investment in the equity of a subsidiary.

Q. What is the double leverage approach to utility rate making?

A. Advocates of the double leverage approach argue that leverage at the parent level should be considered in calculating the required rate of return on equity for a utility subsidiary. Specifically, proponents of the double leverage approach argue that the required rate of return on equity for the subsidiary should be determined by first calculating the parent company's weighted average cost of capital and then equating the utility subsidiary's cost of equity to the parent's weighted average cost of capital. In other words, double leverage advocates argue that, somehow, the use by a utility's parent of debt to finance a portion of its equity investment in a utility

changes the underlying equity return requirement of the utility. In the context of this proceeding, Dr. Klein considers CGC/Southern Company Gas to be the subsidiary and Southern Company to be the parent.

Q. What impact does Dr. Klein's use of the double leverage approach have on his recommended overall required return for CGC?

A. Dr. Klein's use of the double leverage approach, considered by itself, reduces his recommended overall return for CGC by approximately 80 basis points (see TABLE 3 below and Klein Exhibit, page 2 of 17).

TABLE 3
IMPACT OF DOUBLE LEVERAGE
ON DR. KLEIN'S ESTIMATE OF CGC'S OVERALL COST OF CAPITAL

	PERCENT OF TOTAL	COST RATE	WEIGHTED COST
Short-term Debt	6.30%	3.01%	0.19%
Long-term Debt	44.47%	4.73%	2.10%
Common Equity	49.23%	9.00%	4.43%
Total	100.00%		6.72%
Klein Recommendation			5.93%
Difference			0.79%

Q. Do you agree with the double leverage approach to utility rate making?

A. No. As I discuss above, I object to the double leverage approach to utility rate making because it generally violates three fundamental principles of financial economics:

1. The expected or required rate of return on an investment is equal to the expected or required rate of return on other investments of comparable risk.

2. The required rate of return on an investment or project depends only on the risk of that investment or project, not on the risk of the owner's other business activities.
3. The required rate of return on an equity investment depends only on the business and financial risks of that investment, not on how the owner finances the equity investment.

In addition, the double leverage approach is more complex than the straightforward stand-alone approach to setting a utility company's allowed return on equity, and, hence, is subject to misinterpretation and incorrect application.

Q. Can you illustrate how the double leverage approach to utility rate making violates the basic financial principle that the required rate of return on an equity investment must equal the required rate of return on other equity investments of comparable risk?

A. Yes. Consider an investment in two regulated utilities, Company A and Company B, that face identical business and financial risks. Company A is a stand-alone natural gas utility with a 50 percent debt and 50 percent equity capital structure, a cost of debt of 6 percent, a cost of equity of 12 percent, and a weighted average cost of capital of 9 percent (9.0 = 0.5 x 6 + 0.5 x 12). Company B is an identical regulated natural gas utility that has a 50 percent debt and 50 percent equity capital structure and a cost of debt of 6 percent. The only difference between Companies A and B is that Company B is owned by a parent company with an unconsolidated capital structure made up of 30 percent debt and 70 percent equity. Assuming, as do most proponents of the double leverage approach, that the parent's costs of debt

and equity are the same as those of the subsidiary, that is, 6 percent and 12 percent, Company B's parent has a weighted average cost of capital of 10.2 percent (10.2 = 0.3 x 6 + 0.7 x 12).

Because Companies A and B face identical business and financial risks, according to financial theory, both companies should have the same required rate of return on equity, 12 percent. In contrast, the analyst applying the double leverage approach generally finds that Companies A and B have different required rates of return on equity: the stand-alone utility, Company A, has a required rate of return on equity equal to 12 percent, whereas the utility subsidiary, Company B—if the double leverage approach is applied—appears to have a required rate of return on equity equal to 10.2 percent—the weighted average cost of capital of its parent. Because Companies A and B are assumed to have identical business and financial risks, the double leverage approach, as traditionally applied, violates the basic principle that the required rate of return on an equity investment in projects of equal risk must be identical.

Q. Why does the application of the double leverage approach produce the incorrect result that the utility subsidiary, Company B, has a lower required rate of return on equity than the stand-alone utility, Company A, even though Company B has the same business and financial risk as Company A?

A. The application of the double leverage approach produces the incorrect result that subsidiary Company B has a lower required rate of return on equity than the stand-alone utility Company A because the double leverage approach, as traditionally applied, incorrectly assumes that the parent's costs of debt and equity are the same

as the costs of debt and equity for the subsidiary, even though the parent has greater financial risk than the subsidiary.

Q. Would the double leverage approach produce the same required rate of return on equity for the utility subsidiary, Company B, and the stand-alone utility Company A, if the parent's costs of debt and equity were properly adjusted to reflect the financial risk associated with the parent's more highly-leveraged capital structure?

A. Yes. As I explain above, if double leverage advocates properly adjusted the parent's costs of debt and equity to reflect the increased financial risk associated with the parent's greater financial leverage, the double leverage approach would produce the same required rate of return on equity for the utility, either as a subsidiary or as a stand-alone utility. In other words, the added risk assumed by a parent company that leverages a stock purchase with debt is comparable to the added risk assumed by an individual investor who borrows money to finance a stock purchase. In either case, the use of debt to finance an investment in the utility increases the risk, and, hence, the required return, on this investment.

Q. As you discuss above, you object to the double leverage approach because it generally violates the basic financial principle that the required rate of return on an investment or project depends only on the risk of that project, not on the business and financial risk of the owner of the project. Is this principle widely recognized in the financial community?

A. Yes. The financial community recommends using a risk-adjusted discount rate, or cost of capital, for each subsidiary or project when the subsidiary or project risk

differs from the risk of the parent. For example, in their widely used text, *Principles of Corporate Finance*, 8th edition, Brealey, Myers, and Allen state at page 234:

> In principle, each project should be evaluated at its own opportunity cost of capital; the true cost of capital depends on the use to which the capital is put. If we wish to estimate the cost of capital for a particular project, it is *project risk* that counts.

Likewise, in *Modern Corporate Finance*, 1st edition, Shapiro states at page 276:

> Each project has its own required return, reflecting three basic elements: (1) the real or inflation-adjusted risk-free interest rate; (2) an inflation premium approximately equal to the amount of expected inflation; and (3) a premium for risk. The first two cost elements are shared by all projects and reflect the time value of money, whereas the third component varies according to the risks borne by investors in the different projects. For a project to be acceptable to the firm's shareholders, its return must be sufficient to compensate them for all three cost components. This minimum or *required* return is the *project's cost of capital* and is sometimes referred to as a **hurdle rate**. In discussing how to calculate the project's cost of capital, we begin by assuming the firm is all-equity financed and later relax that assumption.
>
> The preceding paragraph bears a crucial message: *The cost of capital for a project depends on the riskiness of the assets being financed, not on the identity of the firm undertaking the project.* [Original emphasis]

Q. How does the double leverage approach violate the basic financial principle that the required rate of return on equity depends only on the business and financial risk of the specific investment or project, not on the business and financial risk of the owner of the project?

A. Recall that the double leverage approach sets the required rate of return on an equity investment in a utility subsidiary equal to the weighted average cost of capital of the parent. However, in general, the after-tax weighted average cost of capital of the parent reflects the business and financial risks of the parent's entire portfolio of business activities. Thus, under the double leverage approach, if the parent has

more operations than a single utility subsidiary, setting the required rate of return on equity for a utility subsidiary equal to the parent's weighted average cost of capital incorrectly ascribes to the utility subsidiary the business and financial risks of the parent's other business activities.

Q. Can you illustrate how the double leverage approach violates the basic financial principle that the required rate of return on an equity investment does not depend on how the equity investment is financed?

A. Yes. Consider a utility subsidiary that is owned by a parent company that has a capital structure containing 100 percent equity, a single asset consisting of its common equity investment in a utility subsidiary, and a cost of equity of 12 percent. Under the double leverage approach, the subsidiary's required rate of return on equity will also be 12 percent because the parent's after-tax weighted average cost of capital is 12 percent.

Now suppose that the parent sells the utility subsidiary to another parent company that has a capital structure containing 50 percent debt and 50 percent equity, with a cost of debt of 6 percent and a cost of equity of 12 percent. Under the double leverage approach as traditionally applied, the utility subsidiary's required rate of return on equity would now be 9 percent (9 = .5 x 0.6 + .5 x .12). Thus, according to the double leverage approach, the transfer of ownership from one parent to another would reduce the utility subsidiary's required rate of return on equity by 300 basis points, even though there has been no change in the subsidiary's business or financial risk.

Q. As discussed above, Dr. Klein assumes in his application of the double leverage approach that one can reduce the required return on an equity investment simply by financing the equity investment with debt. On a simple, intuitive level, is that assumption sensible?

A. No. The double leverage assumption that one can reduce the required return on an equity investment by financing the equity investment with debt violates the basic financial principle that investors require a higher return on investments with greater risk. Because the use of debt financing increases the risk of the equity investment, the use of debt financing for an equity investment increases the required return on the equity investment, rather than reducing the required return, as suggested by Dr. Klein.

Q. What conclusions do you reach from your analysis of the double leverage approach to utility rate making?

A. I conclude that the Commission should reject the double leverage approach to determining CGC's required rate of return on equity presented by Dr. Klein in this proceeding because it: (1) violates basic principles of financial economics; (2) is less straight-forward than a non-double leverage approach to utility rate making; and (3) would produce the same result as a direct, non-double leverage approach if it were properly applied.

VIII. RESPONSE TO DR. KLEIN'S REBUTTAL COMMENTS

Q. What issues does Dr. Klein have regarding your estimate of CGC's cost of equity?

A. Dr. Klein disagrees with my: (1) choice of comparable companies; (2) quarterly DCF model and allowance for flotation costs; (3) CAPM analysis; and (4) risk premium studies.

Q. What are Dr. Klein's comments on your choice of the Value Line natural gas utilities as comparable companies for your cost of equity studies?

A. Dr. Klein criticizes my choice of comparable natural gas utilities, asserting that these companies "are too large to be comparable to CGC, although one might argue that they are comparable to SCG [Southern Company Gas]" (Klein at 17). Dr. Klein also states that "Dr. Vander Weide's comparable firms are all natural gas utilities, which is inconsistent with the double leverage approach that I use." (Klein at 17)

Q. How do you respond to Dr. Klein's comment that your comparable companies "are too large to be comparable to CGC, although one might argue that they are comparable" to Southern Company Gas?

A. I agree with Dr. Klein's comment that my proxy natural gas utilities are comparable to Southern Company Gas because, like Southern Company Gas, my proxy companies are natural gas utilities; and the financial risk of my proxy group is similar to the financial risk of both CGC and Southern Company Gas because CGC finances its investments based on the capital structure of Southern Company Gas. With regard to Dr. Klein's argument that my proxy natural gas utilities are too large to be similar in risk to CGC, I note that Dr. Klein's proxy combination electric/natural gas utilities are significantly larger than the companies in my proxy group of natural gas utilities.

Q. Dr. Klein claims that your use of a proxy group of natural gas utilities is inconsistent with the double leverage approach that he applies in this proceeding. Do you agree with the double leverage approach to utility rate making?

A. No. For the reasons I discuss above, I believe that the double leverage approach as applied in this proceeding is itself inconsistent with fundamental economic principles of financial economics.

Q. Dr. Klein also criticizes your use of the quarterly DCF model and your inclusion of flotation costs. Have you discussed why it is appropriate to recognize the quarterly timing of dividend payments and the existence of flotation costs in calculating the cost of equity in your direct testimony?

A. Yes. I discuss the importance of recognizing the quarterly timing of dividends in my direct testimony (Vander Weide Direct at 20 – 21), and also above in my rebuttal testimony. I also discuss the importance of recognizing flotation costs in my direct testimony (Vander Weide Direct at 28 – 29 and Appendix 3).

Q. Dr. Klein claims that adjustments for quarterly dividend payments and flotation costs are not required because the firm will have sufficient funds to pay quarterly dividends when it earns profits evenly over the year, and higher profits are sufficient to offset any adjustment for flotation costs (Klein at 17 – 19). Do you agree with Dr. Klein's analysis of quarterly dividend payments and flotation costs?

A. No. The DCF cost of equity reflects the timing of dividend payments to investors, not the timing of profits to the firm. Because dividends are paid quarterly, the stock

price will reflect the present value of the quarterly payment of dividends. As I discuss above, Dr. Klein's annual DCF model cannot be derived from the assumption that dividends are paid quarterly. Only the quarterly DCF model reflects the fact that dividends are paid quarterly.

Q. Does Dr. Klein agree with your CAPM analysis?

A. No. Dr. Klein has two criticisms of my CAPM studies. First, he comments that he prefers "to use shorter-term government bonds to calculate the risk premium" (Klein at 19). Second, he disagrees with my use of a forecasted 20-year Treasury bond yield. Dr. Klein believes that the "current 20-year T-bond yield already reflects investor expectations for interest rates over the life of the bond" (Klein at 19).

Q. Do you agree with Dr. Klein's suggestion that it is better to use shorter-term government bonds to calculate the risk premium?

A. No. Because the cost of equity reflects the investor's required return over the life of utility plant, and utility plant is long-lived, the appropriate risk-free rate is the expected yield on long-term government bonds. I note that Dr. Klein himself uses the yield on 20-year Treasury bonds, not the yield on shorter-term Treasury notes, to estimate the CAPM cost of equity in this proceeding.

Q. Do you agree with Dr. Klein's view that the current yield on 20-year Treasury bonds "already reflects investor expectations for interest rates over the life of the bond" (Klein at 19)?

A. No. Although I believe that the current yield on 20-year Treasury bonds reflects investors' current required return on an investment in 20-year Treasury bonds

beginning in the current period, I do not believe that it reflects investors' expectations of the yield on 20-year Treasury bonds for investments beginning in periods beyond the current period. Numerous agencies provide forecasts of future interest rates, and there would be no market for forecasts of long-term interest rates if current long-term yields captured investors' expectations of future interest rates on 20-year Treasury bonds.

Q. What are Dr. Klein's comments on your risk premium analysis?

A. Dr. Klein disagrees with my risk premium approach because I compare the returns on utility stocks to the returns on utility bonds, and, in his opinion, returns on utility bonds are subject to both inflation and default risk, but returns on utility stocks are not (Klein at 19 - 20).

Q. Do you agree with Dr. Klein's opinion that returns on utility stocks are not subject to inflation or default risk?

A. No. Returns on utility stocks are subject to the risk of inflation because utility stocks typically decline when inflation expectations increase and increase when inflation expectations decrease. Returns on utility stocks are subject to default risk because equity values are eliminated or virtually eliminated when utilities default on the interest payments on their bonds.

Q. Does this conclude your rebuttal testimony?

A. Yes, it does.