

**COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION**

In the matter of:	)	
	)	
ELECTRONIC APPLICATION OF	)	Case No. 2026-00099
COLUMBIA GAS OF KENTUCKY, INC.	)	
FOR AN ADJUSTMENT OF RATES;	)	
APPROVAL OF DEPRECIATION STUDY;	)	
APPROVAL OF TARIFF REVISIONS; AND	)	
OTHER RELIEF	)	

**PREPARED REBUTTAL TESTIMONY OF
VINCENT V. REA
ON BEHALF OF COLUMBIA GAS OF KENTUCKY, INC.**

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October 7, 2026

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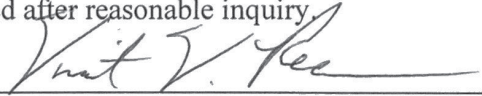
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FOR AN ADJUSTMENT OF RATES;)
APPROVAL OF DEPRECIATION STUDY;)
APPROVAL OF TARIFF REVISIONS; AND)
OTHER RELIEF)

VERIFICATION OF VINCENT V. REA

STATE OF NORTH CAROLINA)

COUNTY OF MOORE)

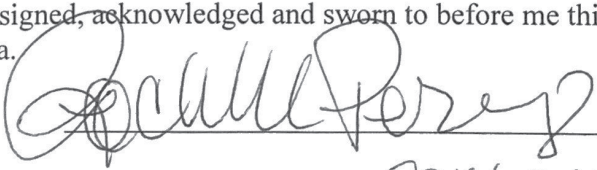
Vincent V. Rea, Managing Director of Regulatory Finance Associates, LLC, being duly sworn, states that he has drafted and/or supervised the preparation of rebuttal testimony in the above-referenced case and that the matters and things set forth therein are true and accurate to the best of his knowledge, information and belief, formed after reasonable inquiry.



Vincent V. Rea

The foregoing Verification was signed, acknowledged and sworn to before me this 10th day of October 2026, by Vincent V. Rea.

Rochelle Perry
NOTARY PUBLIC
Richmond County, NC



Notary Commission No. 2014 31100199

Commission expiration: 11/2/2029

VERIFIED REBUTTAL TESTIMONY OF VINCENT V. REA

TABLE OF CONTENTS

I.	INTRODUCTION AND SUMMARY OF PRINCIPAL CONCLUSIONS.....	2
II.	OVERVIEW OF AG WITNESS ROTHSCHILD’S RECOMMENDATIONS	9
III.	INITIAL REACTIONS TO THE RECOMMENDATIONS OF AG WITNESS ROTHSCHILD	12
IV.	THE COST OF EQUITY RECOMMENDATION OF AG WITNESS ROTHSCHILD WOULD NOT ALLOW COLUMBIA THE OPPORTUNITY TO EARN A FAIR RATE OF RETURN AS COMPARED TO OTHER GAS UTILITY COMPANIES.	22
V.	UPDATE ON U.S. CAPITAL MARKET CONDITIONS AND RECENT FEDERAL RESERVE BOARD POLICY ACTIONS.....	26
VI.	MR. ROTHSCHILD’S DCF METHODOLOGIES ARE FLAWED AND THE RESULTS ARE SIGNIFICANTLY UNDERSTATED	30
VII.	MR. ROTHSCHILD’S CAPM METHODOLOGIES ARE FLAWED AND THE RESULTS ARE SIGNIFICANTLY UNDERSTATED	54
VIII.	MR. ROTHSCHILD’S PROPOSAL TO IMPUTE A HYPOTHETICAL CAPITAL STRUCTURE IS UNSUPPORTED AND WOULD PENALIZE THE COMPANY FOR MAINTAINING A CAPITAL STRUCTURE THAT IS CONSISTENT WITH OTHER GAS UTILITIES BOTH IN KENTUCKY AND NATIONWIDE.	96

I. INTRODUCTION AND SUMMARY OF PRINCIPAL CONCLUSIONS

Q. Please state your name and business address.

A. My name is Vincent V. Rea. My business address is 80 Blake Boulevard, #4572, Pinehurst, NC 28374.

Q. Are you the same Vincent V. Rea who submitted direct testimony in this proceeding?

A. Yes.

Q. What is the purpose of your rebuttal testimony in this proceeding?

A. The purpose of my rebuttal testimony is to respond to the direct testimony of Aaron L. Rothschild, retained by the Kentucky Office of the Attorney General (the "AG") in connection with Columbia's pending request for a base rate adjustment.

Q. Are you sponsoring any attachments to your rebuttal testimony in this proceeding?

A. Yes. I am sponsoring the attachments reflected in Table VVR-1R below, which were prepared under my direction and supervision.

Table VVR-1R Attachments Supporting Rebuttal Testimony	
Attachment	Description
Attachment Rebuttal VVR-1R	No Attachment - Placeholder Only
Attachment Rebuttal VVR-2R	Updated Attachment VVR-2
Attachment Rebuttal VVR-3R	Mr. Rothschild's Option-Implied Growth Estimates for the DCF Model and Option-Implied Betas for the CAPM

Attachment Rebuttal VVR-4R	Correction to Mr. Rothschild's Non-Constant Growth DCF Analysis
Attachment Rebuttal VVR-5R	Updated Attachment VVR-5
Attachment Rebuttal VVR-6R	Updated Attachment VVR-6

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Q. Please provide a summary of the principal conclusions that you have arrived at within your rebuttal testimony.

A. Within this rebuttal testimony, I present arguments and evidence which demonstrate that the analyses and recommendations of AG witness Rothschild are flawed, and should therefore be rejected by the Commission. In this section (Section I) of my rebuttal testimony, I will provide a summary of the most critical disparities and disagreements that I have found between Mr. Rothschild's cost of capital evaluation and my evaluation. In Section II of this rebuttal testimony, I will present a general overview of Mr. Rothschild's cost of equity and capital structure recommendations in this proceeding. In Section III through Section VIII of this rebuttal testimony, I will present a more detailed and comprehensive discussion of the various areas of disagreement between Mr. Rothschild and I as it relates to the implementation of the respective cost of equity analytical models and the appropriate capital structure to reference for ratemaking purposes in this proceeding.

1 To summarize, in forming his recommendations in this proceeding, Mr.
2 Rothschild relied on assumptions, analyses, and conclusions which suffer from a
3 number of critical shortcomings, which I have outlined below:

- 4 • The cost of equity recommendations of AG witness Rothschild do
5 not adequately recognize the increase in long-term capital costs that
6 occurred over the past few years. As I will demonstrate herein, both
7 U.S. Treasury yields and utility bond yields are significantly higher
8 in the current market environment as compared to the time of the
9 Company's last rate proceeding in 2024 (Case No. 2024-00092). This
10 strongly suggests that Columbia's cost of equity is also higher now
11 than at the time of the Company's last base rate proceeding.
12 Notwithstanding the recent upward trend in long-term capital costs,
13 Mr. Rothschild nevertheless recommended a cost of equity that is
14 significantly below the 9.75 percent ROE authorized by the
15 Commission in the Company's 2024 base rate proceeding.
- 16 • Mr. Rothschild's proposed cost of equity of 8.44 percent does not
17 reflect the opportunity cost of capital for utility stock investors,
18 which is demonstrated by the recent national averages of authorized
19 ROEs for gas utilities. For example, during 2025, the national average
20 of authorized ROEs granted to gas utilities in the U.S. was 9.87
21 percent,¹ which is 143 basis points higher than Mr. Rothschild's ROE
22 recommendation of 8.44 percent.² The fact that Mr. Rothschild's cost
23 of equity recommendation is so far removed from both the realities
24 of the U.S. capital markets and the authorized ROE decisions of
25 utility commissions across the U.S. is further demonstrated by the
26 fact that over the past five years (2021-2025), 100 percent of the
27 authorized ROE decisions for gas utilities in the U.S. have been
28 higher than Mr. Rothschild's recommended cost of equity of 8.44
29 percent.³ For these reasons, it is clear that his cost of equity

¹ *Major Energy Rate Case Decisions in the U.S., January-December 2025*, RRA Regulatory Focus, S&P Global, April 2026, at 3.

² In addition, during the first half of 2026 (H1, 2026), the national average of authorized ROEs granted to gas utilities in the U.S. was 9.83 percent, which is 139 basis points higher than Mr. Rothschild's ROE recommendation of 8.44 percent. Source: *Major Energy Rate Case Decisions in the U.S., January-June 2026*, RRA Regulatory Focus, S&P Global, August 2026, at 3.

³ Excludes limited-issue rider cases which are subject to various additional adjustments to the baseline ROE.

1 recommendations in this proceeding are woefully understated and
2 inconsistent with the comparable earnings standard established in
3 *Hope and Bluefield*.

4 Several of Mr. Rothschild's estimates of the Company's cost of equity
5 are grossly understated, as low as 5.35 percent,⁴ which are
6 significantly lower than recent trading yields on "Baa" rated utility
7 bonds (6.26 percent).⁵ These cost of equity estimates reflect a *negative*
8 equity risk premium relative to utility bonds, and would therefore
9 not adequately compensate investors for bearing the higher risks
10 associated with common stock investments.

- 11 • Mr. Rothschild's implementation of the DCF and CAPM models
12 suffer from a number of critical shortcomings. Most notably, he
13 relied on unconventional approaches in conducting his DCF and
14 CAPM analyses, for which he has not provided any evidence
15 demonstrating that his approaches are widely utilized by investors.
16 In this regard, Mr. Rothschild placed excessive emphasis on using
17 stock options trading data as the underlying basis for deriving the
18 required inputs for his analytical models, despite the fact that stock
19 options are predominately used for either hedging purposes or
20 speculative trading purposes, rather than as a direct measurement of
21 the cost of equity. For these reasons, his modeling results are
22 unlikely to reflect the actual return expectations of equity investors.
- 23 • With respect to his constant-growth DCF analysis, Mr. Rothschild
24 placed excessive reliance on the sustainable growth rate
25 methodology, despite the fact that the empirical finance literature
26 demonstrated that the sustainable growth rate method is not as
27 closely correlated to measures of a stock's valuation as compared to
28 other growth measures, such as the EPS growth estimates of equity
29 analysts.

30 Mr. Rothschild's use of "option-implied" growth rates in the
31 constant-growth DCF model suffers from a host of data integrity
32 issues, which I will discuss further herein. Despite the fact that Mr.
33 Rothschild characterizes his option-implied growth rate

⁴ See, Rothschild Direct, at Exhibit ALR-2.

⁵ Source of data: Mergent Bond Record, September 2026 (Volume 92, No. 9) at 17-18. Average trading yield for "Baa" rated long-term utility bonds during August 2026.

1 methodology as appropriately reflecting market data, this is
2 factually incorrect, since most of the input data he has referenced is
3 based on his highly subjective estimation approaches. As a result,
4 his option-implied growth rates and corresponding DCF estimates
5 of the cost of equity are unlikely to reflect the actual growth and
6 return expectations of equity investors and should therefore be
7 rejected by the Commission.

- 8 • Meanwhile, as noted earlier, Mr. Rothschild's CAPM analyses
9 produce estimates of the cost of equity that are vastly understated,
10 as low as 5.35 percent, which are *significantly lower* than recent
11 trading yields on "Baa" rated long-term utility bonds (6.26
12 percent).⁶ This provides clear evidence that components of Mr.
13 Rothschild's CAPM results reflect a *negative* equity risk premium
14 relative to utility bond investments that would not compensate
15 investors for bearing the higher risks associated with common stock
16 investments.

17 Furthermore, as was the case with Mr. Rothschild's use of option-
18 implied growth rates in the DCF model, his use of option-implied
19 beta coefficients and option-implied market risk premium in his
20 CAPM analysis also suffers from data integrity issues. It is
21 noteworthy that Mr. Rothschild cites a 2008 research paper by
22 Christoffersen, Jacobs and Vainberg⁷ as underlying support for his
23 options-implied beta methodology. However, the authors of this
24 paper explicitly state that this beta methodology "allows for the
25 computation of a complete term structure of beta for each company
26 *so long as the options data are available.*"⁸ And yet, as I will demonstrate
27 herein, a significant portion of the required options data for the Gas
28 LDC Group companies was not available due to the lack of active
29 trading activity, which forced Mr. Rothschild to subjectively "fill-in"
30 his estimates of the missing data.

31 Moreover, Mr. Rothschild did not provide any evidence that
32 investors actually utilize option-implied input variables when

⁶ Source of data: Mergent Bond Record, September 2026 (Volume 92, No. 9) at 17-18. Average trading yield for "Baa" rated long-term utility bonds during August 2026.

⁷ Rothschild Direct, at 43, citing to Peter Christoffersen, Kris Jacobs, and Gregory Vainberg, *Forward-Looking Betas* (April 25, 2008), at 24.

⁸ Peter Christoffersen, Kris Jacobs, and Gregory Vainberg, *Forward-Looking Betas* (April 25, 2008), at 24.

1 implementing either the DCF model or the CAPM. When asked in
2 Company Data Request to AG No. 1-5 that he provide copies of any
3 empirical studies that he is aware of that demonstrate that option-
4 implied input variables are widely used by investors in
5 implementing the DCF model or the CAPM, Mr. Rothschild
6 responded: *"I have never claimed that option-implied input variables are*
7 *widely utilized by investors when implementing the DCF model or the*
8 *CAPM"*. Clearly then, as Mr. Rothschild acknowledges, if his option-
9 implied methodologies are not widely utilized by investors, these
10 methodologies cannot possibly have a significant influence on the
11 return expectations of investors, which is essentially an unknown
12 variable that cost of capital witnesses endeavor to estimate or to
13 "infer".
14

- 15 • Mr. Rothschild proposed a cost of equity of 8.44 percent in this
16 proceeding, but his recommendation is contingent upon the
17 adoption of his proposed hypothetical capital structure by the
18 Commission, consisting of 48.39 common equity, 50.38 percent long-
19 term debt, and 1.23 percent short-term debt. To the extent that the
20 Company's proposed capital structure is adopted, Mr. Rothschild
21 instead recommends a cost of equity of 8.27 percent, which
22 according to Mr. Rothschild, incorporates a 0.17 percent capital
23 structure risk adjustment.
- 24 • The Company's proposed equity capitalization ratio in this
25 proceeding is well within the range of: (1) the equity capitalization
26 ratios adopted by the Commission for gas and electric utilities in the
27 Commonwealth in recent years; (2) the recent national averages of
28 equity capitalization ratios adopted for gas utilities across the U.S.;
29 and (3) the average equity capitalization ratios recently adopted for
30 the operating utilities of the Gas LDC Group companies.

31 After reviewing Mr. Rothschild's direct testimony and the various shortcomings
32 identified in his quantitative analyses as noted above, I once again revisited my
33 original cost of equity evaluation and recommendations therein. During this
34 process, I did not come across any new information or evidence that would cause

1 me to revise my original recommendations in his proceeding, which concluded
2 that Columbia's cost of equity is in the range of 10.55 to 11.05 percent, and that,
3 based on the central tendency of the results within this range, a point estimate of
4 10.95 percent is the appropriate cost of equity to reference in this proceeding.

5 **Q. Has the Company revised its proposed weighted average cost of capital and**
6 **overall fair rate of return in this proceeding?**

7 A. Since the time that Columbia filed its case-in-chief on May 20, 2026, the Company
8 completed two additional long-term debt issuances which occurred on June 30,
9 2026 and September 30, 2026, respectively. The interest cost rate for the June
10 issuance was 5.946 percent, which differs from the projected cost rate of 6.50
11 percent that was reflected in the Company's original filing. The interest cost rate
12 for September issuance was 6.6995 percent, which also differs from the projected
13 cost rate of 6.50 percent that was reflected in the Company's original filing. In
14 view of these updated cost rates associated with Columbia's June and September
15 2026 debt issuances, the Company recalculated the Company's overall embedded
16 cost of long-term debt, which reflects no change from Columbia's as-filed cost rate
17 of 5.04 percent. Attachment VVR-5R has also been updated to reflect actual
18 Columbia capital structure data for August 31, 2026. These changes are reflected
19 in the updated versions of Attachment VVR-2, Attachment VVR-5 and Attachment
20 VVR-6 to my direct testimony, which I present herein as Attachment Rebuttal

VVR-2R, Attachment Rebuttal VVR-5R and Attachment Rebuttal VVR-6R, respectively.

II. OVERVIEW OF AG WITNESS ROTHSCHILD'S RECOMMENDATIONS

Q. Please provide an overview of Mr. Rothschild's cost of equity and capital structure recommendations in this proceeding.

A. Mr. Rothschild's overall range estimate of Columbia's cost of equity is between 5.35 percent and 9.61 percent, and he has recommended a 8.44 percent point estimate of the cost of equity, which he maintains is at the 70th percentile of his overall cost of equity results.⁹ Mr. Rothschild further states that his 8.44 percent cost of equity recommendation is based upon his proposed hypothetical capital structure for Columbia in this proceeding, consisting of 48.39 percent common equity, 50.38 percent long-term debt, and 1.23 percent short-term debt.¹⁰ To the extent that the Commission were to adopt the Company's proposed capital structure in this proceeding, Mr. Rothschild suggests that an 8.27 percent cost of equity would be appropriate for Columbia.¹¹

In conducting his cost of equity evaluation, Mr. Rothschild applied a Constant Growth Discounted Cash Flow ("DCF") analysis, a Non-Constant Growth DCF

⁹ Rothschild Direct, at 6-7 and Exhibit ALR-2. Mr. Rothschild further states that his recommended cost of equity range is between 7.70 percent and 8.50 percent, which corresponds to the 60th to 80th percentile of his overall range estimate of Columbia's cost of equity.

¹⁰ Id., at 5.

¹¹ See, Rothschild Exhibit ALR-1

1 analysis, and a Capital Asset Pricing Model (“CAPM”) analysis to his proxy group
2 (the “Rea Gas LDC Group”) of seven publicly-traded gas utility holding
3 companies. In view of the fact that the composition of Mr. Rothschild’s gas proxy
4 group is identical to the gas proxy group that I referenced in my direct testimony
5 (the “Gas LDC Group”), I will refer to this proxy group throughout the remainder
6 of my rebuttal testimony as the “Gas LDC Group”. Based upon his application of
7 the aforementioned analytical models to the market and financial data of the Gas
8 LDC Group companies, Mr. Rothschild’s cost of equity results are as outlined in
9 Table VVR-2R below¹²:

¹² See also Exhibits ALR-1, ALR-2, ALR-3 and ALR-4 to Mr. Rothschild’s direct testimony.

Table VVR-2R AG Witness Rothschild's Cost of Equity Estimates and Recommendations	
Method / Analytical Model	Range of Recommend.
Constant Growth DCF Model	
- Sustainable Growth	9.57% - 9.61%
- Option-Implied Growth	7.78% - 8.44%
Non-Constant Growth DCF Model	8.47% - 8.53%
CAPM ¹³	
- Spot - Risk-Free Rate - 3-Month T-Bill	5.35% - 6.99%
- Spot - Risk-Free Rate - 30-Year T-Bond	6.04% - 7.28%
- 3-Month Weight. Avg - RF Rate - 3-Month T-Bill	5.61% - 6.96%
- 3-Month Weight. Avg - RF Rate - 30-Year T-Bond	6.36% - 7.38%
Overall Range of Estimates	5.35% - 9.61%
Recommend Range (based on percentiles)	7.70% - 8.50%
Cost of Equity Recommendation for Columbia at Rothschild Proposed Capital Structure	8.44%
Cost of Equity Recommendation for Columbia at Company's Proposed Capital Structure	8.27%

1 As reflected in Table VVR-2R above, Mr. Rothschild's evaluation yielded an
2 overall range of cost of equity estimates of between 5.35 percent and 9.61 percent.
3 Within this broader range of overall results, Mr. Rothschild states that his
4 recommended cost of equity range for Columbia is between 7.70 percent and 8.50
5 percent, which corresponds to the 60th to 80th percentile of his overall range of

¹³ In deriving his CAPM range estimate of the cost of equity, Mr. Rothschild evaluated both the 3-month weighted average assumed risk-free rate of return (for the period between April 2026 and June 2026) for both 3-month U.S. Treasury bills and the 30-year U.S. Treasury bond and also referenced "spot" data as of June 30, 2026.

1 results. Mr. Rothschild recommends an 8.44 percent point estimate of the cost of
2 equity for Columbia, which he indicates is at the 70th percentile of his overall range
3 of results. However, he further indicates that this recommendation is based on his
4 proposed hypothetical capital structure for Columbia consisting of 48.39 percent
5 common equity, 50.38 percent long-term debt, and 1.23 percent short-term debt.
6 To the extent that the Commission were to adopt the Company's proposed capital
7 structure in this proceeding, Mr. Rothschild suggests that an 8.27 percent cost of
8 equity would be appropriate for Columbia.

9 **Q. Based on Mr. Rothschild's proposed cost of equity of 8.44 percent and his**
10 **proposed hypothetical capital structure consisting of 48.39 percent common**
11 **equity, 50.38 percent long-term debt, and 1.23 percent short-term debt, what**
12 **weighted average cost of capital and overall fair rate of return has Mr.**
13 **Rothschild proposed in this proceeding?**

14 **A.** As reflected in Exhibit ALR-1, Mr. Rothschild is proposing a weighted average
15 cost of capital and overall fair rate of return of 6.69 percent in this proceeding.¹⁴

16 **III. Initial Reactions to the Recommendations of AG Witness Rothschild**

17 **Q. What are your initial reactions to Mr. Rothschild's cost of equity and capital**
18 **structure recommendations for Columbia in this proceeding?**

¹⁴ Rothschild Direct, at 5 (Table 1) and Exhibit ALR-1.

1 A. Mr. Rothschild's proposed cost of equity recommendation does not even remotely
2 meet established regulatory and judicial standards¹⁵ for determining a fair rate of
3 return in utility rate proceedings. His recommended cost of equity of 8.44 percent
4 falls far outside of the range of the recent national averages of authorized ROEs
5 for gas utilities, which, as noted earlier, was 9.87 percent during calendar-year
6 2025.¹⁶ Based on this data, Mr. Rothschild's cost of equity recommendation is 143
7 basis points below the recent national average of authorized ROEs for gas utilities,
8 and if adopted, would not allow the Company to earn the prevailing opportunity
9 cost of capital. Moreover, Mr. Rothschild's cost of equity recommendation of 8.44
10 percent is 131 basis points lower than Columbia's currently authorized ROE of 9.75
11 percent, which was authorized by the Commission in the Company's 2024 base
12 rate proceeding (Case No. 2024-00092). Lastly, Mr. Rothschild's proposed cost of
13 equity of 8.44 percent does not recognize the significant increase in long-term
14 capital costs that occurred in recent years as I will demonstrate herein.

15 **Q. What other initial reactions do you have to Mr. Rothschild's cost of equity and**
16 **capital structure recommendations in this proceeding?**

¹⁵ *See, Bluefield Water Works and Improvement Company v. Public Service Commission of the State of West Virginia*, 262 U.S. 679, 692 (1923), and *Federal Power Commission et.al. v. Hope Natural Gas Company*, 320 U.S. 591, 603 (1944).

¹⁶ *Major Energy Rate Case Decisions in the U.S., January-December 2025*, RRA Regulatory Focus, S&P Global, April 2026, at 3.

1 A. In forming his cost of equity recommendations, Mr. Rothschild relied on
2 assumptions, analyses and conclusions which suffer from a number of
3 shortcomings and should therefore be rejected by the Commission. First, Mr.
4 Rothschild's implementation of the Constant Growth DCF model is flawed due to
5 the fact that he relied on sustainable growth and option-implied growth rates,
6 which, as I will demonstrate herein, are not widely referenced by investors.
7 Second, Mr. Rothschild's implementation of the CAPM is flawed because he relied
8 on "option-implied" beta coefficients and estimates of the market risk premium
9 that he developed on the basis of relatively obscure research that has not been
10 widely accepted in the investment community or peer-reviewed in the finance
11 literature. As a result, Mr. Rothschild's approach produces estimates of the cost
12 of equity that are highly inconsistent with the estimates produced by the
13 conventional methods of estimation that are widely utilized in utility regulatory
14 proceedings.

15 Third, Mr. Rothschild's option-implied growth rates in his DCF analysis and his
16 option-implied betas in his CAPM analysis are based on incomplete data where it
17 was necessary for Mr. Rothschild to apply his subjective judgment by "filling-in"
18 unavailable data by either interpolating the data or holding the data constant over
19 multiple periods. Fourth, as I will discuss further herein, Mr. Rothschild's
20 recommendation that Columbia should reference a hypothetical capital structure

1 for ratemaking purposes is unsupported. Accordingly, as a result of the
2 aforementioned shortcomings in Mr. Rothschild's cost of equity evaluation, both
3 his model results and his recommendations are woefully understated and should
4 be rejected.

5 **Q. In defending his cost of equity recommendations, Mr. Rothschild presented**
6 **various publications and surveys which suggest that future return expectations**
7 **for U.S. equity securities are lower than historical market returns¹⁷. How do you**
8 **respond to the conclusions drawn within these publications and surveys?**

9 A. My initial reaction to these publications and surveys would be to question the
10 powers of prognostication that are incorporated into these publications,
11 particularly since 100 years of documented U.S. stock market history tells a very
12 different story. In Table 3 (p. 8) in his direct testimony Mr. Rothschild references
13 various publications and surveys which provide predictions of future U.S. equity
14 returns ranging from 5.90 percent to 8.65 percent. In stark contrast to these
15 prognostications, the *Kroll Cost of Capital Navigator* reports that over the past 100
16 years (1926-2025), the historical annual average market return for large-
17 capitalization stocks has been 12.23 percent, which is as much as 633 basis points¹⁸
18 higher than the U.S. market return predictions referenced by Mr. Rothschild. The

¹⁷ Rothschild Direct, at Table 3 (p. 8).

¹⁸ Calculated as follows: 12.23% - 5.90% = 6.33%, or 663 basis points.

1 12.23 percent historical annual average return is the pertinent benchmark value to
2 reference, since over the very long-run (i.e., 100 years), investor expectations are
3 realized, and to my knowledge, there are no particularly compelling reasons to
4 believe that future returns will be significantly lower. This is particularly the case
5 in the view of the rapidly expanding artificial intelligence revolution, which has
6 the potential to significantly bolster U.S. productivity gains and stock market
7 returns well into the distant future. It is further noteworthy that during the more
8 recent 10-year period between 2016-2025, the S&P 500 Index (a proxy for large-
9 capitalization stocks) realized an average annual total return of 15.91 percent,
10 which exceeds the equity market return projections referenced by Mr. Rothschild
11 by as much as 10.01 percentage points (1,001 basis points).¹⁹

12 **Q. Please elaborate further why historical market returns over the long-run (i.e.,**
13 **100 years) provides valuable perspective with regard to the *prospective* return**
14 **expectations of investors.**

15 **A.** Evaluating the historical returns of large-capitalization stocks over the long-run
16 provides an *unbiased* estimate of future market return expectations. This is because
17 these historical returns reflect repeated observations of a variable that has behaved
18 randomly in the past (U.S. stock market returns), and therefore, are devoid of

¹⁹ Calculated as follows: 15.91% - 5.90% = 10.01%, or 1,001 basis points.

1 subjective bias. In contrast, a common thread that runs through the publications
2 and surveys that Mr. Rothschild referenced is *recency bias*, which in this case is the
3 fallacy of concluding that future U.S. equity market returns will be lower simply
4 because recent historical market returns have been more robust by historical
5 standards. There is simply no legitimate basis for making this assumption, as the
6 past 100 years of U.S. stock market history has taught investors otherwise. Indeed,
7 random-walk theory²⁰ demonstrated that U.S. equity returns behave
8 independently of recent historical returns, and, for this reason, using publications
9 and surveys to estimate future market returns is of limited value due to their
10 inherent subjective bias, and are therefore tantamount to crystal ball predictions.

11 **Q. Aside from the impact of recency bias, why do the U.S. equity market return**
12 **projections referenced by Mr. Rothschild likely understate prospective equity**
13 **market returns by a significant margin?**

14 **A.** The publications and surveys that Mr. Rothschild relied on understate prospective
15 market returns because they are based on historical *geometric* average returns,
16 which the finance literature has demonstrated is not an appropriate basis for
17 estimating the cost of equity, which is a forward-looking concept. Geometric

²⁰ As defined by Investopedia, “Random walk theory suggests that changes in stock prices have the same distribution and are independent of each other. Therefore, it assumes the past movement or trend of a stock price or market cannot be used to predict its future movement. In short, random walk theory proclaims that stocks take a random and unpredictable path that makes all methods of predicting stock prices futile in the long run”. *See*, Random Walk Theory Definition and Example (investopedia.com).

1 averages are more useful for reporting past performance on a smoothed basis,
2 meaning that only beginning and ending investment values are considered in the
3 calculation of the geometric average, and not the often volatile journey along the
4 way. For example, Mr. Rothschild referenced a Horizon Actuarial Services, LLC
5 Survey which surveys a number of financial institutions to estimate market returns
6 for purposes of *actuarial calculations for pension plans*.²¹ What Mr. Rothschild fails
7 to mention is that the Horizon survey he referenced clearly states that its U.S.
8 capital markets return assumptions are based entirely on geometric averages
9 rather than arithmetic averages. In this regard, the Horizon survey states the
10 following:

11 the *expected return* of a portfolio is calculated as the weighted
12 average of arithmetic returns, not geometric returns. *This survey*
13 *focuses on geometric returns* (emphasis added).²²

14 Mr. Rothschild also references the J.P. Morgan Asset Management 2026 Long-
15 Term Capital Market Assumptions report and the Charles Schwab 2025 Long-
16 Term Capital Market Expectations report.²³ However, a closer examination of
17 these publications reveals that the expected returns reflected in these reports are
18 based upon geometric averages, which again, the finance literature has
19 demonstrated is an inappropriate basis for estimating the forward-looking cost of

²¹ Rothschild Direct, at Table 3 (p. 8).

²² *Survey of Capital Market Assumptions: 2025 Edition*, Horizon Actuarial Services, LLC (August 2025), at 11.

²³ Rothschild Direct, at Table 3 (p. 8).

1 equity. Multiple academic studies and financial publications²⁴ have made clear
2 that arithmetic mean data is the appropriate data to evaluate when estimating the
3 forward-looking market return and risk premium expectations of investors. This
4 is attributable to the fact that the arithmetic mean is the unbiased estimate of a
5 security's expected future return because it incorporates the variability of
6 historical returns into future return expectations. In contrast, the geometric mean
7 does not incorporate the future variability of equity market returns into the
8 forward-looking expected market return. In fact, the variability of investment
9 returns has been entirely removed from the geometric mean, which provides a
10 "smoothed" growth calculation, and is further illustrated by the fact that the
11 geometric mean invariably has a standard deviation of *zero*.
12 Considering that equity investors would in fact be exposed to potential wide
13 variations in investment returns in the future, these backward-looking geometric
14 average returns are not an appropriate basis for estimating the forward-looking
15 return expectations of utility stock investors. Therefore, Mr. Rothschild's extensive

²⁴ See, Ibbotson Associates, *Stocks, Bonds, Bills, and Inflation, 2005 Yearbook, Valuation Edition*, at 75; Brealey, R., Myers, S., and Allen, P. *Principles of Corporate Finance*, International Edition, New York: McGraw-Hill, 2011, at 159; Bodie, Z., Kane, A., and Marcus, A.J. *Investments*, New York: McGraw-Hill Irwin, 8th ed., 2009, at 126-127; Brigham, E.F. and Ehrhardt, M. *Financial Management: Theory and Practice*, 8th ed., Hinsdale, IL, Dryden Press, 2005; and Bruner, R.F., Eades, K.M., Harris, R.S., and Higgins R.C. "Best Practices in Estimating the Cost of Capital: Survey and Synthesis," *Financial Practice and Education*, Spring/Summer 1998, at 13-28.

1 reliance upon publications and surveys that only reference geometric averages in
2 estimating future market returns is a flawed approach.

3 **Q. Do you have any other concerns regarding the various publications and surveys**
4 **that Mr. Rothschild references in support of his cost of equity recommendations**
5 **as presented in Table 3 (p. 8) of his direct testimony?**

6 A. Yes, I do. Mr. Rothschild's reference to these same types of publications and
7 surveys in previous utility regulatory proceedings has proven to be an unreliable
8 indicator of future U.S. equity market returns. For example, in a 2017 multi-docket
9 water utility proceeding involving four California water utilities (the "2017 Water
10 Proceeding"), Mr. Rothschild included a table in his direct testimony which
11 referenced long-term market return projections from Charles Schwab and the
12 McKinsey Global Institute²⁵. As reflected in Table VVR-3R below, while Mr.
13 Rothschild justified his cost of equity recommendations in the 2017 Water
14 Proceeding on the basis of the 6.60 percent to 8.70 percent projected range of
15 market returns reflected in the Charles Schwab and McKinsey studies, the average
16 annual return of the S&P 500 Index during the nine-year period (2017-2025) after
17 Mr. Rothschild filed his testimony in that proceeding was 16.35 percent, which is

²⁵ Direct Testimony of Aaron Rothschild (Table 6), Application 17-04-001, San Jose Water Company (August 2017).

more than double the midpoint of the market return projections that Mr. Rothschild referenced in the proceeding.

Table VVR-3R Expected U.S. Market Returns Referenced by Mr. Rothschild from Surveys and Studies Presented in Application 17-04-001 (San Jose Water Company)	
Studies and Surveys Referenced vs. Actual Annual Market Index Returns	Projected vs. Actual Annual Returns
Charles Schwab Long-Term Market Return Projections:	-
- U.S. Large Capitalization Stocks	6.70%
- U.S. Small Capitalization Stocks	7.50%
McKinsey Global Institute - Market Return Projections	6.60% - 8.70%
S&P 500 Index - Actual Average Annual Return (2017-2025)	16.35%

Table VVR-3R above demonstrates the significant downward bias inherent in the publications and surveys that Mr. Rothschild referenced in the 2017 Water Proceeding. Therefore, just as these publications and surveys were proven to be an unreliable indicator of future U.S. market returns back in 2017, they continue to be unreliable for purposes of the instant proceeding and should therefore be rejected.

Q. Do recent statements from the Federal Reserve Board support Mr. Rothschild's suggestion that future U.S. economic growth and stock market returns will be lower than the long-run historical averages?

1 A. No, quite the contrary. As noted earlier, the rapidly expanding artificial
2 intelligence revolution has the potential to significantly bolster U.S. productivity
3 growth and stock market returns well into the distant future. Along these lines,
4 Federal Reserve Board Chairman Kevin Warsh made the following keynote
5 remarks at the Fed's recent 2026 Jackson Hole Economic Policy Symposium:

6 With the unchanging picture of the Tetons as our backdrop, we are
7 here to survey an economic landscape that is anything but static. It
8 wasn't so long ago - in the run-up to the crisis of 2008 and over the
9 decade that followed - when economists and policymakers were
10 speaking of secular stagnation and a global saving glut. It was a
11 widely held view that an excess of capital would sit on the sidelines
12 for a long, long time, because there just wouldn't be enough
13 compelling investment opportunities. All the good stuff had been
14 invented. So, growth would be low and slow. Well, times sure have
15 changed. We've come to a hinge point in history. To cite the clearest
16 example, progress in artificial intelligence - the 80-year-old name for
17 the newest technology - has been faster even than its evangelists
18 predicted a couple of years ago. The potential for substantially
19 higher growth is on the rise. Ever-expanding pools of capital are
20 pouring into AI-related infrastructure of all sorts.²⁶

21 Based on Fed Chairman Warsh's recent statements at the Jackson Hole
22 Symposium, it would appear that Mr. Rothschild's outlook for U.S. economic
23 growth and stock market returns may still be mired in an outdated mindset of
24 secular stagnation and a global saving glut.

25 **IV. THE COST OF EQUITY RECOMMENDATION OF AG WITNESS**
26 **ROTHSCHILD WOULD NOT ALLOW COLUMBIA THE OPPORTUNITY TO**

²⁶ *Federal Reserve Board Chairman Kevin Warsh's Keynote Remarks*, Federal Reserve Board 2026 Jackson Hole Economic Policy Symposium (August 28, 2026).

1 **EARN A FAIR RATE OF RETURN AS COMPARED TO OTHER GAS UTILITY**
2 **COMPANIES.**

3 **Q. How does Mr. Rothschild’s cost of equity recommendation of 8.44 percent**
4 **compare to the national averages of authorized ROEs granted to gas utilities**
5 **during 2025 and 2024?**

6 A. Mr. Rothschild’s cost of equity recommendation of 8.44 percent falls significantly
7 below the recent national averages of authorized ROEs for gas utilities, which was
8 9.87 percent during both 2025 and 2024.²⁷

9 **Q. How does Mr. Rothschild’s cost of equity recommendation of 8.44 percent**
10 **compare to the authorized ROEs granted to Kentucky’s gas utilities in recent**
11 **years?**

12 A. The authorized ROEs granted to Kentucky’s gas utilities for the 2024-2026 (year-
13 to-date) period have ranged from 9.75 percent to 9.80 percent and reflect an
14 average value of 9.77 percent. These rate proceedings are identified below:

- 15 • Atmos Energy – 9.75% (Case No. 2024-00276), Order Date: 8-11-2025
- 16 • Columbia Gas – 9.75% (Case No. 2024-00092), Order Date: 12-30-2024
- 17 • Delta Nat. Gas – 9.75% (Case No. 2024-00346), Order Date: 7-1-2025
- 18 • Duke Energy – 9.80% (Case No. 2025-00125), Order Date: 12-23-2025

²⁷ *Major Energy Rate Case Decisions in the U.S. – January-December 2025*, Regulatory Research Associates, S&P Global Market Intelligence, April 2026, at 3.

- LG&E Co. – 9.78% (Case No. 2025-00114), Order Date: 2-16-2026

Q. Are Mr. Rothschild’s cost of equity recommendations consistent with the comparable earnings standard established in *Hope and Bluefield*, or the concept of the opportunity cost of capital?

A. No. Considering that the national average of authorized ROEs for gas utilities was 9.87 percent for both 2025 and 2024, Mr. Rothschild’s recommended cost of equity of 8.44 percent is woefully inconsistent with the comparable earnings standard established in *Hope and Bluefield*.

Q. How would the financial community respond if the Commission authorized an ROE at the level recommended by Mr. Rothschild?

A. If the Commission were to authorize an ROE at the level proposed by Mr. Rothschild, the decision would be met with great concern by the investment community. This is because if Mr. Rothschild’s cost of equity recommendation is adopted, it would fall far below recently authorized ROEs granted to gas utilities nationwide which averaged 9.87 percent during both 2025 and 2024.

It is important to recognize that equity investors derive their return expectations for individual utility stocks on the basis of authorized ROEs of similarly situated utilities in the same regulatory jurisdiction and also nationwide. Therefore, if Mr. Rothschild’s recommendations were adopted, this would create a strong disincentive for investors to commit new investment capital to regulated utilities

1 in Kentucky, since significantly higher returns could be found in other utility
2 stocks with similar risk profiles in other jurisdictions.

3 While the Commission is certainly not bound by the decisions of other state
4 regulatory bodies, it is nonetheless important to recognize that if utilities in
5 Kentucky are offering equity returns which are significantly lower than the returns
6 offered by utilities in other jurisdictions, they will find it increasingly difficult to
7 compete for investor capital with other utilities nationwide. This in turn could
8 jeopardize the utility's ability to make critical infrastructure investments required
9 for safety and reliability purposes, or to do so without a significant impact on its
10 costs, which are ultimately borne by ratepayers. The Company is firmly
11 committed to maintaining a safe, dependable gas distribution system, but it would
12 not be in a position to effectively compete for discretionary capital dollars, whether
13 raised externally or through its affiliate relationship with NiSource, if the cost of
14 equity recommendations of Mr. Rothschild were adopted.

15 Moreover, if Mr. Rothschild's extreme cost of equity recommendations were
16 adopted, this would send a clear message to the financial community that the
17 regulatory climate in Kentucky was no longer fully supportive of maintaining
18 financially sound utilities in the Commonwealth. Ultimately, these adverse
19 consequences would negatively impact Columbia's customers, since the Company
20 must maintain its financial viability in order to finance the necessary infrastructure

1 investments that are essential to providing safe, adequate and reliable gas
2 distribution services to its customers. Indeed, Columbia's customers have a vested
3 interest in the ongoing financial viability of the Company, and for this reason, the
4 interests of Columbia's customers and its shareholders are not mutually exclusive.
5 Clearly, both stakeholders benefit from the maintenance of the financially sound
6 utility.

7 **V. UPDATE ON U.S. CAPITAL MARKET CONDITIONS AND RECENT**
8 **FEDERAL RESERVE BOARD POLICY ACTIONS**

9 **Q. Please provide an update on recent trends in the U.S. capital markets,**
10 **particularly as it relates to the Company's long-term capital costs for purposes**
11 **of the instant proceeding?**

12 **A.** As I discussed at length in my direct testimony,²⁸ it is clear that long-term capital
13 costs have increased significantly in recent years. This is demonstrated by the fact
14 that during 2026 the trading yields for the 10-year U.S. Treasury note and 30-year
15 Treasury bond rose to recent historical high levels as I will discuss further herein.
16 It is further noteworthy that long-term U.S. Treasury and utility bond yields are
17 significantly higher now than levels recorded during the time of the Company's
18 2024 rate proceeding. This strongly suggests that other long-term capital costs,

²⁸ Rea Direct, at 21-23.

1 including Columbia's cost of equity, have also risen significantly since the
2 Company's last base rate proceeding in 2024.

3 **Q. To what extent have long-term interest rates increased since the Company filed**
4 **its last base rate case in 2024 (Case No. 2024-00092)?**

5 A. As reflected in Table VVR-4R below, long-term interest rates in the U.S. continued
6 to trend higher over the past few years and remain higher today than during the
7 period immediately preceding the Company's last rate case filing. Since the first
8 quarter of calendar-year 2024, the average 30-year U.S. Treasury bond yield, which
9 is a proxy for long-term capital costs, increased by 89 basis points, from 4.33
10 percent²⁹ to 5.22 percent³⁰ during August 2026. This upward trend in U.S. Treasury
11 security yields continued through late-September 2026 as the 30-year Treasury
12 bond yield rose to 5.45 percent, its highest level in over 20 years (since 2004).

13 **Q. Have long-term utility bond yields also trended materially higher since the first**
14 **quarter of calendar-year 2024?**

A. Yes. As can also be seen in Table VVR-4R below, the average "A-rated"
long-term utility bond yield increased from 5.53 percent³¹ during the first
quarter of calendar-year 2024 to 6.11 percent³² during August 2026, thus

²⁹ Source of data: www.federalreserve.gov.

³⁰ *Id.*

³¹ Source of data: Mergent Bond Record, September 2026 Edition, at 17-18.

³² *Id.*

reflecting an increase of 58 basis points. During the same period, the average “Baa-rated” long-term utility bond yield increased from 5.77 percent³³ to 6.26 percent³⁴, respectively, reflecting an increase of 49 basis points. This comparative data strongly suggests that other long-term capital costs, including Columbia’s cost of equity, have also risen materially since the Company’s last base rate case filing in 2024.

Table VVR-4R
Changes in Key U.S. Interest Rates – August 2026 vs. Q1, 2024

Time Period	30-Year U.S. Treasury Bond Yield (1)	10-Year U.S. Treasury Bond Yield (1)	Long-Term A Rated Utility Bond Yield (2,3)	Long-Term Baa Rated Utility Bond Yield (2,3)
Key Interest Rates – Q1, 2024 (avg.)	4.33%	4.16%	5.53%	5.77%
Key Interest Rates – August 2026 (avg.)	5.22%	4.68%	6.11%	6.26%
Increase – August 2026 vs. Q1, 2024	+0.89%	+0.52%	+0.58%	+0.49%
Source: (1) www.federalreserve.gov (accessed September 12, 2026) and (2) Mergent Bond Record (September 2026 edition).				

- 1 **Q. What actions did the Fed take during its September 15-16, 2026 Federal Open**
- 2 **Market Committee (FOMC) meeting?**
- 3 **A. During the September 15-16, 2026 FOMC meeting, the Fed elected to raise the**
- 4 **Federal Funds target rate by ¼ percentage point, to the range of 3-3/4 to 4 percent,**

³³ *Id.*

³⁴ *Id.*

1 citing the fact that U.S. inflation remains well-above the Fed's 2 percent targeted
2 level. In the Fed's press release after the September 15-16, 2026 FOMC meeting,
3 the central bank stated the following:

4 The Committee decided to raise the target range for the federal funds
5 rate by 1/4 percentage point to 3-3/4 to 4 percent, in support of the
6 Federal Reserve's dual mandate.

7

8 Economic activity is expanding at a solid pace. While uncertainty
9 remains elevated owing, in part, to geopolitical
10 developments, domestic spending has been resilient. Productivity
11 growth is strong, and capital investment is robust. Job gains have
12 kept pace with the workforce, and the unemployment rate has
13 changed little.

14 Inflation remains elevated. Today's policy action will support a
15 timelier return to the Committee's 2 percent goal. The Committee
16 will deliver price stability.³⁵

17
18 Notably, this was the first time that the Fed raised the Federal Funds target rate
19 since 2023, as the Fed has become increasingly concerned over the stubbornly high
20 U.S. inflation rate, which to a large degree has been driven by higher oil prices as
21 a result of the ongoing U.S. - Iran conflict.

22 **Q. What actions did the Fed take during its July 28-29, 2026 FOMC meeting?**

23 A. During the July 28-29, 2026 FOMC meeting, the Fed elected to keep the Federal
24 Funds Target rate unchanged at 3-1/2 to 3-3/4 percent, citing solid U.S. economic

³⁵ *Federal Reserve Issues FOMC Statement* (September 16, 2026), at 1. Available at:
<https://www.federalreserve.gov/newsevents/pressreleases/monetary20260916a.htm>

1 growth and a strong U.S. employment picture, while also recognizing that
2 inflation remains well-above the Fed's 2 percent targeted level.

3 **VI. MR. ROTHSCILD'S DCF METHODOLOGIES ARE FLAWED AND THE**
4 **RESULTS ARE SIGNIFICANTLY UNDERSTATED**

5 **Q. As a component of his DCF evaluation, Mr. Rothschild relied on the sustainable**
6 **retention growth method in calculating the growth rate component in his**
7 **constant growth DCF analysis. In your judgment, is this a reasonable approach?**

8 **A.** No. The finance literature demonstrates that there are alternative proxies for the
9 growth rate referenced in the constant growth DCF model that are superior to the
10 sustainable retention growth method, including historically based growth rates
11 and the earnings-per-share ("EPS") growth estimates of equity analysts. Among
12 these two superior options, the EPS growth estimates of equity analysts have been
13 determined to be a primary influencing factor on stock valuations. In contrast, the
14 finance literature indicates that the sustainable retention growth method is not as
15 closely correlated to measures of a stock's valuation as compared to the EPS
16 growth estimates of equity analysts. This fact further undermines Mr. Rothschild's
17 suggestion that the sustainable retention growth methodology reflects market
18 expectations. In this regard, in *Modern Regulatory Finance*, Morin makes the
19 following observations:

20 The empirical finance literature discussed earlier demonstrates that
21 the sustainable growth method of determining growth is not as
22 significantly correlated to measures of value, such as stock price and

price/earnings ratios, as other historical growth measures or analysts' growth forecasts. Other proxies for growth, such as historical growth rates and analysts' growth forecasts, outperform retention growth estimates.

....

In summary, there are three proxies for the expected growth component of the DCF model: historical growth rates, analysts' forecasts, and the sustainable growth method....*The retention growth method is the weakest of the three proxies on both conceptual and empirical grounds* (emphasis added).^{36 37}

Q. Can you please elaborate further as to why you believe that the sustainable growth rate technique employed by Mr. Rothschild is flawed?

A. Yes. It is useful to first identify the sustainable growth rate equation, and the key variables or inputs to the equation that are required to derive the sustainable growth rate. The sustainable growth rate equation is shown as reflected below:

$$k_e = \text{Div}_1/P_0 + g$$

where.... $g = br + sv$

and where.... "k_e", is defined as the cost of equity;

"Div₁/P₀", is defined as the dividend yield;

"g", is defined as the dividend growth rate;

"b", is defined as the earnings retention rate;

"r", is defined as the book return on common equity;

³⁶ Roger A. Morin, *Modern Regulatory Finance* (PUR Books, LLC, 2021), at 384.

³⁷ Note that in *Modern Regulatory Finance*, Dr. Morin uses the terms "sustainable growth method" and "retention growth method" interchangeably.

1 "s", is defined as the rate of continuous new stock
2 financing, and....

3
4 "v", is defined as the fraction of funds raised on the sale
5 of stock that increases the book value of the existing
6 shareholders' common equity.

7 What is apparent when reviewing the model inputs into the sustainable growth
8 equation is that the "r" factor, or book return on common equity, is logically
9 circular by its nature. This is because the model requires the analyst to input an
10 assumption as to the expected book return on common equity, when in fact this
11 particular assumption is highly dependent upon the cost of equity that the DCF
12 model is used to estimate. This circular relationship is a fundamental flaw of the
13 sustainable growth methodology. While Mr. Rothschild argues that the "k_e"
14 variable (the market based cost of equity), is not the same variable as "r" (the
15 expected book return on equity),³⁸ this is not accurate because regulatory
16 commissions set the allowed return in utility rate proceedings on the basis of the
17 market-based cost of equity "k_e", which, once applied to a utility's rate base,
18 ultimately is reflected within the book return on common equity "r". Therefore,
19 despite Mr. Rothschild's suggestions to the contrary, the circular relationship
20 remains a fundamental flaw of the sustainable retention growth method.

21 **Q. In his sustainable growth rate DCF analysis, Mr. Rothschild references an "r"**
22 **value, or expected book return on common equity, of 9.10 percent. However, his**

³⁸ Rothschild Direct, at 27-28.

1 **cost of equity recommendation in this proceeding is 8.44 percent. Does the**
2 **disparity between these two values defy logic?**

3 A. Yes. The 9.10 percent expected book return on common equity assumption that
4 Mr. Rothschild has incorporated into his sustainable growth rate calculation
5 exceeds his 8.44 percent overall cost of equity recommendation by a significant
6 margin. In essence, Mr. Rothschild assumed that the Gas LDC Group companies
7 (and by extension Columbia) will continue to earn book ROEs that are significantly
8 higher than the cost of equity that he determined is appropriate for Columbia in
9 this proceeding. This assumption defies logic, since the only practical way for the
10 Gas LDC Group companies to earn book returns in the range of 9.10 percent on a
11 consistent basis going forward is if their allowed returns on equity are also set at
12 9.10 percent or even higher to compensate for cost disallowances and regulatory
13 lag. This further highlights the flawed logic that is incorporated in Mr.
14 Rothschild's sustainable growth DCF analysis and his overall cost of equity
15 recommendation.

16 **Q. Can you identify any additional flaws or challenges in the implementation of**
17 **the sustainable growth rate technique, as employed by Mr. Rothschild?**

18 A. Yes. Implementing the sustainable growth rate technique requires the analyst to
19 estimate what the universe of investors have assumed regarding each of the four
20 variables that are input into the sustainable growth equation. As noted earlier,

1 this includes the “b” factor, defined as the earnings retention rate; the “r” factor,
2 defined as the book return on common equity; the “s” factor, defined as the rate of
3 continuous new stock financing, and the “v” factor, defined as the fraction of funds
4 raised on the sale of stock that increases the book value of the existing
5 shareholders’ common equity. In view of the level of complexity involved in
6 estimating each of these input variables, there exists a significant risk of
7 measurement and forecasting errors, particularly since four separate input
8 variables must be estimated to derive a single growth rate. In contrast, the EPS
9 growth estimates of equity analysts, which Mr. Rothschild chose to ignore in his
10 DCF analyses, provides a single variable estimate of growth, which logic would
11 seem to suggest would be less vulnerable to measurement and forecasting errors.

12 **Q. Mr. Rothschild also relied on his “in-house” proprietary option-implied growth**
13 **estimates within his constant growth DCF model analysis. In your judgment, is**
14 **this an appropriate approach to estimating the growth rate component of the**
15 **Constant Growth DCF model?**

16 **A.** No. Mr. Rothschild did not provide any theoretical or empirical based research
17 supporting the use of option-implied growth rates for purposes of the constant
18 growth DCF model. Moreover, he did not provide any evidence that investors
19 actually utilize option-implied growth rates in deriving their equity return
20 expectations, or that his approach of using option-implied growth rates in the

1 constant growth DCF model has been explicitly adopted by utility regulatory
2 commissions.³⁹ In fact, in response to Columbia's Data Request No. 1-5 to the AG
3 regarding this very matter, Mr. Rothschild stated "*I have never claimed that option-*
4 *implied input variables are widely utilized by investors when implementing the DCF*
5 *model or the CAPM*". Clearly then, as Mr. Rothschild acknowledges, if his option-
6 implied methodologies are not widely utilized by investors, these methodologies
7 cannot possibly have a significant influence on the return expectations of
8 investors, which is essentially an unknown variable that cost of capital witnesses
9 endeavor to estimate or to "infer".

10 Moreover, as I will discuss in my response to Mr. Rothschild's use of option-
11 implied data in his CAPM analysis, even the research paper that he cites in support
12 of his option-implied methodologies indicates that relying upon 180-day option
13 contracts for cost of capital estimation purposes is likely inappropriate.⁴⁰ Lastly, it
14 is particularly noteworthy that the option-implied growth rates that Mr.
15 Rothschild derived are based on incomplete market data where it was necessary
16 for him to apply subjective judgment by "filling-in" unavailable data by either

³⁹ On pages 18-19 of his Direct Testimony, Mr. Rothschild cites to a single case, a California rate proceeding where the California Public Utilities Commission (CPUC) generally found merit in his analyses and the composition of his proxy groups. However, the CPUC does not explicitly state in their rate order that it either supported or adopted the use of option-implied growth rates for purposes of the constant growth DCF model.

⁴⁰ Bo-Young Chang, Peter Christoffersen, Kris Jacobs, and Gregory Vainberg, *Option-Implied Measures of Equity Risk*, Review of Finance (2012) 16, at 391 and 421.

1 interpolating the data or holding the data constant over multiple periods. As a
2 result, this introduces data integrity concerns regarding the input variables that he
3 relied upon in deriving his option-implied growth rates.

4 **Q. Please elaborate further on your findings that the option-implied growth rates**
5 **Mr. Rothschild developed for purposes of his DCF analysis are based on**
6 **incomplete market data where it was necessary for him to apply his subjective**
7 **judgment by “filling-in” unavailable data.**

8 A. Mr. Rothschild’s workpapers⁴¹ indicate that a significant portion of the proxy
9 group data required to develop his option-implied growth rates is unavailable due
10 to limited trading volumes for the stock options of the proxy group companies.
11 This is demonstrated in Attachment Rebuttal VVR-3R, which illustrates the
12 following:

- 13 • Mr. Rothschild’s workpapers indicate that 3 of the 7 companies comprising
14 the Gas LDC Group did not have a sufficient amount of options trading
15 data to reference, which prevented him from deriving option-implied
16 growth rates for either the entire 14-week period that he evaluated, or for
17 multiple weekly periods, forcing Mr. Rothschild to label these data points
18 as “N/A”. These companies include: New Jersey Resources, Northwest
19 Natural Gas, and Southwest Gas Holdings.
20
- 21 • Mr. Rothschild’s workpapers further indicate that in the case of 4 of the 7
22 companies included in the Gas LDC Group, it was necessary for him to “fill-
23 in” a significant number of his option-implied growth rates due to
24 incomplete market data, where Mr. Rothschild either elected to estimate the
25 missing values through interpolation or by simply holding known values

⁴¹ See Mr. Rothschild’s workpaper file “2026.06 - RFC Gas PG Betas - SELECT.xlsx”, “OPTIVA GROWTH” tab.

1 constant over multiple periods. The companies included in this category
2 include: New Jersey Resources, ONE Gas, Spire, Inc. and Southwest Gas
3 Holdings.

- 4
5 • Perhaps the most compelling example of why Mr. Rothschild's option-
6 implied growth rates suffer from data integrity issues is demonstrated in
7 Attachment Rebuttal VVR-3R, which reflects the fact that 10 of the 14 total
8 weekly estimates shown for the Southwest Gas growth rate are *fixed* at 1.19
9 percent, which indicates that due to limited options trading data, it was
10 necessary for Mr. Rothschild to hold the single market-based options
11 trading value that was available as of April 21, 2026 constant for each of the
12 succeeding 10 weekly periods thereafter.
- 13
14 • Lastly, only 2 of the 7 companies in the Gas LDC Group had options trading
15 data available for the entire 14-week period evaluated by Mr. Rothschild.
16 These companies include Atmos Energy and NiSource. This is of particular
17 concern, considering that the other 5 companies in the Gas LDC Group
18 either had very limited options trading data or no options trading data at
19 all. This left Mr. Rothschild with no alternative other than to subjectively
20 estimate a significant number of the DCF growth rates found in his
21 workpapers, which are inappropriately incorporated in his DCF-based
22 estimates of the cost of equity.

23 Therefore, to the extent that the growth rates referenced in Mr. Rothschild's
24 Constant Growth DCF analysis are based on his option-implied growth rate
25 methodology, the limited availability of options trading data for many of the
26 companies included in the Gas LDC Group renders his analysis incomplete, and
27 therefore invalid. Although Mr. Rothschild characterizes his option-implied
28 growth rate methodology as appropriately reflecting market data, this is not
29 correct, since most of the input data he has referenced is actually based on his
30 subjective estimation approaches discussed earlier. As a result, it is highly
31 unlikely that his option-implied growth rates and corresponding DCF estimates

1 of the cost of equity reflect the growth and return expectations of equity investors,
2 and for this reason they should be rejected by the Commission.

3 **Q. Have you identified any other significant shortcomings associated with Mr.**
4 **Rothschild's use of option-implied growth rates in his constant growth DCF**
5 **analysis?**

6 A. Yes. Despite the fact that the constant growth DCF method is conceptually
7 premised upon a long-term or perpetual growth rate extending well into the
8 distant future, Mr. Rothschild's option-implied growth rates are based on options
9 trading data that generally only extend 6-months into the future as based upon the
10 expiration date of the options contracts for the proxy group companies.⁴² For this
11 reason alone, the options trading data referenced by Mr. Rothschild is unlikely to
12 capture the long-term growth and return expectations of equity investors.

13 **Q. Please provide an overview of Mr. Rothschild's Non-Constant Growth DCF**
14 **analysis.**

15 A. Mr. Rothschild's non-constant growth DCF analysis is premised upon an internal
16 rate of return (IRR) calculation that analyzes: (1) an initial cash outflow in 2026
17 reflecting the stock purchase; (2) a relatively short period (2027-2029) of cash
18 inflows reflecting annual dividend payments received; and (3) a final cash inflow
19 reflecting cash proceeds received from the sale of the stock in 2030, which

⁴² See, Exhibit ALR-3 (p. 2) at footnote B.

1 represents the terminal value in Mr. Rothschild's IRR analysis.⁴³ Mr. Rothschild
2 relied on projected data from Value Line for the 2026-2030 forecast period,
3 including forecasted dividends per share ("DPS") and projected book value per
4 share ("BVPS"), and then estimates the terminal value of each individual stock by
5 applying a constant market-to-book (M/B) ratio to the projected BVPS for each of
6 the companies in the Gas LDC Group.⁴⁴ Mr. Rothschild's non-constant growth
7 DCF analysis yields a cost of equity estimate of 8.47 percent based on the end-of-
8 period closing stock price at June 30, 2026, and a 8.53 percent estimate based on
9 the average closing stock price for the year ending June 30, 2026.⁴⁵

10 **Q. Do you have any concerns with the approach that Mr. Rothschild took in**
11 **implementing his non-constant growth DCF analysis?**

12 A. Yes. Mr. Rothschild's non-constant growth DCF analysis only evaluates just three
13 years of discrete dividend payments, and as a result, places a disproportionate
14 weighting on his assumed stock price terminal value in year (5) of his analysis.
15 This observation is of critical importance, because in estimating the terminal value
16 of each individual stock, Mr. Rothschild relied entirely on the approach of
17 applying a constant market-to-book (M/B) ratio to the projected BVPS values
18 reported by Value Line. In my judgment, this approach is flawed because the

⁴³ See, Exhibit ALR-3 (pp. 3-4).

⁴⁴ Id.

⁴⁵ See, Rothschild Direct, at 31, and Exhibit ALR-3 (pp. 3-4).

1 finance literature demonstrated that it is actually the EPS growth estimates of
2 equity analysts that exert the greatest influence on stock valuations, and not BVPS
3 growth rates. Therefore, Mr. Rothschild erred by relying upon projected BVPS
4 growth rates to derive his terminal value stock price assumptions in his analysis.
5 His analysis would have better reflected the return expectations of equity investors
6 had he considered other approaches to developing his stock price terminal value
7 assumptions, such as referencing the consensus EPS growth estimates of equity
8 analysts.

9 **Q. Have you evaluated the degree to which Mr. Rothschild's cost of equity**
10 **estimates under the non-constant growth DCF method would change had he**
11 **more appropriately referenced the EPS growth estimates of equity analysts?**

12 A. Yes, I have. I present this analysis in Rebuttal Attachment VVR-4R, which reflects
13 the same data contained in Mr. Rothschild's Exhibit ALR-3 (pp. 3-4), with one
14 notable exception. Rather than estimating the future terminal value of each
15 individual stock by applying a constant market-to-book (M/B) ratio to the Value
16 Line BVPS projected growth rate, I instead applied Value Line's projected EPS
17 growth rates for each of the Gas LDC Group companies to estimate their respective
18 terminal stock price valuations. As reflected in Rebuttal Attachment VVR-4R, the
19 average 3-5 year EPS growth rate estimate recently reported by Value Line for the
20 Gas LDC Group companies is 7.5 percent, while Mr. Rothschild has referenced an

1 average BVPS growth rate of approximately 5.0 percent. This growth rate
2 disparity has a significant impact on respective estimates of the stock price
3 terminal value for each member of the Gas LDC Group. This results in very
4 different estimates of the cost of equity under the internal rate of return (IRR)
5 methodology used in the non-constant growth DCF approach.

6 As can be seen in Rebuttal Attachment VVR-4R, by appropriately referencing
7 Value Line's EPS growth estimates rather than Value Line's BVPS estimates, the
8 average estimate of the cost of equity for the Gas LDC Group increases from 8.47
9 percent to 10.92 percent based on the end-of-period closing stock price at June 30,
10 2026. Likewise, the average cost of equity estimate for the Gas LDC Group
11 increases from 8.53 percent to 10.97 percent based on the average closing stock
12 price for the year ending June 30, 2026. These results further demonstrate that Mr.
13 Rothschild's cost of equity estimates under his non-constant growth DCF
14 methodology are woefully understated.

15 **Response to Mr. Rothschild's Criticisms of the Company's DCF Analyses**

16 **Q. Mr. Rothschild maintains that your DCF model analysis contradicts your own**
17 **description of the underlying theoretical assumptions of the constant growth**

1 DCF model because you have referenced the EPS growth rate estimates of
2 equity analysts rather than a “sustainable” growth rate.⁴⁶ How do you respond?

3 A. Mr. Rothschild confuses the strict theoretical underpinnings of the constant
4 growth DCF model with the practical implementation of that model in the real
5 world. Substantial empirical research⁴⁷ demonstrates that, among the various
6 growth rate measures that can be utilized in implementing the constant growth
7 DCF model, it is the EPS growth estimates of equity analysts that have the greatest
8 influence over stock valuations, and therefore on the return expectations of
9 investors. It is perplexing why Mr. Rothschild would state in his testimony: “To
10 my knowledge, financial publications do not recommend using EPS growth rates
11 to calculate the cost of equity in a DCF model”.⁴⁸ In fact, as enumerated earlier,
12 this finance literature is widely available to cost of capital witnesses.

⁴⁶ Rothschild Direct, at 68.

⁴⁷ See, e.g., Robert S. Harris, *Using Analysts’ Growth Forecasts to Estimate Shareholder Required Rates of Return*, Financial Management, (Spring 1986), at 59, 66; James H. Vander Weide and William T. Carleton, “Investor Growth Expectations: Analysts vs. History,” The Journal of Portfolio Management (Spring 1988), at 4; Eugene F. Brigham, Dilip K. Shome, and Steve R. Vinson, *The Risk Premium Approach to Measuring a Utility’s Cost of Equity*, Financial Management (Spring 1985), at 36; E.J. Elton, M.J. Gruber and J. Gultekin, “Expectations and Share Prices”, Management Science (September 1981) at 975-981; K.L. Stanley, W.G. Lewellen, and G.G. Schlarbaum, “Further Evidence on the Value of Professional Investment Research”, Journal of Financial Research (Spring 1981), at 1-9; Jing Liu, Doron Nissim and Jacob Thomas, *Equity Valuation Using Multiples*, Journal of Accounting Research, Vol. 40, No. 1, March 2002; Cristi A. Gleason, W. Bruce Johnson, Haidan Li, *Valuation Model Use and the Price Target Performance of Sell-Side Equity Analysts*, Contemporary Accounting Research (Volume 30, Issue 1, Spring 2013); Roger A. Morin, *Modern Regulatory Finance* (PUR Books, LLC, 2021), at 371-372; Stanley B. Block, “A Study of Financial Analysts; Practice and Theory”, *Financial Analysts Journal*, (July-August, 1999), at 88-89 and Bente Villadsen, Michael J. Vilbert, Dan Harris and A. Lawrence Kolbe, *Risk and Return for Regulated Industries*, Academic Press, Elsevier, Inc. (2017), at 99.Id.

⁴⁸ Rothschild Direct, at 13.

1 For example, in *Risk and Return for Regulated Industries*, an authoritative guide on
2 utility cost of capital matters, Villadsen, Vilbert, Harris and Kolbe make clear that
3 the EPS growth estimates of equity analysts are the preferred growth rate estimate
4 for purposes of implementing the constant growth DCF model, where the authors
5 state the following:

6 forecasts of EPS from security analysts are the best available
7 information on forecast growth rates for the DCF model.

8

9 In the constant growth version of the DCF model, the growth rates
10 of dividends, earnings, and the stock price are all expected to be
11 equal and constant.... *In any case, EPS growth is the fundamental*
12 *parameter because dividends are ultimately paid from earnings, so*
13 *dividends cannot grow in the long term at a rate that exceeds EPS growth.*
14 Dividends can grow at a slower rate if the company is reinvesting a
15 larger portion of its earnings, but this sets the stage for an increased
16 rate of dividend growth in the future. (emphasis added).⁴⁹

17 Morin also discusses the propriety of referencing the EPS growth estimates of
18 equity analysts for purposes of the constant growth DCF model in *Modern*
19 *Regulatory Finance*, where he states the following:

20 Since investor growth expectations are the quantities desired in the
21 DCF model, the use of growth forecasts published by investment
22 services merits serious consideration. The growth rates assumed by
23 investors can be determined by a study of the analyses of future
24 earnings and projected long-run growth rates made by the
25 investment community. The anticipated long-run growth rates
26 actually used by institutional investors to determine the desirability
27 of investing in different securities influence investors' growth

⁴⁹ Bente Villadsen, Michael J. Vilbert, Dan Harris and A. Lawrence Kolbe, Risk and Return for Regulated Industries, Academic Press, Elsevier, Inc. (2017), at 99.

1 anticipations. Typically, growth forecasts are in the form of earnings
2 per share over periods ranging from one to 5 years, and are
3 supported by extensive financial analysis.

4 Because of the dominance of institutional investors and their
5 influence on individual investors, analysts' forecasts of long-run
6 growth rates provide a sound basis for estimating required returns.
7 Financial analysts exert a strong influence on the expectations of
8 many investors who do not possess the resources to make their own
9 forecasts, that is, *they are a cause of g.*

10 The use of analysts' forecasts in the DCF model is sometimes
11 denounced on the grounds that it is difficult to forecast earnings and
12 dividends for only one year, let alone for longer time periods. This
13 objection is unfounded, however, because it is present investor
14 expectations that are being priced, *it is the consensus forecast that is*
15 *embedded in price and therefore the required return, and not the future as*
16 *it will turn out to be* (emphasis added).⁵⁰

17 The fact that EPS growth estimates have a strong influence on stock valuations is
18 further demonstrated in a widely referenced article authored by Block which was
19 published in the *Financial Analysts Journal*, wherein professional investment
20 analysts were surveyed. The survey results showed that a company's earnings and
21 cash flow estimates are the factors that are most heavily referenced by investment
22 analysts in forming their stock valuation opinions. More specifically, the article's
23 author concluded the following with regard to the relative importance of
24 dividends:

25 The respondents were also asked to determine the relative importance
26 of other inputs in analyzing securities. Table 6 shows how the survey

⁵⁰ Roger A. Morin, *Modern Regulatory Finance* (PUR Books, LLC, 2021), at 371-372.

1 participants ranked the importance of earnings, cash flow, book value,
2 and dividends.

3 ...

4 Earnings and cash flow are considered far more important than book
5 value and dividends.⁵¹

6 The conclusion drawn from this survey of professional analysts is only logical, as
7 a company's earnings are the very source of both its dividend payments and
8 retained earnings, and for this reason, EPS growth estimates provide a more
9 complete picture of the future growth expectations of investors. Considering that
10 the finance literature clearly demonstrates that the EPS growth estimates of "sell-
11 side" equity analysts have a significant influence on the investment decisions of
12 both institutional and individual investors, they represent the most appropriate
13 measure of expected earnings and dividend growth for purposes of the constant
14 growth DCF model.

15 **Q. Do you agree with Mr. Rothschild's assertion that the EPS consensus growth**
16 **estimates of Wall Street securities analysts are overly optimistic and upwardly**
17 **biased?**

18 **A.** No. As a result of the Self-Regulatory Organization (SRO) reforms implemented
19 during the period between 2002 and 2005, and the Global Analyst Research
20 Settlement (GRAS),⁵² which separated the research and investment banking

⁵¹ Stanley B. Block, "A Study of Financial Analysts; Practice and Theory", *Financial Analysts Journal*, (July-August, 1999), at 88-89.

⁵² *SEC v. Bear, Stearns & Co., Inc.*, No. 03 Civ. 2937, 2003 U.S. Dist. LEXIS 19359 (S.D.N.Y., October 31, 2003).

1 divisions of financial institutions, many of the conflicts-of-interest previously
2 facing sell-side research analysts have now been largely eliminated. Thus, while
3 Mr. Rothschild references several studies which allege that an over-optimism bias
4 still exists, the McKinsey he references from 2010 evaluated time periods prior to
5 the time that the SRO reforms and Global Analyst Research Settlement were
6 implemented. Notably, more recent studies have reached an entirely different
7 conclusion. For example, in a 2009 study conducted by academics at Baruch
8 College and Arizona State University, the study's authors came to the following
9 conclusion with respect to the alleged over-optimism bias:

10 Recent efforts of regulators have helped neutralize analysts' conflict
11 of interest. Analysts tended to make overly optimistic earnings
12 forecasts prior to Regulation FD and the Global Analysts Research
13 Settlement. Regulation FD made analysts less dependent on insider
14 information and, thereby, diminished analysts' motives to inflate
15 their forecasts....

16 ...

17 The Global Settlement had an even bigger impact on analyst
18 behavior. After the Global Settlement, the mean forecast bias
19 declined significantly, whereas the median forecast bias essentially
20 disappeared. These results are not limited to 12 banks covered by
21 the Global Settlement, but are similar for all analysts⁵³.

⁵³ Armen Hovakimian and Ekkachai Saenyasiri, *Conflicts of Interest and Analyst Behavior: Evidence from Recent Changes in Regulation*, April 20, 2009 (available at: <http://ssrn.com/abstract=1133102>).

1 **Q. Are you aware of any other studies that were conducted after the SRO reforms**
2 **and Global Settlement were implemented which indicate that the growth**
3 **estimates of Wall Street analysts are not upwardly biased?**

4 **A. Yes. A 2006 study conducted by Clarke, Ferris, Jayaraman and Lee came to the**
5 **following conclusion:**

6 We fail to find overoptimism in analyst recommendations, including
7 those of affiliated analysts.

8

9 Overall, our results suggest that recently passed legislation to reduce
10 analysts' conflicts of interest might be an overreaction.⁵⁴

11
12 Furthermore, another 2006 study conducted by Yang and Mensah also
13 concluded that Wall Street analyst forecasts were no longer biased towards
14 optimism, stating:

15 The main findings indicate that forecast accuracy improved
16 for both OPC [open-call] and CLC [closed-call] firms compared to
17 the NCC [non-conference-call] firms in the post-Reg. FD [fair
18 disclosure] period. More importantly, the differences in earnings
19 forecast performance between the pre-Reg. FD OPC and CLC firms
20 had disappeared in the post-Reg. FD period.⁵⁵

⁵⁴ Jonathan Clarke, Stephen P. Ferris, Narayanan Jayaraman and Jinsoo Lee, *Are Analyst Recommendations Biased? Evidence from Corporate Bankruptcies*, Journal of Financial and Quantitative Analysis, Volume 41, Issue 1, March 2006, pp. 169-196.

⁵⁵ R. Yang and Y.M. Mensah, *The Effect of the SEC's Regulation Fair Disclosure on Analyst Forecast Attributes*, Journal of Financial Regulation and Compliance, Vol. 14, No. 2, 2006, pp. 192-209.

1 **Q. Mr. Rothschild presents a study by McKinsey and Company which he**
2 **maintains provides evidence that the overoptimism bias of equity analysts**
3 **persists today.⁵⁶ How do you respond?**

4 **A.** As a preliminary matter, I would first point out that the McKinsey study evaluated
5 the 25-year time period between January 1985 and November 2009, and therefore
6 presents data from many decades ago, and cannot possibly speak to whether the
7 alleged over-optimism bias persists today. Moreover, the McKinsey study cited by
8 Mr. Rothschild only evaluated seven years of data (2003-2009) during the period
9 after the Global Settlement was implemented, and during four of those seven years
10 (2003-2006), the EPS growth estimates of equity analysts did in fact prove to be
11 accurate⁵⁷. Although the McKinsey study did conclude that the EPS estimates of
12 equity analysts turned out to be overoptimistic during the 2007-2009 period, this
13 is largely explained by the fact that the U.S. economy was impacted by the collapse
14 of the U.S. housing market, sub-prime mortgage crisis, and financial crisis and
15 Great Recession that ensued thereafter, all during the 2007-2009 period. Therefore,
16 suggesting that the EPS growth estimates of equity analysts were overoptimistic
17 during the 2007-2009 period without also acknowledging the prevailing dynamics

⁵⁶ Rothschild Direct, at 11-12.

⁵⁷ Marc H. Goedhart, Rishi Raj, and Abhishek Saxena, *Equity Analysts: Still Too Bullish* (McKinsey and Company, 2010), at 1.

1 in the U.S. economy and capital markets during the 2007-2009 period, lacks
2 sufficient context to fully inform the reader.

3 Mr. Rothschild further states: “McKinsey & Company continues to advise its
4 clients to be cautious about the reliability of analysts’ forecasts”,⁵⁸ citing a May
5 2022 article from McKinsey.⁵⁹ However, what Mr. Rothschild fails to mention is
6 that this very brief article simply refers back to a previous article published by
7 McKinsey in January 2013, where the authors actually stated that analyst estimates
8 do in fact typically align with reported earnings over the course of the fiscal or
9 calendar year. Specifically, the authors of this research stated the following”

10 analysts’ estimates are typically overoptimistic at the beginning
11 of the financial year, but by the third quarter, it’s reasonable to expect
12 them to fall roughly in line with the eventual *reported earnings* – a
13 pattern borne out by previous research.⁶⁰
14

15 **Q. Mr. Rothschild also cites to an article by Szakmary, Conover, and Lancaster**
16 **published in May 2008 which maintains that Value Line’s three-to-five-year**
17 **projections for earnings and stock returns exhibit a large positive bias.⁶¹ How**
18 **do you respond?**

⁵⁸ Rothschild Direct, at 12.

⁵⁹ David Kohn, Vartika Gupta, Tim Koller and Werner Rehm, *Do Consensus Earnings Accurately Reflect Operating Performance?*, McKinsey & Company (May 16, 2022), at 1.

⁶⁰ Tim Koller, Rishi Raj, and Abhishek Saxena, *Avoiding the Consensus Earnings Trap*, McKinsey & Company (January 2013), at 2.

⁶¹ Rothschild Direct, at 12-13.

1 A. I would note that other studies have come to the opposite conclusion. For
2 example, in a paper by Chatfield, Hein and Moyer, the authors evaluated the
3 accuracy of various approaches to forecasting the earnings growth rates of electric
4 utilities for purposes of regulatory proceedings and concluded that Value Line's
5 long-term earnings forecasts are a superior option for cost of capital estimation
6 purposes in utility rate cases.

7 This paper integrates research on the accuracy of alternative long-
8 term earnings forecasts, the gain in accuracy achievable from
9 combining various forecasts, and the power of different long-term
10 earnings forecasts to explain stock prices. The tests are performed
11 on 82 electric utility firms because of the relative homogeneity of
12 accounting data in that industry and because of the importance of
13 the findings for the determination of the cost of capital in a
14 regulatory proceeding. The results are consistent with earlier
15 research findings that analyst forecasts of long-term earnings growth
16 are more accurate than forecasts from extrapolative models....
17 Finally, valuation tests of alternative forecasting techniques offered
18 strong evidence that investors place the greatest weight on forecasts
19 from Value Line.

20 The valuation tests of the alternative forecasting techniques
21 provided strong evidence that investors place the greatest weight on
22 the forecasts provided by Value Line, rather than on the slightly
23 more accurate implied growth rate forecasts. This result may be
24 explained by the broad availability of Value Line forecasts, and the
25 fact that many earlier research studies have found Value Line to be
26 more accurate than alternative forecasting methods.⁶²

⁶² Robert E. Chatfield, Scott E. Hein, and R. Charles Moyer, *Long-Term Earnings Forecasts in the Electric Utility Industry: Accuracy and Valuation Implications*, The Financial Review (August 1990) at 421 and 438.

1 Therefore, although some analysts may continue to debate whether an over-
2 optimism bias persists among equity analysts, the primary focus for purposes of
3 the instant proceeding is whether an over-optimism bias actually exists with
4 respect to regulated utilities, and in particular, gas utilities. Notably, not a single
5 one of the studies referenced by Mr. Rothschild specifically evaluated whether the
6 so-called over-optimism bias actually applies to regulated utilities. In fact, logic
7 dictates that it is highly unlikely that a significant level of over-optimism bias
8 exists with respect to the earnings estimates for regulated utilities, since a utility's
9 earnings growth is largely constrained by the cost of service ratemaking process.

10 **Q. Mr. Rothschild criticizes the fact that you eliminated outlier estimates of the**
11 **cost of equity in your DCF analyses, noting that the Commission previously**
12 **cautioned against *unreasonably* removing or ignoring outlier data.⁶³ How do**
13 **you respond?**

14 **A.** I disagree. In my DCF analysis of the Gas LDC Group, which is the core proxy
15 group upon which I base my cost of equity recommendations, I eliminated just
16 one outlier estimate, a cost of equity estimate for Southwest Gas Holdings of
17 *negative* -20.0 percent, based on historical growth rate data reported by Value
18 Line. Despite Mr. Rothschild objections, in my judgment, it is unlikely that the
19 Commission would view the removal of a negative -20.0 percent cost of equity

⁶³ Rothschild Direct, at 68-69.

1 estimate as *unreasonably* removing outlier data, since a rational investor would
2 not likely commit investment capital to a utility stock investment that is projected
3 to generate significant negative returns in the future.

4 Regarding the complementary proxy groups referenced in my evaluation, I
5 removed outlier estimates of the cost of the equity of as low as 5.90 percent for
6 Avista Corp.⁶⁴ in the Combination Utility Group, and 4.30 percent for Home
7 Depot Inc.⁶⁵ in the Non-Regulated Group. Considering that these cost of equity
8 estimates are lower than recent trading yields on long-term utility bonds (6.26
9 percent)⁶⁶ which have a substantially lower risk profile than utility stocks, I do
10 not agree that removing these outlier estimates rises to the level of *unreasonably*
11 removing outlier data.

12 **Q. Mr. Rothschild maintains that your flotation cost adjustments are not justified**
13 **because the issuance costs you referenced were incurred by NiSource rather**
14 **than by Columbia. How do you respond?**

15 A. I disagree. As an operating subsidiary of NiSource, Columbia does not directly
16 issue common equity in the public markets, and like the rest of NiSource's utility
17 subsidiaries, the Company receives its equity financing from its parent company.

⁶⁴ *See*, Rea Direct, at Attachment VVR-8 (p. 2).

⁶⁵ *Id.*, at Attachment VVR-9 (p. 1).

⁶⁶ *See*, Section V of Rea Rebuttal, Update on U.S. Capital Market Conditions (Table VVR-4R). For example, during August 2026, the average "Baa-rated" long-term utility bond yield was 6.26 percent.

1 Nevertheless, this does not justify Mr. Rothschild's position, which is essentially
2 that Columbia should be deprived of recovering a "return on" the flotation costs
3 incurred by NiSource on the Company's behalf. Doing so would deprive
4 investors, who provided the necessary capital to NiSource to support its utility
5 subsidiary operations, an opportunity to earn a fair return on their *entire*
6 investment. The finance literature provides useful guidance on the matter of
7 flotation costs in those circumstances where a utility's equity capital is obtained
8 from the parent holding company, as follows:

9 Some controversies have surfaced regarding the flotation cost
10 allowance. The first is the contention that a flotation allowance is
11 inappropriate if the utility is a subsidiary whose equity capital is
12 obtained from its parent. This objection is unfounded since the
13 parent-subsidiary relationship does not eliminate the costs of a new
14 issue but merely transfers them to the parent. It would be unfair and
15 discriminatory to subject parent shareholders to dilution while
16 individual shareholders are absolved from such dilution. Fair
17 treatment must consider that if the utility subsidiary had gone to the
18 capital marketplace directly, flotation costs would have been
19 incurred.⁶⁷

20 Mr. Rothschild further asserts that because the common stock of gas utility
21 companies are currently trading at a market price above book value, this raises the
22 average book value per share, which in turn somehow "*makes selling new common*
23 *stock a net profit center rather than a contributor to costs*".⁶⁸ In this regard, Mr.

⁶⁷ Morin, Roger A., *Modern Regulatory Finance*, PUR Books LLC (2021), at 340.

⁶⁸ Rothschild Direct, at 79.

1 Rothschild would appear to confuse the financing activities of gas utilities with
2 the operating activities of gas utilities. Nevertheless, as I stated at length in my
3 direct testimony,⁶⁹ only the net proceeds from an equity issuance can be invested
4 in a utility's rate base, and therefore the amount invested by equity investors
5 which funds flotation costs will never earn a fair return for those investors unless
6 an appropriate adjustment is made to the cost of equity. This is why, in my
7 judgment, my proposed flotation cost adjustment of 4 basis points in this
8 proceeding is well-supported.

9 **VII. MR. ROTHSCILD'S CAPM METHODOLOGIES ARE FLAWED AND THE**
10 **RESULTS ARE SIGNIFICANTLY UNDERSTATED**

11 **Q. Please provide an overview of Mr. Rothschild's CAPM analysis.**

12 **A.** Mr. Rothschild presents two versions of his CAPM analysis, the first with 3-month
13 weighted average values (for the period between April 2026 and June 2026) for his
14 CAPM input variables, and the second with spot values as of June 30, 2026. Within
15 the two versions of his CAPM analyses, Mr. Rothschild references both a risk-free
16 rate of return based on the 3-month U.S. Treasury bill, and a risk-free rate that is
17 based on the 30-year U.S. Treasury bond. Mr. Rothschild then develops his own
18 "option-implied" forward betas and option implied market risk premiums on the
19 basis of a single research paper published in 2012, which I will discuss further

⁶⁹ Rea Direct, at Appendix C.

herein. Mr. Rothschild also evaluated a “historical blend” of beta values in his analysis, which places a 50 percent weighting on his beta regression analysis that evaluated a six-month period, a 30 percent weighting on his regression analysis that evaluated a two-year period, and 20 percent weighting on this regression analysis that evaluated a five-year period. Based upon the above approaches, Mr. Rothschild’s CAPM analyses produce cost of equity estimates that range from between 5.35 percent and 7.38 percent.⁷⁰ The results of Mr. Rothschild’s CAPM analyses are summarized in Table VVR-5R below.

Table VVR-5R Results of Mr. Rothschild’s CAPM Analyses	
Method / Analytical Model	Range of Recommendations
3-Month Weighted Average	
3-Month Treasury Bill (Rf rate)	5.61% - 6.96%
30-Year Treasury Bond (Rf rate)	6.36% - 7.38%
Spot (November 30, 2024)	
3-Month Treasury Bill (Rf rate)	5.35% - 6.99%
30-Year Treasury Bond (Rf rate)	6.04% - 7.28%

Q. What critical shortcomings did you identify in Mr. Rothschild’s CAPM analysis?

A. The critical shortcomings that I identified include: (1) relying upon the 3-month U.S. Treasury bill yield as a proxy for the risk-free rate of return, which is not a

⁷⁰ See, Rothschild Direct, at 48-49 and Exhibit ALR-2.

1 proper approach; (2) relying upon his “in-house” proprietary beta coefficient
2 calculations, which are woefully inconsistent with the widely referenced betas
3 published by Value Line, and which place an unusually heavy weighting (50
4 percent) on stock return observations for just a 6-month period; (3) relying upon a
5 calculation methodology for his “option-implied” betas which is based on the
6 research of a single group of researchers who themselves have raised doubts
7 concerning the suitability of referencing option-implied betas for cost of capital
8 estimation purposes;⁷¹ and (4) relying upon option-implied betas that Mr.
9 Rothschild developed on the basis of incomplete market data, where it was
10 necessary for him to “fill-in” unavailable data by either interpolating the data or
11 holding the data constant over multiple periods, which introduces significant data
12 integrity concerns.

13 **Q. In his CAPM analysis, Mr. Rothschild relied on the 3-month U.S. Treasury bill**
14 **yield as a proxy for the risk-free rate of return. Is this a proper approach?**

15 A. No. From a duration or tenor standpoint, the 30-year U.S. Treasury bond most
16 closely parallels the investment characteristics of common stocks, since both are
17 considered long-term, if not permanent, capital. Furthermore, 30-year Treasury
18 yields, like common stocks, reflect the long-term inflation expectations of

⁷¹ Bo-Young Chang, Peter Christoffersen, Kris Jacobs, and Gregory Vainberg, Option-Implied Measures of Equity Risk, *Review of Finance* (2012) 16, at 391 and 421.

1 investors, and are subject to less volatility than shorter-dated Treasury securities.
2 Therefore, Mr. Rothschild's use of the 3-month Treasury bill as a proxy for the risk-
3 free rate of return is inappropriate and has further contributed to the downward
4 bias in his CAPM analyses.

5 **Mr. Rothschild's Historical Beta Coefficients**

6 **Q. Do you agree with Mr. Rothschild's approach of using "in-house" historical**
7 **beta coefficient calculations in his CAPM analyses?**

8 A. No. In contrast to the beta coefficients reported by Value Line, Mr. Rothschild's
9 proprietary in-house beta coefficients are not widely disseminated to a broad
10 universe of investors, and for this reason, his calculated betas have limited, if any,
11 influence on the return expectations of equity investors.

12 **Q. Do the in-house historical beta coefficients that Mr. Rothschild calculated**
13 **reflect a reasonably consistent range of beta estimates?**

14 A. No. As reflected in Exhibit ALR-4 (p. 3), Mr. Rothschild's calculated beta estimates
15 reflect an extremely wide range of outcomes, with a beta estimate of as low as 0.15
16 in his historical 6-month evaluation and a beta estimate as high as 0.64 in his
17 historical 5-year evaluation. The wide disparity in these estimates calls into
18 question the accuracy and reliability of Mr. Rothschild's historical beta
19 calculations, because the high-end and low-end of his range of estimates would
20 produce vastly different estimates of the cost of equity under the CAPM.

1 **Q. In view of the wide disparity in Mr. Rothschild's historical beta estimates and**
2 **the fact that his 6-month estimates are at the bottom of his overall range of**
3 **results, was it appropriate for Mr. Rothschild to place a 50 percent weighting⁷²**
4 **on his unusually low 6-month beta estimates?**

5 **A. No.** First, it was not appropriate for Mr. Rothschild to significantly overweight the
6 lowest beta estimates within his overall range of estimates. This is clearly evident
7 in Exhibit ALR-4 (p. 3), which reflects the fact that Mr. Rothschild's average beta
8 estimate for the historical 6-month period is just 0.252, while his historical 2-year,
9 historical 5-year and option-implied forward betas are 0.483, 0.632 and 0.598,
10 respectively. Second, placing a 50 percent weighting on stock return data that only
11 covers a 6-month historical period is not of adequate duration, as it does not
12 capture a long enough period of historical observations to reliably conduct a
13 regression analysis for purposes of calculating a beta coefficient. This time horizon
14 is simply not long enough to sufficiently smooth out any temporary market
15 anomalies. This is illustrated by the fact that seven out of fourteen of Mr.
16 Rothschild's weekly beta estimates under his 6-month approach range from just
17 0.15 to 0.19, while his overall fourteen-week average beta coefficient is just 0.252.⁷³

⁷² Note that among his historical based beta estimates, Mr. Rothschild places a 50 percent weighting on his 6-month historical beta estimates. However, when Mr. Rothschild combines his historical beta estimates with his options-implied forward beta estimates, his 6-month historical beta estimates receive a 25 percent weighting.

⁷³ See, Rothschild Direct, at Exhibit ALR-4 (p.3).

1 These beta estimates are not even remotely comparable to the average beta
2 coefficients reported by Value Line for the Gas LDC Group, which is presently
3 0.77.⁷⁴ This disparity clearly calls into question the accuracy and reliability of the
4 in-house historical beta coefficients that Mr. Rothschild has calculated.

5 **Q. What relative weightings did Mr. Rothschild apply to his proprietary historical**
6 **beta coefficients for his two-year and five-year historical period analyses and**
7 **what are his overall “historical blended” beta estimate results?**

8 A. As reflected in Exhibit ALR-4 (p.3), Mr. Rothschild placed a 30 percent weighting
9 on his two-year historical period analysis, which produced an overall fourteen-
10 week average beta of 0.483. He also placed a 20 percent weighting on his five-year
11 historical period analysis, which produced an overall fourteen-week average beta
12 of 0.632. Based on the above results, which includes his six-month period results,
13 Mr. Rothschild has determined that his overall “historical blended” beta estimates
14 are 0.34 on a “spot” basis and 0.37 on a weighted basis.⁷⁵ Once again, these beta
15 estimates are not comparable to the historically derived average beta coefficients
16 currently reported by Value Line for the Gas LDC Group, which is currently 0.77.
17 In view of the fact that Value Line’s beta coefficients are widely referenced by the
18 investment community while Mr. Rothschild’s in-house betas are not, it is clear

⁷⁴ Source of data: *Value Line Ratings & Reports* (August 21, 2026).

⁷⁵ See. Rothschild Direct, at Exhibit ALR-4 (pp. 1, 3 and 5).

1 that Mr. Rothschild's use of his historical blended beta coefficients further
2 contributes to the significant downward bias in his CAPM-based estimates of the
3 cost of equity.

4 **Mr. Rothschild's "Option-Implied" Beta Coefficients**

5 **Q. Mr. Rothschild relies upon "option-implied" betas in his CAPM analysis which**
6 **he calculated in-house, and which differ significantly from the widely**
7 **disseminated beta coefficients reported by Value Line. Do you agree with Mr.**
8 **Rothschild's approach of attempting to calculate option-implied betas?**

9 **A.** No. Mr. Rothschild's "option-implied" betas are subject to a number of
10 shortcomings which render his CAPM analysis unreliable, including: (1) reliance
11 upon spot market data for a single trading day in each week that Mr. Rothschild
12 evaluated,⁷⁶ which exposes Mr. Rothschild's beta estimates to the vagaries and
13 day-to-day volatility of the financial markets; (2) referencing option contracts with
14 expiration dates of 180 days (6 months) or less, which do not likely reflect the
15 longer-term return expectations of investors; (3) relying upon option-implied beta
16 estimates that have been developed on the basis of incomplete market data, where
17 it was necessary for Mr. Rothschild to "fill-in" unavailable data by either
18 subjectively interpolating the data between two points, or simply holding the data
19 constant over multiple periods; and (4) placing a heavy reliance upon a beta

⁷⁶ See, Rothschild Direct, at 42.

1 calculation methodology that involves a series of complicated calculations and
2 subjective input assumptions⁷⁷ which is a process that the vast majority of
3 investors will not engage in, particularly in view of the fact that beta coefficients
4 are already widely circulated by various investment information providers, such
5 as Value Line and Bloomberg.

6 **Q. Do you have concerns with Mr. Rothschild's approach of using spot market data**
7 **to calculate his option-implied betas?**

8 A. Yes. Mr. Rothschild's calculation of his option-implied betas is dependent upon
9 options data for a *single trading day* in each of the fourteen weeks that he
10 evaluated.⁷⁸ Therefore, the use of spot market data for just one day each week
11 causes Mr. Rothschild's analysis to be subject to the vagaries and day-to-day
12 volatility of the financial markets, which can result in significant disparities in Mr.
13 Rothschild's beta estimates over a short period of time. For example, as reflected
14 in Exhibit ALR-4 (p.3), Mr. Rothschild's option-implied beta estimate for March
15 31, 2026 is 0.45 and just ten weeks later on June 9, 2026 is 0.73, which again, would
16 result in significantly different estimates of the cost of equity when implementing
17 the CAPM. This strongly suggests that the particular day selected by Mr.
18 Rothschild in calculating his option-implied betas can have a significant impact on

⁷⁷ See, Rothschild Direct, at 41-45.

⁷⁸ See, Exhibit ALR-4 (p. 3).

1 his beta estimates. This very fact is acknowledged in the research paper authored
2 by Chang, Christoffersen, Jacobs and Vainberg (“Chang et al. (2012)”) which Mr.
3 Rothschild references as the primary support for his approach of calculating
4 option-implied betas. In this research paper, the study’s authors point out that
5 their beta calculation methodology could potentially be improved if more data
6 points were referenced in the development of the beta estimates. Specifically, the
7 authors made the following observations:

8 The three case studies also illustrate that the forward-looking betas
9 contain a certain amount of high-frequency noise when estimated from
10 only one day of options data. We could reduce this noise by estimating
11 the forward-looking betas using several days of options. However, in
12 order to be as transparent as possible all the forward-looking betas
13 below are estimated using just one day of options data.

14

15 We compute option-implied moments and betas using option prices on a
16 given day. While this is the most obvious and transparent initial approach
17 to investigating the method’s merits, the performance of the option-implied
18 betas may be improved by adjusting these betas using a predetermined
19 rule, or by smoothing betas and/or moments using information extracted
20 from option prices on other days. The optimal use and optimal smoothing
21 of information contained in option prices is certainly worthy of further
22 study⁷⁹.
23

24 As noted above, the paper’s authors acknowledged that relying upon option
25 contracts for a single trading day may not produce consistently reliable beta

⁷⁹ Bo-Young Chang, Peter Christoffersen, Kris Jacobs, and Gregory Vainberg, Option-Implied Measures of Equity Risk, *Review of Finance* (2012) 16; at 409 and 421.

1 estimates. As noted earlier, this is readily apparent in Mr. Rothschild's forward
2 beta estimates as shown in Exhibit ALR-4, page 3.

3 In a previous regulatory proceeding where Mr. Rothschild used the same
4 approach in deriving his option-implied betas, the disparities in his beta estimates
5 were even more pronounced. In *Montana-Dakota Utilities Co.*⁸⁰, Mr. Rothschild
6 derived an option-implied beta of 0.65 for the September 29, 2020 trading day,
7 while *just one week later*, on October 6, 2020, his beta estimate had fallen to 0.29.
8 Therefore, over the course of just one week, Mr. Rothschild's beta estimate
9 decreased by 0.36, more than one-half of his previous week's estimate. I
10 summarized these noted disparities in Mr. Rothschild's forward beta estimates in
11 Table VVR-6R below.

⁸⁰ Direct Testimony of Aaron L. Rothschild (Schedule ALR-4, p. 3), Montana-Dakota Utilities Co., Case No. PU-20-379.

Table VVR-6R Variability of Beta Estimates Produced by Mr. Rothschild's Option-Implied Beta Calculation Methodology		
Case No. 2026-00099, Columbia Gas of Kentucky	Estimate Date: March 31, 2026	Estimate Date: June 9, 2026
Forward Beta Estimate	0.45	0.73
Case No. PU-20-379, Montana-Dakota Utilities	Estimate Date: Sept. 29, 2020	Estimate Date: Oct. 6, 2020
Forward Beta Estimate	0.65	0.29

In either of these two examples shown in Table VVR-6R, the inconsistent and volatile nature of Mr. Rothschild's beta estimates would result in significant fluctuations in his CAPM derived cost of equity estimates.

Q. Do you have any concerns relating to Mr. Rothschild's use of options with expiration dates of 180 days (6 months)?

A. Yes. It should be noted that in the Chang et al. (2012) research paper, the authors acknowledge that options liquidity is the most robust within 30-90 days of an option's expiration date, which suggests that Mr. Rothschild's approach of relying upon options with 180 days (6 months) remaining until the expiration date may in fact not provide the most reliable pricing information. However, at the same time, it should also be noted that referencing options with 180-day (6-month) expiration dates is not likely to adequately capture the longer-term risk and return

1 expectations of equity investors. Regarding these two particular concerns, the
2 study's authors noted the following:

3 The choice of a 180-day horizon is to some extent based on the trade-off
4 between option liquidity that is largest for options with 30-90 days to
5 maturity and the relevant horizon for firm risk, which is arguably
6 considerably longer.

7

8 The main focus in this paper has been on forecasting 180-day ex-post
9 betas, which are relevant for certain applications such as abnormal
10 returns. *For other applications, such as cost of capital calculations, longer-*
11 *horizon betas may be needed.* We plan to investigate the performance of
12 option implied betas in this context by using long-term equity
13 anticipation securities as well as option contracts with longer maturities
14 traded on non-U.S. markets (emphasis added)⁸¹.

15 Therefore, based on the conclusions reached in the Chang et al. (2012) research
16 paper, it is apparent that relying upon 180-day option contracts for cost of capital
17 estimation purposes is inappropriate, notwithstanding Mr. Rothschild's
18 suggestions to the contrary. While the options contracts that Mr. Rothschild relied
19 upon only reflect investors' expectations for approximately the next six months,
20 the pertinent time horizon to evaluate for purposes of utility regulatory
21 proceedings is the rate-effective period, which is typically much longer than six
22 months. Therefore, considering that Mr. Rothschild's option-implied betas only
23 reflect options data for the next six months, his beta estimates are not based on a

⁸¹ Bo-Young Chang, Peter Christoffersen, Kris Jacobs, and Gregory Vainberg, Option-Implied Measures of Equity Risk, *Review of Finance* (2012) 16, at 391 and 421.

1 forecast horizon that reflects the typical rate-effective period after a utility rate
2 proceeding is completed. This further undermines the validity of Mr. Rothschild's
3 option-implied beta estimates and ultimately his CAPM estimates of the cost of
4 equity.

5 **Q. Please elaborate further on your findings that the option-implied betas Mr.**
6 **Rothschild developed for purposes of his CAPM analysis are based on**
7 **incomplete market data where it was necessary for him to apply his subjective**
8 **judgment by "filling-in" unavailable data.**

9 **A.** As was the case with Mr. Rothschild's option-implied growth rates in his DCF
10 analysis, his workpapers⁸² once again indicate that a significant portion of the
11 proxy group company data required to develop his option-implied betas is simply
12 unavailable due to limited trading volumes. This is demonstrated in Attachment
13 Rebuttal VVR-3R, which confirms the following:

- 14 • Mr. Rothschild's workpapers indicate that 3 of the 7 companies comprising
15 the Gas LDC Group did not have a sufficient amount of options trading
16 data to reference, which prevented him from deriving option-implied betas
17 for either the entire 14-week period that he evaluated, or otherwise for
18 multiple weekly periods, forcing Mr. Rothschild to label these data points
19 as "N/A". These companies include: New Jersey Resources, Northwest
20 Natural Gas, and Southwest Gas Holdings.
21
- 22 • Mr. Rothschild's workpapers further indicate that in the case of 4 of the 7
23 companies included in the Gas LDC Group, it was necessary for him to "fill-

⁸² See Mr. Rothschild's workpaper file labeled "2026.06 – RFC Gas PG Betas – SELECT.xlsx, OPTIVA BETAS tab (lines 23-42).

1 in" a significant number of beta estimates due to incomplete options trading
2 data. In these cases, Mr. Rothschild either elected to estimate the missing
3 values through linear interpolation or by simply holding known values
4 constant over multiple time periods. The companies included in this
5 category include: New Jersey Resources, ONE Gas, Spire, Inc., and
6 Southwest Gas Holdings. The beta estimates for these companies are *not*
7 based on actual market data but are instead based on Mr. Rothschild's
8 application of his subjective judgment either through interpolation or by
9 holding a single known value constant over multiple subsequent weekly
10 periods.

- 11
12 • Perhaps the most compelling example of why Mr. Rothschild's option-
13 implied betas suffer from data integrity issues are illustrated by the data
14 presented for Southwest Gas Holdings in Attachment Rebuttal VVR-3R. As
15 can be seen in this attachment, 10 out of the 14 total weekly beta estimates
16 for Southwest Gas Holdings were held constant at 0.3477 for the period
17 between April 28, 2026 and June 30, 2026. This demonstrates that due to
18 limited options trading data, it was necessary for Mr. Rothschild to hold the
19 single value that was actually available on April 21, 2026 constant for each
20 of the succeeding 10 weeks thereafter. Once again, it is important to
21 recognize that 10 of the 14 beta estimates derived by Mr. Rothschild for
22 Southwest Gas Holdings are in fact *not* based on actual market data but are
23 instead based on Mr. Rothschild's application of his subjective judgment by
24 holding a single known value constant over the 10 succeeding weekly
25 periods.
- 26
27 • Lastly, it is further notable that only 2 of the 7 companies in the Gas LDC
28 Group had options trading data available for the entire 14-week period
29 evaluated by Mr. Rothschild. These companies include Atmos Energy and
30 NiSource. In other words, the other 5 companies in the Gas LDC Group
31 had either limited options trading data or no options trading data at all.
32 This left Mr. Rothschild with no alternative other than to subjectively
33 estimate a significant number of the beta values found in his workpapers,
34 which have been inappropriately incorporated into his CAPM-based
35 estimates of the cost of equity.

36 To summarize, to the extent that the betas referenced in Mr. Rothschild's CAPM
37 analyses are based on his option-implied beta methodology, it is clear that the

1 limited availability of options trading data for five of the seven companies
2 comprising the Gas LDC Group raises data integrity concerns, and as result, this
3 renders his analysis unreliable.

4 **Q. Have you identified any other shortcomings associated with the methodology**
5 **that Mr. Rothschild has relied upon in calculating his option-implied beta**
6 **estimates?**

7 A. Yes. The Chang et al. (2012) research paper made clear that the tests the authors
8 conducted to validate their option-implied beta methodology determined that
9 their beta estimates performed better for higher beta stocks. Since utility stocks
10 are typically lower beta stocks as compared to the overall U.S. equity market, this
11 further suggests that the beta calculation methodology employed by Mr.
12 Rothschild may in fact have limited applicability to utility stocks. This is further
13 borne out by the fact that the study's authors indicated that the betas developed
14 for other business sectors, other than the utility industry, performed better in the
15 various validation tests that were conducted by the authors. Specifically, the
16 authors made the following observations:

17 The mean *ex post* beta variable is significant in two of three option-
18 implied beta cases, suggesting that *option-implied beta perform better*
19 *for higher beta stocks.*

20

21 The improvements provided by option-implied and hybrid betas
22 differ across sectors. For the industrials, consumer discretionary,
23 materials and IT sectors, they perform well. Their performance is

1 generally weaker for the consumer staples and health care
2 industries.

3

4 The results across industries largely confirm the findings from Table
5 IV: the option-implied betas perform best for the materials,
6 industrials, and consumer discretionary sectors (emphasis added)⁸³.

7
8 Notably, in Table IV of the Chang et al. (2012) study, the performance of the utility
9 sector was shown to be very similar to the performance of the consumer staples
10 and health care industries, which were the weakest performing industries,
11 particularly for the 180-day realized beta comparison.

12 **Q. What method did Mr. Rothschild use to calculate the market risk premium?**

13 A. To calculate the market risk premium, Mr. Rothschild used essentially the same
14 approach he used to calculate his forward betas but instead used options data for
15 the S&P 500 Index, as based upon both weighted data for the three-month period
16 between April 2026 and June 2026, and spot data as of June 30, 2026. Mr.
17 Rothschild's weighted analysis yielded option-implied market risk premium
18 estimates of 4.95 percent (3-month Treasury bill approach) and 3.76 percent (30-
19 year Treasury bond approach), while his spot analysis yielded option-implied

⁸³ Bo-Young Chang, Peter Christoffersen, Kris Jacobs, and Gregory Vainberg, Option-Implied Measures of Equity Risk, *Review of Finance* (2012) 16, at 417 and 418.

1 market risk premium estimates of 4.35 percent (3-month Treasury bill approach)
2 and 3.31 percent (30-year Treasury bond approach).⁸⁴

3 **Q. Are Mr. Rothschild's market risk premium estimates susceptible to the same**
4 **shortcomings you identified earlier with respect to his forward beta estimates?**

5 A. Yes. Both the weighted and spot market risk premiums that Mr. Rothschild
6 developed are calculated using options contracts data for the S&P 500 Index. To
7 determine the weighted average of the term structure of option-implied volatility
8 and skewness, Mr. Rothschild evaluated options contracts that expire up to 61
9 months into the future. Nevertheless, he gave the most weight to option contracts
10 with an expiration period of 12 months.⁸⁵ Notably, Mr. Rothschild's market risk
11 premium estimates rely upon options data for only a single trading day in each of
12 the weeks he evaluated, which, as noted earlier, leaves his risk premium estimates
13 vulnerable to the day-to-day volatility of the financial markets.

14 **Q. Have the results of Mr. Rothschild's option-implied market risk premium**
15 **estimates been relatively stable over time, thereby providing assurance that**

⁸⁴ See, Rothschild Direct, at 46-47 and Exhibit ALR-4 (pp. 4 and 6).

⁸⁵ Id., at 47.

1 **they are of sufficient accuracy and reliability to be used for ratemaking**
2 **purposes in a utility rate proceeding?**

3 A. No. As discussed earlier, Mr. Rothschild's estimates of the option-implied market
4 risk premium are susceptible to the day-to-day volatility of the financial markets,
5 and this is borne out by comparing his previous estimates of the market risk
6 premium to his current estimates in the instant proceeding. Although the market
7 risk premium is dynamic and has historically demonstrated an inverse
8 relationship with long-term U.S. Treasury bond yields, the finance literature⁸⁶
9 demonstrates that, on average, the market risk premium will only change by about
10 one-half of the amount that long-term interest rates change, but in the opposite
11 direction.⁸⁷ It is therefore notable that in recent years, Mr. Rothschild's calculations
12 of the option-implied market risk premium have changed by significantly more
13 than would be expected as indicated by the finance literature. For example, I
14 present two tables below that were included in Mr. Rothschild's direct testimony

⁸⁶ See, Robert S. Harris, "Using Analysts' Growth Forecasts to Estimate Shareholder Required Rates of Return," Financial Management, (Spring 1986), at 58-67; Robert S. Harris and F. Marston, "Estimating Shareholder Risk Premia Using Analysts' Growth Forecasts," Financial Management, 21 (Summer 1992), at 63-70; Farris M. Maddox, Donna T. Pippert and Rodney N. Sullivan, "An Empirical Study of Ex Ante Risk Premiums for the Electric Utility Industry," Financial Management, 24 (Autumn 1995), at 89-95.

⁸⁷ As reflected in the preceding footnote, a number of academic studies have demonstrated an inverse relationship between the market risk premium and government interest rates. Specifically, these studies found that when government interest rates change by 100 basis points in either direction, the equity risk premium will change by between 37 and 75 basis points in the opposite direction, and therefore, a 50-basis point "inverse relationship" assumption provides a reasonable basis for estimating the prevailing market risk premium based on current government interest rates (i.e.. U.S. Treasury security yields).

in a regulatory proceeding from 2021 involving Connecticut Light & Power (“CL&P”),⁸⁸ which is an electric utility operating subsidiary of Eversource Energy

**TABLE 10: CAPITAL ASSET PRICING MODEL (CAPM) - INDICATED COST OF EQUITY
WEIGHTED - All Inputs Weighted From January 2021 to March 2021**

	<u>3-Month Treasury Bill</u>		<u>30-Year Treasury Bond</u>	
	Hybrid Beta	Forward Beta	Hybrid Beta	Forward Beta
Risk-Free Rate	0.04%	0.04%	2.20%	2.20%
Beta	0.59	0.58	0.59	0.58
Risk Premium	10.29%	10.29%	8.14%	8.14%
CAPM	6.15%	5.97%	7.02%	6.88%

**TABLE 11: CAPITAL ASSET PRICING MODEL (CAPM) - INDICATED COST OF EQUITY (SPOT)
SPOT - All Inputs Based on Last Available Data as of March 31, 2021**

	<u>3-Month Treasury Bill</u>		<u>30-Year Treasury Bond</u>	
	Hybrid Beta	Forward Beta	Hybrid Beta	Forward Beta
Risk-Free Rate	0.03%	0.03%	2.41%	2.41%
Beta	0.63	0.62	0.63	0.62
Risk Premium	9.62%	9.62%	7.24%	7.24%
CAPM	6.10%	5.98%	6.98%	6.89%

As reflected in the above two tables, Mr. Rothschild’s estimates of the option-implied market risk premium in CL&P’s 2021 proceeding (Docket No. 17-12-

⁸⁸ Direct Testimony of Aaron L. Rothschild, Cost of Capital, On Behalf of The Connecticut Public Utilities Regulatory Authority’s Office of Education, Outreach, and Enforcement, Docket No. 17-12-03RE11 (April 26, 2021), at 76-77.

03RE11) ranged from 7.24 percent to 10.29 percent, and for all four estimates provided, demonstrates a central tendency of approximately 8.80 percent.

For comparative purposes, I also present below Table 6 and Table 7 that are presented in Mr. Rothschild's direct testimony (p. 48) in the instant proceeding.

TABLE 6: CAPITAL ASSET PRICING MODEL (CAPM) - INDICATED COST OF EQUITY WEIGHTED - All Inputs Weighted From April to June 2026				
	<u>3-Month Treasury Bill</u>		<u>30-Year Treasury Bond</u>	
	<u>Hist. Blended Beta</u>	<u>Forward Beta</u>	<u>Hist. Blended Beta</u>	<u>Forward Beta</u>
Risk-Free Rate	3.76%	3.76%	4.95%	4.95%
Beta	0.37	0.65	0.37	0.65
Risk Premium	4.95%	4.95%	3.76%	3.76%
CAPM	5.61%	6.96%	6.36%	7.38%

TABLE 7: CAPITAL ASSET PRICING MODEL (CAPM) - INDICATED COST OF EQUITY (SPOT) SPOT - All Inputs Based on Last Available Data as of June 30, 2026				
	<u>3-Month Treasury Bill</u>		<u>30-Year Treasury Bond</u>	
	<u>Hist. Blended Beta</u>	<u>Forward Beta</u>	<u>Hist. Blended Beta</u>	<u>Forward Beta</u>
Risk-Free Rate	3.87%	3.87%	4.91%	4.91%
Beta	0.34	0.72	0.34	0.72
Risk Premium	4.35%	4.35%	3.31%	3.31%
CAPM	5.35%	6.99%	6.04%	7.28%

As reflected in the above two tables, Mr. Rothschild's estimates of the option-implied market risk premium in the instant proceeding range from 3.31 percent to 4.95 percent, and for all four estimates provided demonstrates a central tendency of approximately 4.10 percent.

1 **Q. What conclusions have you drawn after comparing Mr. Rothschild's option-**
2 **implied market risk premium estimates from CL&P's 2021 proceeding versus**
3 **his estimates in the instant proceeding?**

4 A. As reflected in the four tables above, the central tendency of Mr. Rothschild's
5 option-implied market risk premium estimates declined from 8.80 percent in
6 CL&P's 2021 proceeding to just 4.10 percent in the instant proceeding, thus
7 reflecting an astonishing decrease of 4.70 percentage points. This represents a 53.4
8 percent decrease in his average estimate of the option-implied market risk
9 premium. To test the validity of this dramatic downward change in Mr.
10 Rothschild's estimated option-implied market risk premium, I first evaluated the
11 change in the 30-year U.S. Treasury bond yield that occurred between CL&P's 2021
12 proceeding and the instant proceeding, which I determined by reviewing Mr.
13 Rothschild's 30-year Treasury bond yield assumptions presented in the far right
14 columns of the four tables above. On this basis, I determined that the central
15 tendency of Mr. Rothschild's 30-year Treasury bond yield assumptions increased
16 from 2.31 percent in CL&P's 2021 proceeding to 4.93 percent in the instant
17 proceeding, reflecting an increase in the 30-year Treasury bond yield of 2.62
18 percent. As noted earlier, the finance literature has demonstrated that the market
19 risk premium would be expected to change by approximately one-half of the

1 amount of the change in the 30-year Treasury bond yield, but in the opposite
2 direction.

3 It is therefore reasonable to expect that since Mr. Rothschild's 30-year Treasury
4 bond yield assumption *increased* by 2.62 percent, his market risk premium
5 assumption would *decrease* by approximately one-half of that amount, or 1.31
6 percent. However, as noted earlier, in stark contrast, Mr. Rothschild's estimate of
7 the option-implied market risk premium actually decreased by 4.70 percentage
8 points, which is more than 3.5x times the amount that would be expected to occur
9 as indicated by the empirical finance literature. Clearly then, Mr. Rothschild's
10 estimates of the option-implied market risk premium in this proceeding do not
11 comport with the empirical finance literature and are therefore woefully
12 understated. This is further demonstrated by the fact that the central tendency of
13 Mr. Rothschild's estimate of the market risk premium in this proceeding, which is
14 4.10 percent, is 3.27 percentage points lower than the 100-year (1926-2025)
15 historical annual average market risk premium of 7.37 percent.⁸⁹ It simply defies
16 logic to conclude that, although equity investors have become accustomed to a
17 market risk premium in the range of 7.00 percent to 7.50 percent over the past 100
18 years, now suddenly, based upon Mr. Rothschild's option-implied methodologies,
19 investors are willing to accept a market risk premium of just 4.10 percent.

⁸⁹ Source of data: Kroll Cost of Capital Navigator.

1 Q. In your opinion, was it appropriate for Mr. Rothschild to place a heavy emphasis
2 on the beta and market risk premium estimates he derived on the basis of the
3 Chang et al. (2012) research paper?

4 A. No. The conclusions arrived at in the Chang et al. (2012) research paper can hardly
5 be interpreted as a ringing endorsement of the option-implied beta methodology
6 for purposes of cost of capital estimation, and particularly not for utility
7 companies. In their closing remarks, the authors made clear that their option-
8 implied beta methodology was still a work in progress. Most notably, the authors
9 concluded the following:

10 *Much remains to be done.* The computation of the option-implied beta
11 uses moments extracted from options data. While we have made full
12 use of recent innovations in the implementation of these procedures,
13 and added some innovations ourselves, *it may be that the out-of-sample*
14 *performance of the option-implied betas can be improved through more efficient*
15 *estimation of moments.*

16

17 Also, we have not provided an explanation for the relatively poor
18 performance of option-implied betas for stocks with very small *ex post*
19 betas, and *the differences in performance across industries also merit further*
20 *investigation (emphasis added)*⁹⁰.

21
22 Therefore, considering that the authors themselves considered their beta
23 methodology to still be a work in progress, Mr. Rothschild should not have placed
24 a heavy reliance upon this methodology in conducting his CAPM analyses, as it

⁹⁰ Bo-Young Chang, Peter Christoffersen, Kris Jacobs, and Gregory Vainberg, *Option-Implied Measures of Equity Risk*, Review of Finance (2012) 16, at 420.

1 remains an unproven methodology. This is also demonstrated by the fact that Mr.
2 Rothschild did not provide any evidence that more updated research that has been
3 completed supporting his options-implied methodologies where other finance
4 academics have since expanded upon the work of the Chang, Christoffersen,
5 Jacobs and Vainberg.

6 **Response to Mr. Rothschild's Criticisms of the Company's CAPM Analysis**

7 **Q. Mr. Rothschild maintains that you should not have referenced the 30-year U.S.**
8 **Treasury bond as a proxy for the risk-free rate of return in your CAPM analysis**
9 **because the 30-year Treasury bond does not have a beta of zero, and therefore,**
10 **is not truly a risk-free asset.⁹¹ He then suggests that the three-month Treasury**
11 **bill should instead be referenced, which he maintains has a considerably lower**
12 **beta. How do you respond?**

13 **A.** I disagree. As I stated in my direct testimony,⁹² the 30-year Treasury bond most
14 closely parallels the investment characteristics of common stocks, since both are
15 considered long-term, if not permanent, capital. Moreover, in the absence of
16 market anomalies, 30-year Treasury yields, like common stocks, reflect the long-
17 term inflation expectations of investors, and are subject to less volatility as
18 compared to shorter-dated Treasury securities such as Treasury bills. For these

⁹¹ Rothschild Direct, at 70-71.

⁹² Rea Direct, at 77.

1 reasons, the 30-year Treasury bond yield is the most appropriate proxy for the risk-
2 free rate of return when implementing the CAPM. Notwithstanding Mr.
3 Rothschild's suggestions to the contrary, it would appear that he actually does
4 agree with my position in this regard, since he has also referenced the 30-year
5 Treasury bond yield throughout his CAPM analyses.⁹³

6 **Q. With regard to your CAPM analysis, Mr. Rothschild cites to publications and**
7 **other data sources including Damodaran, Hammond and Leibowitz, and Kroll**
8 **to argue that your estimate of the market risk premium is overstated.⁹⁴ How do**
9 **you respond?**

10 A. First, I would note that the Damodaran implied market risk premium is based
11 upon a fundamentally flawed modeling assumption that the growth rate for U.S.
12 stocks will decline to an anemic constant long-term growth rate after five years.
13 There is no compelling reason to believe that the growth rate for U.S. stocks will
14 suddenly decline after an arbitrarily selected five-year period, particularly in view
15 of the rapidly expanding artificial intelligence revolution. Nevertheless, as a proxy
16 for the constant long-term growth rate, the Damodaran model references the
17 current yield on U.S. Treasury securities. In my judgment, there is no logical
18 association between the long-term growth expectations of equity investors and the

⁹³ *See* Rothschild Direct, at 34-35 and Exhibit ALR-4.

⁹⁴ Rothschild Direct, at 71-72.

1 prevailing yield on U.S. Treasury securities. This is clearly demonstrated by the
2 fact that the average consensus EPS growth rate estimate from institutional equity
3 analysts for the S&P 500 stock index has recently been in the range of 10.0 percent
4 to 11.0 percent, which is significantly higher than recent yields for both the 10-year
5 U.S. Treasury note and the 30-year U.S. Treasury bond. This critical shortcoming
6 undermines the validity and usefulness of the Damodaran implied market risk
7 premium estimate that Mr. Rothschild has referenced.

8 Second, with regard to the introductory statements made by Hammond and
9 Leibowitz in the article titled *Revisiting the Equity Premium* as discussed by Mr.
10 Rothschild, it is important to recognize that the estimates of the equity risk
11 premium cited by Hammond and Leibowitz are the product of responses to
12 survey questionnaires and other estimates from participants attending the Equity
13 Risk Premium Forum (the “Forum”).⁹⁵ What becomes immediately clear in
14 reviewing the article *Revisiting the Equity Risk Premium* is the lack of consistency
15 and specificity as to how the survey questions were presented to Forum
16 participants in each of the successive Forums held in 2001, 2011 and 2021. In this

⁹⁵ The Equity Risk Premium Forum is sponsored by the CFA Institute Research Foundation, and to-date has occurred in 2001, 2011 and 2021.

1 regard, Hammond and Leibowitz state the following in the introduction to

2 *Revisiting the Equity Risk Premium*:

3 in the first two cases, participants were free to choose their own
4 (relatively) risk-free asset benchmark, which ranged from 3-month
5 Treasury bills to 10-year Treasury bonds or TIPS (inflation-indexed
6 Treasury bonds). (In the third forum, Larry⁹⁶ asked all of us to use
7 the 10-year nominal Treasury bond as the risk-free asset”.⁹⁷

8 This level of ambiguity undermines the validity, consistency and usefulness of the
9 results yielded in the survey results. It is notable that Roger Ibbotson, a well-
10 recognized finance academic and Forum participant, made the following
11 observations in his 2021 Forum presentation, which appears in *Revisiting the Equity*
12 *Risk Premium*.

13 There are different methods of estimating the equity risk premium.
14 The last approach to estimating the equity risk premium is surveys,
15 in which you might simply ask people what returns they expect or
16 think they should earn. Conceptually, this idea is good, but the
17 questions in surveys tend to be ambiguous. When people ask me
18 what return I expect, I don’t know if they’re talking about the
19 arithmetic mean, the geometric mean, the long term, or the short
20 term. *I would give very different answers depending on these conditions,*
21 *and usually these surveys are not designed well enough for you to know*
22 *which question you’re answering (emphasis added).*⁹⁸
23

⁹⁶ Presumably, Hammond and Leibowitz are referring to Laurence B. Siegel in this statement, who is a co-editor of *Revisiting the Equity Risk Premium*.

⁹⁷ *Revisiting the Equity Risk Premium*, CFA Institute Research Foundation, at vi.

⁹⁸ Roger Ibbotson, *Presentation by Roger Ibbotson: Historical Returns, Premiums and Popularity*, which appears in *Revisiting the Equity Risk Premium*, CFA Institute Research Foundation, at 6.

1 This same topic is discussed in *Risk and Return for Regulated Industries*, which also
2 addresses the shortcomings associated with using survey techniques when
3 estimating the equity risk premium, stating the following:⁹⁹

4 In theory, since the ERP is a forward-looking estimate, simply asking
5 people what they expect the ERP to be seems like an appealing idea.
6 In practice, the use of survey results to estimate the ERP is
7 problematic
8

9 Unfortunately, these surveys are less useful than they might
10 otherwise be because the question regarding the respondent's
11 forecast or belief regarding the MRP does not specify whether the
12 MRP estimates should be an arithmetic or geometric estimate or
13 whether it is in relation to LT or ST government bonds. As noted
14 earlier, the difference between the geometric and arithmetic realized
15 MRP is about 2%, so the lack of specificity in the question could
16 easily lead to forecasts that are inconsistent. *While the survey results*
17 *are interesting, we do not recommend that substantial weight be given to*
18 *survey-based estimates of the MRP in the regulatory setting (emphasis*
19 *added).*¹⁰⁰

20 In fact, while Mr. Rothschild points out that the expected equity risk premium
21 estimates of the Forum participants "tended to be in the 3% to 5% range"¹⁰¹ he fails
22 to mention that virtually all of the Forum participants provided their estimates on
23 the basis of geometric mean values, which, as discussed earlier, are more
24 appropriate for purposes of reporting past performance rather than estimating the

⁹⁹ Note that the authors refer to the equity risk premium (ERP) and market risk premium (MRP) as interchangeable terms.

¹⁰⁰ Bente Villadsen, Michael J. Vilbert, Dan Harris and A. Lawrence Kolbe, *Risk and Return for Regulated Industries*, Academic Press, Elsevier, Inc. (2017) at 67-68.

¹⁰¹ Rothschild Direct, at 72.

1 forward-looking cost of equity. For example, Appendix A to *Revisiting the Equity*
2 *Risk Premium* makes clear that the Forum organizers specifically requested
3 estimates of the equity risk premium based on geometric mean values.
4 Specifically, Appendix A states the following:

5 Because of the rapidly changing financial environment since the time of the
6 Forum, we asked the 11 participants to provide updated estimates of the
7 equity risk premium. Here is our request: “*Given that many changes have*
8 *taken place since this forum was held in late 2021, what is your best estimate of the*
9 *ERP now? (Single-point best estimate, geometric mean, 10-year horizon, US*
10 *equity total return in excess of the 10-year Treasury yield...*” (emphasis
11 added).¹⁰²
12

13 This observation is of critical importance, since as noted by Villadsen, Vilbert,
14 Harris and Kolbe, the realized MRP as based on the geometric mean is generally
15 about 2 percentage points lower than the realized MRP as based on the arithmetic
16 mean. This strongly suggests that if the Forum participants had instead based
17 their estimates on the arithmetic mean, their estimates would have instead been in
18 the 5% to 7% range, which is more consistent with my market equity premium
19 assumption in this proceeding of 7.11 percent.¹⁰³

20 **Q. Mr. Rothschild also criticizes the historically based component of your market**
21 **equity risk premium estimate.¹⁰⁴ How do you respond?**

¹⁰² *Revisiting the Equity Risk Premium*, CFA Institute Research Foundation, at Appendix A.

¹⁰³ *See*, Rea Direct at 78-79.

¹⁰⁴ Rothschild Direct, at 72-74.

1 A. As a preliminary matter, I note that referencing the long-run historical market
2 returns data (often referred to as the Ibbotson Approach¹⁰⁵) in developing an
3 estimate of the market risk premium is a longstanding and widely accepted
4 approach in utility rate proceedings. With that being said, I disagree with all three
5 of Mr. Rothschild's criticisms as outlined above, and would respond as follows:
6 (1) considering that I evaluated the historical market risk premium over a 100-year
7 period, Mr. Rothschild's suggestion that I only considered a one-year timeframe
8 and should have considered a longer period is erroneous. While Mr. Rothschild
9 suggests that a rolling return average over shorter periods would be more
10 appropriate, I disagree, because arbitrarily selecting shorter time periods to
11 evaluate will invariably introduce subjective bias into a risk premium analysis; (2)
12 as I discussed earlier, historical market returns over the long-run provides an
13 unbiased estimate of the future market return expectations of investors, since over
14 the very long-run (i.e., 100 years) investor expectations are realized; and (3) as
15 noted earlier, the finance literature has demonstrated that geometric average
16 returns are not an appropriate basis for estimating the cost of equity. Geometric
17 averages are more useful for reporting past performance on a smoothed basis,
18 meaning that only the beginning and ending investment values are considered in

¹⁰⁵ As previously reported each year in the *SBBI Yearbook*, and which is now reported in the *Kroll Cost of Capital Navigator*.

1 the calculation of the geometric average. This has the effect of removing the
2 variability of returns and associated investment risk that investors actually
3 experience. In fact, geometric mean returns reflect the same “smoothed”
4 compound growth rate each year and therefore reflect a standard deviation of
5 zero.

6 **Q. Mr. Rothschild criticizes your approach of using the EPS growth estimates of**
7 **equity analysts and Value Line’s stock price appreciation potential estimates for**
8 **purposes of estimating the prospective market return for the U.S. equity market.**
9 **In this regard, Mr. Rothschild states “While analysts provide a respected**
10 **opinion, the opinion of a forecaster is not a market”¹⁰⁶, and further states that**
11 **my “resulting calculations produce an inflated, artificial return rather than a**
12 **genuine market-based cost of equity”.¹⁰⁷ How do respond?**

13 **A.** Once again, I disagree. As I discussed at length in both my direct and rebuttal
14 testimonies in this proceeding, the finance literature is clear that the consensus EPS
15 growth estimates of equity analysts have a significant influence on the growth and
16 return expectations of equity investors. The empirical finance literature on this
17 topic has been well-summarized in *Modern Regulatory Finance*, where Morin states
18 the following:

¹⁰⁶ Rothschild Direct, at 63.

¹⁰⁷ Rothschild Direct, at 65.

1 Because of the dominance of institutional investors and their
2 influence on individual investors, analysts' forecasts of long-run
3 growth rates provide a sound basis for estimating required returns.
4 Financial analysts exert a strong influence on the expectations of
5 many investors who do not possess the resources to make their own
6 forecasts, that is, *they are a cause of g.*

7

8 ...it is the consensus forecast that is embedded in price and therefore
9 the required return (emphasis added).¹⁰⁸

10 Therefore, while it is true that institutional equity analysts themselves are "not a
11 market" the finance literature strongly suggests that their EPS growth estimates
12 do in fact have a strong influence on both stock valuations and the required returns
13 of equity investors.

14 As for Mr. Rothschild's statement that my estimates of the prospective market
15 return are inflated, I would cite to the historical market returns data for U.S. large
16 capitalization stocks. As reported by the *Kroll Cost of Capital Navigator*, the average
17 annual return for large capitalization stocks for the 100-year period between 1926-
18 2025 was 12.23 percent. Therefore, while Mr. Rothschild criticizes the analyst-
19 based growth rates that I have referenced, which produced a 11.72 percent
20 prospective market return estimate under my CAPM analysis, he has failed to
21 mention that my prospective market return estimate is actually 51 basis points
22 lower than the 100-year historical average, which further validates the
23 reasonableness of my estimate.

¹⁰⁸ Roger A. Morin, *Modern Regulatory Finance*, PUR Books LLC, 2021, at 371-372.

1 **Q. Mr. Rothschild objects to your evaluation of the Empirical CAPM (ECAPM),**
2 **and argues that “Applying the ECAPM’s 75/25 weighting on top of betas that**
3 **have already been adjusted toward the market average double-counts the same**
4 **purported low-beta effect...”.¹⁰⁹ How do you respond?**

5 **A. The ECAPM does not represent a risk adjustment to beta (or a horizontal axis**
6 **adjustment to the security market line (SML)), but instead represents a return**
7 **adjustment (or vertical axis adjustment to the SML) for empirically observed**
8 **differences in actual stock returns versus what is predicted by the traditional**
9 **CAPM. In contrast, the adjustments that are made to raw betas by investment**
10 **advisory services such as Value Line are designed to correct for the tendency of**
11 **betas to regress towards the mean value of 1.0 over time. For this reason, the use**
12 **of adjusted betas within the ECAPM does not result in any double counting as**
13 **suggested by Mr. Rothschild, since the ECAPM incorporates a return adjustment**
14 **for empirically observed differences in actual returns, rather than a risk**
15 **adjustment to beta. Dr. Morin has made clear that there are no inconsistencies or**
16 **redundancies associated with using adjusted betas within an ECAPM analysis.**
17 **Specifically, in *Modern Regulatory Finance*, Dr. Morin makes the following**
18 **observations:**

¹⁰⁹ Rothschild Direct, at 76.

1 The use of an adjusted beta by Value Line is correcting for a different
2 problem than the ECAPM. The adjusted beta captures the fact that
3 betas regress toward one over time. The ECAPM corrects for the fact
4 that the CAPM under-predicts observed returns when beta is less
5 than one and over-predicts observed returns when beta is greater
6 than one.

7

8 The two adjustments are not the same and there is no double-
9 counting.

10

11 Another way of looking at it is that the Empirical CAPM and the use
12 of adjusted betas comprise two separate features of asset pricing.
13 Assuming *arguendo* a company's beta is estimated accurately, the
14 CAPM will still understate the return for low-beta stocks.
15 Furthermore, if a company's beta is understated, the Empirical
16 CAPM will also understate the return for low-beta stocks. Both
17 adjustments are necessary.¹¹⁰

18 Empirical tests have determined that lower beta stocks, such as utility stocks, will
19 generally realize higher returns as compared to what is indicated by the traditional
20 CAPM. In this regard, the ECAPM was specifically developed to recognize this
21 empirical finding.

22 **Q. Mr. Rothschild further maintains that the ECAPM was developed by a "highly**
23 **biased academic source"**¹¹¹ **and that such empirically based modeling**
24 **adjustments "are often the product of data mining".**¹¹² **How do you respond?**

¹¹⁰ Roger A. Morin, *Modern Regulatory Finance*, PUR Books LLC, 2021, at 223-224.

¹¹¹ Rothschild Direct, at 77.

¹¹² Id. at 76.

1 A. I disagree. By way of background, Dr. Morin developed the ECAPM based on the
2 large body of empirical research which demonstrated that the CAPM risk-return
3 relationship, as illustrated by the Security Market Line, is actually flatter than what
4 is predicted by the traditional CAPM. Dr. Morin's development of the ECAPM
5 was heavily influenced by the research of many other well-respected finance
6 academics¹¹³ who helped lay the foundation for the development of the ECAPM.
7 These academics also developed enhanced CAPM models based on many of the
8 same principles and empirical findings which Dr. Morin applied in developing the
9 ECAPM. The esteemed finance academics Fama and French made important
10 observations regarding these empirical findings and have provided further
11 support for the ECAPM where they have indicated the following:

12 The evidence that the relation between beta and average return is too
13 flat is confirmed in time-series tests, such as Friend and Blume
14 (1970), Black, Jensen and Scholes (1972) and Stambaugh (1982).

15 Confirming earlier evidence, the relation between beta and average
16 return for the ten portfolios is much flatter than the Sharpe-Lintner
17 CAPM predicts. The returns on the low beta portfolios are too high,
18 and the return on the high beta portfolios are too low. For example,
19 the predicted return on the portfolio with the lowest beta is 8.3

¹¹³ *See*, Fama, E.F. and French, K.R. "The Cross-Section of Expected Stock Returns," *Journal of Finance*, June 1992, 427-465; Fama, E.F. and MacBeth, J.D. "Risk, Returns and Equilibrium; Empirical Tests," *Journal of Political Economy*, September 1972, pp. 607-636; Litzzenberger, R.H. and Ramaswamy, K., "The Effect of Personal Taxes and Dividends on Capital Asset Prices: Theory and Empirical Evidence," *Journal of Financial Economics*, June 1979, 163-196; Litzzenberger, R.H., Ramaswamy, K., and Sosin, H. "On the CAPM Approach to the Estimation of a Public Utility's Cost of Equity Capital." *Journal of Finance*, May 1980, 369-383; Pettengill, G.N., Sundaram, S. and Mathur, I. "The Conditional Relation Between Beta and Returns," *Journal of Financial and Quantitative Analysis*, Vol. 30, No. 1, March 1995, at 101-116.

1 percent per year; the actual return is 11.1 percent. The predicted
2 return on the portfolio with the highest beta is 16.8 percent per year;
3 the actual is 13.7 percent.
4

5 The version of the CAPM developed by Sharpe (1964) and Lintner
6 (1965) has never been an empirical success....in the late 1970's,
7 research begins to uncover variables like size, various price ratios
8 and momentum that add to the explanation of average returns
9 provided by beta.
10

11 But the empirical work, old and new, tells us that the relation
12 between beta and average return is flatter than predicted by the
13 Sharpe-Lintner version of the CAPM. As a result, CAPM estimates
14 of the cost of equity for high beta stocks are too high (relative to
15 historical average returns) and estimates for low beta stocks are too
16 low (Friend and Blume, 1970).¹¹⁴

17 Therefore, contrary to Mr. Rothschild's suggestion, Dr. Morin's development of
18 the ECAPM was in fact *not* based on a highly biased academic source, nor was it
19 the product of data mining.

20 **Q. Has the ECAPM been adopted by U.S. regulatory commissions and/or proposed**
21 **by commission staffs and intervening parties in utility rate proceedings?**

22 A. Yes, a growing number of utility commissions, commission staffs, and intervening
23 parties have recognized the merits of empirical forms of the CAPM, and elected to
24 utilize the ECAPM in utility regulatory proceedings. To better address Mr.
25 Rothschild's concern that I have not provided citations to these proceedings, I
26 provided a summary of these cases in Table VVR-7R below.

¹¹⁴ Eugene F. Fama and Kenneth R. French, *The Capital Asset Pricing Model: Theory and Evidence*, The Journal of Economic Perspectives, Vol. 18, No. 3 (Summer, 2004) at 32-33, and 43-44.

Table VVR-7R Utility Regulatory Proceedings Where the ECAPM Has Been Adopted by Regulatory Commissions and/or Proposed by Commission Staff and Consumer Advocates		
Regulatory Commission	Party Adopting or Proposing an ECAPM Analysis	Docket No. / Case No.
Maryland Public Service Commission	Commission Staff	Case Nos. 9299, 9316, 9326 and 9336.
Regulatory Commission of Alaska	Commission Order	Order No. P-97-004 (151)
Colorado Public Utilities Commission	Commission Staff	Proceeding No. 13AL-0067G
New York Public Service Commission	Commission Order	Docket No. 91-M-0509
Mississippi Public Service Commission	PSC Authorization: Use of the ECAPM for Quarterly Benchmark ROE Calculations	Docket U-4761
Montana Public Service Commission	Commission Order	Docket No. D2017.9.80
Wyoming Public Service Commission	Office of Consumer Advocate	See Morin, <i>Modern Regulatory Finance</i> , at 225.
Arkansas Public Service Commission	Office of Attorney General	See Morin, <i>Modern Regulatory Finance</i> , at 225.

- 1 It is notable that, in the aforementioned Montana rate proceeding involving
- 2 Energy West Montana, Inc. and Cut Bank Gas Company, the Public Service

Commission of Montana stated the following in its Final Order with regard to the ECAPM:

The evidence in this proceeding has convinced the Commission that Empirical Capital Asset Pricing Model ("ECAPM") should be the primary method for estimating the Joint Applicants' cost of equity in two different variations, as explained below.

....

The Commission agrees with Scheig that the issue should be remedied by adopting the ECAPM, including his α factor of 0.25, which is intended to approximate the α effect identified by the academic literature reviewed in Morin's textbook¹¹⁵.

Therefore, in view of the empirically observed shortcomings of the traditional CAPM as demonstrated by a number of academic studies, as well as the growing recognition of the merits of the ECAPM by regulatory commissions and commission staff, it is both reasonable and prudent to consider the ECAPM as a useful adjunct within a comprehensive CAPM evaluation.

Q. Citing a 2015 article by Damodaran, Mr. Rothschild maintains that "Financial research has put the Size Effect into serious question."¹¹⁶ Mr. Rothschild also cites to a 2018 article by Alquist, Israel and Moskowitz, which suggests that the size premium diminished shortly after it was first discovered and publicized.¹¹⁷ How do you respond?

¹¹⁵ *In the Matter of the Joint Application for Approval to Change and Establish Natural Gas Delivery Service Rates for Energy West Montana, Inc. and Cut Bank Gas Company*, Docket No. D2017.9.80, Final Order (September 26, 2018), at 40 and 42.

¹¹⁶ Rothschild Direct, at 75.

¹¹⁷ *Id.*, at 75.

1 A. I disagree. Another research paper from 2018 maintains that the size premium
2 continues to be alive and well. In the research paper *"The Size Effect Continues to*
3 *be Relevant When Estimating the Cost of Capital,"* the paper's author, Roger
4 Grabowski, who was the (now retired) Managing Director of Valuation Advisory
5 Services for Kroll LLC, and a widely recognized expert on business valuation,
6 came to the following conclusions:

7 Academic and empirical evidence indicate that the pure textbook
8 CAPM is an imperfect indicator of expected returns.

9

10 Size premia help the valuation professional correct the pure CAPM
11 for the risks of smaller companies not captured by beta. In this
12 paper, I demonstrate that the methodology followed by Duff &
13 Phelps (now Kroll) to calculate size premia is robust and yields a
14 consistent stable premium to be used for pricing long term project as
15 it should be for a good measure of cost of capital.¹¹⁸

16
17 These observations notwithstanding, the finance literature suggests the small-firm
18 size premium does tend to "ebb and flow" over the longer-run horizon, but this
19 should not be interpreted as suggesting that the small-firm size premium no
20 longer exists. This controversy is further addressed in the *2023 SBBI Yearbook*,
21 which states:

22 The increased risk faced by investors in small stocks is quite real. It
23 is important to note, however, that the risk/return profile is over the
24 long-term. The long-term expected return for any asset class can be
25 quite different from short-term expected returns. Investors in small-
26 cap stocks should expect losses and periods of underperformance

¹¹⁸ "The Size Effect Continues to be Relevant When Estimating the Cost of Capital," *Business Valuation Review*, Volume 37, Number 3 (Fall 2018, at 93 and 109).

1 relative to large-cap stocks. While this might lead some market
2 observers to speculate that there is no size premium, statistical
3 evidence suggests that periods of smaller stocks' underperformance
4 should be expected. The evidence also suggests that the longer
5 small-cap companies are given to "race" against large-cap
6 companies, the greater the chance that small-cap companies outpace
7 their larger counterparts.

8

9 As the holding period is increased, and the time that small-cap
10 companies and large-cap companies are given to "race" against each
11 other is lengthened, small-cap stocks tend to increasingly
12 outperform large-cap stocks. For example, over the entire range
13 January 1926-December 2022 (see leftmost column of Exhibit 7.3), as
14 the holding period is increased to 60 months (5-years), to 120 months
15 (10-years), to 240 months (20-years) and finally to 360 months (30-
16 years), small stocks increasingly outperform large stocks (54%, 66%,
17 88%, and 96% of the time, respectively).¹¹⁹

18 It should be further noted that Kroll continues to report size premiums derived
19 from the CRSP¹²⁰ Deciles Size Study within the Kroll *Cost of Capital Navigator*,
20 which is the same data that I referenced in my CAPM analyses. If size premiums
21 had in fact disappeared as Mr. Rothschild suggests, Kroll would no longer be in
22 position to report size premiums by market capitalization deciles, as they continue
23 to do so today.

24 **Q. Is there credible support for the use of size premiums when estimating the cost**
25 **of equity for regulated utilities?**

¹¹⁹ 2023 *SBBI Yearbook*, Kroll LLC, at 147-148.

¹²⁰ The CRSP refers to the "Center for Research in Security Prices" at the University of Chicago, Booth School of Business.

1 A. Yes. Support for the use of the size premium in the utility industry comes from at
2 least two studies which have demonstrated that the size effect does in fact apply
3 to utilities. For example, in *Equity and the Small-Stock Effect*, Annin concluded:

4 For the traditional CAPM, the large-company composite shows a cost
5 of equity of 12.05 percent; the small company composite, 13.93 percent.
6 However, once the respective small capitalization premium is added
7 in, the spread increases dramatically, to 12.07 and 17.95 percent,
8 respectively. Clearly, the smaller the utility (in terms of equity
9 capitalization), the larger the impact that size exerts on the expected
10 return of that security¹²¹.

11 Similarly, in *Utility Stocks and the Size Effect–Revisited*, Zepp concluded:

12 “[n]ew studies based on different size water utilities are presented that
13 do support a small firm effect in the utility industry.”¹²²

14 Furthermore, in a recent opinion, the FERC characterized the small size premium
15 as a “generally accepted approach” to CAPM analyses for purposes of utility
16 regulatory proceedings. Specifically, the FERC stated the following:

17 We disagree with Petitioners’ argument that the NETOs CAPM
18 analysis is flawed due to the fact that the NETOs applied a size
19 adjustment to account for the difference in size between the NETOs and
20 the dividend-paying companies in the S&P 500. *This type of size*
21 *adjustment is a generally accepted approach to CAPM analyses, and we are*
22 *not persuaded that it was inappropriate to use a size adjustment in this case.*
23 The purpose of the NETOs size adjustment is to render the CAPM
24 analysis useful in estimating the cost of equity for companies that are
25 smaller than the companies that were used to determine the market risk
26 premium in the CAPM analysis (emphasis added).¹²³
27

¹²¹ Annin, M., *Equity and the Small-Stock Effect*, Public Utilities Fortnightly, October 15, 1995, 133, at 42.

¹²² Zepp, T., *Utility Stocks and the Size Effect–Revisited*, The Quarterly Review of Economics and Finance, 43 (2003), at 578-582.

¹²³ Federal Energy Regulatory Commission, Opinion 531-B, 61,165 at P117 (2015).

1 **Response to Mr. Rothschild's Criticisms of the Company's RPM Analysis**

2 **Q. Mr. Rothschild criticizes your RPM analysis for two primary reasons.¹²⁴ How**
3 **do you respond?**

4 **A. Mr. Rothschild first argues that my RPM analysis does not provide independent**
5 **corroboration of my CAPM results because several of the data inputs in my RPM**
6 **analysis are also used in my CAPM analysis. In response I would note that the**
7 **same argument can just as easily be made for Mr. Rothschild's DCF and CAPM**
8 **analyses, since he has relied extensively (and inappropriately) on stock options**
9 **trading data throughout all facets of his cost of capital evaluation. On this basis,**
10 **any such "independent corroboration" would also appear to be suspect. This**
11 **argument notwithstanding, my RPM analysis is to a large extent independently**
12 **corroborated. This is demonstrated by the fact that a number of assumptions and**
13 **inputs into my RPM analysis are not factored into my CAPM analyses. Just a few**
14 **examples of these assumptions and inputs include the utilization of corporate and**
15 **utility bond yields rather than U.S. Treasury security yields,¹²⁵ as well as my**
16 **reliance upon the Public Utility Index Approach methodology, which focuses on**
17 **the S&P 500 Utilities Index rather than the overall S&P 500 Index.¹²⁶**

¹²⁴ Rothschild Direct, at 77-78.

¹²⁵ See, Rea Direct, at Attachment VVR-11 (p. 1).

¹²⁶ Id., at 5.

1 Second, Mr. Rothschild maintains that there is an “asymmetry”¹²⁷ in my RPM
2 analysis because my prospective risk premium is measured against an “Aaa”
3 corporate bond yield (5.62 percent) while my blended risk premium is then added
4 to a higher “A-/Baa1” rated utility bond yield of 6.01 percent. However, no such
5 asymmetry exists because my prospective risk premium has been adjusted by a
6 beta factor of 0.79¹²⁸ in order to reflect the systematic risk profile of the Gas LDC
7 Group rather than the overall U.S. equity market. Therefore, contrary to Mr.
8 Rothschild’s statement, the downwardly adjusted risk premium I referenced is
9 entirely consistent with the relatively higher “A-/Baa1” rated prospective bond
10 yield for the Gas LDC Group.

11
12 **VIII. MR. ROTHSCHILD’S PROPOSAL TO IMPUTE A HYPOTHETICAL CAPITAL**
13 **STRUCTURE IS UNSUPPORTED AND WOULD PENALIZE THE COMPANY**
14 **FOR MAINTAINING A CAPITAL STRUCTURE THAT IS CONSISTENT**
15 **WITH OTHER GAS UTILITIES BOTH IN KENTUCKY AND NATIONWIDE.**

16 **Q. Mr. Rothschild maintains that the Company’s proposed equity capitalization**
17 **ratio (52.64 percent) is higher than the five-year average equity ratio for the Gas**
18 **LDC Group¹²⁹. He further maintains that the Company’s proposed equity**

¹²⁷ Rothschild Direct, at 78.

¹²⁸ *See*, Rea Direct, at Attachment VVR-11 (p. 4)

¹²⁹ Rothschild Direct, at 55. Mr. Rothschild cites to a 47.5 percent average ratio for the Gas LDC Group based on permanent capitalization and a 42.6 percent average ratio based on total capitalization. Note, however, that while Mr. Rothschild has referenced the five-year average equity capitalization ratios shown in Attachment VVR-3 (pp. 3-4) to my direct testimony, he should have instead referenced the most recent full-year values shown for 2025 in Attachment VVR-3, which reflected equity capitalization ratios of 49.1 percent based on permanent capitalization, and 45.4% based on total capitalization.

1 capitalization ratio is higher than the equity capitalization ratio of its parent
2 company, NiSource.¹³⁰ Due to the disparities noted above, Mr. Rothschild
3 proposed that the Commission should adopt a hypothetical capital structure for
4 Columbia in this proceeding, consisting of 48.39 percent common equity, 50.38
5 percent long-term debt, and 1.23 percent short-term debt.¹³¹ How do you
6 respond?

7 A. I disagree. Imputing a hypothetical capital structure that is deemed to be more
8 consistent with the Gas LDC Group holding companies and/or the consolidated
9 capital structure of NiSource Inc. would be tantamount to a "double leverage"
10 adjustment, which would effectively penalize the Company for maintaining a
11 capital structure that is consistent with its gas utility peer group. As I discussed
12 in my direct testimony and will discuss further herein, the Company's proposed
13 equity capitalization ratio in this proceeding is well-within the range of the equity
14 capitalization ratios for the utility operating subsidiaries of the Gas LDC Group,
15 as well as the equity capitalization ratios adopted by the Commission in
16 Kentucky's other utility rate proceedings in recent years.

¹³⁰ Rothschild Direct, at 59. Mr. Rothschild cites to a 43.0 percent equity ratio for NiSource for 2025 based on permanent capitalization, and a 41.8% percent equity ratio for 2025 based on total capitalization as reflected in Attachment VVR-3 (pp. 3-4) to my direct testimony

¹³¹ See Rothschild Direct, at 5.

1 According to Mr. Rothschild, his proposed hypothetical capital structure is
2 intended to be more consistent with the average capital structure of the Gas LDC
3 Group holding companies.¹³² However, in determining an appropriate overall fair
4 rate of return for a utility, it is important that the Commission recognize how a
5 utility's rate base is actually financed, which is through the utility's *standalone*
6 capital structure. At the same time, when evaluating a utility's standalone capital
7 structure, what is of critical importance is identifying the risk to which the
8 component parts of that capital structure are exposed, rather than the identity of
9 the provider of that capital. In other words, the cost of capital depends entirely
10 upon the particular *use* of that capital, irrespective of the *source* of the capital. For
11 example, an equity investment in a regulated utility bears a higher level of
12 investment risk as compared to the debt capital provided to utilities by creditors,
13 and this is true regardless of whether that capital was provided by an individual
14 investor, institutional investor, or by the utility's parent company. Therefore,
15 regardless of whether the Company's equity capitalization was funded by its
16 parent company or by otherwise unaffiliated investors, equity investments are
17 invariably exposed to greater structural risks as compared to debt capital, and for
18 this reason, the owner/investor must be adequately compensated for bearing these
19 greater risks.

¹³² Id., at 55.

1 Accordingly, if Mr. Rothschild's proposal to reference a hypothetical capital
2 structure were adopted, this would constitute an unjustified economic penalty, as
3 a significant portion of the Company's current equity capitalization layer would
4 be allocated returns commensurate with that of debt capital. At the same time,
5 Columbia would continue to bear all of the attendant risks associated with equity
6 investments on this layer of the Company's capital structure. In other words, the
7 form of double-leverage adjustment proposed by Mr. Rothschild would
8 essentially recharacterize the investment returns associated with an investment in
9 the Company's common equity, but at the same time, would not alter the
10 corresponding risks. This is clearly inconsistent with the risk and return
11 investment principle, and for this reason alone, Mr. Rothschild's proposal to
12 impute a hypothetical capital structure for the Company should be rejected.

13 **Q. Is there a fundamental disconnect that prevents utility holding company capital**
14 **structures, such as NiSource's consolidated capital structure, from representing**
15 **an appropriate benchmark capital structure for utility ratemaking purposes?**

16 A. Yes. Much like other utility holding companies, NiSource's consolidated capital
17 structure reflects the consolidation of all debt and equity balances across the entire
18 NiSource enterprise, including those of its other gas and electric utility companies.
19 As is also the case with many utility holding companies, NiSource's consolidated
20 capital structure has been affected by a number of strategic transactions over the

1 years, including the merger between NiSource and Columbia Energy Group in
2 2000, the spin-off of Columbia Pipeline Group in 2015, and various other smaller
3 acquisitions and divestitures. These strategic transactions have had the effect of
4 significantly changing the relative composition of the debt and equity balances in
5 the NiSource consolidated capital structure both as a result of the financing
6 activities associated with these transactions and also from the associated
7 accounting gains, losses and special write-offs. All of these impacts are
8 inappropriate to overlay on the utility business and to include in customer rates.
9 This is particularly true because a utility's long-lived rate base assets, which serve
10 the public interest, directly correspond to the financing activities conducted at the
11 utility operating company level and not at the consolidated parent company level.
12 For these reasons, in evaluating the reasonableness of the Company's proposed
13 rate-setting capital structure, Mr. Rothschild should have instead analyzed the
14 capital structures of the utility operating subsidiaries of the Gas LDC Group
15 holding companies.

16 **Q. Have you conducted an evaluation to determine if the Company's proposed**
17 **capital structure in this proceeding is reasonable?**

18 **A.** Yes. I investigated this matter from multiple perspectives. As reflected in Table
19 VVR-8R below, I first compared the Company's proposed 52.64 percent equity
20 capitalization ratio to the equity capitalization ratios that have been adopted by

1 the Commission for Kentucky's gas and electric utilities in recent years. During
2 the approximate five-year period between 2022 and 2026 (year-to-date through
3 August 31, 2026), the average equity capitalization ratio adopted by the
4 Commission in gas utility rate proceedings has been 53.18 percent,¹³³ which is
5 *higher* than Columbia's proposed equity capitalization ratio of 52.64 percent in this
6 proceeding. During the same period, the average equity capitalization ratio
7 adopted by the Commission in both gas and electric rate proceedings has been
8 51.43 percent,¹³⁴ which is generally consistent with the Company's proposed 52.64
9 percent equity capitalization ratio. As reflected in Table VVR-8R below, it is
10 further noteworthy that the Company's proposed equity capitalization ratio of
11 52.64 percent is identical to the 52.64 percent equity capitalization ratio adopted
12 by the Commission in both Columbia's 2024 base rate proceeding (Case No. 2024-
13 00099) and also in the Company's 2021 base rate proceeding (Case No. 2021-
14 00183).

¹³³ Source of data: S&P Global.

¹³⁴ Id.

Table VVR-8R Equity Capitalization Ratios Adopted by the Commission for Kentucky's Gas and Electric Utilities 2022-2026 (1)		
Company	Case Number	Equity Capital Ratio Adopted
Atmos Energy (gas)	Case No. 2024-00276	53.50%
Atmos Energy (gas)	Case No. 2021-00214	54.50%
Columbia Gas (gas)	Case No. 2024-00092	52.64%
Delta Nat. Gas (gas)	Case No. 2024-00346	52.76%
Duke Energy (gas)	Case No. 2025-00125	52.65%
Duke Energy (electric)	Case No. 2024-00354	52.73%
Duke Energy (electric)	Case No. 2022-00372	52.15%
Kentucky Power (elec.)	Case No. 2025-00257	46.13%
Kentucky Power (elec.)	Case No. 2023-00159	41.25%
Kentucky Util. (elec.)	Case No. 2025-00113	52.80%
LG&E (electric)	Case No. 2025-00114	53.00%
LG&E (gas)	Case No. 2025-00114	53.00%
Gas Utilities Average	-	53.18%
Gas & Elec. Utility Avg.	-	51.43%
Columbia Gas Proposed (2)	Case No. 2026-00099	52.64%
Columbia Gas (gas)	Case No. 2024-00092	52.64%
Columbia Gas (gas)	Case No. 2021-00183	52.64%
(1) Through 8/31/2026.		
(2) Columbia's proposed equity capitalization ratio in the instant proceeding.		

- 1 **Q. Have you investigated the reasonableness of Columbia's proposed capital**
- 2 **structure relative to the national average of equity capitalization ratios for gas**
- 3 **utilities as adopted by state commissions across the U.S. in recent years?**

1 A. Yes. As reported by Regulatory Research Associates¹³⁵, the average equity
2 capitalization ratio adopted by state commissions for gas utilities nationwide was
3 51.63 percent, 52.52 percent, and 52.45 percent, during 2025, 2024 and 2023,
4 respectively. This provides further evidence that Columbia's proposed equity
5 capitalization ratio of 52.64 percent is consistent with the national averages for
6 regulated gas utilities.

7 **Q. Have you also evaluated the reasonableness of Columbia's proposed capital**
8 **structure as compared to the utility operating subsidiaries of the Gas LDC**
9 **Group holding companies?**

10 A. Yes. I presented this evaluation in my direct testimony,¹³⁶ and I presented it again
11 in Table VVR-9R below. To confirm the reasonableness of the Company's
12 proposed equity capitalization ratio, I compared it to the capital structure ratios of
13 the utility operating subsidiaries of the Gas LDC Group companies. As reflected
14 in Table VVR-9R below, the respective equity capitalization ratios for the Gas LDC
15 Group operating subsidiaries range from 43.2 percent to 61.1 percent, and reflect
16 median and average equity capitalization ratios of 53.3 percent and 53.9 percent,
17 respectively.

¹³⁵ *Major Energy Rate Case Decisions in the US January-December 2025*, Regulatory Research Associates, S&P Global Market Intelligence (April 25, 2026), at 7-8.

¹³⁶ *See*, Rea Direct, at 50-53.

Table VVR-9R Common Equity Capitalization Ratios of the Utility Operating Subsidiaries of the Gas LDC Group¹³⁷		
Utility Operating Company	Parent	Common Equity Ratio
Atmos Energy - Colorado	ATO	58.0%
Atmos Energy - Kansas	ATO	n/a
Atmos Energy - Kentucky	ATO	53.5%
Atmos Energy - Tennessee	ATO	61.1%
Atmos Energy – West Texas	ATO	61.0%
Atmos Energy – Mid-Tex	ATO	61.0%
New Jersey Natural Gas	NJR	54.0%
Columbia Gas of Maryland	NI	52.2%
Columbia Gas of Ohio	NI	50.6%
Columbia Gas of Pennsylvania	NI	54.4%
Columbia Gas of Virginia	NI	43.2%
Northern Indiana Public Service (gas)	NI	52.4%
Northwest Natural Gas - Oregon	NWN	50.0%
Northwest Natural Gas – Wash.	NWN	n/a
Kansas Gas Service Co.	OGS	n/a
Oklahoma Natural Gas Co.	OGS	n/a
Texas Gas Service Co.	OGS	59.9%
Southwest Gas - Arizona	SWX	48.5%
Southwest Gas - California	SWX	53.0%
Southwest Gas - Nevada	SWX	50.0%
Spire - Alabama	SR	n/a
Missouri Gas Energy (Spire)	SR	n/a
Utility Operating Co. - Minimum	-	43.2%
Utility Operating Co. - Maximum	-	61.1%
Utility Operating Co. - Median	-	53.3%
Utility Operating Co. - Average	-	53.9%
Columbia's Proposed Rate-Setting Equity Capitalization Ratio	-	52.64%

¹³⁷ Source: S&P Global Market Intelligence. Reflects the most recent rate case order where an equity capitalization ratio was disclosed in the final order. The designation “n/a” or “not available” reflects instances where an explicit equity capitalization ratio was not provided in the final rate order, such as in black box settlements.

1 As shown in Table VVR-9R above, the Company's equity capitalization ratio of
2 52.64 percent is well-within the range of what is typical and customary for the
3 utility operating subsidiaries of the Gas LDC Group.

4 **Q. Does this conclude your prepared Rebuttal testimony?**

5 **A. Yes, it does.**

6