

MONTANA-DAKOTA UTILITIES CO.
A Division of MDU Resources Group, Inc.

BEFORE THE NORTH DAKOTA PUBLIC SERVICE COMMISSION

DOCKET NO. PU-15-090

PREPARED REBUTTAL TESTIMONY OF

J. STEPHEN GASKE

1 **Q1. Please state your name, position and business address.**

2 A1. My name is J. Stephen Gaske and I am a Senior Vice President of Concentric
3 Energy Advisors Inc., 1130 Connecticut Avenue NW, Suite 850, Washington, DC
4 20036.

5 **Q2. Are you the same J. Stephen Gaske who filed Prepared Direct Testimony**
6 **earlier in this proceeding?**

7 A2. Yes. I am filing this rebuttal testimony on behalf of Montana-Dakota Utilities Co.
8 ("Montana-Dakota" or the "Company"). Montana-Dakota is a division of MDU
9 Resources Group, Inc. ("MDU Resources").

10 **Q3. What is the purpose of your Rebuttal Testimony in this proceeding?**

11 A3. I am responding to the Direct Testimony concerning return on common equity filed
12 by Aaron L. Rothschild on behalf of the North Dakota Public Service Commission
13 ("Commission"). Mr. Rothschild recommends an allowed cost of equity of 8.62
14 percent for Montana-Dakota's North Dakota natural gas distribution operations,
15 which, if approved, would be lower than even the lowest authorized return over the
16 last two and a half years in natural gas distribution rate proceedings. However, as

1 shown in my Prepared Direct Testimony, and as discussed herein, a return on
2 common equity of 10.0 percent is appropriate in order for Montana-Dakota to be in a
3 position to raise capital on reasonable terms.

4 **Q4. Please summarize the reasons that you believe Mr. Rothschild's ROE**
5 **recommendation in this proceeding is not reasonable.**

6 A4. I disagree with several areas presented in the testimony of Mr. Rothschild that lead
7 him to recommend an inadequate return, including Mr. Rothschild's:

- 8 1. Contentions with the use analyst growth rates in my DCF analysis;
- 9 2. Failure to recognize that a flotation cost adjustment is required in order to
10 meet the capital attraction standard that must be met;
- 11 3. Disagreement with my calculation of the equity risk premium;
- 12 4. Argument regarding the significance of my market-based cost of equity
13 estimate for the S&P 500; and
- 14 5. Failure to recognize that Montana-Dakota's North Dakota natural gas
15 distribution operations face greater overall business and regulatory risks than
16 the typical company in the proxy group.¹

¹ See Direct Testimony of Aaron L. Rothschild, at 44.

1 **I. REASONABLENESS OF ROE RECOMMENDATIONS**

2 **Q5. Please provide an overview of Mr. Rothschild's ROE recommendation in this**
3 **proceeding.**

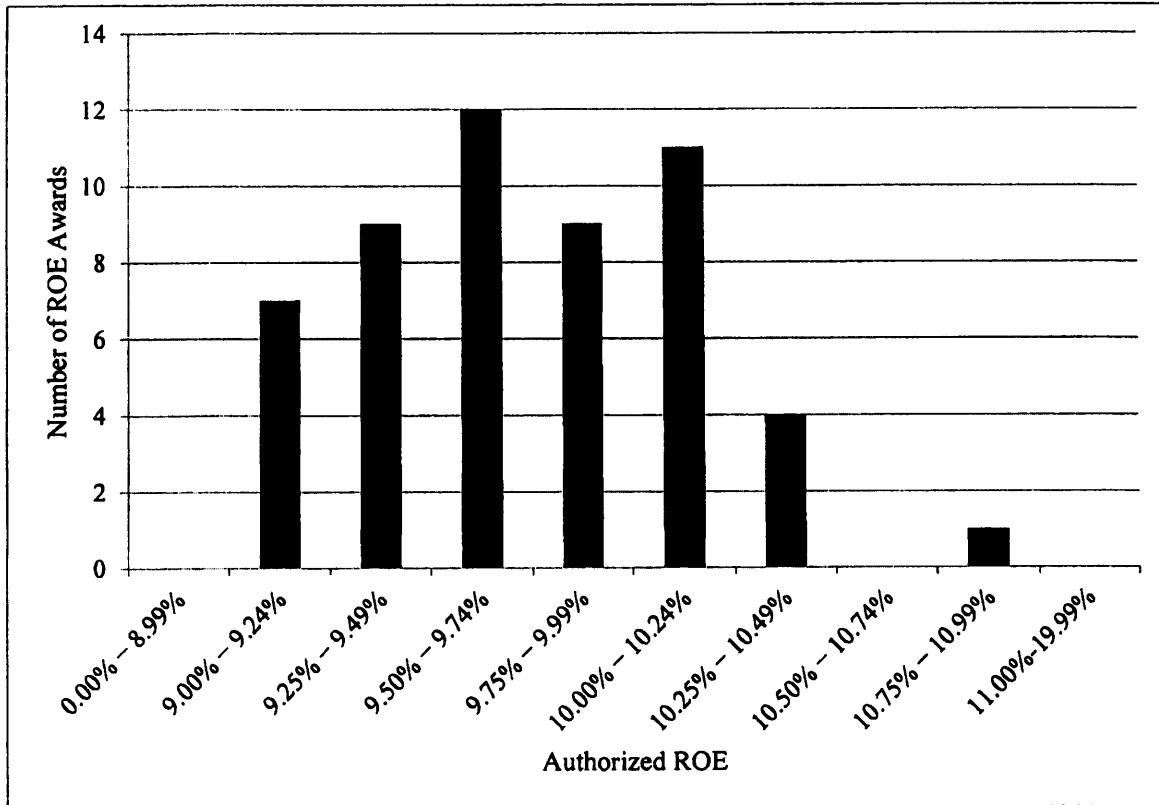
4 A5. Mr. Rothschild argues for a return on equity of 8.62 percent based on the average of
5 the results of his DCF analyses.² In performing those analyses, Mr. Rothschild
6 includes the same proxy group companies that I included in my Direct Testimony,
7 but does not use the same proxy company growth rates. In addition, Mr. Rothschild
8 does not take into consideration any of the business risks that I described in my
9 Direct Testimony in his overall return on equity recommendation.

10 **Q6. Please assess the reasonableness of Mr. Rothschild's 8.62 percent**
11 **recommended return on common equity.**

12 A6. Figure 1 below is a histogram of all returns on common equity authorized in natural
13 gas distribution rate proceedings covered by Regulatory Research Associates
14 between 2013 and 2015.

² See Direct Testimony of Aaron L. Rothschild, at 1.

1 **Figure 1: Authorized Returns on Equity for Natural Gas Distribution Utilities (2013-**
 2 **2015)³**



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4 With respect to Mr. Rothschild’s recommended ROE of 8.62 percent, of the 53
 5 natural gas rate proceedings with explicit ROE awards from 2013-2015, zero
 6 awards were below 9.0 percent. By comparison, 16 of the 53 ROE awards for
 7 natural gas distribution companies (or 30 percent) were between 10.00 percent
 8 and 10.99 percent over this same time period. This evidence demonstrates that
 9 Mr. Rothschild’s recommendation is considerably below the lowest return
 10 allowed for a natural gas distribution company by any Commission in recent
 11 years. It is evident that setting the authorized return on common equity for

³ Source: Regulatory Research Associates.

1 Montana-Dakota's North Dakota natural gas distribution operations at 8.62
2 percent would not provide investors with an ROE that is "commensurate with
3 returns on investments in other enterprises having corresponding risks."⁴ As a
4 result, adopting Mr. Rothschild's recommendation would violate the comparable
5 investment standard set forth by the United States Supreme Court in *Federal*
6 *Power Commission v. Hope Natural Gas Company* (1944).

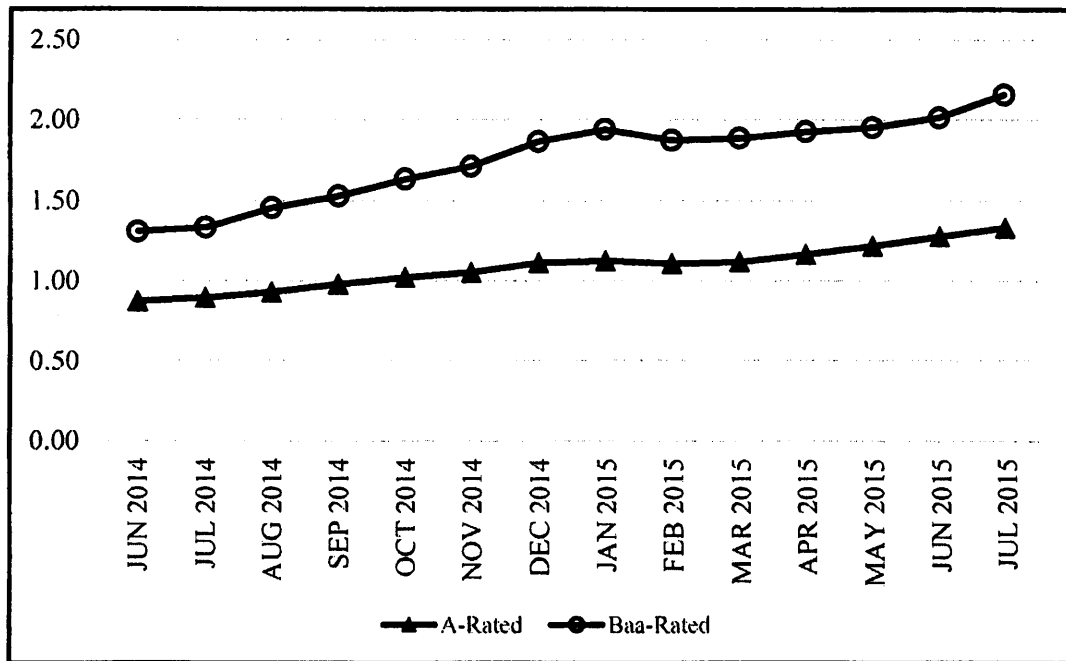
7 **Q7. During the past year, have investors increased the risk premiums and interest**
8 **rates that they require?**

9 **A7. Yes. As you can see in Figure 2, credit spreads have been progressively increasing**
10 **over the past year.**

⁴ Federal Power Commission v. Hope Natural Gas Company, 320 U.S. 591, 603 (1944).

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Figure 2: Credit Spreads



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In addition, interest rates over the last six months are rising. Table 1 shows that Public Utility Bond yields for A-rated and Baa-rated bonds have increased by 82 and 83 basis points, respectively.

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Table 1: Public Utility Bonds January 2015 and June 2015

	Public Utility Bonds	
	A-Rated	Baa-Rated
Jan-15	3.58	4.39
Jun-15	4.40	5.22
Basis Point Increase	0.82	0.83

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The fact that Mr. Rothschild's return on equity recommendation of 8.62 percent is lower than the lowest return allowed by any Commission in recent years, combined with the fact that interest rates have been rising rapidly this year, further demonstrates that his recommendation is unreasonable and inadequate to

1 allow Montana-Dakota' North Dakota natural gas distribution operations to
2 compete for capital required to expand and improve infrastructure.

3 **Q8. Chart 4 of page 12 of Mr. Rothschild's Direct Testimony shows that the stock**
4 **prices of the proxy group companies fell significantly compared to the S&P 500**
5 **and the Dow Jones Utility Average. What would you conclude from this chart?**

6 **A8.** Mr. Rothschild has presented two alternatives to calculating the dividend yields he
7 utilizes in his return on equity range: 1) the spot yield of June 30, 2015 (3.62); and 2)
8 the average of the high and low stock prices over the last six months (3.21). The
9 decline in proxy group stock prices indicates that the spot dividend yield presented
10 by Mr. Rothschild is more representative of the current conditions than the year to
11 date dividend yield. The dramatic change in market prices over the past six months
12 is such that I believe the six month average dividend yield should not be given any
13 weight. The result of Mr. Rothschild's DCF analysis using the spot dividend yield is
14 an ROE of 8.92 percent, the high of his range.⁵

15 **II. RESPONSE TO THE DIRECT TESTIMONY OF MR. ROTHSCHILD**

16 **Q9. Please summarize Mr. Rothschild's testimony and recommendation in this**
17 **proceeding.**

18 **A9.** Mr. Rothschild argues for a return on equity of 8.62 percent based on the results of
19 his DCF analyses of between 8.32 percent and 8.92 percent.⁶ Mr. Rothschild uses a

⁵ 8.92 percent is still lower than any Commission authorized ROE over the past two and a half years.

⁶ See Direct Testimony of Aaron L. Rothschild, at 1.

1 constant growth form of DCF based on the sustainable retention growth formula and
2 a non-constant DCF method as a check.⁷ As described in his testimony, Mr.
3 Rothschild compares his results to those of Ibbotson's Long Term Market
4 Predictions and Charles Schwab's Long Term Market Returns although he does not
5 explain how these estimates relate to Montana-Dakota's North Dakota natural gas
6 distribution operations.⁸ Mr. Rothschild notes that the Company's requested capital
7 structure is reasonable for rate making purposes because it reflects the capital
8 structure ratios of the proxy group used to calculate the cost of equity.

9 III. DCF GROWTH RATE ESTIMATES

10 Q10. How did Mr. Rothschild estimate investors' future growth rate expectations?

11 A10. As described in his testimony, Mr. Rothschild's approach to estimating growth rates
12 is to divide the projected overall growth into two components so that:

$$13 \quad g = br + sv$$

14 The first component is his estimate of the growth that investors can expect solely
15 from internal factors such as retained earnings. This "br" component is supposed
16 to represent the long-term average of investors' expectations of growth to be
17 achieved by retaining and re-investing earnings of the company. Apparently, Mr.
18 Rothschild's value of "r" of 11.0 percent is derived from a combination of the
19 Proxy Group's: 1) average of Value Line's future return on equity; 2) Zacks

⁷ See Direct Testimony of Aaron L. Rothschild, at 24.

⁸ See Direct Testimony of Aaron L. Rothschild, at 3.

1 consensus forecast; and 3) the actual returns on equity earned on average by the
2 Proxy Group from 2012, 2013 and 2014.

3 The other component of Mr. Rothschild's growth rate estimate is "sv" the growth
4 that investors can expect from external financing. Because companies sometimes
5 finance a portion of their growth through external stock issuances, the impact of
6 such issuances on existing stockholders can affect the future growth rates that
7 investors expect. Mr. Rothschild calculates his "sv" using the proxy group's
8 median⁹ external financing rate of 1.00 percent and the proxy group's dividend
9 yield as of June 30, 2015.¹⁰

10 A. ISSUES WITH "BR+SV" ONLY ESTIMATION

11 **Q11. Would you please comment upon Mr. Rothschild's method of estimating the**
12 **"br+sv" growth rate component?**

13 A11. Retention growth ("br") is just one of several methods by which investors might
14 expect a company to grow. Consequently, focusing solely on "br," or even "br + sv"
15 can overlook some types of growth that investors may expect from a company. For
16 this reason, analysts' estimates of long-term growth rates in earnings, which
17 presumably consider all of the expected sources of growth, provide one of the best
18 sources of information concerning the long-term future growth rate expectations that
19 are reflected in the current stock prices and dividend yields of companies. For
20 example Mr. Rothschild's Schedule ALR 3, page 3 indicates that the average

⁹ Mr. Rothschild rounds the median external financing rate of 0.83 percent to 1.00 percent.

¹⁰ Schedule ALR 3, page 1, ALR 4, page 1 and ALR 5, page 1.

1 analysts' estimated growth rates for the proxy companies is 5.49 percent in contrast
2 to his range of growth rates of 5.03 percent to 5.21 percent as shown in Schedule
3 ALR 4, page 1, line 5. Utilizing the growth rates shown in the next to last column
4 on Mr. Rothschild's ALR 3, page 3 indicates that investors expect a median required
5 return of 9.58 percent and an average return of 10.21 percent. In fact, his exhibit
6 indicates that several of the proxy companies have an expected return greater than
7 12 percent. By giving little or no weight to analysts' estimates, Mr. Rothschild is
8 effectively ignoring the possibility that his companies may have means for growth
9 other than retained earnings ("br") such as: 1) re-directing capital to projects with a
10 higher ROE; 2) issuing common stock at prices greater than book value; 3)
11 borrowing to invest in projects that earn more than the cost of debt; and 4)
12 purchasing assets or merging with other companies at prices that are accretive to
13 earnings.

14 **Q12. In your analysis, did you consider historical growth rates for your proxy**
15 **companies?**

16 A12. No, I did not. It is important to stress that historical growth rates generally are not,
17 by themselves, sufficient to establish investors' growth rate expectations. Instead,
18 historical growth rates are useful only insofar as they can tell an analyst something
19 about investors' expectations concerning future growth. In addition, the historic
20 time period that most influences investors' expectations, if any, generally will
21 change from time to time as intelligent investors attempt to evaluate those specific
22 factors that have influenced growth during the past as an aid in determining which
23 factors are most likely to influence growth in the future.

1 **Q13. What growth rates do you use in your DCF analyses?**

2 A13. As explained in my Direct Testimony, I calculated my DCF using three different
3 growth rate assumptions: 1) retention growth from Value Line forecasts of
4 dividends, earnings and return on equity; 2) a Basic DCF analysis that relied on
5 analysts' earnings forecasts; and 3) a combination of the Value Line retention
6 growth forecasts and analysts' earnings growth projections to produce a Blended
7 Growth Rate Analysis.¹¹

8 **Q14. Which of your growth rates produces a greater cost of capital estimate?**

9 A14. My Retention Growth DCF analysis indicates a higher rate of return than my Basic
10 DCF analysis which is based on analysts' estimates. Thus if we were to accept Mr.
11 Rothschild's argument concerning analysts' growth rates, the result would be a
12 marginally higher cost of capital.

13 **Q15. At page 28, lines 10-12 of his testimony, Mr. Rothschild argues that analysts'**
14 **projections of earnings growth rates are not a good measure of long-term**
15 **investor expectations when dividend growth rate projections differ from**
16 **earnings growth rate projections. Do you agree?**

17 A15. No, I do not. There is a large amount of literature that suggests analysts' earnings
18 growth rate forecasts are a superior measure of the long-term growth rate
19 expectations that are reflected in stock prices. For example, the research of

¹¹ Direct Testimony of Gaske, at 18-19.

1 Professors Carleton and Vander Weide demonstrates that analysts' earnings growth
2 projections have a statistically significant relationship to stock valuation levels,
3 while dividend growth projections do not.¹² Those findings suggest that investors
4 form their investment decisions based on expectations of growth in earnings, not
5 dividends. Consequently, earnings growth is the appropriate measure for the
6 purpose of the Constant Growth DCF model. Thus, academic research demonstrates
7 that Mr. Rothschild is incorrect in arguing that earnings growth estimates result in an
8 overstatement of the cost of equity.

9 **Q16. If Mr. Rothschild is incorrect in asserting that earnings growth forecasts**
10 **overstate the cost of equity, do you agree with his suggestion (p. 29, lines 11-12)**
11 **that one should reject the constant growth model in favor of a non-constant**
12 **growth DCF model?**

13 A16. No, analysts' estimates generally are the superior measure of analysts' growth
14 expectations. For example, Marston, Harris and Crawford examined publicly
15 available data from 1982-1985 and found that "plausible measures of risk are more
16 closely related to expected returns derived from a constant growth model than to
17 those derived from multistage growth models."¹³

¹² Vander Weide, J.H. and Carleton, W.T., "Investor Growth Expectations: Analysts vs. History," *The Journal of Portfolio Management*, Spring 1988, 78-82.

¹³ F. Marston, R. Harris, and P. Crawford, "Risk and Return in Equity Markets: Evidence Using Financial Analysts' Forecasts," in *Handbook of Security Analysts' Forecasting and Asset Allocation*, J. Guerard and M. Gultekin (eds.), Greenwich, CT, JAI Press; as described in R. Harris and F. Marston, "Estimating Shareholder Risk Premia Using Analysts' Growth Forecasts," *Financial Management*, Summer 1992, p. 64.

1 In 2004, the Carleton and Vander Weide study was updated to determine whether
2 analysts' earnings growth forecasts are still significant in the stock valuation
3 process. The results of that updated study continued to demonstrate the
4 importance of analysts' earnings forecasts, including the application of those
5 forecasts to utility companies.¹⁴ Here again, the finding was clear: analysts'
6 earnings forecasts are highly related to stock price valuations and, therefore, are
7 appropriate inputs to stock valuation and ROE estimation models. In addition,
8 Dr. Roger Morin cites several published studies which demonstrate that growth
9 forecasts made by securities analysts represent an appropriate source of DCF
10 growth rates and are reasonable indicators of investor expectations.¹⁵

11 **Q17. Do you agree with Mr. Rothschild's method of applying a multi-stage growth**
12 **rate approach?**

13 A17. No. At pages 36-37 of his testimony, Mr. Rothschild describes his multi-stage
14 growth rate approach as being a combination of dividend growth and book value
15 growth rates. Thus, his multi-stage analysis simply ignores earnings growth
16 forecasts rather than using a second stage to even out any possible over- or under-
17 estimates in a first stage. In my opinion, if one has any doubts about the
18 sustainability of analysts' earnings growth rate forecasts, it is more appropriate to
19 combine the analysts' growth forecasts with retention growth (b x r) forecasts which
20 are a minimum level of growth that is sustainable indefinitely. That is what I did in

¹⁴ Advanced Research Center, Investor Growth Expectations, Summer, 2004.

¹⁵ Morin, Roger T., New Regulatory Finance, p, 298.

1 the Blended Growth analysis in my filed Direct Testimony on Exh. No. JSG-2,
2 Schedule 4, page 7. That multi-stage growth analysis indicates a significantly higher
3 cost of equity than Mr. Rothschild's unusual multi-stage approach.

4 **V. FLOTATION COST ADJUSTMENT**

5 **Q18. Does Mr. Rothschild recommend a flotation cost adjustment?**

6 A18. No he does not. Mr. Rothschild claims that because gas companies currently are
7 selling at a market price that is approximately 100 percent above book value, a
8 common equity financing cost allowance is not necessary.¹⁶ However, Mr.
9 Rothschild is overlooking the effect of equity financing on the market value of the
10 investors' common equity. Although the book value can increase when new shares
11 are issued, the effect on the *market* value of the stock is far more relevant. If MDU
12 Resources invests the funds in a regulated operation that has a market value equal to
13 book value, it drives down the market value of existing investors' stock. Thus, in the
14 absence of a flotation cost adjustment to the investor-required return, Mr.
15 Rothschild's recommendation would be relying on MDU Resources' investors to
16 cross-subsidize the Montana-Dakota gas distribution operations by forfeiting a
17 portion of the *market* value of their unregulated operations if there is a need to issue
18 stock to finance the Montana-Dakota distribution operations.

¹⁶ Direct Testimony of Aaron L. Rothschild, at 42.

1 VI. MR. ROTHSCHILD'S CONTENTIONS WITH YOUR MARKET DCF
2 ANALYSIS AND RISK PREMIUM ANALYSIS

3 Q19. Please summarize Mr. Rothschild's disagreement with your Market DCF
4 analysis.

5 A19. Mr. Rothschild states that my Market DCF analysis is likely overstating the market
6 required cost of equity for the S&P 500 since I did not use retention growth rates.¹⁷

7 Q20. Do you agree that your Market DCF is overstated?

8 A20. No, I do not. As noted above, analysts' earnings growth rate forecasts are a superior
9 measure of the long-term growth rate expectations that are reflected in stock prices.
10 My approach to conducting a market DCF is virtually identical to one adopted by
11 the Federal Regulatory Energy Commission ("FERC") in a recent order. In
12 response to arguments similar to those proffered by Mr. Rothschild in this
13 proceeding, the FERC concluded:

14 We are also unpersuaded that the growth rate projection in the
15 NETOs' CAPM study was skewed by the NETOs' reliance on
16 analysts' projections of non-utility companies' medium-term
17 earnings growth, or that the study failed to consider that those
18 analysts' estimates reflect unsustainable short-term stock repurchase
19 programs and are not long-term projections. As explained above, the
20 NETOs based their growth rate input on data from IBES, which the
21 Commission has found to be a reliable source of such data. Thus, the
22 time periods used for the growth rate projections in the NETOs'
23 CAPM study are the time periods over which IBES forecasts
24 earnings growth. Petitioners' arguments against the time period on
25 which the NETOs' CAPM analysis is based are, in effect, arguments
26 that IBES data are insufficient in a CAPM study.¹⁸

¹⁷ Direct Testimony of Aaron L. Rothschild, at 55-56.

¹⁸ 150 FERC ¶ 61,165, Docket Nos. EL11-66-002, Opinion No. 531-B, para. 112.

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While an individual company cannot be expected to sustain high short term growth rates in perpetuity, the same cannot be said for a stock index like the S&P 500 that is regularly updated to contain only companies with high market capitalization, and the record in this proceeding does not indicate that the growth rate of the S&P 500 stock index is unsustainable.¹⁹

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For good reason, the FERC did not agree with the argument that analysts'

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projections for the S&P 500 are unsustainable.

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Q21. At page 6, line 9 to page 7, line 4 of his testimony, Mr. Rothschild maintains

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that the stock market is high by historical standards and that the Federal

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Reserve Board has been artificially manipulating interest rates to drive down

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yields on U.S. Treasury debt. What does this mean for the cost of common

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equity for gas distribution companies?

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A21. The DCF cost of equity results for regulated gas distribution companies is being

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affected by artificial factors in the current and projected capital markets including

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the following two key factors: (1) the Federal Reserve's continuing accommodative

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monetary policy; and (2) the market's expectation for substantially higher interest

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rates.

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As to the Federal Reserve's continuing accommodative monetary policy, in

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October 2014, the Federal Open Market Committee ("FOMC") ended its

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Quantitative Easing program, which provided extraordinary monetary stimulus

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for the U.S. economy over the last few years through asset purchases of

¹⁹ *Id.* at para. 113.

1 mortgage-backed securities and Treasury bonds. However, the Federal Reserve's
2 accommodative policy continues today. For example, the FOMC recently noted,
3 "[the FOMC's] policy, by keeping the Committee's holdings of longer-term
4 securities at sizable levels, should help maintain accommodative financial
5 conditions."²⁰

6 Specifically, in December 2014, the FOMC's policy statement indicated that
7 future changes in short-term interest rates would depend on maintaining a
8 reasonable balance between the level of unemployment and inflation. In June
9 2015, the FOMC noted that, "with appropriate policy accommodation, economic
10 activity will expand at a moderate pace, with labor market indicators continuing
11 to move toward levels the Committee judges consistent with its dual mandate [of
12 fostering maximum employment and price stability]."²¹ The FOMC further noted
13 that it expects inflation to increase over the medium term.²²

14 In addition to the stated expectations of the FOMC, market analysts are expecting
15 increases in interest rates in the short and medium term. The June 1, 2015 issue
16 of Blue Chip Financial Forecast surveyed market participants concerning their
17 views regarding the timing of possible future rate increases by the Federal
18 Reserve. Blue Chip reports that, "[t]he vast majority of our panelists continue to
19 believe the Federal Reserve's Open Market Committee (FOMC) will begin to
20 gradually increase its overnight policy rate this year, most likely starting at its

²⁰ Minutes of the Federal Open Market Committee, June 16-17, 2015, at 10.

²¹ Minutes of the Federal Open Market Committee, June 16-17, 2015, at 11.

²² *Ibid.*

1 September 16th-17th meeting and hiking again at the December 15th-16th
2 meeting.”²³ The 30-day average yield on the 30-year U.S. Treasury bond as of
3 June 30, 2015 was 3.07 percent. By contrast, the Blue Chip consensus estimate
4 projects that the average yield on the 30-year U.S. Treasury bond will increase to
5 4.80 percent for the period from 2017 through 2021.²⁴ Thus, the consensus
6 estimate from leading economists is for an increase of 173 basis points in U.S.
7 Treasury bond yields over the next several years.

8 Rising interest rates have historically had a negative effect on stock prices. When
9 interest rates begin to rise, the return on gas utility equities may be less attractive
10 to investors as compared with other investments of comparable risk. The
11 market’s expectation for rising interest rates suggests that the calculated cost of
12 equity for the proxy companies using current market data is likely to be an
13 artificially depressed estimate of investors’ required return at this time. For
14 example, Chart 4 on page 13 of Mr. Rothschild’s testimony suggests that the
15 market has begun responding to the expectation of higher interest rates as stock
16 prices for the proxy companies have plunged in the past approximately six
17 months.

18 Currently, the DCF model results are also influenced by the above-described
19 artificial and abnormal market conditions that are not expected to be sustained.

20 To the extent that relatively high proxy company stock valuations during the past

²³ Blue Chip Financial Forecasts, Volume 34, No. 6, June 1, 2015, at 1.

²⁴ Blue Chip Financial Forecasts, Vol. 34, No. 6, June 1, 2015, at 14.

1 year are abnormal and not sustainable, there is a downward bias in Mr.
 2 Rothschild's 12-month average DCF results and possibly even his June 30, 2015
 3 spot price analysis. Furthermore, the market's expectation that interest rates will
 4 begin increasing later in 2015, the second key factor noted above, supports
 5 selection of a return toward the upper end of a reasonable range of equity cost rate
 6 estimates even before taking account of the above-average risks associated with
 7 Montana-Dakota's North Dakota natural gas distribution operations.

8 **Q22. At page 3, lines 11-12 or his testimony, Mr. Rothschild argues that proxy**
 9 **companies are less risky than the overall market because they have a lower**
 10 **beta. What does Mr. Rothschild's proxy company beta mean for the cost of**
 11 **capital for the gas distribution companies?**

12 **A22. Beta is frequently used as the measure of relative risk in the capital asset pricing**
 13 **model ("CAPM"). If one gives credence to Mr. Rothschild's beta analysis we can**
 14 **insert his proxy company beta into a CAPM model to get the following results:**

15 **Table 2: LDC CAPM Cost of Equity²⁵**

S&P Current Required Return	12.72
Less: July '15 T-Bond Yield	3.07
Market Risk Premium	9.65
x ALR-3, p. 3 Beta	0.78
LDC Risk Premium	7.53
Plus: July '15 T-Bond Yield	3.07
LDC CAPM Cost of Eq.	10.60

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²⁵ S&P required return is from Direct Testimony of J. Stephen Gaske, JSG-2, Schedule 5, page 1.

1 Thus, if one were to use Mr. Rothschild's beta analysis in the CAPM as a
2 benchmark of a reasonable return, this benchmark of 10.60 percent supports the
3 recommended return of 10.00 percent in this proceeding.²⁶

4 **Q23. Do you agree with Mr. Rothschild's contention at page 3 of his testimony that**
5 **the Ibbotson and Charles Schwab forecasts of long-term market returns**
6 **indicate the required rate of return in the market at the current time?**

7 A23. No. Predicted average earned returns are different from *required* returns. There are
8 three different concepts of expected return at play here. There is the required rate of
9 return on company assets that investors need to expect in order to buy common
10 stocks; this return comes in the form of dividends and growth in dividends and is the
11 "return" that we are trying to estimate in this proceeding. Second, there is the return
12 that the company is expected to earn on its hard assets. This "return" is net income
13 to the company that can either be reinvested by the company or paid out in
14 dividends. For example, in column 7, of Schedule ALR-3, page 2, Mr. Rothschild
15 indicates that the median proxy company is expected to earn 11.00 percent on its
16 invested equity. And, third, there is the return that stockholders actually achieve as
17 they "play" the market and attempt to buy low and sell high (while often achieving
18 the reverse). That is the "return" being forecasted by Ibbotson and Charles Schwab.

²⁶ This CAPM calculation is identical to the one adopted by the U.S. Federal Energy Regulatory Commission earlier this year. *Martha Coakley, et al. v. Bangor Hydro-Electric Company, et al.*, Opinion No. 531, 147 FERC ¶61,234 (2014); *aff'd* in Opinion No. 531-B, 150 FERC ¶61,165 (March 3, 2015). Note that FERC used the CAPM only as a benchmark, but set the allowed rate of return above the median indicated by a DCF analysis of proxy companies because of the current abnormal financial market conditions.

1 My DCF analysis of the S&P 500 indicates the level of the first type of return --
2 the return currently *required* in the broad market to get investors to buy stock and
3 to invest the proceeds in hard assets such as distribution system plant.

4 However, if investors expect the lower returns on buying and selling stock
5 predicted by Ibbotson and Charles Schwab – the third type of “return” – to be
6 correct, the unusually high current stock valuations described at page 6, lines 9-16
7 of Mr. Rothschild’s testimony will not be sustained in the long run and investors
8 who buy stocks at these prices are likely to be disappointed in the returns they
9 achieve by buying and selling the soft asset common stocks. In other words,
10 Ibbotson and Charles Schwab expect that the abnormally high stock prices at the
11 current time will lead to a correction in which investors will reduce the prices that
12 they pay for stocks to a level at which they can expect to earn their required
13 return. By reducing stock prices the lower returns on holding stocks will occur
14 because of capital losses on the stock price, but the returns in terms of dividends
15 and growth in dividends required to attract investment in utility or other hard
16 assets generally will be unaffected by fluctuations in the prices of soft assets such
17 as common stocks.

18 **Q24. Do you agree with Mr. Rothschild’s contentions regarding your equity risk**
19 **premium analysis?**

20 A24. No, I do not. Mr. Rothschild suggests that I overstate the required risk premium
21 because I use an arithmetic average return instead of a geometric. However, there is
22 a fundamental difference between (i) measuring historical and/or projected average
23 returns *achieved*, and (ii) establishing an *allowed* rate of return. For any data series

1 that has rates of return that fluctuate from year to year, the geometric mean rate of
 2 return will be less than the arithmetic mean growth rate. For example, assume that
 3 two investments have the same arithmetic average return, but Series A earns the
 4 same amount every year and Series B has a return that varies significantly from year
 5 to year:

6 **Table 3: Arithmetic vs. Geometric Mean**

Period	Series A Constant Returns		Series B Variable Returns	
	Return	Value	Return	Value
0		\$1,000		\$1,000
1	15.00%	\$1,150	0.00%	\$1,000
2	15.00%	\$1,323	15.00%	\$1,150
3	15.00%	\$1,521	30.00%	\$1,495
3-Year Arithmetic Average	15.00%		15.00%	
3-Year Geometric Average		15.00%		14.34%

Note: Geometric Avg. = $((V_3/V_0)^{(1/3)}) - 1$

7
 8 As this example demonstrates, if the returns are the same every year (e.g., 15.00
 9 percent) the Arithmetic average return and the Geometric average return both will
 10 be 15.00 percent. However, if the return is variable from year to year, the
 11 Arithmetic average return (15.00 percent) will be greater than the Geometric
 12 average return (14.34 percent).

13 When one wants to measure the overall average return earned over a period of *past*
 14 years, it is usually the Geometric mean growth rate that one would calculate.
 15 Similarly, if one wanted to project an ending value for an investment over a period
 16 of years, one would also use a Geometric average growth rate for this purpose.

1 However, if the object is to set an allowed rate of return that will give a company a
2 reasonable opportunity to achieve a specific geometric average rate of return in the
3 future, the Arithmetic average return is the correct method to use in setting an
4 *allowed* rate of return or risk premium.

5 **Q25. Can you illustrate what would happen if regulators were to set the allowed rate**
6 **of return based on the arithmetic average historical return?**

7 A25. To illustrate this point, I have prepared Exhibit No.____(JSG-4), Schedule 1 that
8 compares the results that would occur if the allowed rate of return was re-set every
9 three years to correspond to the historic average rate of return during the prior three
10 years. Page 1 of this exhibit shows that an allowed rate of return that is initially
11 based on the historic *arithmetic* average rate of return, 15 percent, will produce a
12 *geometric* average rate of return of 14.71 percent after three years. If the allowed
13 rate of return in the fourth year is set to 15 percent, i.e., equal to the *arithmetic*
14 average rate of return during years 1-3, the company again will earn a *geometric*
15 average rate of return of 14.71 percent. In this example, the pattern would continue
16 for 30 years and the company would achieve a *geometric* average rate of return of
17 14.71 percent over the 30-year period. Note, however, that in order to achieve the
18 historic geometric average rate of return of 14.71 percent, the regulator needed to
19 repeatedly set the allowed rate of return equal to 15.00 percent, which was the
20 *arithmetic* average rate of return.

21 **Q26. What would happen if the regulator took Mr. Rothschild's advice and used the**
22 **geometric average rate of return as the standard for allowed rates of return?**

1 A26. That result is demonstrated on page 2 of Exhibit No.__(JSG-4) Schedule 1. As in
2 the preceding example, the regulator initially observes that historically the *arithmetic*
3 average rate of return has been 15.00 percent and the *geometric* average rate of
4 return has been 14.71 percent. However, this time the regulator takes Mr.
5 Rothschild's advice and uses the *geometric* average rate of return to set the allowed
6 rate of return equal to 14.71 percent. After three years the company achieves an
7 *arithmetic* average rate of return 14.71 percent and a *geometric* average rate of
8 return of only 14.42 percent. Seeing the obvious failure of the company to achieve
9 the intended 14.71 percent *geometric* average rate of return during the first three
10 years, the regulator could again take Mr. Rothschild's advice and base a new
11 allowed rate of return for years 4-6, on the observed *geometric* average rate of return
12 from the first three years: 14.42 percent. However, the *geometric* average rate of
13 return achieved during years 4-6 would be only 14.12 percent. After repeated
14 iterations of setting allowed rates of return based on *geometric* average data, the
15 company would be realizing a *geometric* average rate of return of only 11.76 percent
16 in years 28-30 – which is considerably less than the *geometric* average rate of return
17 that the regulator intended.

18 Obviously this example is exaggerated and no regulator would actually set returns
19 in the manner depicted. However, this example serves to illustrate that one must
20 use *arithmetic* average returns and risk premiums in setting or evaluating an
21 allowed rate of return.

1 **VIII. RELATIVE RISK OF MONTANA-DAKOTA'S NORTH DAKOTA**
2 **OPERATIONS**

3 **Q27. Please summarize your areas of disagreement with Mr. Rothschild concerning**
4 **the relative business and regulatory risks associated with Montana-Dakota's**
5 **North Dakota natural gas distribution operations.**

6 A27. There are four primary areas of disagreement regarding Mr. Rothschild's risk
7 assessment for Montana-Dakota's North Dakota natural gas distribution operations.
8 Specifically, Mr. Rothschild: (1) disagrees that the Montana-Dakota's overall risks
9 are higher than the proxy group; (2) claims that the proxy companies are riskier than
10 Montana-Dakota's North Dakota natural gas distribution business because they have
11 more revenues from unregulated operations; and (3) argues that Montana-Dakota's
12 small size does not indicate greater overall risk.²⁷ In addition, Mr. Rothschild does
13 not take into consideration the fact that Montana-Dakota's North Dakota operations
14 has much greater relative capital expenditures than the proxy companies.

15 **Q28. Please explain Mr. Rothschild's contention that Montana-Dakota's overall risk**
16 **is lower than that of the proxy group.**

17 A28. Mr. Rothschild comes to this conclusion by showing the unregulated revenues of the
18 proxy group companies. His Table 4 shows that on average, 40 percent of the
19 revenues of the proxy companies are non-regulated and thus the proxy group is
20 likely in a higher risk category than Montana-Dakota's North Dakota gas utility
21 operation. He states that because of this, the ROE used to set rates for Montana-

²⁷ Direct Testimony of Aaron L. Rothschild, at 44-48.

1 Dakota natural gas consumers should be no higher than the median results from the
2 DCF cost of equity estimates based on the proxy group.

3 **Q29. Do you agree with Mr. Rothschild's contentions?**

4 A29. No I do not. First of all, my proxy group was selected based on assets and income
5 because those are much better indicators of value than revenues. Most local
6 distribution companies buy and sell the natural gas commodity on a pass-through
7 basis that adds nothing to their earnings. Because the cost of gas is a large part of
8 the overall cost of the service, the revenues of the utility can be inflated by gas costs
9 without any commensurate increase in earnings potential. Thus, the percentage of
10 revenues associated with regulated operations can be an unreliable measure of the
11 attributes that are relevant for investors. As can be seen in Table 4 below, the
12 average proxy company has more than 85 percent of its income and assets associated
13 with regulated operations.

1 **Table 4: Proxy Regulated vs. Unregulated Assets and Income²⁸**

Company	Ticker	Regulated	Unregulated	Regulated	Unregulated
		Income	Income	Assets	Assets
AGL Resources Inc.	GAS	52%	48%	81%	19%
Atmos Energy Corporation	ATO	91%	9%	117%	-17%
Laclede Group, Inc. (The)	LG	98%	2%	89%	11%
New Jersey Resources Corporation	NJR	64%	36%	73%	27%
Northwest Natural Gas Company	NWN	100%	0%	99%	1%
Piedmont Natural Gas Company, Inc.	PNY	100%	0%	96%	4%
South Jersey Industries, Inc.	SJI	89%	11%	65%	35%
Southwest Gas Corporation	SWX	85%	15%	89%	11%
WGL Holdings, Inc.	WGL	93%	7%	82%	18%
Average		86%	14%	88%	12%

2

3 Secondly, the majority of the unregulated operations of the proxy group companies
4 consist of gas marketing operations, as shown in Table 5 below. Thus, a proxy company
5 that buys and sells gas on an unregulated basis is similar to Montana-Dakota's natural
6 gas distribution division which buys and sells gas for its customers on a pass-through
7 basis. Although the cost of gas for marketing operations inflates the amount of
8 unregulated revenue, the important point is that these companies have most of their
9 investment in regulated operations and derive most of their income from regulated
10 operations.

²⁸ Company 2014 10k's. Atmos Energy Corporation's Regulated Asset percentage is greater than 100 percent due to negative eliminations used in the calculation of Total Assets.

1

Table 5: Proxy Companies Unregulated Operations

Company	Ticker	Gas Marketing
AGL Resources Inc.	GAS	Yes
Atmos Energy Corporation	ATO	Yes
Laclede Group, Inc. (The)	LG	Yes
New Jersey Resources Corporation	NJR	Yes
Northwest Natural Gas Company	NWN	No
Piedmont Natural Gas Company, Inc.	PNY	No
South Jersey Industries, Inc.	SJI	Yes
Southwest Gas Corporation	SWX	No
WGL Holdings, Inc.	WGL	Yes

2

3 **Q30. Please explain your disagreement with Mr. Rothschild's assessment of the**
4 **Company's business risk associated with small size.**

5 A30. Mr. Rothschild disagrees that there is significant risk associated with the small size
6 of the Montana-Dakota's North Dakota natural gas distribution operations compared
7 to the proxy group. Specifically, Mr. Rothschild contends that: 1) Montana-
8 Dakota's North Dakota gas utility operation is not a stand-alone company; 2) the
9 evidence for the "size effect" is mixed; and 3) MDU Resources is more liquid than
10 the proxy group as measured by turnover rate.

11 **Q31. Should Montana-Dakota's North Dakota natural gas distribution operations be**
12 **evaluated on a stand-alone basis?**

13 A31. Yes. Many state regulatory commissions have determined that the objective of a
14 rate case is to establish the cost of equity for the jurisdictional utility as if it were a
15 stand-alone entity. One advantage of this approach for ratepayers is that if the parent
16 company also is engaged in higher risk non-regulated activities, the risk of those
17 operations are not included in the cost of equity for the regulated utility. In that way,

1 Commissions are able to insulate ratepayers from the risks associated with those
2 higher risk non-jurisdictional activities. For example, the Commission stated in a
3 1990 Montana-Dakota rate decision that:

4 Fitzpatrick's analysis focused on the parent company, MDU
5 Resources Group, rather than on the North Dakota gas operations. As
6 testified to by Dobesh and admitted by Fitzpatrick, the risk of the
7 parent company here has been elevated due to difficulties with its
8 Williston Basin Pipeline business. ... Therefore, the Commission
9 agrees with Dobesh's recommendation that MDU's cost of common
10 equity be 12 percent which is the higher of the two cost of equity
11 estimates discussed by Dobesh for MDU's gas distribution business
12 in North Dakota.²⁹

13 The logic of evaluating utility operations on a stand-alone basis also makes sense
14 when one considers the implications for operations that might be spun off or
15 merged. For example, if the North Dakota natural gas distribution operations
16 were to be spun off, the risks of constructing distribution mains and providing
17 service in that jurisdiction would not change. Nor would the risk of investing in
18 North Dakota distribution facilities change if the company is purchased by some
19 other entity.

20 **Q32. Do you agree with Mr. Rothschild's claim that smaller companies do not face**
21 **greater risks?**

22 A32. Mr. Rothschild disagrees that there is significant risk associated with the small size
23 of the Montana-Dakota's North Dakota natural gas distribution operations compared
24 to the proxy group. Specifically, Mr. Rothschild contends that small size is not a
25 relevant risk for Montana-Dakota's North Dakota natural gas distribution operations

²⁹ Order in Case No. PU-399-90-820 page 7, lines 26-27.

1 because "(a)s a subsidiary, Montana-Dakota does not have the risk profile of a small
2 company because it has access to the resources of its parent, MDU Resources,
3 Inc."³⁰

4 I disagree with Mr. Rothschild's position on this issue because the purpose of this
5 proceeding is to establish the authorized ROE for Montana-Dakota's North
6 Dakota natural gas distribution business as if that business were a stand-alone
7 entity that is independently going to the capital markets to raise equity capital in
8 order to serve North Dakota jurisdictional customers. In that regard, as explained
9 in my Prepared Direct Testimony, Montana-Dakota's North Dakota natural gas
10 distribution operations are considerably smaller than the operations of any of the
11 proxy companies and a small fraction of the typical proxy company.³¹ Mr.
12 Rothschild's analysis has not accounted for the risks associated with small size,
13 which I have estimated might require a return that is more than 100 basis points
14 higher than the return required for the typical proxy company.³²

15 Morningstar (formerly Ibbotson Associates) has documented the significantly higher
16 returns that are generally associated with utilities that have small market
17 capitalizations. Specifically, a senior consultant with Ibbotson Associates noted:

18 For small utilities, investors face additional obstacles, such as smaller
19 customer base, limited financial resources, and a lack of
20 diversification across customers, energy sources, and geography.
21 These obstacles imply a higher investor return.³³

³⁰ Direct Testimony of Aaron L. Rothschild, at 47, lines 12-14.

³¹ Prepared Direct Testimony of J. Stephen Gaske, at 28.

³² Prepared Direct Testimony of J. Stephen Gaske, at 30.

³³ Michael Annin, *Equity and the Small-Stock Effect*, Public Utilities Fortnightly, October 15, 1995.

1 Similarly, Fama and French found that firm size is one of the most significant
2 factors affecting the returns on stocks, with higher returns strongly associated
3 with smaller firms.³⁴ For these reasons, it is appropriate to select an authorized
4 ROE above the midpoint of the range of reasonableness, as I have done, to
5 account for the Company's small size.

6 Mr. Rothschild's approach would violate the well-established regulatory principle
7 that a utility's rates should be set on a stand-alone basis without receiving or
8 providing subsidies to affiliated companies. The risks and cost of capital the
9 North Dakota natural gas distribution operations would be the same whether
10 MDU Resources continued to own these operations, or spun them off into a
11 separate company. Thus, his suggestion that the cost of capital is somehow less
12 because of the consolidated risks of the utility's owner is incorrect.

13 **Q33. Do you agree with Mr. Rothschild's analysis and contentions on page 46 of his**
14 **testimony that MDU Resources is more liquid than the average of the proxy**
15 **group companies and is therefore less risky than the proxy group companies?**

16 **A33.** No, I do not. First of all, his analysis of MDU Resources' liquidity is misplaced
17 because we are not setting a rate of return for the diversified company MDU
18 Resources in this proceeding. Instead, according to Mr. Rothschild's measure of
19 liquidity risk, Montana-Dakota's North Dakota division has zero liquidity because it

³⁴ Fama and French, "The Cross-Section of Expected Stock Returns," Journal of Finance, Vol. XLVII, No. 2, June 1992, 427-465.

1 does not trade at this time. Moreover, if the North Dakota gas distribution business
2 were a stand-alone company its liquidity likely would be low as well.

3 In addition, Mr. Rothschild quotes text from an unpublished working paper by A.
4 Damadoran, but he appears to have misunderstood the significance of Damadoran's
5 arguments concerning size premiums.

6 If, as is the practice now, we add a small cap premium of between
7 4% to 5% to the cost of equity of small companies, without
8 attributing this premium to any specific risk factor, we are exposed to
9 the risk of double counting risk. For instance, assume that the small
10 cap premium that we have observed over the last few decades is
11 attributable to the lower liquidity (and higher transactions costs) of
12 trading small cap stocks. ... If we attach an illiquidity discount to this
13 value, we are double counting the effect of illiquidity.³⁵

14 According to Damadoran, it is *common* to add a risk premium onto the estimated
15 rate of return for small companies. But Damadoran believes there may be several
16 different risk features embedded in the size premium and therefore recommends that
17 investors look for the sub-components contributing to the size premium. Moreover,
18 he warns against adding both a size premium and a liquidity premium to the cost of
19 capital because the size premium probably already reflects a liquidity premium.
20 However, I am not proposing to add a liquidity premium and therefore would not
21 make the mistake of double-counting a liquidity premium that Damadoran warns
22 against. Instead, my analysis of size risk is consistent with the economic literature
23 and does not attempt to further measure all of the different factors that might cause
24 investors to require a size premium for investing in small companies. Such an

³⁵ A. Damadoran, "Equity Risk Premiums (ERP): Determinants, Estimates and Implications (paper updated March 2015), p. 41.

1 analysis, if it were possible, is not necessary for the analysis of the cost of capital
2 that I have conducted here.

3 **Q34. Have other Commission's previously recognized that the small size of gas**
4 **distribution operations leads to greater risks than the proxy companies?**

5 A34. Yes. In Order No. 5856b in Docket No. D95.7.90 issued in 1996, the Montana
6 Public Service Commission concluded:

7 In the area of business risk MDU's smaller revenue base, compared
8 to that of the sample group, increases its risk, because MDU has a
9 smaller proportion of return available to absorb fixed costs during
10 period of economic downturns. ... [para. 26]

11 In addition, the FERC recognized that small size could provide for greater risk:

12 We disagree with Petitioners' argument that the NETOs' CAPM
13 analysis is flawed due to the fact that the NETOs applied a size
14 adjustment to account for the difference in size between the NETOs
15 and the dividend-paying companies in the S&P 500. This type of size
16 adjustment is a generally accepted approach to CAPM analyses, and
17 we are not persuaded that it was inappropriate to use a size
18 adjustment in this case. The purpose of the NETOs' size adjustment
19 is to render the CAPM analysis useful in estimating the cost of equity
20 for companies that are smaller than the companies that were used to
21 determine the market risk premium in the CAPM analysis.³⁶

22 **Q35. What other important risks of Montana-Dakota's North Dakota natural gas**
23 **distribution operations does Mr. Rothschild fail to take into consideration?**

24 A35. Montana-Dakota's North Dakota natural gas distribution operations has much
25 greater relative capital expenditures than the proxy companies. As provided in
26 response to the Commission's Data Request 4-10 and in Table 6 below, Montana-

³⁶ FERC Opinion No. 531-B, para. 117.

1 Dakota's North Dakota division had capital expenditures that were equal to 18.89
2 percent of its total assets, as compared to the proxy group average of 7.35 percent.

3 **Table 6: Capital Expenditures of the Proxy Companies as a Percentage of Total**
4 **Assets³⁷**

Company	Ticker	Capital		Capital Expenditure
		Expenditure [1]	Total Assets [1]	as a Percentage of Total Assets (%)
AGL Resources Inc.	GAS	\$ 769,000	\$ 14,909,000	5.16%
Atmos Energy Corporation	ATO	\$ 835,251	\$ 8,594,704	9.72%
Laclede Group, Inc.	LG	\$ 171,000	\$ 5,074,000	3.37%
New Jersey Resources Corporation	NJR	\$ 264,976	\$ 3,158,804	8.39%
Northwest Natural Gas Company	NWN	\$ 120,092	\$ 3,064,945	3.92%
Piedmont Natural Gas Company, Inc.	PNY	\$ 460,444	\$ 4,784,253	9.62%
South Jersey Industries, Inc.	SJI	\$ 342,578	\$ 3,349,425	10.23%
Southwest Gas Corporation	SWX	\$ 396,898	\$ 5,214,515	7.61%
WGL Holdings, Inc.	WGL	\$ 394,762	\$ 4,856,499	8.13%
	Average			7.35%
MDU Resources Group, Inc.	MDU	\$ 972,102	\$ 7,809,978	12.45%
MDU - North Dakota Division		\$ 21,623	\$ 114,487	18.89%

5
6 In order for Montana-Dakota's North Dakota division to sustain its high levels of
7 investment in needed infrastructure it is important that it is able to attract capital
8 on reasonable terms. Mr. Rothschild's recommended return on equity of 8.62
9 percent would discourage such investments.

10 **Q36. How does Mr. Rothschild's failure to consider relevant business and regulatory**
11 **risks affect his ROE recommendation for Montana-Dakota's North Dakota**
12 **natural gas distribution operations?**

13 **A36. By failing to consider relevant risks, such as those discussed in my Prepared Direct**
14 **Testimony, Mr. Rothschild's ROE recommendation is not based on an appropriate**

³⁷ SNL Financial, 2014 Figures, MDU-ND Gas Rate Filing

1 comparison of the business and financial risks of Montana-Dakota's North Dakota
2 natural gas distribution operations relative to the proxy group companies. Had Mr.
3 Rothschild appropriately accounted for the higher business and regulatory risks of
4 Montana-Dakota's North Dakota natural gas distribution operations, his ROE
5 recommendation would have been significantly higher than the mean of his DCF
6 result for the proxy group.

7 **Q37. Please summarize your Rebuttal Testimony.**

8 A37. The return on common equity recommended by Mr. Rothschild is inadequate to
9 meet the tests of a reasonable rate of return because it is based on flawed analyses
10 and is substantially lower than the authorized ROEs for other natural gas distribution
11 utilities, many of which have lower business and regulatory risk than Montana-
12 Dakota's North Dakota natural gas distribution operations. In summary, Mr.
13 Rothschild has underestimated the risks that investors perceive in regard to the
14 Company's natural gas distribution operations in North Dakota. By contrast, the
15 evidence presented in my Prepared Direct Testimony supports the reasonableness of
16 my recommended ROE of 10.0 percent.

17 **Q38. Does this conclude your Prepared Rebuttal Testimony?**

18 A38. Yes.

Allowed Return Based on Arithmetic Average
 Historical Results Produces Expected Return

Historical Return in the Beginning				15.000%	14.709%	0.1000
Year	Arithmetic Allowed Return	Investment Value	One-Year Actual Return	3-Year Results:		
				Arithmetic Mean	Geometric Mean	Standard Deviation
0		1.00				
1	15.00%	1.15	15.000%			
2	15.00%	1.44	25.000%			
3	15.00%	1.51	5.000%	15.000%	14.709%	0.1000
4	15.00%	1.74	15.000%			
5	15.00%	2.17	25.000%			
6	15.00%	2.28	5.000%	15.000%	14.709%	0.1000
7	15.00%	2.62	15.000%			
8	15.00%	3.27	25.000%			
9	15.00%	3.44	5.000%	15.000%	14.709%	0.1000
10	15.00%	3.95	15.000%			
11	15.00%	4.94	25.000%			
12	15.00%	5.19	5.000%	15.000%	14.709%	0.1000
13	15.00%	5.97	15.000%			
14	15.00%	7.46	25.000%			
15	15.00%	7.83	5.000%	15.000%	14.709%	0.1000
16	15.00%	9.01	15.000%			
17	15.00%	11.26	25.000%			
18	15.00%	11.82	5.000%	15.000%	14.709%	0.1000
19	15.00%	13.60	15.000%			
20	15.00%	17.00	25.000%			
21	15.00%	17.85	5.000%	15.000%	14.709%	0.1000
22	15.00%	20.52	15.000%			
23	15.00%	25.66	25.000%			
24	15.00%	26.94	5.000%	15.000%	14.709%	0.1000
25	15.00%	30.98	15.000%			
26	15.00%	38.72	25.000%			
27	15.00%	40.66	5.000%	15.000%	14.709%	0.1000
28	15.00%	46.76	15.000%			
29	15.00%	58.45	25.000%			
30	15.00%	61.37	5.000%	15.000%	14.709%	0.1000
30-Year Average				15.000%	14.709%	0.0830

NOTE: Allowed Return Based on Average Arithmetic Return for the most recent 3 years.

**Allowed Return Based on Geometric Average
 Historical Results Produces Less Than Expected Return**

Historical Return in the Beginning				15.000%	14.709%	0.1000
Year	Geometric Allowed Return	Investment Value	One-Year Actual Return	3-Year Results:		
				Arithmetic Mean	Geometric Mean	Standard Deviation
0		1.00				
1	14.71%	1.15	14.709%			
2	14.71%	1.43	24.709%			
3	14.71%	1.50	4.709%	14.709%	14.418%	0.1000
4	14.42%	1.71	14.418%			
5	14.42%	2.13	24.418%			
6	14.42%	2.23	4.418%	14.418%	14.126%	0.1000
7	14.13%	2.54	14.126%			
8	14.13%	3.15	24.126%			
9	14.13%	3.28	4.126%	14.126%	13.833%	0.1000
10	13.83%	3.74	13.833%			
11	13.83%	4.63	23.833%			
12	13.83%	4.81	3.833%	13.833%	13.539%	0.1000
13	13.54%	5.46	13.539%			
14	13.54%	6.74	23.539%			
15	13.54%	6.98	3.539%	13.539%	13.245%	0.1000
16	13.24%	7.91	13.245%			
17	13.24%	9.74	23.245%			
18	13.24%	10.06	3.245%	13.245%	12.950%	0.1000
19	12.95%	11.36	12.950%			
20	12.95%	13.97	22.950%			
21	12.95%	14.38	2.950%	12.950%	12.654%	0.1000
22	12.65%	16.20	12.654%			
23	12.65%	19.87	22.654%			
24	12.65%	20.40	2.654%	12.654%	12.357%	0.1000
25	12.36%	22.92	12.357%			
26	12.36%	28.04	22.357%			
27	12.36%	28.71	2.357%	12.357%	12.060%	0.1000
28	12.06%	32.17	12.060%			
29	12.06%	39.26	22.060%			
30	12.06%	40.07	2.060%	12.060%	11.761%	0.1000
30-Year Average				13.389%	13.091%	0.0835

NOTE: Allowed Return Based on Average Geometric Return for the most recent 3 years.