BEFORE THE PUBLIC SERVICE COMMISSION OF UTAH

In the Matter of the Application of Dominion Energy Utah to Increase Distribution Rates and Charges and Make Tariff Modifications	Docket No. 19-057-02

DIRECT TESTIMONY OF ANGC WITNESS
BRUCE R. OLIVER

ANGC EXHIBIT 1

Phase 1

October 17, 2019

Testimony on Behalf of

American Natural Gas Council

/s/Bruce R. Oliver

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I. INTRODUCTION

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Bruce R. Oliver. My business address is 7103 Laketree Drive Fairfax Station, Virginia, 22039.

Q. BY WHOM AND IN WHAT CAPACITY ARE YOU EMPLOYED?

A. I am employed by Revilo Hill Associates, Inc., and serve as President of the firm, and I manage the firm's business and consulting activities. I direct the preparation and presentation of economic, utility planning, and policy analyses for clients.

Q. ON WHOSE BEHALF DO YOU APPEAR IN THIS PROCEEDING?

A. I appear on behalf of the American Natural Gas Council ("ANGC").

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

A. This testimony addresses issues relating to return on equity ("ROE") analyses and recommendation presented in the Direct Testimony of Robert B. Hevert on behalf of Dominion Energy Utah.

Q. PLEASE SUMMARIZE YOUR EXPERIENCE AND QUALIFICATIONS.

A. I am an economist specializing in the areas of utility rates, energy, and regulatory policy matters. I have over 40 years of experience in the analysis of energy and utility policy issues. That experience includes employment in management positions in the rate departments of two major utilities (the Pacific Gas and Electric Company and the Potomac Electric Power Company), as well as service in management and senior staff positions for three firms engaged in energy, utility and public policy consulting. Those firms include: Revilo Hill Associates, Inc., the Resource Dynamics Corporation, and ICF Incorporated.

As a consultant, I have served a diverse group of clients on issues encompassing a wide range of energy and utility related matters. My clients have included state regulatory commissions, utilities, state Attorneys General, consumer advocacy groups, municipal governments, federal agencies, commercial and industrial energy users, hospitals and universities, suppliers of equipment and services to utility markets, residential consumer intervenors, the Electric Power Research Institute (EPRI), and the World Bank. Projects for those clients have included work on gas, electric, water, and wastewater utility regulatory proceedings, as well as analyses and forecasts of supply, demand, and prices for utility and non-utility energy markets. I have also assisted a number of commercial and industrial energy users in the negotiation of energy service contracts, including contracts for the procurement of competitive electricity and natural gas services.

To date, I have filed nearly 500 separate pieces of testimony in more than 300 proceedings before regulatory commissions in 24 jurisdictions. The regula-

tory jurisdictions in which I have testified include: the states of Arizona, California, Connecticut, Delaware, Illinois, Maryland, Massachusetts, New Jersey, New Mexico, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, Virginia, Vermont, South Dakota, and Wisconsin, as well as the District of Columbia, Guam, the Virgin Islands, the City of Philadelphia, the Province of Alberta, Canada, and the U.S. Federal Energy Regulatory Commission (FERC). My testimonies in those jurisdictions have addressed such topics as industry restructuring, utility mergers and acquisitions, divestiture of generation assets, sighting of energy facilities, utility revenue requirements, costs of capital, jurisdictional and class cost of service allocations, rate design, revenue decoupling, incentive ratemaking, gas utility long-range supply planning, electric capacity planning, gas asset management, deployment of automated metering infrastructure (AMI), gas system expansion, energy efficiency, demand-side management, contracts for non-tariff services provided to large energy users, natural gas purchasing practices, gas transportation service, natural gas processing, competitive bidding, economic development rates, load research, load forecasting, weather normalization, metering, environmental remediation costs, fuel procurement, fuel pricing issues, and hedging strategies.

Q. HAVE YOU PREVIOUSLY APPEARED BEFORE THIS COMMISSION?

A. No, I have not.

Q. WERE THIS TESTIMONY AND ACCOMPANYING SCHEDULES PREPARED BY YOU OR UNDER YOUR DIRECT SUPERVISION AND CONTROL?

A. Yes, they were.

II. SUMMARY

Q. PLEASE SUMMARIZE YOUR CONCLUSIONS REGARDING THE APPROPRIATE COST OF EQUITY AND CAPITAL STRUCTURE FOR DEU?

A. My analyses suggest that the range of reasonableness for the Company's ROE is between 8.50% and 9.50%. The mid-point of that range is 9.00%.[1] However, just as commissions are encouraged to reflect gradualism in their adjustment for rates for utility customers, it would be reasonable for this Commission to reflect a measure of gradualism in its adjustment of DEU's ROE. Thus, even though a larger downward adjustment to DEU's ROE can be justified, my recommended ROE for the Company in this proceeding is 9.50%. That represents elimination of 35 basis points of the 85 basis point difference between DEU's last authorized ROE (i.e., 9.85% in Docket No. 13-057-05) and the mid-point of the range of reasonableness for DEU's ROE that I have identified. Although a larger downward adjustment to DEU's ROE could be justified by current market conditions, the more gradual adjustment proposed provides for greater continuity in regulatory determinations and avoids a large one-time change.

[1] This range and the identified mid-point reflect the influence of a 20 basis point downward adjustment to the results of the proxy group analyses (DCF, CAPM, and ECAPM) to recognize that those analyses are premised on data for holding companies, not gas distribution utilities.

This testimony also submits that DEU's proposed capital structure includes an inappropriately large amount of common equity that places unnecessary cost burdens on DEU ratepayers. For this reason, a more balanced debt to equity ratio in DEU's capital structure is recommended. As explained in Part A of my Discussion of Issues, I have attempted to remove some of the upward bias in the Cost of Equity and Capital Structure recommendations of DEU Witness Hevert. When properly assessed, DEU's overall cost of capital could be as low as 6.94% as opposed to the Company's requested 7.74% overall rate of return. Adjustment of the Company's requested ROE to a level that more reasonably reflects current market conditions and DEU's risk profile, apart from any change in capital structure, could yield more than a two-thirds reduction of DEU's requested revenue increase in this proceeding. By also adjusting downward the Common Equity percentage in DEU's proposed capital structure the Commission could essentially eliminate the Company's need for additional revenue without consideration of any other revenue requirements issues.[2] Clearly, necessary and appropriate adjustments to DEU's costs of capital have a significant impact on the magnitude of the Company's revenue increase request in this proceeding.

The ROE recommendation presented herein, which provides for a gradual approach to adjusting DEU's ROE, presumes that the Commission will reduce the common equity percentage in the Company's requested capital structure to

[2] Scenario 3 in ANGC Exhibit 1.05, page 2 of 4, shows that approval of a 9.50% ROE in combination with the Capital Structure accepted by the Commission in Docket No. 13-057-05 would lower DEU's revenue increase request (before consideration of any other ratemaking issues) to less than $1.5 million. If the Commission adopts an ROE of not greater than 9.50% in combination with a balanced capital structure with 50% common equity and 50% long-term debt, DEU's revenue requirement would be $-1.5 million (before consideration of any other ratemaking issues).

not more that the roughly 52% that was used in Docket No. 13-057-05. If the Commission accepts DEU's proposed capital structure that includes 55% common equity, then I would reduce my ROE recommendation to not more than the mid-point of the ROE range of reasonableness I have identified (i.e., **9.00%**).

Q. DO YOU HAVE ANY GENERAL OBSERVATIONS REGARDING THE ROE ANALYSES THAT DOMINION ENERGY UTAH HAS SUBMITTED IN THIS PROCEEDING IN SUPPORT OF ITS REVENUE INCREASE?

A. I do. A presumption throughout the ROE analyses that DEU Witness Hevert presents is that the Company's risk profile is comparable to that of the risk profile of the proxy group companies that Witness Hevert employs in those analyses. However, that presumption is inaccurate. Witness Hevert's proxy group comprises utility holding companies with investment portfolios that often include significant non-utility and non-price regulated business activities. Representations that the risks associated with those holding companies are comparable to the risks faced by DEU's gas distribution operations in Utah are inappropriate and unjustified.

In addition, this testimony documents Witness Hevert's established history of presenting ROE recommendations in state utility regulatory proceedings that are well above the ROE levels that regulators have ultimately found to be reasonable in the gas distribution utility cases in which he has offered specific ROE recommendations. Witness Hevert's analyses and recommendations are to a large extent a product of his judgmental determinations, and in that context, the

manner in which his judgments have differed from those of the regulators who have evaluated his ROE recommendations provides important perspective for the Commission.

Q. PLEASE SUMMARIZE THE KEY FINDINGS OF YOUR TESTIMONY REGARDING THE RETURN ON EQUITY REQUIRED BY DOMINION ENERGY UTAH?

A. The following are key findings that have been derived from my review and analysis of the Direct Testimony of DEU Witness Hevert in this proceeding as well as from my own assessment of the Company's equity return requirements:

- Witness Hevert's ROE recommendation for DEU is a highly judgmental determination derived from an extremely wide range of ROE estimates. Yet, history shows that Witness Hevert's ROE judgments have been significantly different than those of regulators.

- Witness Hevert has a long-established history of presenting ROE recommendations that significantly overstate regulators' assessments of required equity return requirements for utilities.

- Witness Hevert's use of Value Line estimates of earnings growth for his proxy group companies introduces a significant upward bias in his DCF estimates.

- Witness Hevert's proxy group which comprises utility holding companies with investment portfolios that incorporate more risky non-regulated business activities reflects greater risk and higher return requirements than DEU's gas distribution utility operations.

- Witness Hevert's representations of yields on 30-year U.S. Treasury Bonds (i.e., his measures of the risk-free rate) overstate current market requirements, as well as current expectations of future market requirements.

- It is difficult to rationalize or justify a proposed ROE for DEU that is **above** Witness Hevert's projected ROE for Dominion Energy, Inc. based on Bloomberg earnings growth projections.

- Contrary to Witness Hevert's representations, his Expected Earnings Analysis does not provide confirmation or validation of the ROE range that he recommends in this proceeding.

- A capital structure for DEU that contains significantly greater equity than the capital structure of its ultimate parent company, Dominion Energy, Inc., cannot be justified. As of June 30, 2019, **Dominion Energy, Inc**. had a capital structure that contained **less than 43.6%** common equity.

Q. WHAT RECOMMENDATIONS DO YOU OFFER WITH RESPECT TO DEU'S REQUIRED RETURN ON EQUITY IN THIS PROCEEDING?

A. The following presents a summary of recommendations that I offer for the Commission's consideration in this proceeding. These recommendations are based on the findings discussed above and the discussion of issues and supporting analyses contained in the remainder of this testimony as well as the accompanying attachments and schedules.

1. The Commission should find that an authorized ROE of 9.50% is reasonable and appropriate for DEU.

2. The Commission should reject Witness Hevert's arguments for a flotation cost adjustment to the Company's authorized ROE.

3. The Commission should find that DEU's proposed capital structure contains an inappropriately high percentage of Common Equity which unnecessarily increases the Company's weighted average cost of capital.

4. The Commission should establish a capital structure for DEU For ratemaking purposes that contains not more than 52% equity.

III. DISCUSSION OF ISSUES

Q. HOW IS YOUR DISCUSSION OF ISSUES RELATING TO DEU'S DIRECT TESTIMONY AND SCHEDULES IN THIS PROCEEDING ORGANIZED?

A. The discussion of issues in this testimony is presented in four sections. Section A presents my review and critique of Witness Hevert's cost of equity analyses. Section B describes the cost of equity analyses that I present for the Commission's consideration in this proceeding. Included in the review of Witness Hevert's cost of equity presentation are examinations of his DCF, Risk Premium and Expected Earnings analyses, as well as his positions regarding business risks, regulatory mechanisms, and the need for a flotation cost adjustment. Section C response to Witness Hevert's position regarding an appropriate Capital Structure for DEU, and Section D explains the impacts of adjustments to DEU's requested ROE and proposed Capital Structure on the Company's required overall rate of return and computed revenue deficiency (i.e., revenue increase request) in this proceeding.

A. Witness Hevert's Cost of Equity Analyses

Q. WHAT RATE OF RETURN ON COMMON EQUITY ("ROE") DOES DEU WITNESS HEVERT RECOMMEND IN THIS PROCEEDING?

A. Witness Hevert's Direct Testimony recommends that the Commission approve an ROE of **10.50%.**[3] His recommendation is based on his assessment the Company's ROE should fall with a range between 9.90% to 10.75%.[4]

Q. IS WITNESS HEVERT'S RECOMMENDED ROE FOR DEU IN THIS PROCEEDING REASONABLE?

A. No. His recommended ROE significantly overstates the ROE required of investments with risk comparable to the risk of DEU's gas distribution utility operations in Utah.

Q. IS IT UNUSUAL FOR WITNESS HEVERT'S ROE RECOMMENDATIONS TO BE NOTICEABLY ABOVE THE ROE LEVELS THAT COMMISSIONS FIND TO BE APPROPRIATE?

A. No. I demonstrate that Witness Hevert's recommended ROEs in gas utility rate proceedings have overstated the ROEs ultimately authorized by the utility regulatory commission to which he presented those recommendations by an average of 78 basis points. That substantial upward bias reflects the differences between Witness Hevert's recommended ROEs and regulatory commission determinations in decided cases in which Witness Hevert has testified over the last three years. **ANGC Exhibit 1.01** shows that over the past three years Witness Hevert's recommendations in gas utility proceedings have on average been **78 basis points above** the levels that regulators ultimately found

[3] DEU Witness Hevert, Direct Testimony, page 2 of 65, lines 37-40.
[4] DEU Witness Hevert, Direct Testimony at page 2 of 65, lines 35-37.

reasonable in the cases in which he has presented a specific ROE recommendation.[5]

Q. IS YOUR COMPUTATION OF A REGULATORS' ADJUSTMENT FACTOR INTENDED TO SUGGEST THAT REGULATORS SHOULD MAKE ROE DETERMINATIONS BY SIMPLY APPLYING A DOWNWARD ADJUSTMENT TO WITNESS HEVERT'S ROE RECOMMENDATIONS?

A. No. Witness Hevert presents ROE estimates that display a wide range of ROE results. He then applies substantial judgment to those results to arrive at his ROE recommendation. My presentation of the Regulators' Adjustment Factor is intended to illustrate the extent to which Witness Hevert's judgments regarding the selection of appropriate ROEs for gas utilities have differed from regulators' evaluations of appropriate ROEs in the proceedings in which he has presented ROE recommendations. Nothing in my presentation is intended to suggest that any commission has relied, or should rely, solely on differences between Witness Hevert's recommendations in past proceedings and regulatory commissions' ultimate ROE determinations in past proceedings as the basis for assessing an appropriate ROE for any utility.

[5] This does not include a pending determination in a Washington Gas Light Company proceeding in Virginia (i.e., Case No. PUR-2018-00080 in which an associate of Witness Hevert at Scott Madden recommended a 10.30% ROE and the proposed Hearing Examiner's Order in that case concludes that a 9.20% ROE is reasonable. It should also be noted that Witness Hevert's ROE recommendations in electric utility regulatory proceedings have incorporated a similar upward bias.

Q. WHAT SUPPORT DOES WITNESS HEVERT OFFER FOR THE COMPANY'S REQUESTED 10.50% COST OF EQUITY?

A. Witness Hevert presents cost of equity analyses that are developed using four equity cost estimation methods. Those methods include: (1) a constant growth discounted cash-flow ("DCF") model; (2) a traditional Capital Asset Pricing Model ("CAPM"); (3) an ECAPM variant on the CAPM methodology ("ECAPM"); and (4) a Bond Yield Risk Premium Model ("RPM").[6] After his presentation of the results of those models, Witness Hevert also discusses an Expected Earnings Analysis which he portrays as corroboration of his recommended ROE range of 9.90% to 10.75%. In addition, Witness Hevert argues for an upward adjustment to his ROE results to reflect flotation costs.

Q. WHAT IS THE RANGE OF ROE ESTIMATES THAT WITNESS HEVERT PRESENTS?

A. Before adjustment for flotation costs, the ROE estimates that Witness Hevert computes range from a low of 7.47% to high of 13.55%.[7] That is an extremely wide range which provides little insight regarding DEU's actual required return on equity.

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[6] Witness Hevert refers to his CAPM, ECAPM, and Bond Yield Plus Risk Premium analyses collectively as "Risk Premium Results." See Witness Hevert's Direct Testimony, Table 7, at page 24 of his Direct Testimony.

[7] Witness Hevert computes Mean Low, Mean, and Mean High constant growth DCF estimates for his selected proxy Group that range from 7.47% to 13.55%. His CAPM and ECAPM results range from 8.94% to 12.28%, and his Bond Yield Plus Risk Premium analyses yield ROE estimates that range from 9.87% to 10.11%. He also presents an Expected Earnings Analysis that yields median and average ROE estimates of 10.41% and 10.73% respectively.

Q. DOES WITNESS HEVERT CONSISTENTLY APPLY THE STANDARDS ESTABLISHED FOR ROE DETERMINATIONS IN *HOPE* AND *BLUEFIELD*?

A. No. Although he asserts that his analyses and recommendations consider "*the Company's business risk relative to the proxy group…*" the continuation of that sentence states that the proxy group is comprised of "*comparable companies.*" Yet, that is not accurate. The differences in risk between the utility holding companies that comprise his selected proxy group and the risk of DEU's regulated utility operations are significant and must not be ignored. However, Witness Hevert's cost of equity analyses are premised on an assumption that DEU's distribution utility risk is comparable to the risk for the holding companies included in his selected proxy group.

Witness Hevert also does not consider the impacts of changes in industry structure and regulatory policies over time on gas distribution utility risk and ROE requirements. For this reason, the Commission should be cautioned that when reading Witness Hevert's "*Summary of Issues Surrounding Cost of Equity Estimation in Regulatory Proceeding.*"[8] His use of the phrase "*the firm*" in that discussion is misleading. Witness Hevert states "*investors will only provide funds to a firm if the return they expect is equal to, or greater than, the return they require to accept the risk of providing funds to the firm.*"[9] However, there is now only one investor in DEU. That is Dominion Energy, Inc., and equity investors in Dominion Energy Inc. base their investment decisions on the risks and returns offered more broadly by Dominion Energy, Inc., not DEU's gas distribution utility

8 The Direct Testimony of DEU Witness Hevert, page 8 of 65, starting at line 142.
9 Ibid., lines 147-149.

operations. Moreover, as Moody's has noted, one of the credit challenges for DEU is that is a "*highly leveraged parent that carries higher credit risk.*"[10] In fact, there are numerous examples of the financial community recognition of greater business and financial risk in utility holding companies than in their distribution utility subsidiaries. Thus, assessments of equity return requirements must not be premised on either proxy groups comprised primarily, if not exclusively, of holding companies and/or broad measure of industry equity return requirements that do not differentiate the requirements of distribution utilities and those of their parent companies. The Commission must further recognize that the comparable risk standards set forth in the *Hope* and *Bluefield* decisions are not satisfied when differences in risk between utility holding companies and their distribution utility subsidiaries are not explicitly addressed in regulatory cost of equity determinations for distribution utilities.

Q. DOES THE FINANCIAL COMMUNITY RECOGNIZE ANY OTHER DIFFERENCES IN THE RISKS FACED BY DISTRIBUTION UTILITIES, SUCH AS DEU, AND THE RISKS ASSOCIATED WITH THE HOLDING COMPANIES THAT NOW OWN THOSE DISTRIBUTION UTILITY OPERATIONS?

A. Yes. There are a number of rating agency reports and regulatory commission decisions that have explicitly addressed those differences and concluded that regulated distribution utility operations are less risky than those of their parent companies. For example, those differences in risk are the basis for numerous

[10] DEU Exhibit 1.05, page 2 of 10.

recent efforts to ring-fence acquired distribution utilities from the finances of their holding company parents and/or the effects of bankruptcies in other subsidiaries of the parent company.[11]

Q. CAN THE EFFECTS OF DIFFERENCES IN RISK BETWEEN DISTRIBUTION UTILITIES AND THEIR HOLDING COMPANY PARENTS BE EASILY QUANTIFIED?

A. Unfortunately, with most gas distribution utilities now owned by holding companies, there is little, if any, current market data on which to assess gas distribution utility equity investment risk and costs of equity. Moreover, there are no models that have been developed to date that reliably quantify differences in equity risk for distribution utilities and their holding company parents. However, as discussed above, we can make observations that demonstrate the existence of such differences.

Q. IS IT REASONABLE TO ASSESS THAT DEU'S ROE REQUIREMENTS ARE GREATER THAN THOSE OF ITS PARENT, DOMINION RESOURCES?

A. No, it is not. Yet, the analysis upon which Witness Hevert relies to develop his Bloomberg-Derived Market Risk Premium (that is detailed in DEU Exhibit 2.03 and used in his CAPM and ECAPM analyses in DEU Exhibit 2.05) shows a **projected** DCF ROE for Dominion Energy, Inc. of **10.13%.** By contrast, Witness Hevert's recommended ROE for DEU's gas distribution operations in this

[11] Unlike their distribution utility subsidiaries, utility holding companies and their non-utility business ventures have no on-going public service obligations.

proceeding is **10.50%**. These results are, at best, difficult to reconcile. DEU's lower risk distribution utility operations should not require a ROE that is greater than that for its parent company's overall business operations (which includes non-utility business ventures).

1. DCF Analyses

Q. ARE WITNESS HEVERT'S CONSTANT GROWTH DCF ANALYSES REASONABLE?

A. Only in part. An examination of the detail of Witness Hevert's DCF analysis in DEU Exhibit 2.10 finds that in each scenario (i.e., 30-day, 90-day and 180-day average stock prices) the Value Line Earnings Growth estimates that he shows (in Column [7] for each scenario) reflect significantly different projections of earnings than the earnings growth projections offered by Zacks and First Call. This is particularly true for Northwest Natural Holding Company (NWN). For NWN, Witness Hevert shows an earnings growth estimate from Value Line of **25.50%**. Neither Zacks nor First Call estimates earnings growth for any of Witness Hevert's proxy group companies at a rate greater than **7.20%**. Moreover, for all of the proxy group companies, the Value Line estimates of earnings growth that Witness Hevert uses differ significantly from the earnings estimates for the same companies from Zacks and First Call. As shown in DEU Exhibit 2.01, the mean earnings growth for Witness Hevert's proxy group companies based on Zacks earnings growth estimates is 5.89%. The mean

earnings growth for Witness Hevert's proxy group companies based on First Call earnings growth estimates is 5.31%. By comparison, the Value Line mean earnings growth for Witness Hevert's proxy group companies is 9.63%. The significantly higher mean earnings growth estimate from Value Line directly impacts both Witness Hevert's Mean ROE and Mean High ROE results.[12]

Q. OTHER THAN THE FACT THAT THE VALUE LINE ESTIMATES OF EARNINGS GROWTH DIFFER FROM THOSE FROM OTHER SOURCES, WHY SHOULD THE VALUE LINE EARNINGS GROWTH ESTIMATES BE DISREGARDED?

A. There are two elements of my considerations relating to the Value Line earnings growth estimates on which Witness Hevert has relied.

First, it appears that Value Line's earnings growth estimates have not been computed in a manner that eliminates consideration of abnormal or one-time adjustments for earnings. For example, for NWN Value Line's earnings growth is distorted by a significant one-time loss on non-utility gas storage operations. In 2017 Northwest Natural Gas recorded a $192 million loss on its gas storage operations. Although Northwest Natural's regulated utility operations represent the largest component of the holding company's overall business activities, its utilities have generated annual earnings over the last several years

[12] When presenting a summary of his findings, Witness Hevert essentially discards the "mean low" ROE estimates from his DCF analyses claiming that those results are below any authorized ROE for a natural gas utility since at least 1980 and more than 200 basis points below DEU's currently authorized ROE. I offer a different perspective on those results. The "mean low" ROE results from Witness Hevert's analyses are driven to an extremely low level by the questionable measures of earnings growth that he derives from Value Line.

in the range of $50 million to $60 million per year. In other words, NWN's loss on its gas storage operations equated to the equivalent of more than **three years** of utility earnings. In our assessment, Value Line's **25.50%** earnings growth estimate primarily reflects a return of the holding company's earnings to more normalized earnings levels.[13] Such a one-time adjustment to earnings for non-utility operations should have no role in ROE determinations for DEU in this proceeding.

Second, in Rebuttal Testimony in a currently pending gas distribution utility rate case in Maryland, Witness Hevert provided the following data as demonstration that analysts growth rates for his proxy companies "*are within, even toward the lower end or below, the long-term growth ranges provided by the companies' management teams.*"[14] As all four of the companies included in Witness Hevert's comparison of earnings growth estimates are also included in his selected proxy group in this proceeding, his rebuttal comparison from the referenced Maryland proceeding is also relevant to this case.

[13] Although Northwest Natural has also undergone the transition to a holding company structure within the last few years, it does not appear that its transition to a holding company structure has had a significant impact on its projected earnings growth. Moreover, even if that transition to a holding company has impacted its earnings growth, there is no evidence that the transition to a holding company structure has impacted or is anticipated to significantly impact its expected growth in earnings from regulated utility operations.

[14] Maryland Public Service Commission, Case No. 9605, Rebuttal Testimony of Witness Robert Hevert for Washington Gas Light Company, August 8, 2019, pages 26-27.

Table 1
Analysts' Earnings Growth Projections
Relative to Management Presentations[15]

Company	Ticker	Zacks Earnings Growth	First Call Earnings Growth	Investor Presentation Earnings Growth Range
New Jersey Resources	NJR	7.00%	6.00%	6.00% - 8.00%
Northwest Natural Holdings	NWN	4.50%	4.00%	3.00% - 5.00%
ONE Gas	OGS	5.90%	5.00%	6.00% - 8.00%
South Jersey Industries	SJI	7.20%	5.50%	6.00% - 8.00%

Table 2 repeats the information presented in Table 1 but adds the Value Line earnings growth estimates that Witness Hevert has used in this proceeding. As shown in Table 2, none of the Value Line earnings growth estimates that Witness Hevert has used in his DCF analyses for this proceeding fall within the range of the earnings growth estimates the listed companies have offered in their investor presentations. For three of the four companies (i.e., NWN, OGS, and SJI) listed, the Value Line earnings growth estimates are above the upper end of the range each company has presented to investors. On the other hand, the Value Line earnings growth estimate for NJR is less than half the value for the low end of the range the NJR has presented to investors.

[15] Ibid., page 27.

Table 2
Analysts' Earnings Growth Projections
Relative to Management Presentations
And Value Line Earnings Growth Estimates

Company	Ticker	Zacks Earnings Growth	First Call Earnings Growth	Investor Presentation Earnings Growth Range	Value Line Earnings Growth[16]
New Jersey Resources	NJR	7.00%	6.00%	6.00% - 8.00%	2.50%
Northwest Natural Holdings	NWN	4.50%	4.00%	3.00% - 5.00%	25.50%
ONE Gas	OGS	5.90%	5.00%	6.00% - 8.00%	9.00%
South Jersey Industries	SJI	7.20%	5.50%	6.00% - 8.00%	9.50%

Q. WOULD THE EXCLUSION OF VALUE LINE EARNINGS GROWTH ESTIMATES FROM WITNESS HEVERT'S DCF ANALYSIS SIGNIFICANTLY ALTER HIS DCF RESULTS?

A. Yes. As shown in Table 3 below, Witness Hevert's use of earnings growth estimates from Value Line data leads to a substantial inflation of his DCF-based ROE estimates for his proxy group companies. With consideration of Value Line-derived earnings growth estimates Witness Hevert assesses the proxy group ROE to be between 7.47% and 13.55%. With the more extreme Value Line earnings growth estimates excluded, the range of mean ROE estimates for Witness Hevert's proxy group is narrowed substantially and depicts a range from **7.91% to 8.62%**. Thus, when the impact of Witness Hevert's Value Line earnings growth estimates is quantified, the significance of the bias that the Value Line estimates introduce is readily observed. The "without Value Line"

[16] From DEU Exhibit 2.01, Column [7], page 1 of 3 through 3 of 3.

ROE estimates[17] presented in Table 3 show noticeably lower "Mean" ROE estimates and dramatically lower "High" ROE estimates under all scenarios. The "without Value Line" ROE estimates also yield higher "Low" ROE estimates for each scenario, and thereby, reduce the differential between Witness Hevert's "Low" ROE and "High" ROE estimates.

Table 3
Comparison of Hevert Constant Growth ROE Determinations with and without Consideration of Value Line Earnings Growth Estimates

	With Value Line			Without Value Line		
	Low ROE	Mean ROE	High ROE	Low ROE	Mean ROE	High ROE
30-Day Avg Stock Price	7.47%	9.66%	13.45%	**7.91%**	**8.22%**	**8.52%**
90-Day Avg Stock Price	7.54%	9.73%	13.52%	**7.98%**	**8.29%**	**8.60%**
180-Day Avg Stock Price	7.57%	9.75%	13.55%	**8.01%**	**8.32%**	**8.62%**

Without the influence of comparatively extreme Value Line-derived earnings growth estimates, both the upper end and the lower end of Witness Hevert's Constant Growth DCF estimates would be more reasonable. A corrected version of Witness Hevert's DCF analyses that excludes Value Line earnings growth estimates, as well as Witness Hevert's retention growth estimates that are developed from the same Value Line data, is presented in ANGC Exhibit 1.03.

[17] Note [1] to DEU Exhibit 2.02 indicates that Witness Hevert's "Retention Growth Estimates" are also developed from Value Line earnings growth projections. For that reason, the "without Value Line" results presented in Table 3 also exclude without consideration of Witness Hevert's "Retention Growth Estimates."

Q. WHAT IS YOUR ASSESSMENT OF WITNESS HEVERT'S DISCUSSION OF HIS "MEAN LOW" DCF RESULTS?

A. As demonstrated in ANGC Exhibit 1.03, the extreme low levels of those results are a function of his own approach to presenting DCF results, and the data inputs on which he has chosen to rely.[18] However, given the format of his presentation, I would discount the value of both his "mean low" and "mean high" DCF results. Moreover, the Commission should also question why Witness Hevert offers such an assessment of his "mean low" DCF results without presenting a similar assessment of his "mean high" DCF results. His "mean high" results are all in the range of 13.50%, and those results are more than **350 basis points** above DEU's most recently authorized ROE. They also exceed any ROE authorized for a gas distribution utility in the US since the last decade.

Q. DO YOU HAVE ANY COMMENTS REGARDING THE AVERAGE STOCK PRICE DATA THAT WITNESS HEVERT EMPLOYS IN HIS DCF ANALYSES?

A. I do. The Commission should understand that the 30-day, 90-day, and 180-day stock price averages that Witness Hevert employs do **NOT** reflect standard calendar month periods. Rather, those averages refer to the numbers of "trading days" for which prices are averaged. His 30-day stock price average actually averages stock price data over roughly a six-week period. His 90-day average

[18] The calculation of "mean low" and "mean high" DCF results is not a common practice of cost of equity witnesses other than Witness Hevert. Most analysts use proxy group analyses to identify the central tendencies of the group rather than to bring focus to extreme low or extreme high results. Witness Hevert's use of Value Line earnings growth estimates was not dictated by any outside force. That was his analytic choice. If his choice of data inputs yields extreme "mean low" and "mean high" results, he should change the format of his presentation and/or choose different sources for the earnings growth estimates on which he relies.

uses stock price data for trading days covering a period of about four and a half months. His 180-day period averages stock prices over roughly nine months. These are not broadly used measures of average stock prices.

More commonly, average stock prices are computed by averaging the highest and lowest reported closing prices for a stock over a twelve-month period. Data for the high and low stock prices over the last year (i.e., 52-week high and 52-week low prices or 52-week range) are readily available to investors on a number of financial websites (e.g., Yahoo Finance, MSN Money, Google Finance), as well as numerous on-line stock trading platforms. The Commission should also note in the Expected Earnings Analysis that Witness Hevert presents in DEU Exhibit 2.07, he employs the more common "2019 High Price," 2019 Low Price," and "2019 Price Mid-Point" (average price). This discussion is not intended to suggest that Witness Hevert's 30-day, 90-day, and 180-day stock price averages are incorrectly computed. Rather, those stock price measures are simply not commonly used by investors. Moreover, the differences in DCF estimates that result from those scenarios are not material,[19] and thus, his use of three different stock price measures adds little of value to his ROE presentation except, perhaps, the appearance of additional analytic effort.

[19] As indicated by a comparison of the mean ROE estimates presented in columns [10], [11], and [12] on the pages of DEU Exhibit 2.01, in no case do the differences between the Proxy Group Mean ROE estimates for his three stock price scenarios account for more than 10 basis points.

2. ***Risk Premium Analyses***

Q. HOW SHOULD THE COMMISSION ASSESS THE RISK PREMIUM ANALYSES THAT WITNESS HEVERT PRESENTS ON BEHALF OF DEU?

A. As summarized in Table 7 on page 24 of Witness Hevert's Direct Testimony, he offers a number of scenarios for the CAPM, Empirical CAPM ("ECAPM"), and Bond Yield Plus Risk Premium analyses. All are premised on 30-year U.S. Treasury Bond yields that significantly overstate now current risk-free yield requirements. Witness Hevert uses a current 30-year U.S. Treasury Bond yield of 2.92%. However, since the preparation of his Direct Testimony, 30-year U.S. Treasury Bond yields have fallen sharply. The 30-year U.S. Treasury Bond yield as of September 30, 2019 was 2.16%. The average U.S. Treasury Bond yield for the month September 2019 was 2.16%.[20] That is **75 basis points below** the "current" U.S. Treasury Bond yield used by Witness Hevert in the preparation of the risk premium analyses presented in his Direct Testimony. It also suggests that the projections of near-term 30-year U.S. Treasury Bond yields on which he has relied are not reliable.

Q. WHAT WEIGHT SHOULD BE GIVEN TO WITNESS HEVERT'S USE OF LONG-TERM PROJECTED 30-YEAR U.S. TREASURY BOND YIELDS IN HIS BOND YIELD PLUS RISK PREMIUM ANALYSES?

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[20] See ANGC Exhibit 1.01.

A. None. The long-term projections of 30-year U.S. Treasury Bond yields on which Witness Hevert relies are premised on projections for periods as long as 10 years into the future. The likelihood that the rates approved by the Commission in this proceeding will remain in effect through even half of that projected time period is extremely low. Therefore, the Commission's examination of risk premium analyses should focus on current and near-term project yields. When even the near-term "consensus" forecasts have been subject to significant downward adjustments within the last several months, the value of using long-term projections of U.S. 30-year Treasury bond yields must be questioned.

Q. HAS WITNESS HEVERT RECOGNIZED THE DECLINE IN U.S. 30-YEAR TREASURY BOND RATES IN OTHER RECENT TESTIMONY?

A. Yes. On August 6, 2019, Witness Hevert filed rebuttal testimony in Case No. 9605 before the Maryland Public Service Commission. In that testimony he presented updated ROE analyses including updated current and projected U.S. 30-year Treasury Bond yields. Table 4 provides a comparison of the bond yields Witness Hevert used in that Maryland testimony with the current and projected U.S. 30-year Treasury Bond yields he used in testimony filed a little more than one month earlier in this proceeding.

Table 4
Comparison of Current and Projected
30-Year U.S. Treasury Bond Yields

	30-Year U.S. Treasury Bond Yields	Utah Docket No. 19-057-02	Maryland Case No. 9605
	Date of Testimony	*Jul 1, 2019*	*Aug 6, 2019*
	Current	2.92%	2.63%
	Near-Term	3.08%	2.70%
	Long-Term	4.05%	3.70%

Q. ARE THERE OTHER PROBLEMS ASSOCIATED WITH WITNESS HEVERT'S CAPM AND ECAPM ANALYSES?

A. Yes. There are two problems with the Beta coefficients that Witness Hevert uses. First, Witness Hevert's presentation fails to openly discuss differences in measures of Beta he employs. Second, the Beta coefficients used in his CAPM and ECAPM analyses only adjusted are not designed to reflect the risk and return requirements of a gas distribution utility. Rather, they are only intended to adjust Witness Hevert's estimate of a market risk premium to reflect the risk associated with the holding company entities for which stock price information can be observed. Nothing in either the CAPM and ECAPM models or the Beta coefficients used accounts for differences in risk and return requirements between utility holding companies and their gas distribution utility subsidiaries. Although, as discussed previously herein, there is substantial evidence of differences between distribution utility risk and the risk of their holding company parents, those differences are ignored.

Furthermore, the Commission should recognize that Beta have been developed as measures of the volatility of a company's stock price relative to the volatility of the broader market. However, that focus on relative stock price volatility only addresses one element of a company's risk. Other forms of financial risk, operating risk, and market risk that a company may face in the production and marketing of its products and services are not addressed. This is important since regulated distribution utilities often are provided mechanisms (e.g., revenue and/or cost adjustment mechanisms) to insulate them from various forms of risk for which competitive have no protection.

The Commission is also asked to appreciate that Beta coefficients are key inputs to CAPM and ECAPM analyses. Yet, there are numerous alternative methods for computing Beta coefficients, and some of those alternatives can noticeably alter the ROE estimates that are derived from CAPM and ECAPM models. It is, therefore, imperative to understand differences in: (1) Beta computation methods; (2) the time periods over which different measures are computed.

Q. WHAT IS YOUR ASSESSMENT OF WITNESS HEVERT'S BOND YIELD PLUS RISK PREMIUM ANALYSIS?

A. Witness Hevert's Bond Yield Plus Risk Premium analysis engenders a number of concerns from both conceptual and practical perspectives. His efforts to estimate a regression relationship are based on data for rate case ROE determinations and measures of 30-year Treasury yields from January 1980

through May 2019 (i.e. roughly a 40-year period). Over that period there have been substantial, and in some respects dramatic, changes in the utility industry, regulatory policies, financial market conditions, and the ownership of distribution utilities. Natural gas has been fully deregulated at the wellhead, gas transportation markets have been opened to competition, gas service offerings are increasingly unbundled, and the availability of natural gas production in the U.S. is achieving new all-time record levels. There has also been a dramatic consolidation of utility ownership through numerous mergers and acquisitions that has resulted in gas distribution utilities becoming subsidiaries of larger, and generally more diversified, holding company parents. Regulatory practices have also changed to allow increased numbers of rate adjustment mechanism and cost deferrals. Also, in many jurisdictions, utility revenues have been either fully or partially decoupled in a manner that provides increased assurance of revenue recovery. In addition, the Federal Reserve has become more active as a manager of the economy through its monetary policies. As a result of such changes the risks faced by gas distribution utilities today differ substantially from those faced by companies providing the same utility services in prior decades. Yet, Witness Hevert offers no assessment of the impacts of those changes on his analysis and the proper interpretation and application of the results of his analysis.

The Bond Yield Plus Risk Premium methodology employed by Witness Hevert is premised on the notion that changes in utility equity return requirements over time are related to changes in the costs of risk-free investments. However,

nowhere in that model is there an ability to account for changes in risk profiles of the utilities for which ROE determinations are rendered. Instead, users of the Bond Yield method must implicitly assume that either: (1) there have been no changes in utility risk profiles over time; or (2) the risks faced by all utilities have generally affected all utilities in a uniform manner over time. Based on my years of experience, neither of those assumptions is reasonable. Again, it is inappropriate for Witness Hevert to assert that he has considered the comparable risk standards of the *Hope* and *Bluefield* decisions when he does not account for changes in risk profiles of companies within the industry over time.

In terms of more practical considerations, Witness Hevert provides no indication of how the measure of the risk-free rate (i.e., the 30-year U.S. Treasury Bond Yield), that he associates with individual rate case decisions, were determined. U.S. Treasury Bond yields measured as of the date of issuance of orders would not be a measure of yields that regulators could have considered in reaching their ROE determinations. If the measures of bond yields for individual rate case ROE determinations that Witness Hevert uses in his regression equation were not actually considered by regulators when making their ROE determinations, then the relationship estimated by Witness Hevert may represent little more than coincidence (e.g., a correlation between stock market performance and the length of hemlines on women's dresses). The identification of a statistical correlation does not necessarily imply a causal relationship, nor does it necessarily imply that the identified relationship will continue to hold as we move

forward in time. In other words, correlations developed from past relationships may not be reliable predictors of future outcomes.

For these reasons, regression-based Bond Yield Plus Risk Premium analyses must be well understood before reliance is placed on such models.

3. Expected Earnings Analysis

Q. WHAT WEIGHT SHOULD THE COMMISSION GIVE TO WITNESS HEVERT'S EXPECTED EARNINGS ANALYSIS?

A. None. The Expected Earnings Analysis that Witness Hevert includes in his ROE testimony does not depict the earnings required of DEU's gas distribution utility operations. As shown in DEU Exhibit 2.07, his Expected Earnings Analysis only examines earnings expectations for utility holding companies. Moreover, the Value Line estimates for Expected Earnings and Shares Outstanding that Witness Hevert uses in his Expected Earnings Analysis only provide average earnings expectations for those holding companies for the 2022-2024 period.

Q. DOES WITNESS HEVERT'S "EXPECTED EARNINGS ANALYSIS" OFFER A REASONABLE AND UNBIASED BASIS FOR EVALUATING THE ROE ESTIMATES HE HAS PRODUCED?

A. No. Witness Hevert indicates that he has used an Expected Earnings Analysis to assess the reasonableness of the results of his DCF, CAPM, and Bond Yield Plus Risk Premium analyses. However, an examination of DEU Exhibit 2.07

finds that his Expected Earnings Analysis is also developed from Value Line earnings estimates. Accepting *arguendo*, the structure of Witness Hevert's Expected Earnings Analysis, comparable results computed using the generally lower earnings growth rate estimates that Witness Hevert derives from Zacks or First Call would yield noticeably lower Expected Earnings ROE results. Moreover, the Commission must recognize that the Adjusted ROEs Witness Hevert computes in DEU Exhibit 2.07 are for holding companies, not distribution utilities, and Witness Hevert makes no adjustment for differences in risk between holding companies and their distribution utility subsidiaries.

In Witness Hevert's discussion of his Expected Earnings Analysis, he states, "*By taking historical returns on book equity and comparing those to authorized ROEs, investors are able to directly compare returns from investments of similar risk.*" Yet, Witness Hevert provides no demonstration that the risks faced by his proxy group companies are comparable to those faced by Dominion Energy, Inc. or DEU. Witness Hevert also fails to demonstrate that the risks faced by DEU's distribution utility operations in Utah are comparable to those for the more diversified holdings of Dominion Energy, Inc., a significant portion of which are not subject to price regulation.

4. Other Business Risk Considerations

Q. IS DEU'S RISK PROFILE IMPACTED BY THE EFFORTS OF STATES AND LOCAL MUNICIPALITIES TO ACHIEVE "DEEP DECARBONIZATION"?

A. In some areas of the U.S., the effects of "deep de-carbonization" on gas distribution utilities is beginning to emerge as a significant consideration. For example, in the District of Columbia (a jurisdiction in which I have testified extensively) regulators are just beginning to grapple with issues associated with de-carbonization. It is a particularly acute issue in that jurisdiction as the gas utility that serves the District of Columbia operates extensive amounts of very old distribution system and has comparatively high, and rapidly growing, numbers of natural gas leaks.[21] It is also a city that has set a goal of becoming carbon free by the year 2030. By contrast, DEU operates a comparatively young system with a much lower loss rate,[22] and it operates in a state that has no legislative mandate for dramatic reduction of its carbon footprint. Thus, the risk of incurring stranded costs is not uniform across gas utilities. I would also suggest that utility regulators in the U.S. have generally acted to protect investors from losses due to the stranded costs. Recent adoptions of revenue decoupling mechanisms represent an example of such efforts.

I do not preclude the possibility that deep de-carbonization efforts will impact DEU's operations in the future. But as of this juncture, the risk that DEU

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[21] Out of roughly 1200 miles of mains on the Washington Gas Light Company gas distribution system in the District of Columbia the Company's 2018 annual report to PHMSA (i.e., the U.S. Pipeline and Hazardous Materials Safety Administration) indicates over one third were cast iron mains. Moreover, those cast iron mains have an average age of roughly 100 years. In addition, the same PHMSA report shows a lost and unaccounted for gas rate for the year ending June 30, 2018 of 4.16%. Further, the number of Grade 1 hazardous leaks on the Washington Gas Light Company gas distribution system in the District of Columbia has nearly tripled in the last five years, despite the Company's pursuit of an accelerated pipe replacement program. The annual number of Grade 1 leaks in the District of Columbia rose from 565 in 2013 to 1,641 in 2018.

[22] Comparable PHMSA data for DEU indicates that DEU operates a system that includes more than 18,000 miles of distribution of which only about 66 miles (i.e. less than 0.3%) were installed prior to 1940. Furthermore, there are no cast iron mains on DEU's distribution system in Utah, and DEU reported only 0.7% unaccounted for gas for the year ended June 30, 2018.

719 will incur stranded costs is much smaller than it is for utilities that operate older
720 gas distribution systems with higher leak rates in eastern states. Moreover, the
721 likelihood that investors in DEU will ultimately be required to absorb stranded
722 costs associated with electrification and/or deep de-carbonization appears even
723 more remote.
724
725 **Q. WITNESS HEVERT SUBMITS THAT THE COMPANY'S USE OF A**
726 **FORECASTED TEST YEAR DOES NOT REDUCE THE COMPANY'S RISK**
727 **RELATIVE TO THE PROXY GROUP.[23] DO YOU AGREE?**
728 A. No. The problem in Witness Hevert's assessment of this issue is that he
729 implicitly assumes that the proxy group companies comprise only the utility
730 subsidiaries listed in DEU Exhibit 2.08. In fact, most, if not all, of the holding
731 companies included in his proxy group have significant business activities that do
732 not enjoy the benefit of the type of rate adjustment clauses and regulatory
733 policies addressed in that exhibit. I would accept that, in general, the adjustment
734 clauses and regulatory policies that have been applied to DEU by this Commis-
735 sion do not appear to create significant differences in risk between DEU and
736 most of the other gas utilities referenced in DEU Exhibit 2.08. But that is the
737 wrong comparison. When ROE estimates are developed based on a proxy
738 group that comprises numerous holding companies, any of the listed policies or
739 mechanisms that are applied to DEU but not available to elements of a holding
740 company's non-utility operations can create a difference in the risk profile of DEU

[23] The Direct Testimony of DEU Witness Hevert, page 28 of 65, lines 494-495.

and the overall risk profiles of the business venture in which Witness Hevert's proxy group companies engage.

5. Flotation Costs

Q. SHOULD THE COMMISSION ACCEPT WITNESS HEVERT'S ARGUMENT THAT IT IS NECESSARY TO INCLUDE AN EQUITY FLOTATION COST ALLOWANCE IN DEU'S AUTHORIZED ROE?

A. No. The Commission should find that Witness Hevert's arguments in support of a flotation cost adjustment to the Company's authorized ROE is inappropriate for at least three reasons.

First, the flotation cost adjustment that Witness Hevert proposes (i.e., 5 basis points) is small in comparison to Witness Hevert's recommended range of reasonableness for DEU's ROE. In that context, the Commission can reasonably conclude that his proposed flotation cost adjustment is well within the error of his ROE estimates. Essentially, the comparatively small flotation cost adjustment Witness Hevert advocates is not warranted by the level of imprecision associated with his ROE recommendation.

Second, Witness Hevert incorrectly asserts that flotation costs incurred by DEU remain as part of the Company's cost structure in the test year and beyond. In fact, former Questar shareholders were compensated for their entire equity holdings, including associated flotation costs when Dominion's acquisition of Questar closed. Further, since the closing of that merger transaction, DEU no

longer issues common equity and records no equity flotation costs on its books. Additionally, it is at best difficult to ascertain the extent to which equity infusions received by DEU from its parent company are actually the result of its parent company's issuance of additional common equity. Thus, the relationship, if any, between the incurrence of flotation costs by Dominion Energy, Inc. and DEU's cost of equity is not readily discernible. Moreover, it is possible that funds provided to DEU as equity infusions could be financed through an issuance of debt or the parent company's sale of assets, and neither of those sources would require the incurrence of equity flotation costs.

Third, Witness Hevert's flotation cost analysis in DEU Exhibit 2.09 indicates that the flotation cost percentages for recent equity issuances by Dominion Energy, Inc. are significantly below those for all of the other companies examined. Where Dominion Energy, Inc. has flotation cost percentages of 0.801% and 0.589%, most of the other issuances shown have flotation cost percentages between 3.4% and 4.8%. Yet, Witness Hevert fails to explain why the higher flotation cost estimate that results from his consideration of proxy group companies is appropriate when DEU's parent company has issued equity at noticeably lower costs. Finally, I note that Witness Hevert's use of DCF analyses to assess the impact of flotation costs is distorted by the same Value Line earnings growth estimates that I have previously discussed herein.

Q. IS WITNESS HEVERT CORRECT WHEN HE ASSERTS THAT EQUITY FLOTATION COSTS REMAIN ON THE UTILITY'S BOOKS OVER TIME?

A. No. Through mergers and acquisitions cost of equity issued directly by a utility is replaced with equity from the parent company (i.e., Dominion Energy, Inc. or "DEI"), and the utility's prior equity investors are fully compensated for all costs associated with the equity they held prior to the transaction. Since that merger transaction, DEU is not in a position to issue common equity and thus has incurred no new equity issuance costs.

B. ANGC Cost of Equity Analyses for DEU

Q. PLEASE DESCRIBE THE COST OF EQUITY ANALYSES THAT YOU HAVE DEVELOPED FOR THIS PROCEEDING?

A. In addition to my review of Witness Hevert's cost of equity presentation, my efforts to estimate an ROE for DEU in this proceeding include the computation of DCF, CAPM, ECAPM, and Bond Yield Plus Risk Premium analyses. Those analyses are presented in the pages of ANGC Exhibit 1.04. For my DCF, CAPM and ECAPM analyses I have used the same proxy group chosen by Witness Hevert, noting the inherent upward bias in ROE estimates that a proxy group dominated by utility holding companies can be expected to yield for a gas distribution utility such as DEU.[24]

[24] As a result of recent mergers and acquisitions, few alternatives remain for the construction of gas utility proxy groups. One variant of Witness Hevert's proxy group which involved the addition of NiSource (i.e., a company that Witness Hevert has used as part of his proxy group in prior gas distribution utility proceedings in other jurisdictions) was tested. NiSource is also a utility holding company that gas distribution utility subsidiaries operating in multiple eastern states. However, the inclusion of NiSource was found to have only had minor impact on computed ROE estimates for the proxy group.

Q. HOW ARE YOUR DCF ANALYSES PRESENTED?

A. The detail of my DCF analysis is presented on page 2 of ANGC Exhibit 1.04. That analysis employs annual high and low stock price data and earnings growth projections from Zacks, CNN, and Yahoo in a traditional Constant Growth DCF model.[25] Overall proxy group DCF results are summarized for each source of earnings growth estimates on page 1, lines 1-4, of ANGC Exhibit 1.04. After computing an overall average DCF result, I apply a conservative 20-basis point reduction in an effort to reflect the difference between the risk of DEU's distribution utility operations and the risks embodied by the overall business activities of the proxy group companies. As previously noted, that risk differential is not easily quantified. However, I believe the application of a 20-basis point risk differential is conservative.

Q. PLEASE DESCRIBE YOUR RISK PREMIUM ANALYSES.

A. My CAPM and ECAPM analyses are presented in ANGC Exhibit 1.04, page 1, lines 6-13. My Bond Yield Plus Risk Premium analysis is detailed in ANGC Exhibit 1.04, page 3. It is also summarized on page 1 of ANGC Exhibit 1.04, lines 14-15.

All of these Risk Premium analyses have been developed to estimate required ROEs for DEU using measures of both current and near-term projected 30-Year U.S. Treasury Bond yields. The current 30-Year U.S. Treasury Bond yield is based on the average daily yield for the month of September 2019, the

[25] Low, Mean, and High ROE estimates are only shown only for comparison to Witness Hevert's results.

calculation of that average daily yield is shown in Exhibit ANGC 1.01. The near-term projected 30-Year U.S. Treasury Bond yield is based on an average of projections for six calendar quarters ending December 31, 2020 with a 25-basis point downward adjustment to reflect the 25-basis point interest rate implemented by the Federal Reserve in September 2019.

The CAPM and ECAPM analyses utilize the same Bloomberg-derived market risk premium estimates and Bloomberg Beta Coefficients that are used by Witness Hevert in DEU Exhibit 2.05. After computing an average CAPM and ECAPM result, I have once again applied a 20-basis point downward adjustment in an effort to account for risk differences between the proxy group companies and DEU. I do not apply that adjustment to the Bond Yield Plus Risk Premium results, since that methodology relies directly on utility (i.e., rate case decisions) and is **not** premised on a proxy group that includes holding companies with non-distribution utility investments.

Finally, the Bond Yield Plus Risk Premium analysis that I present is premised on a regression that only uses rate case decisions within the last ten years. By shortening the period examined, the influences of significant changes in the industry, in financial markets, and in regulatory policies over the period examined is reduced.

Q. HAVE YOU IDENTIFIED A RANGE OF REASONABLENESS FOR THE COMMISSION'S ROE DETERMINATIONS IN THIS PROCEEDING?

A. Yes, I have. That range represents plus or minus 50-basis points from the average of my DCF results, my CAPM and ECPM results, and my Bond Yield Plus Risk Premium estimates. That average (rounded to the nearest tenth of a percent) is 9.00%. Thus, the suggested range of reasonableness is 8.50% to 9.50%. However, while the mid-point of my recommended ROE is justifiable as an authorized ROE for DEU, I believe that the Commission should exercise gradualism in its determination of an authorized ROE for DEU. In that context, I recommend that the Commission set DEU's authorized ROE at the upper end of my identified range of reasonableness (i.e., at 9.50%).

C. DEU Capital Structure

Q. WHAT IS THE CAPITAL STRUCTURE THAT DEU PROPOSES IN THIS PROCEEDING?

A. The Company proposes a capital structure for ratemaking purposes that comprises 55% Common Equity and 45% Long-Term Debt.[26]

Q. DOES DEU'S PROPOSED CAPITAL STRUCTURE REFLECT ITS PROJECTED ACTUAL CAPITAL STRUCTURE FOR 2020?

A. No. The Company represents that its projected capital structure for 2020 comprises 60% Common Equity, and by implication, 40% Long-Term Debt.[27] Moreover, there is no guarantee that DEU's projected capital structure will be

[26] The Direct Testimony of DEU Witness Hevert, page 43, lines 791-793.
[27] Ibid.

achieved during the period in which rates approved in this proceeding are in effect. Thus, the Commission should be cautious with respect to the Company's use of the phrase "***actual*** *projected 2020 capital structure*," as there is no assurance that the DEU's projections will be achieved or maintained during 2020. More appropriately, the word "**actual**" should be stricken, and the Commission should simply refer to the Company's "*projected 2020 capital structure.*"

Q. DOES WITNESS HEVERT'S CAPITAL STRUCTURE ANALYSIS IN EXHIBIT DEU 2.10 PROVIDE INSIGHT REGARDING THE APPROPRIATE CAPITAL STRUCTURE FOR DEU'S GAS DISTRIBUTION UTILITY OPERATIONS IN UTAH?

A. No, it does not. The data Witness Hevert presents in DEU Exhibit 2.10 are for the utility holding companies that comprise his proxy group. Nothing in that exhibit addresses an appropriate capital structure for Dominion Energy Utah's regulated distribution utility operations. The investment portfolio of a utility holding company can have very different capital structure requirements than a distribution utility subsidiary. Thus, Witness Hevert's comparison of the capital structures of utility holding companies offers no insight regarding the appropriate capital structure for a regulated distribution utility.

Q. DOES WITNESS HEVERT'S DISCUSSION OF DEU'S CAPITAL STRUCTURE ADDRESS THE IMPACTS OF ALTERNATIVE CAPITAL STRUCTURES ON THE COMPANY'S COSTS OF PROVIDING SERVICE?

A. No, it does not. His only contributions are: (1) a generalized discussion of financial risk and the Company's ability to raise capital; and (2) a comparison of DEU's proposed capital structure with those of the holding companies that comprise his proxy group. Nowhere in his presentation does Witness Hevert address the costs to ratepayers of maintaining different levels of Common Equity within its capital structure.

Q. WHAT IS THE PURPOSE OF ESTABLISHING A CAPITAL STRUCTURE FOR A UTILITY AS PART OF THE RATEMAKING PROCESS?

A. The role of regulators in the establishment of capital structures for rate regulated utilities is to ensure that the costs of capital included in utility rates are optimized to ensure the financial viability of the utility while protecting ratepayers from unnecessary capital cost burdens. Equity capital is generally more costly to utility ratepayers than debt capital.[28] With the need to recognize income taxes that must be paid on utility equity returns, the relative cost of equity rises further above utility costs for long-term debt.[29] For this reason, a utility capital structure that comprises a high percentage of equity capital will tend to impose substantial unnecessary capital cost burdens on ratepayers. However, as the percentage of debt in a utility capital structure increases, the utility's costs of borrowing funds

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[28] Over the last five years, costs of long-term debt for utilities have generally ranged from about 3.0% to 5.0%, while costs of equity for gas utilities have been set in the range of 9.0% to 10.0%. In other words, utility costs of equity, before consideration of income taxes, are roughly twice as expensive as long-term debt.

[29] To provide equity investors a 10% return, the pre-tax cost of equity must be adjusted for state and federal income taxes. Considering just federal income taxes at the current corporate rate of 21%, the effective pre-tax cost of equity is nearly 12.7%.

through debt instruments can also be expected to increase. A capital structure should seek to **minimize** the overall costs of capital borne by ratepayers while ensuring the utility's financial health and ability to obtain additional financing when required.

Q. ARE THERE SIGNIFICANT DIFFERENCES IN DEU'S COSTS OF EQUITY AND LONG-TERM DEBT?

A. Yes, there are. DEU proposes a cost of equity or ROE of 10.5%. However, the Company must pay income taxes on funds used to provide equity returns. When grossed-up for income taxes the effective pre-tax cost of Common Equity the DEU ratepayers must bear would be 13.95%.[30] DEU's weighted average cost of Long-Term Debt is 4.37%.[31] In other words, at DEU's requested ROE the Company's effective cost of Common Equity is **more than three times** its weighted average cost of Long-Term Debt. Thus, considerable opportunity exists for the Commission to lower ratepayer costs by increasing the percentage of Long-Term Debt included in DEU's Capital Structure.

Q. WOULD LOWERING THE EQUITY PERCENTAGE IN DEU'S PROPOSED CAPITAL STRUCTURE ERODE THE COMPANY'S CREDIT RATING AND CAUSE ITS WEIGHTED AVERAGE COST OF DEBT TO INCREASE?

A. Variations in DEU's capital structure may have some impact on DEU's incremental costs of financing. However, within a range of roughly +/- 5% around

[30] The Company's effective cost of equity equals its approved ROE grossed-up for income taxes.
[31] DEU Exhibit 3.31.

a capital structure that is 50% Common Equity and 50% Long-Term Debt, those impacts, if any, would be small relative to the substantial premium that must be paid for equity capital. Furthermore, an increase in debt financing costs would only impact the costs of incremental debt issuances. Thus, the impacts of any increases in debt financing costs are substantially diluted. In addition, given current financial market conditions, it is possible that incremental issuances of long-term debt could be made at effective rates below the Company's current weighted average cost of debt.

Q. HOW DOES THE CAPITAL STRUCTURE THAT DEU PROPOSES FOR RATEMAKING PURPOSES IN THIS PROCEEDING COMPARE WITH THE CAPITAL STRUCTURE OF ITS PARENT, DOMINION ENERGY, INC.?

A. Information reported in Dominion Energy's most recent SEC Form 10-Q filing indicates that at the end of the second quarter of 2019, Dominion Energy, Inc. had a capital structure that included approximately 44% Common Equity and 56% Long-Term Debt (i.e., DEU's parent had substantially less common equity and noticeably more Long-Term Debt).

Utility holding companies often seek higher equity ratios in the capital structures of their **regulated utilities** to enable the holding company to finance non-utility activities at lower costs. When engaged in competitive businesses, minimizing overall capital costs is important to the achievement of marketable products and services. While a strategy that leverages utility capital structures may serve to improve the holding company's overall returns, it raises costs to

utility ratepayers without providing incremental benefits. For this reason, the Commission must act to ensure that the costs of capital borne by ratepayers are not unnecessarily increased to provide a holding company greater leverage in its financing of non-utility operations.[32]

Q. SHOULD DEU'S ACTUAL CAPITAL STRUCTURE HAVE A BEARING ON THE CAPITAL STRUCTURE THE COMMISSION APPROVES FOR RATEMAKING PURPOSES IN THIS PROCEEDING?

A. No, due to a variety of considerations (including "lumpiness" of new debt and equity issuances, variations in the timing and costs of plant additions, and fluctuations in the timing of actual revenue collections).[33] As a result, fluctuations in reported utility debt and equity ratios are virtually unavoidable, and it must be expected that the Company's actual capital structure will necessarily vary over the course of a year. However, through sound business and financial management practices, any negative impacts of such capital structure fluctuations on earnings can generally be minimized.[34]

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[32] Allowing holding companies to inappropriately leverage the equity in their utility operations not only harms utility ratepayers, it provides an anti-competitive advantage to the holding company's non-regulated business activities by enabling such non-regulated activities to finance their activities at lower costs than other entities in the same markets.

[33] Other factors that may cause changes in a utility's capital structure can include: seasonal fluctuations in revenues and earnings; equity added through dividend re-investment programs; stock distributions to executives or other employees as part of compensation plans.

[34] Not all impacts of capital structure fluctuations are negative. For example, in the current market it is conceivable that new debt financings can be marketed at effective rates below the Company's current average weighted average cost of debt. Such financings would provide the Company opportunities to supplement its earnings, by reducing its weighted average cost of long-term debt below the levels assumed in the development of the Company's revenue requirement.

Q. DOES THE COMMISSION'S APPROVAL OF A CAPITAL STRUCTURE FOR RATEMAKING PURPOSES MANDATE THAT THE COMPANY MAINTAIN A FIXED CAPITAL STRUCTURE AT ALL TIMES?

A. No. It simply serves as an input for the establishment of a target level of capital costs. The utility remains free to manage its finances and operating expenditures within the Company's approved overall revenue requirement. In DEU Exhibit 2.11 it can be seen that each of the Company's issuances of Long-Term Debt over the last three years have effective rates (yields) that are below the Company's weighted average long-term debt costs. When the Company can refinance maturing debt issuances at lower costs between rate cases, the Company retains the benefit of any savings achieved until the next rate case. Similarly, the Company may at times substitute lower cost short-term debt for long-term debt and effectively increase the Company's achieved return on equity for its shareholder, Dominion Energy, Inc.

Q. WHAT PERCENTAGES OF DEBT AND EQUITY SHOULD THE COMMISSION AUTHORIZE FOR DEU'S CAPITAL STRUCTURE IN THIS PROCEEDING?

A. In Docket No. 13-057-05, this Commission accepted a stipulation among the parties that provided for a capital structure that included 52.07% common equity and 47.93% long-term debt.

998 **D. Overall Cost of Capital and Revenue Requirements**

999

1000 **Q. WHAT IS THE OVERALL COST OF CAPITAL THAT RESULTS FROM YOUR**
1001 **ROE AND CAPITAL STRUCTURE RECOMMENDATIONS?**

1002 A. The combined impact of the ROE and capital structure recommendations that I
1003 present would lower DEU's overall rate of return ("ROR") to 6.94%. That result is
1004 shown in **Scenario 5** on page 4 of ANGC Exhibit 1.05. With the Company's
1005 ROR lowered to 6.94% its projected revenue deficiency is fully erased before
1006 consideration of any other ratemaking adjustments and a small (i.e., $1.52
1007 million) revenue reduction would be justified.

1008

1009 **Q. WOULD YOU PLEASE FURTHER EXPLAIN THE OTHER SCENARIOS**
1010 **PRESENTED IN ANGC EXHIBIT 1.05.**

1011 A. ANGC Exhibit 1.05 sets forth overall rate of return and revenue requirement
1012 impacts for six scenarios in which the Company's requested ROE, its proposed
1013 capital structure, or both are adjusted. Although I recommend movement to a
1014 balanced capital structure with 50% common equity and 50% long-term debt, I
1015 also provide scenarios in which the capital structure used approximates the
1016 capital structure accepted by the Commission and the parties in Docket No. 13-
1017 057-05 to depict an intermediate capital structure alternative. I also include, for
1018 comparative purposes, a scenario (i.e., Scenario 6 on page 4 of ANGC Exhibit
1019 1.05) that presents the results of a continuation of the ROE and capital structure

for DEU at the levels set forth in the Commission's February 24, 2014 Report and Order in Docket No. 13-057-05.

ANGC Exhibit 1.05, page 1 of 3, Scenario 1, computes the impact of the 9.50% ROE recommended herein on DEU's overall cost of capital and revenue requirement assuming the Capital Structure proposed by DEU in this proceeding is not altered. Under that scenario, the overall rate of return for DEU would fall from 7.74% to **7.19%,** and the Company's requested revenue increase would be lowered by $13.3 million (i.e., from $19.25 million annually to $5.97 million annually).

ANGC Exhibit ANGC Exhibit 1.05, Scenario 2, illustrates the impact of replacing the Company's proposed capital structure with the capital structure to which the parties stipulated in Docket No. 13-057-05[35] while maintaining the Company's proposed ROE. In this scenario, DEU's overall cost of capital declines from 7.74% to 7.56%, and DEU's requested revenue increase is reduced by $5.2 million.

ANGC Exhibit 1.05, Scenario 3, depicts the combined effects of the 9.50% ROE recommended herein and the use of a Capital Structure with 52% Common Equity and 48% Long-Term Debt. That combination of ROE and capital structure produces an overall ROR for DEU of 7.04% and lowers the Company's computed revenue deficiency to $1.477 million.

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[35] As set forth in the Commission's February 21, 2014 Report and Order in Docket No. 13-057-05, the parties stipulated to a capital structure that included 52.07% common equity and 47.93% long-term debt. For the purposed of the analyses presented in ANGC Exhibit 1.05, I have taken the liberty of rounding those percentages to 52.0% common equity and 48.0% long-term debt.

Scenario 4 presents the impact of adopting a balanced 50/50 equity/debt capital structure while leaving DEU's requested ROE unchanged at 10.50%. Although I do not encourage the Commission to authorize a 10.50% ROE for the Company, this scenario illustrates the value to ratepayers of adopting a balanced capital structure. As shown in this scenario, just the movement to a capital structure with 50% debt and 50% common equity would eliminate nearly half of DEU's claimed revenue deficiency.

IV. CONCLUSION

Q. DO YOU HAVE ANY CONCLUDING OBSERVATIONS REGARDING THE COMPANY'S REQUESTED ROE IN THIS PROCEEDING?

A. Since Witness Hevert filed his Direct Testimony in this proceeding the Federal Reserve has lowered interest rates **twice** (i.e., each time by 25 basis points) and yields on 30-year U.S. Treasury Bonds have fallen sharply. Those changes provide further evidence that the current and projected 30-year bond yields on which Witness Hevert has relied are not reflective of current market conditions and expectations. These downward movements in both Federal Reserve interest rates and 30-year U.S. Treasury Bond yields over the last several months further exacerbate the substantial upward bias in Witness Hevert's ROE recommend-ation. As shown herein, lowering the approved ROE for DEU to a level that is more reflective of current financial market conditions has a significant impact on

the overall magnitude of the Company's requested revenue increase in this proceeding.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes. It does.

CERTIFICATE OF SERVICE

I certify that a true and correct copy of the Direct Testimony of Bruce R. Oliver for ANGC in Phase 1 of Docket 19-057-02 was served by email October 16, 2019 on the following:

QUESTAR GAS COMPANY
Jenniffer Nelson Clark jenniffer.clark@questar.com
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/s/Stephen F. Mecham

BRUCE R. OLIVER

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EXPERIENCE

Over 40 years of experience specializing in the areas of utility rates, energy, and regulatory policy. Offers unusual depth and breadth in his understanding of energy and utility industries which leads to creative and effective resolution of rate issues. Has presented expert testimony in regulatory proceedings in more than 300 proceedings before regulatory commissions in 24 jurisdictions, and has served a diverse group of clients on issues encompassing a wide range of energy and utility-related activities. Assists clients in the assessment of competitive energy markets for retail services and in the negotiation of contracts for the purchase of such services. Clients have included commercial and industrial energy users, hospitals and universities, state regulatory commissions, utilities, consumer advocates, municipal governments, federal agencies, and suppliers of equipment and services to utility markets.

1985-Present — Revilo Hill Associates, Inc.
President and CEO

Directs the firm's consulting practice, with specialization in the areas of industrial economics, energy, utilities and regulatory policy. Provides expert testimony in regulatory proceedings. Assists individual commercial and institutional customers in the competitive procurement of energy services and resolution of utility service and billing issues. Regulatory work includes participation in electric, gas, water and sewer utility rate and policy matters, with particular specialization in the areas of utility costs of service, rate structure, rate of return, utility planning, and forecasting. Examples of recent projects include:

- Development and presentation of positions regarding the merits of various forms of alternative ratemaking including, but not limited to: multi-year rate plans; performance-based ratemaking concepts; and the merits of proposals for Performance Incentive Mechanisms.

- Assessment of a gas distribution utility's plans for accelerated replacement of aging and leak prone distribution mains by an LDC, as well as the impacts of rising leak rates the utility's gas system safety and rates distribution services.

- Negotiation of settlements to reflect the impacts of the Tax Cut and Jobs Act of 2017 in rates for certain electric and gas distribution utilities.

- Investigation of utility merger issues including ring-fencing, costs to achieve, estimated merger benefits, and allocation of merger benefits among customers for electric and gas utility mergers.

- Investigation of gas distribution utility system expansion proposals, tariff changes, and proposed ratemaking treatment of costs for gas expansion activities.

- Examination of utility proposals undergrounding overhead electric distribution facilities and the recovery of costs for undergrounding activities.

- Evaluation of utility proposals for the deployment of Advanced Metering Infrastructure (AMI) and the development of dynamic pricing rates to be implemented using AMI equipment.

- Detailed evaluation of a gas distribution utility's long-range gas supply planning, its evaluation of gas supply alternatives, and the prudence of gas its procurement decisions.

- Investigation of cost of service, rate design, tariff, forecasting and planning issues for island utilities in the U.S. Virgin Islands and Guam.

- Analysis of utility revenue decoupling proposals including assessment of the cost of service and rate impacts of such proposals and the development of appropriate tariff language for such proposals.

- Investigation of matters relating to a utility's outsourcing of significant components of its Administrative and General and Customer Service activities, including the merits of the proposed outsourcing arrangements and appropriate rate treatment of costs incurred to: select providers of outsourced services; negotiate contracts; and achieve the implementation of outsourcing arrangements.

- Strategic analysis and policy guidance for a major commercial consumer group in the development and presentation of positions before legislative and regulatory bodies regarding electric and gas regulatory issues.

- Development of Asset Management incentive programs for natural gas distribution utilities.

- Investigation and preparation of a report on the causes of large heating oil price increases for the Attorney General of a New England state.

- Participation as a member of a three-person panel hearing a gas marketer complaint of anti-competitive behavior by a local gas distribution utility in its provision of unbundled gas transportation services.

- Preparation of cost allocation studies and rate structure proposals for electric, gas, water and wastewater utility regulatory proceedings;

- Analysis of proposals for restructuring and the unbundling of rates for local gas distribution companies, and negotiated terms, conditions, and pricing for restructured utility services.

2000-Present AOBA Alliance, Inc.
Director and Chief Economist

Key technical advisor to one of the nation's largest and most successful customer-based energy aggregation programs. Assists non-residential customers in the Washington, D.C. area in the procurement of competitive retail energy services, including the evaluation and negotiation of contract terms for competitive electricity, natural gas, energy information services. Monitors energy markets and keeps participants informed regarding energy market developments and pricing trends. Focused primarily on the commercial building industry, the AOBA Alliance, Inc. serves more than 9,000 electric and natural gas accounts in twelve states and the District of Columbia. Those participants use over 3.0 billion kWh per year and over 660 MW of electrical peak load.

1981-85 Resource Dynamics Corporation
Principal and Vice President

Responsible for the firm's activities in the areas of energy pricing, utility rates and regulatory policy. Provided expert testimony before utility regulatory commissions on issues relating to costs of service, rate design, load management, load research, fuel price forecasting, utility costing analyses, and cost allocation methods. Evaluated utility fuel procurement practices, fuel price forecasts, and price forecasting methodologies. Contributed to modeling efforts relating to the estimation of national and regional electric utility load curves and coal market prices. Participated in the development handbooks for cogeneration feasibility assessment.

1980-81 Potomac Electric Power Company
Manager of Rate Research Department

Directed the development of all rate related programs. Supervised the costing, design and analysis of traditional and innovative rates (including time-of-use, load management and cogeneration tariffs). Also was responsible for corporate revenue forecasting activities, as well as the development of marginal and avoided cost studies.

1979-80 Pacific Gas and Electric Company
Rate Experimentation Supervisor

Responsible for design, implementation and analysis of innovative rate programs for both gas and electric service. Developed programs for curtailable service; cogeneration; conservation; residential load cycling; and commercial, industrial, and agricultural time-of- use rates. Directed analyses of time-of-use and lifeline price elasticities and development of marginal and avoided costing methods.

1973-79 ICF Incorporated
Project Manager

Specialized in energy policy and utility regulatory analyses. Performed detailed analysis of U.S. petroleum, natural gas, coal and electric utility industries. Provided expert testimony on utility rate issues. Designed experimental rates for federally funded time-of-use rate and load management programs in North Carolina. Provided technical support to the DOE Regulatory Intervention Program. Contributed to the design and development of the National Coal Model, and prepared forecasts of low sulfur fuel availability for utility markets.

1972-73 U.S. Cost-of-Living Council - Pay Board
Labor Economist

Served in the Office of the Chief Economist. Responsible for macroeconomic analyses of Board decisions, and for the development data systems to support assessments of the impacts of Board decisions and the reporting of aggregate statistics on wage increases granted by the Board.

EDUCATION

1972 M.A., Economics, Virginia Polytechnic Institute and State University

1970 B.A., Economics, Virginia Polytechnic Institute and State University

RATE CASE PARTICIPATION

Alberta, Canada	
Canadian Western Natural Gas	1998 General Rate Application
NOVA Gas Transmission Ltd.	1995 GRA, Phase II
Canadian Western Natural Gas	Core Market Direct Purchase
Northwestern Utilities	Core Market Direct Purchase
TransAlta Utilities Corp.	Load Retention Rate Offering
Alberta Power Ltd.	1993 General Rate Application
Arizona	
Southwest Gas Corporation	Docket No. U-1551-93-272
Sun City Water Company	Docket No. U-1656-91-134
Havasu Water Company	Docket No. U-2013-91-133
Arizona Water Company	Docket No. U-1445-91-227
California	
Pacific Gas & Electric Company	Application No. 58089
Connecticut	
Southern Connecticut Gas Company	Docket No. 89-09-06
Connecticut Light & Power Company	Docket No. 87-07-01
Delaware	
Chesapeake Utilities Corporation	Docket No. 95 - 73
Delmarva Power & Light Company	Docket No. 94 - 141
Delmarva Power & Light Company	Docket No. 94 - 129
Delaware Electric Cooperative	Docket No. 94 - 100
Delmarva Power & Light Company	Docket No. 92 - 85
Delmarva Power & Light Company	Docket No. 92 - 71F
Delaware Electric Cooperative	Docket No. 91 - 37
Delmarva Power & Light Company	Docket No. 91 - 24
Delmarva Power & Light Company	Docket No. 91 - 20
Delmarva Power & Light Company	Docket No. 90 - 31
Delmarva Power & Light Company	Docket No. 90 - 21
Delmarva Power & Light Company	Docket No. 89 - 26
Chesapeake Utilities Corporation	Docket No. 88 - 39F
Delmarva Power & Light Company	Docket No. 88 - 34
Delmarva Power & Light Company	Docket No. 88 - 32, Phase 2
Delmarva Power & Light Company	Docket No. 88 - 32
Delaware Electric Cooperative	Docket No. 87 - 34, Phase 2
Delaware Electric Cooperative	Docket No. 87 - 34
Delmarva Power & Light Company	Docket No. 87 - 9, Phase 5
Delmarva Power & Light Company	Docket No. 87 - 9, Phase 4

Delmarva Power & Light Company	Docket No. 87 - 9, Phase 3
Delmarva Power & Light Company	Docket No. 87 - 9, Phase 2
Delmarva Power & Light Company	Docket No. 87 - 9
Delmarva Power & Light Company	Docket No. 86 - 43
Delmarva Power & Light Company	Docket No. 86 - 24

District of Columbia

Potomac Electric Power Company	Formal Case No. 1151
Potomac Electric Power Company	Formal Case No. 1150
Potomac Electric Power Company	Formal Case No. 1145
WGL – AltaGas Merger	Formal Case No. 1142
Potomac Electric Power Company	Formal Case No. 1139
Washington Gas Light Company	Formal Case No. 1137
Potomac Electric Power Company	Formal Case No. 1133
Potomac Electric Power Company	Formal Case No. 1130
Potomac Electric Power Company	Formal Case No. 1121
Exelon – Pepco Merger	Formal Case No. 1119
Potomac Electric Power Company	Formal Case No. 1116
Washington Gas Light Company	Formal Case No. 1115
Potomac Electric Power Company	Formal Case No. 1103
Washington Gas Light Company	Formal Case No. 1093
Potomac Electric Power Company	Formal Case No. 1087
Washington Gas Light Company	Formal Case No. 1079
Potomac Electric Power Company	Formal Case No. 1076
Potomac Electric Power Company	Formal Case No. 1056
Washington Gas Light Company	Formal Case No. 1054
Potomac Electric Power Company	Formal Case No. 1053, Phase II
Potomac Electric Power Company	Formal Case No. 1053
Washington Gas Light Company	Formal Case No. 1016
Potomac Electric Power/Conectiv Merger	Formal Case No. 1002
Washington Gas Light Company	Formal Case No. 989
Potomac Electric Power Company/Baltimore Gas & Electric Company Merger	Formal Case No. 951
Potomac Electric Power Company	Formal Case No. 945
Potomac Electric Power Company	Formal Case No. 939
Washington Gas Light Company	Formal Case No. 934
Washington Gas Light Company	Formal Case No. 922
District of Columbia Natural Gas	Formal Case No. 890
Potomac Electric Power Company	Formal Case No. 889
Potomac Electric Power Company	Formal Case No. 869
District of Columbia Natural Gas	Formal Case No. 845
District of Columbia Natural Gas	Formal Case No. 840
Potomac Electric Power Company	Formal Case No. 834
Potomac Electric Power Company	Formal Case No. 813, Phase II
Potomac Electric Power Company	Formal Case No. 813
Washington Gas Light Company	Formal Case No. 787

Potomac Electric Power Company	Formal Case No. 785
Potomac Electric Power Company	Formal Case No. 759, Phases III
Potomac Electric Power Company	Formal Case No. 759, Phases II
Potomac Electric Power Company	Formal Case No. 759, Phases I
Potomac Electric Power Company	Formal Case No. 758

Guam

Guam Power Authority	Docket No. 11-090, Phase II
Guam Power Authority	Docket No. 11-090
Guam Power Authority	Docket No. 07-010
Guam Power Authority	Docket No. 98-002
Guam Power Authority	Docket No. 96-004
Guam Power Authority	Docket No. 95-001
Guam Power Authority	Docket No. 94-001
Guam Power Authority	Docket No. 92-002
Guam Power Authority	Docket No. 89-002 A,B,C

Illinois

Commonwealth Edison Company	Docket No. 86-0128

Maryland

Washington Gas Light Company	Case No. 9605
Potomac Electric Power Company	Case No. 9602
Washington Gas Light Company	Case No. 9481
WGL – AltaGas Merger	Case No. 9449
Potomac Electric Power Company	Case No. 9443
Washington Gas Light Company	Case No. 9433
Potomac Electric Power Company	Case No. 9418
Exelon – Pepco Merger	Case No. 9361
Potomac Electric Power Company	Case No. 9336
Washington Gas Light Company	Case No. 9335
Washington Gas Light Company	Case No. 9322
Potomac Electric Power Company	Case No. 9311
Potomac Electric Power Company	Case No. 9286
Washington Gas Light Company	Case No. 9267
Potomac Electric Power Company	Case No. 9217
Potomac Electric Power Company	Case No. 9207
Washington Gas Light Company	Case No. 9158
Washington Gas Light Company	Case No. 9104, Phase II
Washington Gas Light Company	Case No. 9104
Potomac Electric Power Company	Case No. 9092, Phase II
Potomac Electric Power Company	Case No. 9092
Standard Offer Service Docket	Case No. 9063
Standard Offer Service Docket	Case No. 9056
Standard Offer Service Docket	Case No. 9037

Potomac Electric Power Company	Case No. 8895
Washington Gas Light Company	Case No. 8991
Washington Gas Light Company	Case No. 8959
Washington Gas Light Company	Case No. 8920, Phase II
Washington Gas Light Company	Case No. 8920
Potomac Electric Power Company	Case No. 8895
Potomac Electric Power Company	Case No. 8890
Potomac Electric Power Company	Case No. 8791
Potomac Electric Power Company	Case No. 8773
Generic Electric Industry Restructuring	Case No. 8738
Potomac Electric Power Company/Baltimore Gas & Electric Company Merger	Case No. 8725
Washington Gas Light Company	Case No. 8545
Potomac Electric Power Company	Case No. 8315
Potomac Electric Power Company	Case No. 8251
Maryland Natural Gas	Case No. 8191
Potomac Electric Power Company	Case No. 8162
Maryland Natural Gas	Case No. 8119
Potomac Electric Power Company	Case No. 8079
Baltimore Gas & Electric Company	Case No. 8070
Maryland Natural Gas	Case No. 8060
Potomac Electric Power Company	Case No. 7972
Potomac Electric Power Company	Case No. 7874
Washington Gas Light Company	Case No. 7649

Massachusetts

Investigation of Rate Structures to Promote Efficient Deployment of Demand Management	Docket No. 07-50

North Carolina

Generic Electric Load Management	Docket No. M100, Sub 78

New Jersey

Public Service Electric and Gas	Docket No. GT93060242
Public Service Electric and Gas	Docket No. ER91111698J
Elizabethtown Gas Company	Docket No. 8812-1231
Elizabethtown Gas Company	Docket No. 8612-1374
Public Service Electric and Gas	Docket No. 8512-1163
Jersey Central Power & Light	Docket No. 8511-1116
New Jersey Natural Gas Company	Docket No. 8510-974
South Jersey Gas Company	Docket No. 850-8858
Public Service Electric and Gas	Docket No. 850-2231
New Jersey Natural Gas Company	Docket No. 850-7732
South Jersey Gas Company	Docket No. 843-184, Phase II
Atlantic Electric Company	Docket No. 8310-883, Phase II
New Jersey Natural Gas Company	Docket No. 831-46

Public Service Electric and Gas	Docket No. 837-620
Public Service Electric and Gas	Docket No. 8210-869

New Mexico

Gas Company of New Mexico	Case No. 2353
Gas Company of New Mexico	Case No. 2340
Gas Company of New Mexico	Case No. 2307
Gas Company of New Mexico	Case No. 2183
Gas Company of New Mexico	Case No. 2147 (Remand)
Gas Company of New Mexico	Case No. 2147
Gas Company of New Mexico	Case No. 2093

New York

Consolidated Edison Company	Docket No. 94-E-0334
Consolidated Edison Company	Docket No. 91-E-0462
Brooklyn Union Gas Company	Docket No. 90-G-0981

Ohio

Toledo Edison Company	Case No. 78-628-EL-FAC

Pennsylvania

PECO Energy Company	Docket No. R-20028394
PG Energy, Inc.	Docket No. R-00061365
Philadelphia Electric Company	Docket No. R-00970258
Mechanicsburg Water Company	Docket No. R-00922502
West Penn Power Company	Docket No. R-00922378
Pennsylvania Electric Company	Docket No. M-920312
North Penn Gas Company	Docket No. R-922276
Metropolitan Edison Company	Docket No. R-922314
York Water Company	Docket No. R-922168
Dauphin Consolidated Water Company	Docket No. R-921000
Pennsylvania Electric Company	Docket No. M-920312
Duquesne Light Company	Docket No. C-913424
Pennsylvania American Water Company	Docket No. R-911909
West Penn Power Company	Docket No. R-901609
Pennsylvania Gas & Water Co. Water Div.	Docket No. R-891209
Pennsylvania Power Company	Docket No. R-881112
Duquesne Light Company	Docket No. R-870651
Pennsylvania Electric Company	Docket No. R-870172
Metropolitan Edison Company	Docket No. R-870171
Western Pennsylvania Water Company	Docket No. R-860397
Duquesne Light Company	Docket No. R-860378
Philadelphia Electric Company	Docket No. R-850290
Pennsylvania Power Company	Docket No. R-850267
Pennsylvania Power & Light Company	Docket No. R-850251
Philadelphia Electric Company	Docket No. R-850152

Western Pennsylvania Water Company	Docket No. R-850096
Pennsylvania Power Company	Docket No. R-842740
Pennsylvania Power & Light Company	Docket No. R-842651
Pennsylvania Electric Company	Docket No. R-832550
Metropolitan Edison Company	Docket No. R-832549
Duquesne Light Company	Docket No. R-842383
UGI Corporation-Gas Utility Division	Docket No. R-832331
Pennsylvania Power & Light Company	Docket No. I-830374
Pennsylvania Electric Company	Docket No. R-822250
Metropolitan Edison Company	Docket No. R-822249
Pennsylvania Power & Light Company	Docket No. R-822169
Pennsylvania Gas & Water Co. - Water Div.	Docket No. R-822102
Columbia Gas Co. of Pennsylvania	Docket No. R-822042
Pennsylvania Gas & Water Co. - Gas Div.	Docket No. R-821961
Philadelphia Electric Company	Docket No. R-811626

Philadelphia, City of

Philadelphia Gas Works	1992 Rate Design Proceeding
Philadelphia Water Department	1992 Rate Increase Request
Philadelphia Gas Works	1990 Rate Increase Request
Philadelphia Water Department	1990 Rate Increase Request
Philadelphia Gas Works	1989 Proceeding
Philadelphia Gas Works	1988 Rate Increase Request
Philadelphia Gas Works	1987-88 Operating Budget
Philadelphia Gas Works	1986 Rate Increase Request
Philadelphia Water Department	1985 Rate Increase Request

Rhode Island – Public Utilities Commission

National Grid – Gas Long-Range Plan	Docket No. 4872
National Grid – Gas GCR	Docket No. 4846
National Grid – Gas DAC	Docket No. 4816
National Grid – Gas Annual ISR Filing	Docket No. 4781
National Grid – Gas Base Rates	Docket No. 4770
National Grid – Gas GCR	Docket No. 4719
National Grid – Gas DAC	Docket No. 4708
National Grid – Gas GCR	Docket No. 4647
National Grid – Gas DAC	Docket No. 4634
National Grid – Gas Long-Range Plan	Docket No. 4608
National Grid – Gas GCR	Docket No. 4576
National Grid – Gas DAC	Docket No. 4573
National Grid – Gas Customer Choice	Docket No. 4523
National Grid – Gas GCR	Docket No. 4520
National Grid – Gas DAC	Docket No. 4514
National Grid – Gas GCR	Docket No. 4436

National Grid – Gas DAC	Docket No. 4431
National Grid – Gas GCR	Docket No. 4346
National Grid – Gas DAC	Docket No. 4339
National Grid – Gas On-System Margins	Docket No. 4333
National Grid – Gas Base Rates	Docket No. 4323
National Grid – Gas GCR	Docket No. 4283
National Grid – Gas DAC	Docket No. 4269
National Grid – Electric Backup Service	Docket No. 4232
National Grid – Elec & Gas Revenue Decoupling	Docket No. 4206
National Grid – Gas GCR	Docket No. 4199
National Grid – Gas DAC	Docket No. 4196
National Grid – Gas GCR	Docket No. 4097
National Grid – Gas DAC	Docket No. 4077
National Grid – Electric	Docket No. 4065
National Grid – Gas Portfolio Management	Docket No. 4038
National Grid – Gas GCR	Docket No. 3982
National Grid – Gas DAC	Docket No. 3977
National Grid – Gas GCR	Docket No. 3961
National Grid – Gas Base Rates	Docket No. 3943
National Grid – Gas GCR	Docket No. 3868
National Grid – Gas DAC	Docket No. 3859
National Grid – Gas Long-Range Plan	Docket No. 3789
National Grid – Gas GCR	Docket No. 3766
National Grid – Gas DAC	Docket No. 3760
New England Gas Company	Docket No. 3696
New England Gas Company	Docket No. 3690
Block Island Power Company	Docket No. 3655
New England Gas Company	Docket No. 3548
New England Gas Company	Docket No. 3459
New England Gas Company	Docket No. 3436
New England Gas Company	Docket No. 3401
Providence Gas Company	Docket No. 3295
Narragansett Electric Company	Docket No. 2930
Providence Gas Company	Docket No. 2902
Providence Gas Company	Docket No. 2581
Providence Gas Company	Docket No. 2552
Providence Gas Company	Docket No. 2374
Providence Gas Company	Docket No. 2286
Valley Gas Company	Docket No. 2276
Valley Gas Company	Docket No. 2138, Phase II
Valley Gas Company	Docket No. 2138, Phase I
Providence Gas Company	Docket No. 2082
Providence Gas Company	Docket No. 2076
Providence Gas Company	Docket No. 2001, Phase II
Valley Gas Company	Docket No. 2038
Providence Gas Company	Docket No. 2001

Block Island Power Company	Docket No. 1998
Providence Gas Company	Docket No. 1971
Generic Gas Transportation	Docket No. 1951
Valley Gas Company	Docket No. 1736
Providence Gas Company	Docket No. 1723
Providence Gas Company	Docket No. 1673

Rhode Island – Division of Public Utilities

National Grid Acquisition of New England Gas Company's Rhode Island Assets	Docket No. D-06-13
Merger of Southern Union, Valley Gas Company And Bristol & Warren Gas Company	Docket No. D-00-02

South Dakota

Northern States Power Company	Docket No. F-3188

Vermont

Department of Public Service	Docket No. 5378
Department of Public Service	Docket No. 5307

Virginia

Washington Gas Light Company	Docket No. PUR 2018-00080
Virginia Electric Power Company	Docket No. PUE 2018-00042
AltaGas – WGL Merger	Docket No. PUR 2017-00049
Virginia Electric Power Company	Docket No. PUE 2016-00021
Virginia Electric Power Company	Docket No. PUE 2016-00001
Virginia Electric Power Company	Docket No. PUE 2015-00027
Virginia Electric Power Company	Docket No. PUE 2011-00027
Washington Gas Light Company	Docket No. PUE 2010-00139
Virginia Electric Power Company	Docket No. PUE 2009-00019
Virginia Electric Power Company	Docket No. PUE 2009-00018
Virginia Electric Power Company	Docket No. PUE 2009-00017
Virginia Electric Power Company	Docket No. PUE 2009-00016
Virginia Electric Power Company	Docket No. PUE 2009-00011
Washington Gas Light Company	Docket No. PUE 2006-00059
Washington Gas Light Company	Docket No. PUE 2005-00010
Washington Gas Light Company	Docket No. PUE 2003-00603
Washington Gas Light Company	Docket No. PUE 2002-00364
Virginia Electric Power Company	Docket No. PUE 000584
Virginia Electric Power Company	Docket No. PUE 980213
Virginia Electric Power Company	Docket No. PUE 980212
Virginia Electric Power Company	Docket No. PUE 960296
Washington Gas Light Company	Docket No. PUE 940031
Virginia Electric Power Company	Docket No. PUE 920041
Virginia Electric Power Company	Docket No. PUE 910047
Northern Virginia Natural Gas	Docket No. PUE 900016

Northern Virginia Natural Gas	Docket No. PUE 880024
Virginia Electric Power Company	Docket No. PUE 830029
Washington Gas Light Company	Docket No. PUE 830008

Virgin Islands

Water and Power Authority – Water Rates	Docket No. 613
Water and Power Authority – Electric Rates	Docket No. 612
Water and Power Authority – Water Rates	Docket No. 576
Water and Power Authority – Electric Rates	Docket No. 575
Water and Power Authority – Electric Rates	Docket No. 533

Wisconsin

Gas Transportation - Generic	Docket No. 05-GI-102

Federal Energy Regulatory Commission

Weaver's Cove Energy, LLC.	Docket No. CP04-36-000
Mill River Pipeline, LLC.	Docket No. CP04-41-000
Columbia Gulf Transmission Co.	Docket No. RP86-167-000
Columbia Gas Transmission Corp.	Docket No. RP86-168-000
Columbia Gulf Transmission Co.	Docket No. TC86-021-000

SELECTED REPORTS, PUBLICATIONS AND PRESENTATIONS

"Will Energy Market Developments Drive Government Policy or Will Government Policy Drive Energy Markets," Presentation to AOBA Utility Committee, June 27, 2013.

"Ratemaking for Recovery of Pipeline Safety Investments," Presentation to the National Association of Regulatory Utility Commissioners, February 6, 2013.

"In Comparatively Stable Energy Markets, Legislative and Regulatory Decisions Make Budgeting for Energy Services A Real Challenge," Presentation to AOBA Utility Committee, October 19, 2011.

"Energy Commodities Show Stability; Charges for Utility Services Rise," Presentation to AOBA Utility Committee, April 20, 2011.

"Budgeting for Utilities In the Face of Constantly Changing Rates," Presentation to AOBA Utility Committee, November 10, 2010.

"Electric Utilities Seek Increased Rates to Fund Large Construction Projects," Presentation to AOBA Utility Committee, October 7, 2009.

"Could You Soon Be Paying $1.00 per kWh for Peak Electricity Supply?" Presentation to AOBA Utility Committee, June 24, 2009.

"Energy Markets in a Tailspin," Presentation to AOBA Utility Committee, March 11, 2009.

"Energy price Outlook for 2009," Presentation to AOBA Utility Committee, December 10, 2008.

"Are You 'Going Green' or Going in the Red," Presentation to AOBA Utility Committee, June 18, 2008.

"Understanding Your Utility Costs and Your Competitive Service Options," Presentation to the Mid-Atlantic Hispanic Chamber of Commerce, July 10, 2006.

"Keeping Your Head Above Water In Volatile Electricity And Natural Gas Markets," Presentation to Legum & Norman Managed Condominiums, February 28, 2006.

"Surviving in Deregulated Energy Markets: *What You Don't Know Will Hurt You*!" Presentation to AOBA Legislative & Regulatory Seminar, May, 18, 2006.

"The Utility Market And Deregulation: *What's In It For You*? Presentation to the Montgomery County, Maryland, Apartment Assistance Program, September 29, 2005.

"Winds of Long-Term Change or Another Short-Term Market Distortion: Post-Katrina and Rita Energy Markets," Keynote Presentation to AOBA Leadership Conference, September 28, 2005.

"These Are Not Your Father's Energy Markets," Presentation to the Institute of Real Estate Management, March 8, 2005.

"Understanding Natural Gas Markets," Prepared for the AOBA Alliance, Inc., August 2004.

"Default Service: Protection or Problem," Prepared for the AOBA Alliance, Inc., April 2004.

Assessment of Winter 2000 Heating Oil Price Increases for Rhode Island, Report Prepared for the Rhode Island Department of Attorney General, September 2001 (with P. Roberti).

"Stranded Costs and Stranded Values," Presentation before the Virginia General Assembly, Joint Subcommittee on Electric Industry Restructuring, Task Force on Stranded and Transition Costs, May, 1998.

"Comments Regarding Restructuring of the Electric Industry in Maryland," Presentation before the Maryland Legislative Task Force on Electric Industry Restructuring, December 1997.

Electric Industry Restructuring And Competition In Virginia, Prepared for the Apartment and Office Building Association of Metropolitan Washington, September 1997.

"Assessment of the Proposed Pepco/BGE Merger," Presentation to the District of Columbia Community Forum on Merger Issues, December 1996.

Assessment of the Agreement Between Delmarva Power & Light Company and the Medical Center of Delaware for the Supply of Electrical Power, Prepared for the Delaware Public Service Commission, Docket No. 94-129, December 1994.

Assessment of the Agreement Between Delmarva Power & Light Company and Ciba-Geigy Corporation for the Supply of Limited Volume Natural Gas, Prepared for the Delaware Public Service Commission, Docket No. 94-141, November 1994.

Assessment of the Natural Gas Service Agreement Between Delmarva Power & Light Company and the Medical Center of Delaware, Prepared for the Delaware Public Service Commission, Docket No. 94-129, November 1994.

Lifeline Rates for Electric Service and Their Potential Application to the Guam Power Authority, Prepared for the Public Utilities Commission of Guam, December 1991.

Review of Additional Information Provided by Delmarva Power & Light Company Regarding the Costs of Gas Supply for Hay Road Combined Cycle Generation; prepared for the Delaware Public Service Commission, Docket No. 87-9, Phase V, June 1991.

Evaluation of Delmarva Power & Light Company's Proposed Near-Term Capacity Additions, prepared for the Delaware Public Service Commission, Docket No. 87-9, Phase V, August, 1990.

Evaluation and Recommendations: Delmarva Power & Light Company's Proposed Commercial and Industrial Indoor Lighting Pilot Program, Prepared for the Delaware Public Service Commission, Docket No. 87-9, Phase V, January, 1990.

Preliminary Evaluation of DP&L's Proposed Long Term Purchase of Capacity and Energy from Duquesne Light Company, Prepared for the Delaware Public Service Commission, Docket No. 87-9, Phase IV, January 1990.

Staff Review and Technical Assessment: Challenge 2000 Supply Side Plan, Prepared for the Delaware Public Service Commission, Docket No. 87-9, Phase II, October 1988 (with N.R. Friedman and J. Byrne).

Review and Preliminary Analysis of Rates for the Bordentown Sewerage Authority, Prepared for the Bordentown Citizens' Committee, August 1988.

Evaluation of the Proposed Load Management Program and Accompanying New Rate Schedule R-LM, Prepared for the Delaware Public Service Commission, Docket No. 87-34, January 1988.

Staff Interim Report to the Hearing Examiner, Prepared for the Delaware Public Service Commission, Docket No. 87-9, January 1988, (with J. Byrne, D. Rich, & Y.D. Wang).

Report for the Attorney General of the State of New Mexico: In the Matter of the Application of Gas Company of New Mexico for a Variance to and a Change in General Order No. 44, February 1987 (with R. LeLash and G. Epler).

Determinants of Capital Costs for Coal-Fired Power Plants, prepared for U.S. Energy Information Administration, March 1985 (with J. P. Price and C. J. Koravik).

Trends in Electric Utility Load Duration Curves, prepared for U.S. Energy Information Administration, December 1984. (with J. P. Price)

"Potential 1984 Strike by United Mine Workers of America," Executive Briefing Paper, prepared for U.S. Energy Information Administration, Sept., 1984.

Coal Market Decision - Making: Description and Modeling Implications, prepared for the U.S. Energy Department Information Administration, May 1984 (with J. P. Price).

Power System Load Management Technologies, Energy Department Paper No. 11, World Bank, November 1983 (with J.P. Price).

"Excess Capacity in U.S. Electric Utilities," Geopolitics of Energy, Volume 5, Issue No. 9, September 1983.

Ohio Cogeneration Handbook, prepared for the Ohio Department of Energy, June 1982 (with N. R. Friedman and J. P. Price).

Cogeneration Engineering Handbook, prepared for the California Energy Commission. January 1982 (with N. R. Friedman and J. P. Price).

Third Annual Report: Time of Use Rates for Very Large Customers, Pacific Gas and Electric Company, March 1980 (with R. Levitan).

Residential Peak Load Reduction Program: Implementation Plan, Pacific Gas and Electric Company, January 1980.

"Marginal Cost Adjustment Mechanisms and Rate Design", paper presented to the California Marginal Cost Pricing Project, August 1979.

Effects of Time-of-Day Pricing Under Alternative Assumptions: Three Case Studies, prepared for the U.S. Department of Energy, 1979. (with R. Spann)

Long Run Incremental Cost Analysis and the Development of Time-of-Day Rates for Blue Ridge Electric Membership Corporation, prepared for the North Carolina Utilities Commission, January 1978.

Report on Federally Financed Time-of-Day Rate Experiments for Residential Electric Utility Customers, prepared for the U.S. General Accounting Office, November 1977.

An Empirical Evaluation of the Predatory Theory of Vertical Integration: The Case of Petroleum, (with E. Erickson and R. Spann) prepared for the American Petroleum Institute, October, 1977.

Electric Utility Coal Consumption and Generation Trends, 1976-1985, prepared for the Office of Coal, Federal Energy Administration, October 1976.

Methodology for Improving the Price Sensitivity of the PIES Oil and Gas Supply Curves, prepared for the Federal Energy Administration, February 1976.

Coal Demand for Electricity Generation 1975-1984, prepared for the Office of Coal, Federal Energy Administration, August 1975.

Tanker Requirements for U.S. Waterborne Oil Imports, prepared for the Federal Maritime Administration, September 1973 (with W. Stitt).

Dominion Energy Utah

Docket No. 19-057-02

Current 30-Year U.S. Treasury Yields - September 2019

Month	Day		Yield
Sep	1	Sunday	
Sep	2	Monday	
Sep	3	Tuesday	1.95%
Sep	4	Wednesday	1.97%
Sep	5	Thursday	2.06%
Sep	6	Friday	2.02%
Sep	7	Saturday	
Sep	8	Sunday	
Sep	9	Monday	2.11%
Sep	10	Tuesday	2.19%
Sep	11	Wednesday	2.22%
Sep	12	Thursday	2.22%
Sep	13	Friday	2.37%
Sep	14	Saturday	
Sep	15	Sunday	
Sep	16	Monday	2.31%
Sep	17	Tuesday	2.27%
Sep	18	Wednesday	2.25%
Sep	19	Thursday	2.22%
Sep	20	Friday	2.17%
Sep	21	Saturday	
Sep	22	Sunday	
Sep	23	Monday	2.16%
Sep	24	Tuesday	2.09%
Sep	25	Wednesday	2.18%
Sep	26	Thursday	2.15%
Sep	27	Friday	2.13%
Sep	28	Saturday	
Sep	29	Sunday	
Sep	30	Monday	2.12%
Average			**2.16%**

Source:
https://www.treasury.gov/resource-center/data-chart-center/interest-rates/pages/TextView.aspx?data=yieldYear&year=2019

Dominion Energy Utah

Utah PSC Docket No. 19-057-02

Development of Regulators' Adjustment Factor - Gas Utility Rate Cases

Ln No	Jurisdiction	Utility	Gas/Electric	Docket No.	Date	Proposed ROE	Approved ROE	Difference
1	Arizona	Southwest Gas Corp	Gas	G-01551A- 16-0107	May-16	10.25%	9.40%	0.85%
2	Arkansas	Oklahoma Gas & Electric Co	Gas & Electric	16-052-U	Sep-16	10.25%	9.50%	0.75%
3	Colorado	Atmos Energy Corp	Gas	17AL-0429G	Jun-17	10.50%	9.45%	1.05%
4	Delaware	Delmarva	Gas	17-0978	Aug-17	10.10%	9.70%	0.40%
5	Delaware	Delmarva	Gas	16-650	May-16	10.60%	9.70%	0.90%
6	Dist of Columbia	Washington Gas Light Company	Gas	FC 1137	Feb-16	10.25%	9.25%	1.00%
7	Illinois	Ameren Illinois Co.	Gas	18-0463	Jan-18	10.30%	9.87%	0.43%
8	Kansas	Kansas City Power & Light	Gas & Electric	15-KCPE-116-RTS	Jan-15	10.30%	9.30%	1.00%
9	Maine	Nothern Utilites	Gas	2017-00065	May-17	10.30%	9.50%	0.80%
10	Maryland	Washington Gas Light Company	Gas	Case No. 9605	Apr-19	10.40%	9.70%	0.70%
11	Maryland	Washington Gas Light Company	Gas	Case No. 9481	May-18	10.30%	9.70%	0.60%
12	Massachusetts	Boston Gas, Colonial Gas	Gas	DPU 17-170	Nov-17	10.50%	9.50%	1.00%
13	Nevada	Southwestern Gas Corp	Gas	18-05031	May-18	10.30%	9.25%	1.05%
14	New Hampshire	Northern Utilites	Gas	DG 17-070	Jun-17	10.30%	9.50%	0.80%
15	New Hampshire	EnergyNorth Natural Gas	Gas	DG 17-048	Apr-17	10.30%	9.30%	1.00%
16	New Jersey	Elizabethtown Gas	Gas	GR16090826	Aug-16	10.25%	9.60%	0.65%
17	North Carolina	Piedmont Natural Gas Co, Inc.	Gas	G-9, Sub 743	Apr-19	10.60%	9.70%	0.90%
18	North Carolina	Public Service Company of NC	Gas1/	G-5, Sub 565	Mar-16	10.60%	9.70%	0.90%
19	Oklahoma	CenterPoint Energy - Oklahoma Gas	Gas	PUD201600094	Mar-16	10.30%	10.00%	0.30%
20	Rhode Island	National Grid	Gas2/	4770	Nov-17	10.10%	9.25%	0.85%
21	Texas	CenterPoint Energy Texas Gas	Gas	GUD 10669	Nov-17	10.30%	9.80%	0.50%
22	Texas	CenterPoint Energy Texas Gas	Gas	GUD 10567	Dec-16	10.25%	9.60%	0.65%
23	Virginia	Virginia Natural Gas, Inc.	Gas	PUE-2016-00143	Mar-17	10.25%	9.50%	0.75%
24	Virginia	Washington Gas Light Company	Gas	PUE-2016-00001	Jun-16	Settled - ROE Not Specified		
25	**Average**					**10.33%**	**9.52%**	**0.78%**

1/ **ROE determined through pending settlement.**

2/ Case involved both gas and electric service, however a separate ROE was established by settlement for National Grid's gas service.

Dominion Energy Utah

Utah PSC Docket No. 19-057-02

Correction of Hevert DCF Analysis (Excludes Value Line Estimates)

Constant Growth Discounted Cash Flow Model
30 Day Average Stock Price

Company	Ticker	[1] Annualized Dividend	[2] Average Stock Price	[3] Dividend Yield	[4] Expected Dividend Yield	[5] Zacks Earnings Growth	[6] First Call Earnings Growth	[9] Average Earnings Growth	[10] Low ROE	[11] Mean ROE	[12] High ROE
Atmos Energy Corporation	ATO	$2.10	$101.11	2.08%	2.14%	6.50%	6.45%	6.48%	8.59%	8.62%	8.64%
Chesapeake Utilities Corporation	CPK	$1.62	$92.44	1.75%	1.81%	6.00%	6.00%	6.00%	7.81%	7.81%	7.81%
New Jersey Resources Corporation	NJR	$1.17	$49.40	2.37%	2.45%	7.00%	6.00%	6.50%	8.44%	8.95%	9.45%
Northwest Natural Holding Company	NWN	$1.90	$66.82	2.84%	2.90%	4.50%	4.00%	4.25%	6.90%	7.15%	7.41%
ONE Gas, Inc.	OGS	$2.00	$87.48	2.29%	2.35%	5.90%	5.00%	5.45%	7.34%	7.80%	8.25%
South Jersey Industries, Inc.	SJI	$1.15	$31.97	3.60%	3.72%	7.20%	5.90%	6.55%	9.60%	10.27%	10.93%
Spire Inc.	SR	$2.37	$83.36	2.84%	2.89%	3.80%	2.82%	3.31%	5.70%	6.20%	6.70%
Southwest Gas Corporation	SWX	$2.18	$82.86	2.63%	2.71%	6.20%	6.30%	6.25%	8.91%	8.96%	9.01%
Proxy Group Mean				2.55%	2.62%	5.89%	5.31%	5.60%	7.91%	8.22%	8.52%
Proxy Group Median				2.50%	2.58%	6.10%	5.95%	6.13%	8.12%	8.21%	8.45%

Notes:
[1] Source: Bloomberg Professional
[2] Source: Bloomberg Professional, equals indicated number of trading day average as of May 17, 2019
[3] Equals [1] / [2]
[4] Equals [3] x (1 + 0.5 x [9])
[5] Source: Zacks
[6] Source: Yahoo! Finance
[7] Source: Value Line
[8] Source: Schedule RBH-2, Value Line
[9] Equals Average([5], [6], [7], [8])
[10] Equals [3] x (1 + 0.5 x Minimum([5], [6], [7], [8])) + Minimum([5], [6], [7], [8])
[11] Equals [4] + [9]
[12] Equals [3] x (1 + 0.5 x Maximum([5], [6], [7], [8])) + Maximum([5], [6], [7], [8])

Dominion Energy Utah

Utah PSC Docket No. 19-057-02

Correction of Hevert DCF Analysis (Excludes Value Line Estimates)

Constant Growth Discounted Cash Flow Model
90 Day Average Stock Price

Company	Ticker	[1] Annualized Dividend	[2] Average Stock Price	[3] Dividend Yield	[4] Expected Dividend Yield	[5] Zacks Earnings Growth	[6] First Call Earnings Growth	[9] Average Earnings Growth	[10] Low ROE	[11] Mean ROE	[12] High ROE
Atmos Energy Corporation	ATO	$2.10	$99.20	2.12%	2.19%	6.50%	6.45%	6.48%	8.64%	8.66%	8.69%
Chesapeake Utilities Corporation	CPK	$1.62	$90.61	1.79%	1.84%	6.00%	6.00%	6.00%	7.84%	7.84%	7.84%
New Jersey Resources Corporation	NJR	$1.17	$48.43	2.42%	2.49%	7.00%	6.00%	6.50%	8.49%	8.99%	9.50%
Northwest Natural Holding Company	NWN	$1.90	$64.40	2.95%	3.01%	4.50%	4.00%	4.25%	7.01%	7.26%	7.52%
ONE Gas, Inc.	OGS	$2.00	$85.70	2.33%	2.40%	5.90%	5.00%	5.45%	7.39%	7.85%	8.30%
South Jersey Industries, Inc.	SJI	$1.15	$31.06	3.70%	3.82%	7.20%	5.90%	6.55%	9.71%	10.37%	11.04%
Spire Inc.	SR	$2.37	$80.20	2.96%	3.00%	3.80%	2.82%	3.31%	5.82%	6.31%	6.81%
Southwest Gas Corporation	SWX	$2.18	$81.30	2.68%	2.77%	6.20%	6.30%	6.25%	8.96%	9.02%	9.07%
Proxy Group Mean				2.62%	2.69%	5.89%	5.31%	5.60%	7.98%	8.29%	8.60%
Proxy Group Median				2.55%	2.63%	6.10%	5.95%	6.13%	8.17%	8.25%	8.49%

Notes:
[1] Source: Bloomberg Professional
[2] Source: Bloomberg Professional, equals indicated number of trading day average as of May 17, 2019
[3] Equals [1] / [2]
[4] Equals [3] x (1 + 0.5 x [9])
[5] Source: Zacks
[6] Source: Yahoo! Finance
[7] Source: Value Line
[8] Source: Schedule RBH-2, Value Line
[9] Equals Average([5], [6], [7], [8])
[10] Equals [3] x (1 + 0.5 x Minimum([5], [6], [7], [8])) + Minimum([5], [6], [7], [8])
[11] Equals [4] + [9]
[12] Equals [3] x (1 + 0.5 x Maximum([5], [6], [7], [8])) + Maximum([5], [6], [7], [8])

Dominion Energy Utah

Utah PSC Docket No. 19-057-02

Correction of Hevert DCF Analysis (Excludes Value Line Estimates)

Constant Growth Discounted Cash Flow Model
180 Day Average Stock Price

Company	Ticker	[1] Annualized Dividend	[2] Average Stock Price	[3] Dividend Yield	[4] Expected Dividend Yield	[5] Zacks Earnings Growth	[6] First Call Earnings Growth	[9] Average Earnings Growth	[10] Low ROE	[11] Mean ROE	[12] High ROE
Atmos Energy Corporation	ATO	$2.10	$97.00	2.16%	2.23%	6.50%	6.45%	6.48%	8.68%	8.71%	8.74%
Chesapeake Utilities Corporation	CPK	$1.62	$87.42	1.85%	1.91%	6.00%	6.00%	6.00%	7.91%	7.91%	7.91%
New Jersey Resources Corporation	NJR	$1.17	$47.63	2.46%	2.54%	7.00%	6.00%	6.50%	8.53%	9.04%	9.54%
Northwest Natural Gas Company	NWN	$1.90	$65.43	2.90%	2.97%	4.50%	4.00%	4.25%	6.96%	7.22%	7.47%
ONE Gas, Inc.	OGS	$2.00	$83.74	2.39%	2.45%	5.90%	5.00%	5.45%	7.45%	7.90%	8.36%
South Jersey Industries, Inc.	SJI	$1.15	$31.60	3.64%	3.76%	7.20%	5.90%	6.55%	9.65%	10.31%	10.97%
Spire Inc.	SR	$2.37	$77.74	3.05%	3.10%	3.80%	2.82%	3.31%	5.91%	6.41%	6.91%
Southwest Gas Corporation	SWX	$2.18	$80.58	2.71%	2.79%	6.20%	6.30%	6.25%	8.99%	9.04%	9.09%
Proxy Group Mean				2.65%	2.72%	5.89%	5.31%	5.60%	8.01%	8.32%	8.62%
Proxy Group Median				2.58%	2.66%	6.10%	5.95%	6.13%	8.22%	8.31%	8.55%

Notes:
[1] Source: Bloomberg Professional
[2] Source: Bloomberg Professional, equals indicated number of trading day average as of May 17, 2019
[3] Equals [1] / [2]
[4] Equals [3] x (1 + 0.5 x [9])
[5] Source: Zacks
[6] Source: Yahoo! Finance
[7] Source: Value Line
[8] Source: Schedule RBH-2, Value Line
[9] Equals Average([5], [6], [7], [8])
[10] Equals [3] x (1 + 0.5 x Minimum([5], [6], [7], [8])) + Minimum([5], [6], [7], [8])
[11] Equals [4] + [9]
[12] Equals [3] x (1 + 0.5 x Maximum([5], [6], [7], [8])) + Maximum([5], [6], [7], [8])

Dominion Energy Utah
Case No. 19-057-02

ANGC Cost of Equity - Proxy Group Analyses

DCF Analysis

Ln No	Source of Earnings Growth Estimates	Average Dividend Yield	Dividend Growth Component	Adjusted Dividend Yield	Earnings Growth Rate	Indicated Rate of Return
1	Zacks	2.63%	0.16%	2.79%	6.02%	8.81%
2	CNN	2.63%	0.15%	2.78%	5.81%	8.59%
3	Yahoo	2.63%	0.14%	2.77%	5.23%	7.99%
4	**Average of DCF Result**					**8.46%**
5	**Average Proxy Group DCF Result Adjusted to Reflect Distribution Utility Risk (i.e., Avg less 20 basis points)**					**8.26%**

CAPM and ECAPM Analysis

		30-Year US Treasury Bond Yields *(Risk Free Rate Assumptions)*		
		Current	Near-Term	Average
6	Assumed Risk Free Rate	2.16% 1/	2.45% 2/	
7	Bloomberg DCF Derived Ex-Ante Market Risk Premium	11.26%	11.26%	
8	Bloomberg Proxy Group Average Beta Coefficient	0.573	0.573	
10	CAPM Results	8.61%	8.90%	8.76%
11	ECAPM Results	9.81%	9.86%	9.84%
12	**Average of CAPM and ECAPM Results**			**9.30%**
13	**Average of CAPM and ECAPM Results Adj to Dist Utility Risk**			**9.10%**

Bond Yield Plus Risk Premium Analysis

		Risk-Free Rate	10-Yr Est Risk Premium	Required ROE	
14	**Current US Treasury Bond Yield**	2.16%	7.49%	9.65%	
15	**Near-Term Projected US Treasury Bond Yield**	2.45%	7.45%	9.90%	**9.78%**
16	**Average Unadjusted Results** *(Avg lines 4, 12, and 15)*				9.18%
17	**Average Adjusted Results** *(Avg lines 5, 13, and 15)* 3/				**9.00%**

Estimated ROE Range of Reasonableness

18	High	9.50%
19	Low	8.50%
20	Mid-Point	9.00%

1/ Based on daily average yield for the month of September 2019 as reported on *Treasury Bonds.gov*.
2/ Reflects the July 1, 2019 Blue Chip Near-Term Financial Forecast - Average (Q3:2019 through Q4:2020) adjusted to reflect Federal Reserve September 2019 25 basis point interest rate cut.
3/ Rounded to the nearest tenth of a percent.

Dominion Energy Utah
Case No. 19-057-02

Dividend Yields, Earnings Growth, and Indicated ROE for Proxy Group Companies

Ln No	Company	Ticker	Market Price Per Share[1] High	Low	Average	Indicated Dividend Per Share[1]	Dividend Yield	Projected 5-Year Earnings Growth Zacks[2]	CNN[3]	Yahoo[4]	Dividend Growth Component	Adjusted Dividend Yield	Average Earnings Growth Rate	Indicated Rate of Return	Low	Mean	High
1	Atmos Energy Corp.	**ATO**	$111.58	$ 87.88	$ 99.73	$ 2.10	2.11%	6.67%	6.50%	6.50%	0.14%	2.24%	6.56%	8.80%	8.74%	8.80%	8.92%
2	Chesapeake Utilities Corp	**CPK**	$ 96.27	$ 77.20	$ 86.74	$ 1.62	1.87%	7.00%	7.50%	6.00%	0.13%	2.00%	6.83%	8.83%	7.98%	8.83%	9.51%
3	New Jersey Rescources Corp	**NJR**	$ 51.83	$ 43.51	$ 47.67	$ 1.17	2.45%	7.00%	6.00%	6.00%	0.16%	2.61%	6.33%	8.94%	8.60%	8.94%	9.63%
4	Northwest Natural Gas Co.	**NWN**	$ 73.50	$ 57.20	$ 65.35	$ 1.90	2.91%	4.50%	4.00%	4.00%	0.12%	3.03%	4.17%	7.20%	7.02%	7.20%	7.54%
5	ONE Gas, Inc.	**OGS**	$ 93.04	$ 75.51	$ 84.28	$ 2.00	2.37%	5.85%	5.50%	5.00%	0.13%	2.50%	5.45%	7.95%	7.49%	7.95%	8.36%
6	South Jersey Industires, Inc.	**SJI**	$ 36.72	$ 26.06	$ 31.39	$ 1.15	3.66%	6.57%	6.57%	5.50%	0.23%	3.89%	6.21%	10.10%	9.37%	10.10%	10.47%
7	Southwest Gas Corp.	**SWX**	$ 92.01	$ 72.68	$ 82.35	$ 2.18	2.65%	6.17%	6.00%	6.10%	0.16%	2.81%	6.09%	8.90%	8.81%	8.90%	8.98%
8	Spire Inc.	**SR**	$ 87.13	$ 70.53	$ 78.83	$ 2.37	3.01%	4.41%	4.40%	2.71%	0.12%	3.12%	3.84%	6.96%	5.80%	6.96%	7.55%
9	NiSource	**NI**	$ 30.34	$ 24.19	$ 27.27	$ 0.80	2.93%	5.39%	5.57%	4.66%	0.15%	3.09%	5.21%	8.29%	7.73%	8.29%	8.67%
10	**Proxy Group - Mean**		**$ 80.26**	**$ 63.82**	**$ 72.04**	**$ 1.81**	**2.63%**	**6.02%**	**5.81%**	**5.23%**	**0.15%**	**2.78%**	**5.69%**	**8.46%**	7.98%	**8.46%**	8.87%
11	Proxy Group + NiSource - Mean		$ 74.71	$ 59.42	$ 67.07	$ 1.70	2.73%	5.95%	5.78%	5.16%	0.15%	2.89%	5.63%	8.44%	7.85%	8.44%	8.84%
12	Proxy Group - Median		$ 89.57	$ 71.61	$ 80.59	$ 1.95	2.55%	6.37%	6.00%	5.75%	0.16%	2.71%	6.15%	**8.81%**	8.29%	8.81%	8.95%
13	Proxy Group + NiSource - Median		$ 87.13	$ 70.53	$ 78.83	$ 1.90	2.65%	6.17%	6.00%	5.50%	0.16%	2.81%	6.09%	8.80%	7.98%	8.80%	8.92%

Sources:

[1] From www.Zacks.com 9-3-19
[2] From www.Zacks.com 9-3-19
[3] From www.cnn.com 9-3-19
[4] From www.finance.yahoo.com 9-3-19

Dominion Energy Utah

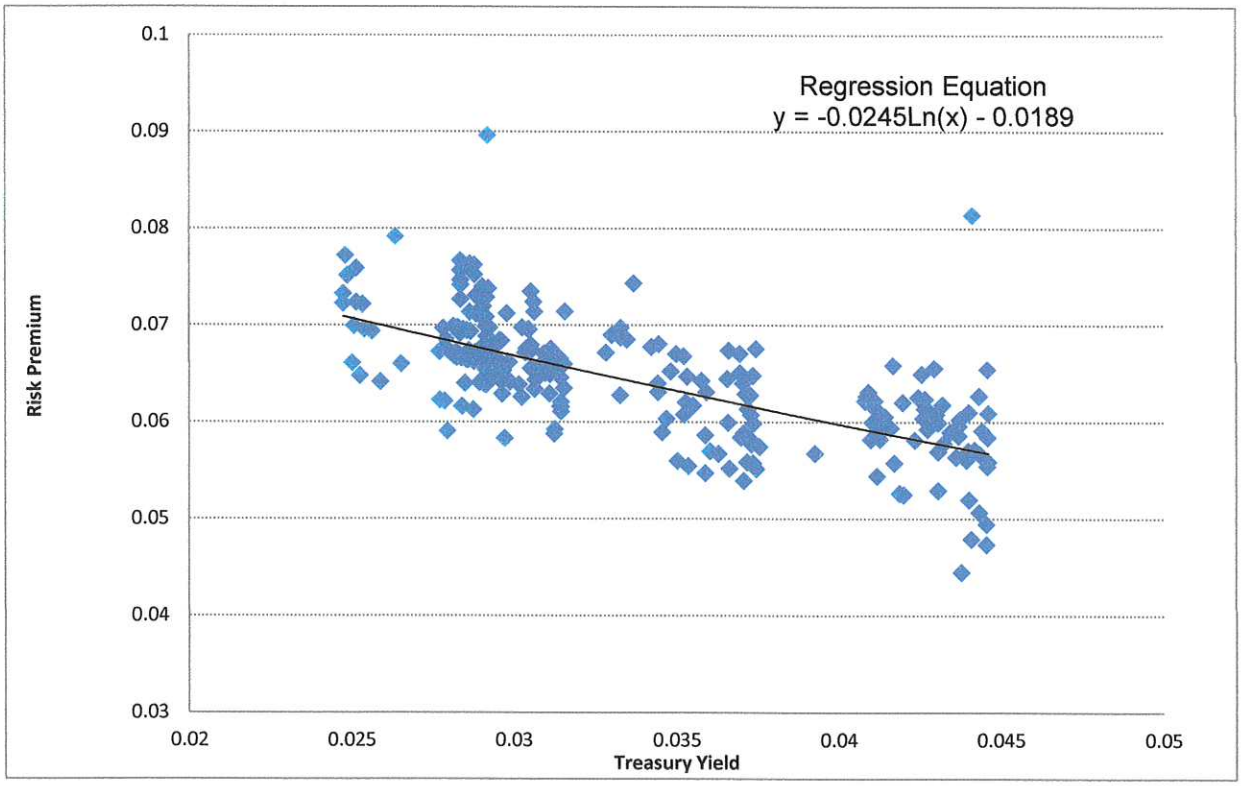
Case No. 19-057-02

Bond Yield Plus Risk Premium Analysis

10-Year Risk Premium Regression

Slope	-0.024471
Intercept	-0.018907
R-Square	0.4679188

	30-Year Treasury Yield	Risk Premium	Return on Equity
Current 30-Year Treasury Bond Yield	2.16%	7.49%	9.65%
Near-Term Projected 30-Year Treasury Bond Yield	2.20%	7.45%	9.65%



Notes:
Current 30-Year US Treasury Yield based on average daily yield for Sep 2019. See Exhibit ANGC 1.01.
Near Term Projected 30-Year Treasury based on average yield projected in July 1, 2018 Blue Chip Financial Forecast for six forward looking quarters (i.e., Q3:2019 through Q4:2020) less an adjustment of 25 basis points for the Federal Reserve September 2019 interest rate cut.

Dominion Energy Utah

Docket No. 19-057-02

Analysis of Revenue Impacts of Alternative Capital Structures and ROEs

ROE and Capital Structure as Proposed by DEU

	Cost Rate	% of Total Capital	Weighted Cost	Inc. Tax Gross-Up Factor	Pre-Tax Weighted Cost of Capital
Common Equity	10.50%	55.0%	5.78%	1.328905	7.67%
Long-Term Debt	4.37%	45.0%	1.97%	1.0000	1.97%
Total			7.74%		9.64%
Rate Base					$ 1,816,213,951
Required Pre-Tax Return on Rate Base					$ 175,099,846
DEU Requested Revenue Increase					$ 19,249,740

Scenario 1

ANGC Recommended ROE and DEU Capital Structure Proposal

	Cost Rate	% of Total Capital	Weighted Cost	Inc. Tax Gross-Up Factor	Pre-Tax Weighted Cost of Capital
Common Equity	9.10%	55.0%	5.01%	1.328905	6.65%
Long-Term Debt	4.37%	45.0%	1.97%	1.0000	1.97%
Total			6.97%		8.62%
Rate Base					$ 1,816,213,951
Required Pre-Tax Return on Rate Base					$ 156,515,313
Change in Required Dollars for Return					$ (18,584,533)
DEU Requested Revenue Increase					$ 19,249,740
Increase after ANGC Adjustment to DEU's Proposed ROE					$ 665,206

Dominion Energy Utah

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Analysis of Revenue Impacts of Alternative Capital Structures and ROEs

Scenario 2

DEU Proposed ROE and ANGC Recommended Capital Structure

	Cost Rate	% of Total Capital	Weighted Cost	Inc. Tax Gross-Up Factor	Pre-Tax Weighted Cost of Capital
Common Equity	10.50%	52.0%	5.46%	1.32890	7.26%
Long-Term Debt	4.37%	48.0%	2.10%	1.00000	2.10%
Total			7.56%		9.35%
Rate Base					$ 1,816,213,951
Required Pre-Tax Return on Rate Base					$ 169,878,139
Change in Required Dollars for Return					$ (5,221,707)
DEU Requested Revenue Increase					$ 19,249,740
Increase after Adjustment to Capital Structure					$ 14,028,033

Scenario 3

ANGC Recommended ROE and Capital Structure

	Cost Rate	% of Total Capital	Weighted Cost	Inc. Tax Gross-Up Factor	Pre-Tax Weighted Cost of Capital
Common Equity	9.50%	52.0%	4.94%	1.32890	6.56%
Long-Term Debt	4.37%	48.0%	2.10%	1.00000	2.10%
Total			7.04%		8.66%
Rate Base					$ 1,816,213,951
Required Pre-Tax Return on Rate Base					$ 157,327,545
Change in Required Dollars for Return					$ (17,772,301)
DEU Requested Revenue Increase					$ 19,249,740
Increase after Adjustments to ROE and Capital Structure					$ 1,477,439

Dominion Energy Utah

Docket No. 19-057-02

Analysis of Revenue Impacts of Alternative Capital Structures and ROEs

Scenario 4

DEU Proposed ROE and 50/50 Capital Structure

	Cost Rate	% of Total Capital	Weighted Cost	Inc. Tax Gross-Up Factor	Pre-Tax Weighted Cost of Capital
Common Equity	10.50%	50.0%	5.25%	1.32890	6.98%
Long-Term Debt	4.37%	50.0%	2.19%	1.00000	2.19%
Total			7.44%		9.16%
Rate Base					$ 1,816,213,951
Required Pre-Tax Return on Rate Base					$ 166,397,001
Change in Required Dollars for Return					$ (8,702,845)
DEU Requested Revenue Increase					$ 19,249,740
Increase after Adjustment to ROE and Capital Structure					$ 10,546,895

Scenario 5

ANGC Recommended ROE and Capital Structure

	Cost Rate	% of Total Capital	Weighted Cost	Inc. Tax Gross-Up Factor	Pre-Tax Weighted Cost of Capital
Common Equity	9.50%	50.0%	4.75%	1.32890	6.31%
Long-Term Debt	4.37%	50.0%	2.19%	1.00000	2.19%
Total			6.94%		8.50%
Rate Base					$ 1,816,213,951
Required Pre-Tax Return on Rate Base					$ 154,329,122
Change in Required Dollars for Return					$ (20,770,724)
DEU Requested Revenue Increase					$ 19,249,740
Increase after Adjustment to ROE and Capital Structure					$ (1,520,984)

Dominion Energy Utah

Docket No. 19-057-02

Analysis of Revenue Impacts of Alternative Capital Structures and ROEs

Scenario 6

DEU ROE and Capital Structure from Docket No. 13-057-05

	Cost Rate	% of Total Capital	Weighted Cost	Inc. Tax Gross-Up Factor	Pre-Tax Weighted Cost of Capital
Common Equity	9.85%	52.0%	5.12%	1.32890	6.81%
Long-Term Debt	4.37%	48.0%	2.10%	1.00000	2.10%
Total			7.22%		8.90%
Rate Base					$ 1,816,213,951
Required Pre-Tax Return on Rate Base					$ 161,720,253
Change in Required Dollars for Return					$ (13,379,593)
DEU Requested Revenue Increase					$ 19,249,740
Increase after Adjustment to ROE and Capital Structure					$ 5,870,147