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**SUMMARY OF PREPARED DIRECT TESTIMONY  
OF  
BENTE VILLADSEN**

Dr. Bente Villadsen provides direct testimony before the Federal Energy Regulatory Commission (“FERC” or “the Commission”) on behalf of Northern Natural Gas Company (“Northern”) on the matters of return on equity (ROE”) and capital structure. Dr. Villadsen recommends a ROE of 14.2 percent, which results from the Commission’s traditional discounted cash flow (“DCF”) estimation method. It is supported by the additional methods used in the NETO Briefing Order.<sup>1</sup> She further finds that Northern’s actual capital structure of 59.4 percent equity is reasonable and consistent with that of the proxy group and FERC precedent.

In her testimony, Dr. Villadsen first defines the cost of capital, its relation to risk, and Commission precedent as it pertains to natural gas pipelines.

Second, Dr. Villadsen discusses her selection of a Core and Expanded Sample of pipeline companies that are used as proxies for Northern to assess its cost of equity and the reasonableness of the proposed capital structure. The Core Sample consists of publicly traded companies that own FERC-regulated pipelines and have substantial natural gas pipeline activity in the form of assets or income. The Expanded Sample broadens the group of pipeline companies by looking to a lower, yet still meaningful, proportion of natural gas pipeline activity. This sample serves as a check on the reasonableness of Dr. Villadsen’s Core Sample.

Third, Dr. Villadsen outlines the estimation procedures she used in this proceeding to calculate the required return on equity for Northern. She first discusses the Commission’s

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<sup>1</sup> *Coakley v. Bangor Hydro-Elec. Co.*, 165 FERC ¶ 61,030 (2018).

traditional DCF methodology before explaining the additional estimation methodologies presented in the recent NETO Briefing Order.

Fourth, Dr. Villadsen finds that the Commission's traditional DCF method results in a median ROE of 14.2 percent for the Core Sample. This figure is supported by both the results for the Expanded Sample and by the additional methodologies used in the NETO Briefing Order. The table below summarizes the results of my analysis:

### Summary Results of ROE Estimation

Sample	DCF		CAPM	Expected Earnings
	IBES Growth Rates	Weighted Average Growth Rates		
<b><u>Core Sample</u></b>				
Range	7.3% - 16.9%	9.2% - 17.6%	14.1% - 23.3%	8.6% - 19.4%
Median	<b>14.2%</b>	15.4%	17.6%	13.5%
<b><u>Expanded Sample</u></b>				
Range	7.3% - 16.9%	9.2% - 21.5%	14.1% - 25.9%	8.6% - 23.7%
Median	13.3%	15.4%	17.7%	14.8%

Based on the results in the table above, the 16.2 percent ROE resulting from Witness Jay Nigh's Risk Premium Method calculation, and Dr. Carpenter's finding that Northern has higher business risk than the median of the Core Sample, Dr. Villadsen recommends a ROE of 14.2 percent.

Lastly, Dr. Villadsen concludes that Northern's use of its actual capital structure of 59.4 percent equity and 40.6 percent debt, is reasonable. As Dr. Villadsen explains, the Commission's established precedent is to use a pipeline's own capital structure for rate making purposes so long as the pipeline (1) issues its own debt; (2) has its own separate bond rating; and (3) has an equity ratio that is not excessive in light of the other equity ratios approved by the Commission and in comparison with the equity ratios of the proxy companies. As Dr. Villadsen demonstrates, Northern's actual capital structure meets each of these criteria.

**GLOSSARY**

Bps	basis points
CAPM	capital Capital asset Asset pricing Pricing modelModel
DCF	Discounted Cash Flow
EEP	Enbridge Energy Partners
ENB	Enbridge Inc.
ENBL	Enable Midstream Partners
EPS	earnings per share
EQT	EQT Midstream Partners
MLP	Master Limited Partnership
NEB	Canadian National Energy Board
NYSE	New York Stock Exchange
ROE	return on equity
SEP	Spectra Energy Partners
TRP	TransCanada Corporation
TRSL	Thomson Reuters Spreadsheet Link
TSE	Toronto Stock Exchange
WMB	Williams Companies, Inc.
WPS	Williams Partners

**PREPARED DIRECT TESTIMONY  
OF  
BENTE VILLADSEN**

**I. INTRODUCTION AND SUMMARY**

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**Q. Please state your name, title, and business address.**

A. My name is Bente Villadsen. I am a Principal at The Brattle Group’s (“Brattle”) Boston office located at One Beacon St., Suite 2600, Boston, MA 02108, USA.

**Q. On whose behalf are you submitting testimony?**

A. I am submitting testimony on behalf of Northern Natural Gas Company (“Northern”).

**Q. Please briefly summarize your professional qualifications and educational background.**

A. I am a Principal of *The Brattle Group*, an economic, environmental, and management consulting firm with offices in Boston, Washington D.C., London, San Francisco, Madrid, Rome, New York, Toronto, Sydney, and Brussels with specialties including financial economics, regulatory economics, and the gas, water, electric, and pipeline industries. My work concentrates on regulatory finance and accounting. As a Principal, I work in the areas of cost of capital, risk, regulatory accounting, regulatory precedent and related matters for regulated entities, regulators, or investors.

I am the co-author of the text, “Risk and Return for Regulated Industries” and I have testified or filed expert reports on cost of capital in Alaska, Arizona, California, Illinois, New Mexico, New York, Oregon, and Washington, as well as before the Bonneville Power Administration, the Federal Energy Regulatory Commission (“FERC” or “Commission”), the Surface Transportation Board, the Alberta Utilities Commission, and the Ontario Energy

1 Board. I have provided white papers on cost of capital to the British Columbia Utilities  
2 Commission, the Canadian Transportation Agency as well as to European and Australian  
3 regulators on cost of capital. I have testified or filed testimony on regulatory accounting  
4 issues before the FERC, the Regulatory Commission of Alaska, the Michigan Public Service  
5 Commission, the Texas Public Utility Commission as well as in international and U.S.  
6 arbitrations. In addition, I regularly provide advice to utilities on regulatory matters.

7 I hold a Ph.D. from Yale University's School of Management with a concentration  
8 in accounting. I also hold a Master of Science as well as a Bachelor of Science joint degree  
9 in mathematics and economics from University of Aarhus in Denmark.

10 Additional details regarding my professional experience and qualifications are  
11 contained in my résumé, which is attached as Exhibit No. NNG-00054.

12 **Q. Have you previously testified before or submitted testimony to this Commission?**

13 A. Yes. I have submitted testimony on cost of capital in Docket Nos. ER19-1553 and RP19-  
14 1291, and testimony on regulatory accounting matters before the Commission in Docket  
15 Nos. PA10-13-000 and EL11-13-000.

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

17 A. The purpose of my testimony is to determine the appropriate allowed return on equity  
18 ("ROE") for Northern. I do so by determining the zone of reasonableness for a proxy group  
19 of pipeline companies (1) using the Discounted Cash Flow ("DCF") methodology that the  
20 FERC traditionally has applied to natural gas pipeline companies and (2) comparing it to  
21 the results of the additional models incorporated in the proposed revised methodology

1 specified in the Commission’s October 2018 NETO Briefing Order.<sup>2</sup> Having determined  
2 the zone of reasonableness indicated by these financial analyses, I discuss how the results  
3 are best applied in determining a reasonable ROE for Northern taking into account the  
4 Company’s business risk characteristics as discussed in the testimony of Witness Dr. Paul  
5 Carpenter (“Carpenter Testimony”). I have also been asked to support the reasonableness  
6 of Northern’s actual capital structure including 59.4 percent equity.

7 **Q. How did you approach the task of determining Northern’s cost of equity?**

8 A. First, I selected a proxy group (including a Core and Expanded Sample) of comparable  
9 companies that reflect the business risk characteristics of a natural gas pipeline at this time.  
10 For each company, I apply the Commission’s DCF method, as articulated in *Composition*  
11 *of Proxy Groups for Determining Gas and Oil Pipeline Return on Equity*, 123 FERC ¶  
12 61,048 (2008) (“*Proxy Group Policy Statement*”). I also consider certain alternative models  
13 as proposed and relied on in the Commission’s October 2018 NETO Briefing Order.

14 I then consider these results in the context of Northern’s business risk characteristics  
15 compared to the sample as examined in the Carpenter Testimony in conjunction with my  
16 opinion that Northern’s actual capital structure with 59.4 percent equity is reasonable and  
17 consistent with the financing observed for the sample and other regulated natural gas  
18 pipelines. The business risk consideration relies on the business risk testimony and evidence  
19 presented by Witness Dr. Paul Carpenter in Exhibit No. NNG-00056. Based on this  
20 analysis, I recommend Northern be allowed the opportunity to earn an ROE of 14.2 percent

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<sup>2</sup> *Coakley Mass. Attorney General v. Bangor Hydro-Elec. Co.*, Opinion No. 531, 147 FERC ¶ 61,234 (2014), *order on paper hearing*, Opinion No. 531-A, 149 FERC ¶ 61,032 (2014), *order on reh’g*, Opinion No. 531-B, 150 FERC ¶ 61,165 (2015), *vacated & remanded sub nom.*, *Emera Maine v. FERC*, 854 F.3d 9 (D.C. Cir. 2017), *order on remand*, 165 FERC ¶ 61,030 (2018) (“NETO Briefing Order”).

1 although it is a conservative estimate of Northern's ROE given Dr. Carpenter's finding that  
2 Northern's has higher business risk than the median of my Core Sample. This is the median  
3 of the ROEs estimated for the Core Sample using the Commission's traditional DCF method  
4 and supported by additional methods discussed in the Commission's NETO Briefing Order.

5 **Q. Why are you calculating the ROE using methods other than the Commission's**  
6 **traditional DCF method for natural gas pipelines?**

7 A. For two reasons. First, the cost of capital can be estimated in several ways, and I believe it  
8 is preferable to use several methods to estimate and confirm the cost of capital. For  
9 example, the risk-positioning method (such as the capital asset pricing model or "CAPM")  
10 is generally useful, in part because the risk-positioning model estimates the cost of equity  
11 capital for individual companies relative to the risk-return tradeoff for all investments in the  
12 market instead of based only on company-specific parameters as does the DCF model. In  
13 addition, the FERC's traditional DCF method does not directly consider differences in  
14 financial risk among the sample companies when establishing the range of reasonableness.  
15 Second, the Commission has indicated that the considerations that led it to rely on different  
16 cost of capital models in the electric context are also potentially relevant in the natural gas  
17 pipeline context. For example, in a recent natural gas pipeline rate case, the Commission  
18 indicated that "at least some of the concerns expressed in [the NETO Briefing Order]  
19 regarding the Commission's historical reliance upon the DCF also appear applicable to  
20 natural gas pipelines," and confirmed that the hearing in that case should consider whether  
21 it was appropriate to establish the pipeline's cost of capital using the traditional DCF method

1 or alternative methodologies.<sup>3</sup> The FERC in its recent Notice of Inquiry<sup>4</sup> has also requested  
2 comments on the methods to be applied for the determination of the cost of capital issues  
3 for natural gas pipelines as well.

4 **Q. Please summarize the results of your ROE analysis.**

5 A. I selected a group of pipeline companies with substantial FERC-regulated gas pipeline  
6 operations (“Core Sample”) as well as a broader sample of companies with FERC-regulated  
7 pipeline assets and a substantial portion of operations subject to rate regulation (“Expanded  
8 Sample”). For these sample companies, I calculated the Commission’s traditional “two-  
9 step” DCF methodology<sup>5</sup>—relying exclusively on *IBES* for the company-specific growth  
10 “first step” rates, but also considering a scenario where additional estimates from Value  
11 Line are incorporated in a weighted average. Based on the Commission’s traditional two-  
12 step DCF method applied to the Core Sample, I recommend a ROE of 14.2 percent for  
13 Northern. I additionally calculated the CAPM and Expected Earnings methods described  
14 in the NETO Briefing Order. Witness Jay Nigh calculated the Risk Premium approach.<sup>6</sup>  
15 Figure 1 below summarizes the results of my analyses.

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<sup>3</sup> See *Trailblazer Pipeline Company LLC*, 166 FERC ¶ 61,141, at PP 3, 48 (2019).

<sup>4</sup> See *generally Inquiry Regarding the Commission’s Policy for Determining Return on Equity*, 166 FERC ¶ 61,207 (2019).

<sup>5</sup> See, e.g., *Kern River Gas Transmission Co.*, 117 FERC ¶ 61,077 at PP 139-40, 161 (2006); *High Island Offshore System, L.L.C.*, 110 FERC ¶ 61,043 at PP 117-18 (2005); *Williston Basin Interstate Pipeline Co.*, 104 FERC ¶ 61,036 (2003); *Enbridge Pipelines (KPC)*, 100 FERC ¶ 61,260, at PP 214-215 (2002) (“*Enbridge*”).

<sup>6</sup> As discussed further below and in Mr. Nigh’s testimony, it is not practical in the natural gas pipeline context to calculate a Risk Premium analysis of the specific type relied on in the Commission’s NETO Briefing Order because of the rarity of explicitly-approved allowed ROEs for natural gas pipelines from which to develop the necessary relationship with Treasury and/or utility bond yields. Mr. Nigh’s testimony therefore proposes an alternative Risk Premium approach.

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**Figure 1: Summary of Results**

Sample	DCF		CAPM	Expected Earnings
	IBES Growth Rates	Weighted Average Growth Rates		
	[1]	[2]		
<b>Core Sample</b>				
Average	13.5%	14.7%	17.5%	13.6%
Range	7.3% - 16.9%	9.2% - 17.6%	14.1% - 23.3%	8.6% - 19.4%
<b>Median</b>	<b>14.2%</b>	<b>15.4%</b>	<b>17.6%</b>	<b>13.5%</b>
<b>Expanded Sample</b>				
Average	13.2%	14.7%	18.4%	15.1%
Range	7.3% - 16.9%	9.2% - 21.5%	14.1% - 25.9%	8.6% - 23.7%
<b>Median</b>	<b>13.3%</b>	<b>15.4%</b>	<b>17.7%</b>	<b>14.8%</b>

Source: Exhibit No. NNG-00055.

[1]: Table No. BV-3(a).

[2]: Table No. BV-3(b).

[3]: Table No. BV-8.

[4]: Table No. BV-9.

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Based on the traditional DCF method, the Core Sample finds a median ROE of 14.2 percent within a reasonable range of 7.3 to 16.9 percent using *IBES* growth rates only. The Expanded Sample yields slightly lower results on an *IBES* basis, while using both Value Line and *IBES* growth rates results in a higher median and upper bound on the zone of reasonableness.

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Looking to the additional methods used in the NETO Briefing Order, the CAPM reasonable range of 14.1 to 23.3 percent overlaps with but is towards the high end of the DCF method results. The Expected Earnings method also finds an overlapping range of 8.6 to 19.4 percent. The Risk Premium approach calculated by Witness Jay Nigh produces a result of 16.2 percent. Considering these results, I find that the Commission's traditional DCF model as well as the additional estimation results support an estimate of 14.2 percent for the cost of equity for a representative (average risk) natural gas pipeline company.

1           Lastly, the testimony of Dr. Carpenter finds that investors in Northern’s equity face  
2           higher business risk than the median of the pipelines in my Core Sample. According to Dr.  
3           Carpenter, Northern faces elevated competition. Additionally, in comparison to the median  
4           of the pipelines in the Core Sample, Northern has less contract cover, which increases  
5           Northern’s exposure to the market value of capacity; and higher capital expenditures, which  
6           increases Northern’s operating risks; and higher storage-related risks.<sup>7</sup> Therefore, the  
7           median ROE for the Core Sample is a conservative estimate of Northern’s cost of equity.

8   **Q.   Please summarize your conclusions with respect to Northern’s capital structure.**

9           As described in the testimony of Witness Joseph Lillo, Northern’s actual capital structure is  
10          59.4 percent equity and 40.6 percent debt.<sup>8</sup> The Commission’s established precedent is to  
11          “use a pipeline’s own capital structure for rate making purposes so long as the pipeline (1)  
12          issues its own debt; (2) has its own separate bond rating; (3) has an equity ratio that is not  
13          excessive in light of the other equity ratios approved by the Commission and in comparison  
14          with the equity ratios of the proxy companies.”<sup>9</sup> As discussed below, Northern’s actual  
15          capital structure meets each of these criteria. Northern issues its own debt and has its own  
16          bond rating. Northern’s equity ratio is also not excessive when compared with other equity  
17          ratios approved by the Commission and those of the proxy companies.

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<sup>7</sup> See Carpenter Testimony, Exhibit No. NNG-00056.

<sup>8</sup> See Witness Joseph Lillo Testimony, Exhibit No. NNG-00038.

<sup>9</sup> *Transcontinental Gas Pipe Line Corp.*, 84 FERC ¶ 61,084, at 61,414 (1998), *reh’g denied*, 85 FERC ¶ 61,323 (1998) (“*Transco*”), *petition for review denied sub. nom. N.C. Utils. Comm’n v. FERC*, D.C. Cir. Case No. 99-1037 (Feb. 7, 2000) (per curiam).

1 For example, to inform the question of what capital structure is appropriate for use  
2 in developing Northern's revenue requirement, I analyzed the capital structure of the  
3 comparable companies in both the Core and Expanded Samples. I find that the comparable  
4 companies have market value equity ratios of 53 to 77 percent with an average of 60 percent  
5 for the Core Sample and 64 percent for the Expanded Sample (medians of 59 percent and  
6 62 percent, respectively).<sup>10</sup> The market value capital structure is a reasonable benchmark  
7 because the DCF and CAPM cost of equity estimates are derived based on market stock  
8 price and return data that reflects market value capital structure and associated financial  
9 risks.

10 The book value capital structure equity ratios of the twelve Core and Expanded  
11 proxy group companies range from 36 to 63 percent with averages of 49 and 47 percent  
12 book equity in the Core Sample and Expanded Sample (medians of 51 and 49 percent),  
13 respectively.<sup>11</sup> Finally, I looked to the equity percentage reported in the Form No. 501-G  
14 filings of FERC-jurisdictional natural gas pipeline companies and found an average of 63  
15 percent equity (median 62 percent) for the actual 2017 book capital structure and an average  
16 of 56 percent (median 57 percent) used as the capital structure for the purpose of computing  
17 ROE in Form No. 501-G.<sup>12</sup>

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<sup>10</sup> This calculation assigns preferred stock as 50 percent equity and 50 percent debt. Alternatively, I investigated assigning preferred to debt and equity according to the individual outstanding series' characteristics. This analysis did not result in a substantial change on the ranges, but increased the median Core Sample estimate from 59 percent to 60 percent.

<sup>11</sup> As I discuss below, this book value range and summary statistics exclude the anomalously low book value equity ratio reported by TC PipeLines, since this value is the result of specific nonrecurring circumstances and is not representative of how natural gas pipelines finance their operations.

<sup>12</sup> See Exhibit No. NNG-00055.

1           In sum, I find that Northern's actual capital structure including 59.4 percent equity  
2 is reasonable and consistent with the Commission's criteria, as well as the equity ratios of  
3 the Core and Expanded Sample companies and the book equity values used for purposes of  
4 computing ROE in the Form No. 501-G filings.

5 **Q. How is your testimony organized?**

6 A. Section II formally defines the cost of capital and explains its relevance in the principles  
7 relating to the estimation of the cost of capital for a business and the theory underlying the  
8 DCF model. Section III first describes the process used to develop the Core and Expanded  
9 Samples of proxy comparable companies that serve as the basis for my market based cost  
10 of capital model estimates. It then describes the Commission's traditional DCF method as  
11 well as additional cost of capital estimation methodologies used in the Commission's NETO  
12 Briefing Order. Section IV presents the results of my implementation of these models for  
13 both the Core and Expanded Sample, and summarizes my interpretation of these results as  
14 it relates to the zone of reasonableness determined for Northern.

15 **Q. What exhibits are you sponsoring?**

16 A. I am sponsoring this Prepared Direct Testimony, Exhibit No. NNG-00053, as well as  
17 Exhibit No. NNG-00054, which contains my résumé, and Exhibit No. NNG-00055, which  
18 contains the tables supporting the results summarized in this testimony.

19 **Q. Were your testimony and exhibits prepared by you or under your direct supervision?**

20 A. Yes.

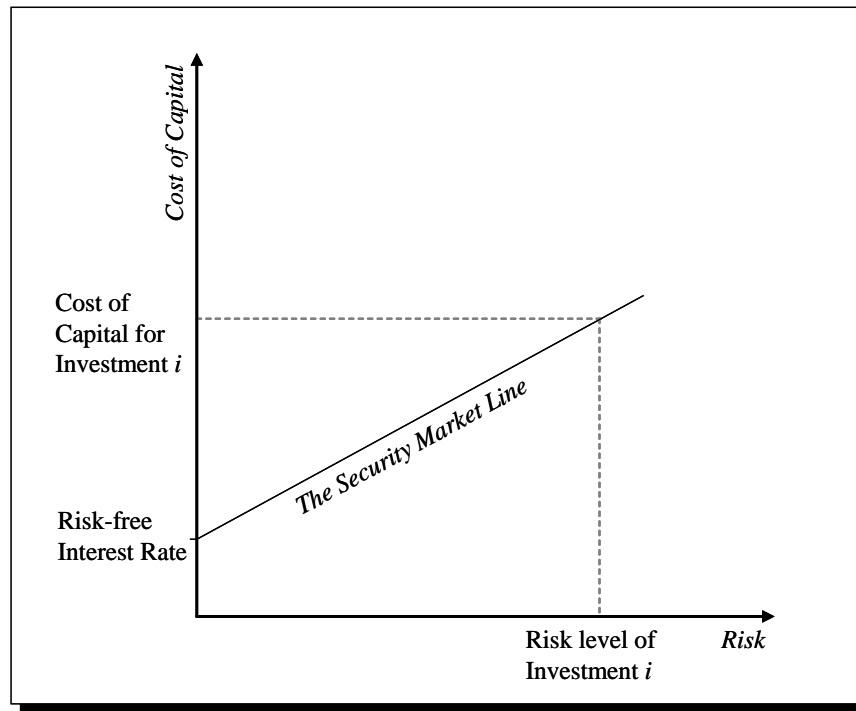
1 **II. THE COST OF CAPITAL AND RISK**

2 **Q. Please formally define the term “Cost of Capital.”**

3 A. The cost of capital can be defined as *the expected rate of return in capital markets on*  
4 *alternative investments of equivalent risk.* In other words, it is the rate of return investors  
5 require based on the risk-return alternatives available in competitive capital markets. The  
6 cost of capital is a type of opportunity cost: it represents the rate of return that investors  
7 could expect to earn elsewhere without bearing more risk. The terms “expect” and  
8 “expected” in my testimony, as in the definition of the cost of capital itself, refer to the  
9 probability-weighted average over all possible outcomes. The definition of the cost of  
10 capital recognizes a tradeoff between risk and return that is known as the “security market  
11 risk-return line,” or “security market line” for short. This line is depicted in Figure 2. The  
12 higher the risk, the higher the cost of capital. Variations of Figure 2 apply for all  
13 investments.

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**Figure 2: The Security Market Line**



2 **Q. Please explain why the cost of capital is relevant in rate regulation?**

3 A. It has become routine in U.S. rate regulation to accept the “cost of capital” as the appropriate  
4 expected rate of return on utility investment. That practice is normally viewed as consistent  
5 with the U.S. Supreme Court’s opinions in *Bluefield Water Works & Improvement Co. v.*  
6 *Public Service Commission of West Virginia*, 262 U.S. 679 (1923), and *FPC v. Hope*  
7 *Natural Gas Co.*, 320 U.S. 591 (1944).

8 A return that determines the ROE (absent incentive or other adders) is the expected  
9 rate of return investors will require to maintain Northern’s ability to attract capital and  
10 preserve its financial integrity.

11 Importantly, an inadequate return raises serious issues not only for the regulated  
12 utility but also for its customers. Specifically, it may adversely affect the utility’s ability to  
13 provide stable and favorable rates (because the company may need to potentially postpone

1 desirable projects that are not immediately required for reliable service in the near term) or  
2 it may require the company to file more frequent rate cases. Long-term, inadequate returns  
3 lead to inadequate investment, whether for maintenance or for new plant and equipment.  
4 The costs of an undercapitalized industry can be far greater than any short-run gains from  
5 shortfalls in the allowed rate of return. Moreover, in capital-intensive industries (such as  
6 the pipeline industry), systems with long expected service lives cannot be fixed overnight.

### 7 III. THE COMMISSION'S COST OF CAPITAL METHODOLOGY

#### 8 A. Sample Selection

##### 9 1. Criteria for Selecting the Proxy Group

10 **Q. Please describe the Commission's precedent for selecting a sample that accurately**  
11 **reflects the business risk of natural gas transmission.**

12 A. The Commission's *Proxy Group Policy Statement* regarding sample composition provides  
13 the most important guidance in this regard.<sup>13</sup> Specifically, the *Proxy Group Policy*  
14 *Statement* addresses criteria for assuring a sample that is both representative and robust. A  
15 key decision in the *Proxy Group Policy Statement* was that it explicitly permitted the  
16 inclusion of Master Limited Partnerships ("MLPs") in proxy groups for estimating the ROE  
17 of Commission-regulated pipeline companies.<sup>14</sup>

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<sup>13</sup> *Composition of Proxy Groups for Determining Gas and Oil Pipeline Return on Equity*, 123 FERC ¶ 61,048 (2008) ("*Proxy Group Policy Statement*").

<sup>14</sup> *Id.* at P 42, 49-51.

1 **Q. What was the genesis of the *Proxy Group Policy Statement*?**

2 A. Because of shrinking availability of suitable proxy candidates, the Commission had to revise  
3 its criteria for sample selection. In *El Paso Natural Gas Co.*, 145 FERC ¶ 61,040 at P 595  
4 (2013) (“*El Paso*”), FERC stated that it preferred to have at least five proxy group  
5 companies in order to ensure statistical accuracy.<sup>15</sup> The Commission’s preference prior to  
6 *Williston Basin Interstate Pipeline Co.*, 104 FERC ¶ 61,036 (2003) (“*Williston Basin*”), was  
7 to select companies that satisfied the following criteria:

- 8 • The selected company had to be publicly-owned with publicly-traded stock;
- 9 • The selected company had to be recognized by investors as reflective of the  
10 risks of natural gas pipelines, own one or more FERC-regulated interstate  
11 natural gas pipelines, and have stock tracked by an investment information  
12 service (such as Value Line); and
- 13 • Natural gas pipeline operations had to constitute a high proportion of the  
14 company’s business, where “high” means that pipeline operations have  
15 accounted for at least 50 percent of the company’s assets or 50 percent of  
16 their operating income, or both, on average over the most recent three-year  
17 period.

18 Application of these criteria, however, resulted in ever smaller proxy groups to the point  
19 that any resulting proxy group would be of questionable reliability. At the time, MLPs were  
20 not included in the proxy group based on concerns about the applicability of the DCF model  
21 to the MLP organizational structure and cash distribution patterns. Thus, the Commission  
22 ultimately accepted the proposal to expand the sample to nine companies based on the  
23 Diversified Natural Gas industry group generated by Value Line Investment Survey, all of  
24 which owned FERC-regulated natural gas pipelines.

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<sup>15</sup> This view was qualified in *Kern River*, Opinion No. 486-B, 126 FERC ¶ 61,034 at P 104: “[W]hile the Commission agrees that adding more members to the proxy group results in greater statistical accuracy, this is true only if the additional members are appropriately included in the proxy group as representative firms.”

1           Although the requirement to have at least 50 percent of operations concentrated in  
2           the natural gas pipeline industry was relaxed in *Williston Basin*, and thereby provided a  
3           temporary solution to the shrinking sample problem, it proved insufficient in subsequent  
4           proceedings. Mergers and acquisitions in the industry and the growing trend of forming  
5           MLPs to invest in pipeline assets continued to result in smaller samples even under the  
6           revised selection criteria. Subsequent decisions in *High Island Offshore System, L.L.C.*,  
7           110 FERC ¶ 61,043 at PP 117-18 (2005) (“*HIOS*”),<sup>16</sup> and *Kern River Gas Transmission*  
8           *Co.*, 117 FERC ¶ 61,077 at PP 139-40, 161 (2006) (“*Kern River*”) left the Commission with  
9           a four-company proxy group even under the revised criteria.

10           Following a technical conference in 2007, the Commission issued the *Proxy Group*  
11           *Policy Statement*, which determined that the DCF method could be applied to MLPs as well  
12           as to corporations, but specified that the long-term growth rate used in the two-step DCF  
13           calculation for MLP proxy group members would be one half the expected long-term future  
14           rate of the U.S. Gross Domestic Product (“GDP”) growth, rather than the full GDP growth  
15           rate.<sup>17</sup>

16   **Q.   How has the situation changed since the *Proxy Group Policy Statement* was issued?**

17   A.   At the time the *Proxy Group Policy Statement* was issued, the ability to include MLPs in  
18           the proxy group generally made it possible to select a reasonably large sample of companies  
19           meeting the Commission’s other criteria for inclusion in a natural gas pipeline sample (*i.e.*,  
20           publicly-traded companies with investment-grade bond ratings and the majority of their

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<sup>16</sup> *Id.* at P 124.

<sup>17</sup> *Proxy Group Policy Statement*, at P 42.

1 business activities consisting of FERC-regulated natural gas pipeline operations). However,  
2 since that time, the midstream natural gas industry has developed in such a way that there  
3 are very few companies whose majority focus is on regulated interstate natural gas pipeline  
4 transportation.

5 Through organic growth and especially merger and acquisition, the publicly-traded  
6 holding companies that own interstate natural gas pipelines and storage systems have  
7 generally become diversified to include—among other business activities—(i) interstate  
8 pipeline transportation of natural gas liquids (“NGLs”), crude oil, and petroleum products  
9 (*i.e.*, “liquids pipelines”), (ii) intrastate natural gas and liquids pipelines, (iii) natural gas  
10 gathering systems, (iv) natural gas and NGL processing facilities, and (v) the provision of  
11 terminaling, marketing, and assorted other midstream natural gas and petroleum services.

12 Additionally, in recent years, several pipeline-owning MLP entities were acquired  
13 by corporate entities, including several that were “rolled up” by the corporations that served  
14 as their general partners. Examples include the July 2018 acquisition of Boardwalk Pipeline  
15 Partners (“BWP”) by diversified conglomerate Loews which had controlled its general  
16 partner,<sup>18</sup> the August 2018 roll-up of Williams Partners (“WPZ”) into Williams Companies,  
17 Inc. (“WMB”),<sup>19</sup> and the late 2018 acquisitions of U.S. MLPs Spectra Energy Partners  
18 (“SEP”) and Enbridge Energy Partners (“EEP”) by Canadian corporation Enbridge, Inc.<sup>20</sup>

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<sup>18</sup> See Loews to Buy Out Investors in Boardwalk Pipeline MLP, July 13, 2018. Accessible at <https://www.barrons.com/articles/loews-to-buy-out-investors-in-boardwalk-pipeline-mlp-1531511536>

<sup>19</sup> See Williams Completes Acquisition of Williams Partners, August 10, 2018. Accessible at <https://investor.williams.com/press-release/williams/williams-completes-acquisition-williams-partners>

<sup>20</sup> See Enbridge Inc. and Spectra Energy Partners, LP Complete Merger, December 17, 2018; and Enbridge Inc. Completes Mergers with Enbridge Energy Partners, L.P. and Enbridge Energy Management, L.L.C., December 20, 2018. Accessible at <https://www.enbridge.com/media-center/news>

1 **Q. Is it necessary again to revise or relax certain of the Commission’s traditional sample**  
2 **selection criteria to assemble a sample group for the current case?**

3 A. Yes. For the reasons stated above it is not possible to identify at least four proxy companies  
4 for which FERC-regulated interstate natural gas pipelines operations constitute a majority  
5 of their business activities (as measured by assets or operating income).

6 Therefore, to obtain a reasonably sized sample, I relaxed this criterion by reducing  
7 the threshold for natural gas transmission-related activities to 30 percent of the company’s  
8 assets or operating income.<sup>21</sup> In doing so, I include rate-regulated natural gas pipelines that  
9 are regulated by the Canadian National Energy Board (“NEB”) or other non-FERC  
10 jurisdictions, and further attempt to ensure that the sample companies’ non-gas pipeline  
11 businesses do not, on balance, reflect very different industry and risk characteristics  
12 compared to FERC-regulated natural gas transmission and storage (*i.e.*, Northern’s  
13 business). Using this approach, I was able to select a Core Sample of seven companies that  
14 are substantially devoted to rate-regulated natural gas transportation operations and whose  
15 broader business profiles—including rate-regulated natural gas gathering and distribution  
16 of natural gas, operation of rate-regulated liquids pipelines, and provision of fee-based  
17 natural gas and NGL gathering and processing services—I believe make them generally risk  
18 appropriate for evaluating Northern’s cost of capital.

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<sup>21</sup> Different companies report different disaggregated financial metrics for their various business segments. Depending on the company, a percentage of “assets” may refer to gross original cost of total assets on the balance sheet or to gross or net balances of long-lived property, plant, and equipment (“PP&E”) assets. Similarly, my analysis of income and cash flows is in certain cases expanded to include reported data on EBITDA (“Earnings Before Interest, Taxes, Depreciation and Amortization”) and gross operating margin, as well as operating income (often defined to be synonymous with EBIT – Earnings Before Interest and Taxes).

1           Additionally, to serve as a check on the robustness of the results derived from my  
2           Core Sample, I consider a broader Expanded Sample consisting of 12 companies (including  
3           the seven Core Sample companies) that (A) operate at least some FERC-regulated pipelines  
4           (including liquids pipelines as well as natural gas pipelines) and (B) have substantial  
5           regulated pipeline assets. The pipelines that constitute the Expanded Sample all have  
6           FERC-regulated pipelines with at least 30 percent pipeline assets and at least 50 percent  
7           regulated assets or income. Thus, even the companies in the Expanded Sample that do not  
8           make it into the Core Sample have substantial activities that resemble those of Northern.  
9           As I note below, the Expanded Sample serves as a check on the Core Sample, and thus,  
10          bolsters the results of analysis.

11   **Q. In considering regulated pipeline operations other than FERC-regulated natural gas**  
12   **transmission, are you assuming that all categories of regulated pipelines have identical**  
13   **risk for cost of capital purposes?**

14   A. No. It is not even the case that all natural gas pipeline companies have identical risk.  
15   However, I do believe that the inclusion of companies with a substantial percentage of  
16   pipeline assets under rate regulation is the best possible indicator of the risk of a natural gas  
17   pipeline such as Northern. For clarity, I am not arguing that the risks of different classes of  
18   FERC pipelines are identical, or that differences in regulatory regimes across jurisdictions—  
19   such as between the Commission and the NEB—do not have implications for business risk.  
20   Rather it is my opinion that, relative to other types of business activities that potential  
21   sample companies may engage in, rate-regulated gas or liquids transportation activities, be  
22   they under FERC, state, or NEB jurisdiction, are likely to be the most risk comparable for  
23   purposes of assessing Northern's cost of capital.

1 Put differently, in the absence of a large and robust sample of companies meeting  
2 the Commission’s traditional business activity criterion (*i.e.*, 50 percent FERC-regulated  
3 natural gas pipeline assets or income), a Core Sample with at least 30 percent regulated  
4 natural gas pipeline assets or income—bolstered by results from a larger Expanded Sample  
5 including companies with substantial regulated pipeline assets—is the most reliable option  
6 to serve as a proxy for Northern’s business risk characteristics. I believe applying this  
7 approach to achieve a sufficient number of sample companies reduces sampling error  
8 without unduly sacrificing comparability in business risk across the sample.

9 **2. Sample Selection Process**

10 **Q. Please explain how you select a sample that is consistent with the Commission’s**  
11 **precedent for estimating a gas pipeline’s cost of capital.**

12 A. Consistent with the *Proxy Group Policy Statement*, I consider both C-Corporations and  
13 MLPs for inclusion in my sample. I began with the lists of all companies categorized by  
14 Value Line as (i) “Gas or Oil Distribution,” (ii) “Pipeline MLPs in the U.S.,” or (iii)  
15 “Diversified Natural Gas.” This group was narrowed to only include companies that meet  
16 the following criteria:

- 17 1. The company’s stock is publicly traded and has been for the most recent six-  
18 month period;
- 19 2. The company pays dividends and has done so during the last six months  
20 without any cuts to its dividends;<sup>22</sup>
- 21 3. The company has a majority of its credit ratings at an investment-grade level;

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<sup>22</sup> The Commission’s traditional DCF methodology requires only six months of historical data to compute the cost of equity for each comparable company.

- 1           4.     The company has had no significant amount of completed merger and  
2           acquisition (“M&A”) activity over the last six months;
- 3           5.     The company must have at least \$300 million in Market Capitalization;
- 4           6.     The company must have FERC-regulated pipeline assets, and meet the  
5           business activity segmentation criteria described in the preceding subsection  
6           (III.A.1) for final selection into the Core and Expanded Samples.

7           Criteria 1 and 2 are necessary for the implementation of the DCF model. Criteria 3 and 4  
8           ensure that there are no recent impacts from either potential financial distress situations or  
9           M&A activities. Criteria 5 eliminates companies that are too small to provide meaningful  
10          comparable data.<sup>23</sup>

11           As discussed above, Criteria 6 intends to capture the risk of the natural gas pipeline  
12          industry. This criterion requires me to investigate the companies’ business descriptions and  
13          financial statement disclosure to assess whether sufficient assets, revenue or income is  
14          devoted to natural gas transportation or at least regulated activities. Specifically, if a  
15          company has operations outside the natural gas transportation business, I examine the nature  
16          of such business and favor regulated activities over non-regulated activities. For example,  
17          to expand the sample, I give preference to regulated liquids pipeline activities over oil and  
18          gas exploration and production activities because the former is subject to rate of return  
19          regulation while the latter is not. Additionally, I acknowledge that some of my sample  
20          companies have operations subject to state regulatory jurisdictions or own Canadian  
21          pipeline assets that are regulated by the NEB.

22           My Core Sample contains seven companies, but I also consider an Expanded Sample  
23          that includes five additional companies that are substantially engaged in regulated pipeline

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<sup>23</sup> In this case, no company was eliminated due to Criteria 5.

1 operations and related activities, but which may have more of these regulated operations in  
2 areas outside of the natural gas transmission sector.

3 **Q. Please specifically describe how you applied the criteria outlined above to select your**  
4 **sample companies.**

5 A. I began with 99 companies listed in the three relevant Value Line categories. First, I  
6 eliminated 40 companies that either do not regularly pay dividends or had a dividend cut  
7 during the six months leading up to the study date, leaving 59 companies as the subject of  
8 further screening. Next, I eliminated 36 companies that have non-investment grade credit  
9 ratings, leaving 23 potential sample companies after this step of the sample selection  
10 process.<sup>24</sup>

11 Two of the remaining 23 companies had engaged in significant completed M&A  
12 activities in the last six months leaving 21 companies. I define significant activity as any  
13 M&A transaction accounting for greater than 25 percent of the company's pre-merger  
14 market value.<sup>25</sup> Large M&A activity can often lead to a decoupling of prices from  
15 fundamentals in the period leading up to and after the transaction. As a result, the inclusion  
16 of a company for which this is the case may lead to an unreliable ROE estimate.

17 I then reviewed market capitalization data for these remaining 21 companies to  
18 eliminate all companies that had market capitalization lower than \$300 million. None of the

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<sup>24</sup> At this stage, I also eliminate companies for which I cannot procure credit ratings through any of the major ratings agencies: Standard and Poor's ("S&P"), Moody's Analytics ("Moody's") and Fitch Ratings ("Fitch").

<sup>25</sup> I note that Energy Transfer, L.P. was the surviving entity of a merger between Energy Transfer Partners, L.P. and the MLP that previously controlled its general partner, Energy Transfer Equity, L.P. The merger was announced August 1, 2018 (outside of the 6-month study period), and finalized October 19, 2018, just at the start of the study period. Having observed no material impact on Energy Transfer's financial data used in my DCF analysis, I did not exclude it based on this transaction.

1 remaining 21 companies had market capitalization of less than \$300 million, leaving 21  
2 potential sample companies after applying these steps of the sample selection criteria.

3  
4

**Figure 3**  
**Sample Selection Elimination Summary**

Value Line Company Universe	[a]	99
Eliminated due to Dividend cuts	[b]	40
Eliminated due to Bond Ratings	[c]	36
Eliminated due to M&A	[d]	2
Eliminated due to Market Cap	[e]	0
Prospective Sample Companies	[f]	21

[a]: Represents all companies covered by Value Line Investment Analyzer classified by Value Line as Pipeline MLP, Oil & Gas, or Gas Diversified.

[b]: Companies eliminated for having a dividend cut or not issuing dividends between 10/1/2018 and 3/31/2019.

[c]: Companies eliminated for not having investment grade credit ratings as of 12/31/2018.

[d]: Companies eliminated for having M&A exceeding 25% of beginning of year Market Capitalization between 10/1/2018 and 3/31/2019.

[e]: Companies eliminated for insufficient Market Capitalization as of the most recent quarter for which there is data (less than \$300 million as of 12/31/2018).

[f] = [a] - SUM([b]:[e])

5 For the remaining companies, I reviewed their business descriptions and segmented  
6 financial data from their 2018 Annual Reports and selected companies meeting the business  
7 segmentation discussed above. Companies that did not engage in substantially rate-  
8 regulated natural gas and/or liquids transportation activities, as well as companies that  
9 engaged predominantly in businesses with very different risk profiles (such as oil and gas  
10 exploration and production, petroleum refining, fuels distribution, electric utility service, or

1 non-energy-related businesses) were excluded.<sup>26</sup> For the seven Core Sample companies  
2 and five members of the Expanded Sample, Figure 4 below summarizes the percentages of  
3 their assets and income / cash flows that I estimated are dedicated to (i) regulated natural  
4 gas pipeline operations and (ii) rate-regulated activities more broadly.

5 **Figure 4**  
6 **Sample Regulated Assets and EBITDA Summary**<sup>[A1]</sup>

Company	Assets		Income / Cash Flow	
	Regulated Natural Gas Pipeline Operations	Total Regulated Business Activities	Regulated Natural Gas Pipeline Operations	Total Regulated Business Activities
	[1]	[2]	[3]	[4]
<b>Enable Midstream Part.</b>	<b>35%</b>	<b>35%</b>	<b>31%</b>	<b>31%</b>
<b>Enbridge Inc.</b>	<b>31%</b>	<b>89%</b>	<b>19%</b>	<b>88%</b>
<b>EQT Midstream Partners</b>	<b>27%</b>	<b>27%</b>	<b>35%</b>	<b>35%</b>
<b>Kinder Morgan Inc.</b>	<b>70%</b>	<b>82%</b>	<b>48%</b>	<b>74%</b>
<b>TC PipeLines, LP</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>
<b>TransCanada Corporation</b>	<b>73%</b>	<b>91%</b>	<b>70%</b>	<b>91%</b>
<b>Williams Cos.</b>	<b>47%</b>	<b>52%</b>	<b>39%</b>	<b>39%</b>
Energy Transfer LP	25%	47%	28%	51%
Enterprise Products	20%	54%	12%	51%
Magellan Midstream	0%	52%	0%	57%
ONEOK Inc.	9%	38%	10%	35%
Plains All American Pipeline, L.P.	0%	59%	0%	56%

Sources and notes: See Carpenter Testimony, Exhibit No. NNG-00056. Tables 2 and 3 for Assets and Income / Cash Flow respectively. Total Regulated Business Activities calculated as sum of Gas Pipelines & Storage, Oil and Liquids Pipelines, Gas Distribution columns.

7 **Q. You included Canadian corporations Enbridge Inc. (“ENB”) and TransCanada**  
8 **Corporation (“TRP”) in your sample. Can you explain why?**

9 Yes. Both Enbridge and TransCanada are headquartered in Canada, but they (i) trade on  
10 both the New York Stock Exchange (“NYSE”) and on the Toronto Stock Exchange (“TSE”)  
11 and (ii) both own substantial assets that are subject to FERC regulation. Specifically, in

<sup>26</sup> The nine companies that did not pass the business profile filter were Cimarax Energy, Devon Energy, EOG Resources, MDU Resources, National Fuel Gas, Pembina Pipeline, Andeavor Logistics LP, MPLX, and Phillips 66 Partners.

1 part as a result of its 2018 acquisition of Spectra Energy Partners, ENB is a major owner /  
2 operator of U.S. natural gas transportation assets (17,627 miles of pipe), to go along with  
3 8,626 miles of liquids transportation assets plus storage and other assets.<sup>27</sup>

4 Similarly, since its 2016 acquisition of Columbia Pipeline Group, TRP owns more  
5 pipeline assets in the U.S. than it owns in Canada,<sup>28</sup> and is likewise a major player in the  
6 U.S. interstate natural gas transmission business. Also, both companies have a very large  
7 percentage of assets invested in natural gas pipelines and liquids pipelines that are regulated,  
8 which (as discussed above), contributes to making them broadly risk appropriate.

9 **Q. You included EQT Midstream Partners (“EQT”) and Enable Midstream Partners**  
10 **(“ENBL”) in your sample. Can you explain why?**

11 A. Both of these companies own very large natural gas pipelines. EQT owns Equitrans, while  
12 ENBL owns Enable Gas Transmission, LLC and Enable Mississippi River Transmission.  
13 In addition, 35 percent of EQT’s income comes from regulated pipeline activities and 35  
14 percent of ENBL’s assets are regulated natural gas pipelines.<sup>29</sup> Thus, to ensure that my  
15 sample is sufficiently large, I include those entities engaging in substantial pipeline activity.

16 **Q How do the Core and Expanded Sample compare to Northern?**

17 A. Like Northern, the Core Sample has substantial pipeline transportation assets that are FERC  
18 regulated. Although only TC PipeLines, L.P. is a pure-play natural gas pipeline, all of the

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<sup>27</sup> [https://www.enbridge.com/~/\\_media/Enb/Documents/Factsheets/FS\\_ENB\\_US\\_assets.pdf?la=en](https://www.enbridge.com/~/_media/Enb/Documents/Factsheets/FS_ENB_US_assets.pdf?la=en)

<sup>28</sup> Presentation to 2018 J.P. Morgan Energy Conference, Don Marchand, Executive VP & CFO, June 19, 2018. TransCanada has U.S. natural gas pipeline assets of CAD \$35.9 billion compared to CAD \$16.9 billion in Canadian natural gas pipeline assets. *See also* TransCanada Corporation 2017 Consolidated financial statements, p. 131.

<sup>29</sup> The majority of ENBL’s and EQT’s non-pipeline, non-storage assets are gathering related.

1 Core Sample companies have FERC regulated natural gas pipelines and natural gas  
2 transportation is a key activity for these entities. The Expanded Sample is similar in that all  
3 companies engage in pipeline transportation and have an investment grade credit rating.

4 As discussed in the Carpenter Testimony, the main business activities of the Core  
5 Sample is interstate transmission and storage with limited non-regulated activities, so the  
6 sample's business risk is comparable to that of Northern. Dr. Carpenter calculates the  
7 contract coverage for the each of the Core Sample companies as well as the share of assets  
8 and EBITDA that is involved in various business activities. Based on this information as  
9 well as an analysis of the competition risk, Dr. Carpenter concludes that Northern faces  
10 higher business risk than the median of my Core Sample. Dr. Carpenter further finds that  
11 the additional risk is caused primarily by elevated competition or bypass risk in Northern's  
12 Market Area and a slightly lower forward contract coverage than the Core Sample group.  
13 Dr. Carpenter also discusses aspects of Northern's risks associated with storage services  
14 and capital expenditure, which contribute to Northern's business risk profile being above  
15 that of the Core Sample median.<sup>30</sup>

16 **B. The Commission's DCF Calculation**

17 **Q. Please describe the Commission's estimation methodology.**

18 A. The *Proxy Group Policy Statement* essentially re-affirms the Commission's DCF  
19 methodology as articulated in prior decisions such as *Williston Basin*, *Kern River*, and  
20 *HIOS*, but outlines a modification in the case of MLPs, which are now permitted to be

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<sup>30</sup> Carpenter Testimony, Exhibit No. NNG-00056.

1 included in the sample. The one modification indicated for MLPs is to reduce the estimated  
2 long-term growth rate to one-half of the long-term GDP growth forecast instead of the full  
3 amount of the GDP growth rate forecast used for the C-corporations in the sample.<sup>31</sup>

4 **Q. Please describe the details of the DCF model traditionally used by the Commission to**  
5 **establish the “range of reasonableness”.**

6 A. As noted earlier, the Commission’s DCF model is a modification of the standard, constant-  
7 growth DCF model, where the dividend growth rate is a weighted-average of the company’s  
8 5-year analyst growth rate estimates ( $\frac{2}{3}$  weight), such as those provided by *IBES* or  
9 Bloomberg, plus a common long-term growth rate estimate ( $\frac{1}{3}$  weight). Details of the  
10 approach are articulated in *Kern River*, as well as in *Williston Basin* and *Enbridge Pipelines*  
11 (*KPC*) (“*Enbridge*”). As the Commission stated in *Enbridge*:

12 The Commission uses the Discounted Cash-Flow (DCF) methodology when  
13 calculating a range of reasonable rates of return on equity for natural gas  
14 pipelines. Under that methodology, the rate of return equals the dividend  
15 yield (stock price divided by dividends), plus the projected growth in  
16 dividends.

17 For natural gas pipelines, the Commission uses a two-step procedure to  
18 determine the projected growth in dividends of the proxy group companies,  
19 averaging short-term and long-term growth estimates. The Commission uses  
20 five-year Institutional Broker's Estimate System (I/B/E/S) growth  
21 projections for each proxy group company for the short-term growth  
22 projection. The Commission uses the growth rate of the Gross Domestic  
23 Product (GDP) as its long-term growth rate, since the Commission has found  
24 that pipeline specific projections of long-term growth cannot reasonably be  
25 developed based on available data sources. The Commission averages these  
26 growth projections, giving two-thirds weight to the short-term growth  
27 projection and one-third weight to the long-term growth projection.<sup>32</sup>

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<sup>31</sup> *Proxy Group Policy Statement* at P 96.

<sup>32</sup> *Enbridge Pipelines (KPC)*, 100 FERC ¶ 61,260 at PP 214-215 (2002) (“*Enbridge*”).

1 In formulating the DCF model, the Commission further adds an adjustment to the dividend  
2 yield term resulting in the Commission’s DCF cost of capital equation. As explained by  
3 Commission Staff, the formula is:<sup>33</sup>

$$k = \frac{D_0 \times \left(1 + \frac{1}{2}g\right)}{P} + g$$

4 **Q. How is the dividend yield determined?**

5 A. The Commission has established a very specific procedure for calculating the dividend yield  
6 to use in the DCF formula. Specifically, the “current” dividend yield is to be computed  
7 using the prior six months of dividend and price data. One first records the highest and  
8 lowest trading price during the month for each of the prior six months. The current dividend  
9 for each quarter is annualized (*i.e.*, multiplied by 4) and then divided by the average of these  
10 two prices (the highest and lowest trading price during each month) to produce six monthly  
11 dividend yields. Averaging these six dividend yields produces an unadjusted dividend yield  
12 for each company as of today. To obtain the dividend yield for the next period, which is  
13 what is used in the FERC’s DCF model, today’s dividend yield ( $D_0/P$ ) is multiplied by:

14 
$$\left(1 + \frac{1}{2}g\right)$$

15 where  $g$  is the company’s weighted average growth rate. Thus, the adjusted dividend yield  
16 is obtained by growing the dividend by  $\frac{1}{2}$  of the growth rate.

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<sup>33</sup> *Seaway Crude Pipeline Co.*, 154 FERC ¶ 61,070 at P 198 (2016) (“*Seaway*”).

1 **Q. Why is only one half of the growth rate used to set the dividend yield in the**  
2 **Commission's traditional DCF methodology?**

3 A. The Commission has chosen this implementation as an adjustment for the timing in how  
4 dividends are paid and the fact that they are paid quarterly. I disagree with the use of the  
5 0.5 multiplier for the initial growth rate as a matter of economic principle because it violates  
6 the basic assumptions of the DCF model. The DCF model is derived under the assumption  
7 that dividends grow at the full growth rate for the period. However, because it is the  
8 Commission's traditional approach to calculating the DCF model, my calculations follow  
9 the Commission's precedent and use this version of the dividend yield in the DCF model.

10 **Q. The Commission's methodology, as outlined in the orders referenced, and the *Proxy***  
11 ***Group Policy Statement* requires an estimated long-term growth rate for each of the**  
12 **companies. Please explain how this is computed.**

13 A. Although companies can experience very high rates of growth from time to time (*i.e.*,  
14 greater than the growth of the economy as a whole), these high rates cannot generally be  
15 expected to last indefinitely. Conversely, very low rates of growth in the near term can  
16 generally be expected to improve over time. The longest term for which analyst earnings  
17 growth forecasts are publicly available are for about five years. This lack of long range  
18 information requires that dividend and earnings growth beyond five years be estimated in  
19 some way. A standard assumption often used is that a company will grow at the same rate  
20 as the economy in the long term. If it were expected to grow more rapidly, it would become  
21 an ever increasing portion of the economy. Similarly, a company expected to grow more  
22 slowly than GDP would play a shrinking role in the economy. For purposes of the DCF  
23 model, neither outcome seems reasonable.

1           The Commission’s traditional DCF approach prescribes a long-term growth rate  
2 equal to the forecast of long-run GDP growth (in nominal terms). Specifically, the overall  
3 growth rate in the Commission’s DCF model is the weighted-average of the current *IBES*  
4 estimate of the company’s short-term earnings growth and the GDP growth rate forecast,  
5 with  $\frac{2}{3}$  weight on the short-term growth forecast and  $\frac{1}{3}$  weight on the GDP forecast.<sup>34</sup> For  
6 MLPs, the *Proxy Group Policy Statement* prescribes the use of  $\frac{1}{2}$  of the GDP growth rate  
7 forecast instead of the full amount as the long-term growth rate.

### 8           **1. *IBES* Growth Rate Inputs**

#### 9           **Q. How do you obtain the *IBES* growth rates?**

10          A. I downloaded them from Thomson ONE—a third-party data platform provided by Thomson  
11 Reuters—using the Thomson Reuters Spreadsheet Link (“TRSL”) plug-in for Microsoft  
12 Excel.

#### 13          **Q. How does Thomson Reuters update *IBES* growth rates over time?**

14          A. Thomson Reuters tracks 3- to 5-year earnings growth rate estimates submitted by equity  
15 analysts who cover a specific company, and calculates the consensus earnings per share  
16 (“EPS”) growth rate estimate as the average of the growth rates reported by the individual  
17 analysts. *IBES* communicates with the analysts and assembles their submissions to maintain  
18 as up-to-date a value for the consensus growth rate as possible at any point in time.

---

<sup>34</sup> Per the FERC *Proxy Group Policy Statement*, P 6, footnote 7, the GDP forecast is based on the long-term GDP forecasts produced by the Social Security Administration, the Energy Information Administration, and Global Insight.

1 **Q. Is there sometimes a difference between *IBES* growth rates reported by *Yahoo!***  
2 ***Finance* and Thomson Reuters?**

3 A. Yes. Although I do not know the reason, estimates reported by *Yahoo! Finance* may be  
4 “stale” in that, if there are no currently available estimates, *Yahoo! Finance* may continue  
5 to report an estimate that has been removed by Thomson Reuters as out of date.

6 **Q. How have growth rates for the Core and Expanded Sample changed over time?**

7 A. The *IBES* 5-year growth rates forecasts for the companies in both the Core Sample and the  
8 Expanded Sample have been highly volatile. There are two primary drivers of the observed  
9 volatility. First, there are only a few analysts—often no more than one or two—tracking  
10 each sample company. Second, individual analyst’s forecasts often appear to be updated  
11 only infrequently.<sup>35</sup> When only a few analysts (fewer than three in most cases for the  
12 selected Core and Expanded Samples) forecast a company’s growth rate, even a change in  
13 a single analyst’s forecast can alter the consensus growth rate estimate substantially.

14 **Q. In your opinion are the *IBES* growth rate forecasts reliable?**

15 A. Generally, yes. The brokers and equity analysts who contribute estimates to *IBES* are in  
16 generally knowledgeable about the companies they cover, and their views are visible to and  
17 frequently cited by the investment community. Furthermore, *IBES* has a long history of  
18 gathering the contributed estimates and a reputation for doing so according to consistent  
19 standards. I therefore believe that the EPS growth rate estimates aggregated and reported by

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<sup>35</sup> For example, the growth forecasts for Kinder Morgan as reported on April 11, 2019 were made in mid-2018. Source: Bloomberg.

1 *IBES* provide useful information about the market expectation regarding the growth  
2 prospects of the sample companies.

3 However, the *IBES* consensus growth rate forecasts for the companies in the Core  
4 and Expanded Samples are determined by averaging estimates from a small and variable  
5 group of contributing analysts, so increasing the number of analysts providing forecasts by  
6 including estimates from Value Line would reduce some of the volatility, as explained  
7 below.

8 **Q. Given your observations about *IBES* growth rate forecasts, do you undertake any  
9 additional analyses of the DCF-based cost of equity?**

10 A. Yes. In addition to implementing the traditional FERC DCF model using *IBES* growth  
11 rates, I also implement the model using a combination of the *IBES* and Value Line growth  
12 rates. Specifically, in my analysis using both *IBES* and Value Line growth rates I assign  
13 equal weight to each analyst, so that the *IBES* growth rate is weighted by the number of  
14 analysts providing an estimate, while Value Line's estimates is treated as one analyst. Thus,  
15 the total number of analysts is the number providing an *IBES* estimate plus one.<sup>36</sup> Adding  
16 Value Line to the earnings growth forecasts used in the DCF model increases the number  
17 of analysts providing growth rates, which is beneficial. It is always preferable to have  
18 additional observations (i.e., a consensus), because the broader coverage a company has,

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<sup>36</sup> According to the Value Line, Inc. 2018 Form 10-K, Value Line's "target audiences within the investment research field are individual investors, colleges, libraries, and investment management professionals. Individuals come to Value Line for complete research in one package. Institutional licensees consist of corporations, financial professionals, colleges, and municipal libraries. Libraries and universities offer [Value Line]'s detailed research to their patrons and students. Investment management professionals use the research and historical information in their day-to-day businesses."

1 the better it reflects equity investors' perspective. Adding analysts is especially important,  
2 when the number of analysts providing a forecast to *IBES* is low.

3 Additionally, the Value Line analysts update their reports on a strict 13 week  
4 schedule so the forecast will never be older than 13 weeks. The reliability of Value Line's  
5 quarterly review schedule is a key benefit of using Value Line EPS growth forecasts  
6 alongside the *IBES* estimates, given that (as mentioned above) the Thomson Reuters *IBES*  
7 consensus growth rates can include estimates that may not have been updated for 6 months  
8 or more.

9 **C. Alternative Methods from the Commission's NETO Briefing Order**

10 **Q. Please describe the FERC's revised ROE estimation methodology.**

11 A. On October 16, 2018, the Commission issued the NETO Briefing Order on the ROE to be  
12 used by New England electric utilities for setting transmission rates. The Commission  
13 proposes to expand the methodological basis for calculating ROEs for electric utilities to  
14 encompass four analysis:

- 15 • Capital Asset Pricing Model ("CAPM")
- 16 • Expected Earnings Method
- 17 • Risk Premium Method<sup>37</sup>
- 18 • Two-step DCF – same as the Commission's traditional DCF method.

19 After excluding low- and high-end outliers from each model's results, the methodology  
20 establishes a "composite zone of reasonableness."<sup>38</sup> The NETO Briefing Order indicates

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<sup>37</sup> The Risk Premium Method is used to determine the median ROE but not to determine the zone of reasonableness.

<sup>38</sup> NETO Briefing Order at P 16.

1 that outliers are identified based on a minimum spread of 100 basis points (“bps”) between  
2 the ROE estimate and the yield on BBB-rated utility debt (“low-end”) and based on a  
3 maximum of a 1.5 multiple of the median estimate (“high-end”).

4 For setting the new ROE (*i.e.*, if an existing ROE is determined to be no longer just  
5 and reasonable), the Commission’s NETO Briefing Order proposed methodology uses the  
6 average of the midpoints or the medians of the three models along with a single point  
7 estimate from a proposed fourth methodology, the Risk Premium.<sup>39</sup> For my purposes in this  
8 testimony, I have not directly computed or relied on an average of medians – rather I  
9 consider the results of the CAPM and Expected Earnings methods (which I calculate) to  
10 inform my judgment regarding the reasonableness of the range and median of results from  
11 the Commission’s traditional DCF model. The Risk Premium Method (calculated by  
12 Witness Jay Nigh) is also consistent with the estimates I calculate. Since I discussed the  
13 DCF model in detail above, I shall restrict attention below to the CAPM and Expected  
14 Earnings models.<sup>40</sup>

15 Additionally, I note that the implementation of the Risk Premium model proposed  
16 and relied on in the NETO Briefing Order is based on a statistical analysis of the historical  
17 relationship between allowed ROEs approved for FERC-regulated electric transmission  
18 utilities and contemporaneously prevailing government and corporate bond yields. Given

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<sup>39</sup> The NETO Briefing Order states that “[t]he Commission will continue to use the midpoint of the zone of reasonableness as the appropriate measure of central tendency for a diverse group of average risk utilities and the median as the measure of central tendency for a single utility.” NETO Briefing Order at n.46.

<sup>40</sup> I note that I have been asked by Northern to implement the CAPM and Expected Earnings models in a manner that is as consistent as possible with the implementations discussed and relied on in the NETO Briefing Order. Thus, while I may implement the models differently in other proceedings or regulatory context, my goal here is to implement as closely as possible the models proposed by the Commission’s NETO Briefing Order.

1 the small number of available data points, it is not feasible to analyze how approved natural  
2 gas pipeline ROEs move relative to contemporaneous bond yields over time, and the results  
3 of any such analysis would not be statistically reliable or meaningful in the context  
4 envisioned by the NETO Briefing Order.<sup>41</sup> Witness Jay Nigh therefore proposes an  
5 alternative Risk Premium Method approach that is described in his testimony.<sup>42</sup>

6 **1. The Capital Asset Pricing Model**

7 **Q. Can you explain the CAPM?**

8 A. Yes. Modern models of capital market equilibrium express the cost of equity as the sum of  
9 a risk-free rate and a market risk premium. The CAPM is a long-standing and widely used  
10 version of these models. The model requires the specification of: (i) the values of the  
11 benchmarks that determine the Security Market Line (see Figure 2 above); (ii) the relative  
12 risk of a security or investment (*i.e.*, beta); and (iii) how the benchmarks combine to produce  
13 the Security Market Line. Given these specifications, the company's cost of capital is a  
14 function of the company's relative risk. More precisely, the CAPM calculates the cost of  
15 capital for an investment, (*e.g.*, a particular common stock) as follows:

16 
$$r_s = r_f + \beta_s \times MRP$$

17 Where  $r_s$  is the cost of capital for investment S;

18  $r_f$  is the risk-free interest rate;

19  $\beta_s$  is the beta risk measure for the investment S; and

---

<sup>41</sup> While I am aware that gas pipeline rate case settlements occasionally mention a notional ROE as part of the overall ROE (usually "black box"), even such instances are not common enough to establish a robust statistical relationship.

<sup>42</sup> See Exhibit No. NNG-00005.

1            *MRP* is the market risk premium.

2            The CAPM relies on the empirical fact that investors price risky securities to offer a higher  
3            expected rate of return than safe securities. The higher the systematic risk, the greater is the  
4            expected return.<sup>43</sup> Thus, the CAPM states that the Security Market Line starts at the risk-  
5            free interest rate (that is the return on a zero-risk security, the y-axis intercept in Figure 2,  
6            equals the risk-free interest rate). Further, the risk premium of a security over the risk-free  
7            rate equals the product of the beta of that security and the risk premium on a value-weighted  
8            portfolio of all investments, which by definition has average risk.

9            *a. The Risk-free Interest Rate*

10    **Q. What interest rates do your calculations require?**

11    A. The Commission's methodology relies upon the version of the model that is based upon the  
12    long-term risk-free rate.

13    **Q. What interest rate do you use in your implementation of the CAPM?**

14    A. The interest rate used in the CAPM must be consistent with the MRP selected. If the MRP  
15    is measured relative to 30-year U.S. Treasury bonds, then the risk-free rate should be for a  
16    30-year U.S. Treasury bonds. Consistent with the NETO Briefing Order, I use the historical  
17    yield although I generally believe a forecasted risk-free rate is preferable. Using the most  
18    recent 6-months ending March 31, 2019, I rely on a risk-free rate of 3.14 percent.<sup>44</sup>

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<sup>43</sup> See Section II above.

<sup>44</sup> See Exhibit No. NNG-00055.

1           ***b. The Market Risk Premium***

2   **Q. How was the MRP estimated in the NETO Briefing Order?**

3   A. The NETO Briefing Order relied upon a methodology proposed by Dr. Avera, the NETO  
4   witness in that proceeding. Dr. Avera estimated the MRP by implementing a single stage  
5   DCF model for the dividend paying companies in the S&P 500 index using *IBES* earnings  
6   growth rate estimates. Dr. Avera then calculated the expected market return by calculating  
7   a market-value weighted-average of the individual company DCF estimates. To derive the  
8   MRP, Dr. Avera subtracted the 6-month average risk-free interest rate on 30-year Treasury  
9   bonds.

10 **Q. What MRP did you estimate?**

11 A. Using the methodology above, I estimate the MRP to be 10.77 percent as of March 31, 2019.  
12 Details of this calculation are contained in my workpapers to Exhibit No. NNG-00055.

13           ***c. Beta***

14 **Q. What beta estimates were used in the NETO Briefing Order?**

15 A. The NETO Briefing Order uses beta estimates for the sample companies from Value Line.  
16 I similarly use Value Line as the source of my beta estimates.

17 **Q. Can you more fully explain beta?**

18 A. The basic idea behind beta is that risks that cannot be diversified away in large portfolios  
19 matter more than those that can be eliminated by diversification. Beta is a measure of the  
20 risks that cannot be eliminated by diversification. That is, it measures the “systematic” risk  
21 of a stock---the extent to which a stock's value fluctuates more or less than average when  
22 the market fluctuates.

1           Diversification is a vital concept in the study of risk and return. (Harry Markowitz  
2           won a Nobel Prize for work showing just how important it was.<sup>45</sup>) Over the long run, the  
3           rate of return on the stock market has a very high standard deviation, on the order of 20  
4           percent per year. Many individual stocks have much higher standard deviations than this.  
5           The stock market's standard deviation is “only” about 15-20 percent because when stocks  
6           are combined into portfolios, some of the risk of individual stocks is eliminated by  
7           diversification. Some stocks go up when others go down, and the average portfolio return—  
8           whether positive or negative—is usually less extreme than that of many individual stocks  
9           within it. The fact that the market's actual annual standard deviation is so large means that,  
10          in practice, the returns on stocks are positively correlated with one another, and to a material  
11          degree. The reason is that many factors that make a particular stock go up or down also  
12          affect other stocks. Examples include the state of the economy, the balance of trade, and  
13          inflation. Thus, some risk is “non-diversifiable” in that even a well-diversified portfolio of  
14          stocks will experience changes in value caused by these shared risk factors. Single-factor  
15          equity risk premium models (such as the CAPM) are based upon the assumption that all of  
16          the systematic factors that affect stock returns can be considered simultaneously, through  
17          their impact on one factor: the market portfolio. Other models derive somewhat less  
18          restrictive conditions under which several factors might be individually relevant.

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<sup>45</sup> Professor Markowitz won the Nobel Prize in 1990 for developing “the theory of portfolio choice.” See Press Release from Royal Swedish Academy of Science, October 16, 1990.

1 **Q. What does a particular value of beta signify?**

2 A. By definition, a stock with a beta equal to 1.0 has average non-diversifiable risk: it goes up  
3 or down by 10 percent on average when the market goes up or down by 10 percent. Stocks  
4 with betas above 1.0 exaggerate the swings in the market: stocks with betas of 2.0 tend to  
5 fall 20 percent when the market falls 10 percent, for example. Stocks with betas below 1.0  
6 are less volatile than the market. A stock with a beta of 0.5 will tend to rise 5 percent when  
7 the market rises 10 percent.

8 *d. Size Adjustment*

9 **Q. What is the size adjustment?**

10 A. The size adjustment is a modification to the CAPM estimates based upon empirical evidence  
11 from academic studies documenting a difference between a company's theoretical return as  
12 estimated by the CAPM and its realized return. The difference is a function of the size of  
13 the entity, where size is measured by its market value capitalization. As discussed in the  
14 NETO Briefing Order, the size adjustment applied to the CAPM estimates is reported by  
15 Duff & Phelps<sup>46</sup> and varies with decile. The smallest decile of companies requires the  
16 largest addition to the expected return estimated to depend solely on beta, while stocks in  
17 the largest decile have actually shown an empirical tendency to return *less* than the rate of  
18 return predicted by applying the CAPM equation to its beta; hence, companies with very  
19 large market capitalizations actually receive a downward adjustment.

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<sup>46</sup> The NETO Briefing Order relied upon the data from the New England Transmission Owner's expert, Dr. Avera, who relied on Duff & Phelps for this calculation. See Duff & Phelps, *2017 Valuation Handbook*, U.S. Guide to Cost of Capital, 7-10 and 7-11.

1           **2. Expected Earnings Method**

2   **Q.    How did the NETO Briefing Order implement the expected earnings method?**

3    A.    The Expected Earnings method uses the expected or forecast return on book equity as  
4          provided by Value Line. The forecast used is the expected ROE three to five years in the  
5          future. Because the forecast is assumed to be an ROE based upon the company's book  
6          equity in the last year of the period, an adjustment is needed to convert the forecasted ROE  
7          to an ROE over an average book value of equity over the period. This adjustment is  
8          accomplished by multiplying the future forecasted ROE by the following adjustment factor,  
9          where "change in equity" refers to the forecasted percent change in the book equity balance  
10         over the three to five year forecast horizon.

$$\frac{2 \times (1 + \text{change in equity})}{2 + \text{change in equity}}$$

11   **Q.    Are the Expected Earnings estimates market based?**

12    A.    No. They are projections of accounting measures of return. Unlike models that rely on  
13          market prices, the Expected Earnings approach directly estimates the expected return on  
14          book value equity, which is directly comparable to the way rate of return regulation  
15          determines an allowed ROE to be applied to a book value rate base.

IV. RESULTS FROM ROE ESTIMATION MODELS

A. DCF Results

Q. What are your results from your implementation of the Commission’s DCF model?

A. The results are displayed in Figure 5 below.<sup>47</sup>

Figure 5: Results from the DCF Method

Company	Dividend Yield	GDP Growth	Company Growth Rates			Cost of Equity Estimates	
			IBES Consensus	Value Line	Weighted Average	IBES Consensus	Weighted Average
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
<b>Enable Midstream Part.</b>	<b>8.6%</b>	<b>2.1%</b>	<b>7.2%</b>	<b>21.4%</b>	<b>11.9%</b>	<b>14.3%</b>	<b>17.6%</b>
<b>Enbridge Inc.</b>	<b>6.2%</b>	<b>4.2%</b>	<b>13.5%</b>	<b>5.1%</b>	<b>11.4%</b>	<b>16.9%</b>	<b>15.4%</b>
<b>EQT Midstream Part.</b>	<b>10.0%</b>	<b>2.1%</b>	<b>3.7%</b>	<b>2.5%</b>	<b>3.1%</b>	<b>13.3%</b>	<b>12.9%</b>
<b>Kinder Morgan Inc.</b>	<b>4.6%</b>	<b>4.2%</b>	<b>12.0%</b>	<b>18.9%</b>	<b>15.5%</b>	<b>14.2%</b>	<b>16.5%</b>
<b>TC PipeLines LP</b>	<b>8.2%</b>	<b>2.1%</b>	<b>9.3%</b>	<b>-</b>	<b>9.3%</b>	<b>15.4%</b>	<b>15.4%</b>
<b>TransCanada Corp.</b>	<b>5.2%</b>	<b>4.2%</b>	<b>0.9%</b>	<b>9.3%</b>	<b>3.7%</b>	<b>7.3%</b>	<b>9.2%</b>
<b>Williams Cos.</b>	<b>5.4%</b>	<b>4.2%</b>	<b>9.0%</b>	<b>22.1%</b>	<b>13.3%</b>	<b>13.0%</b>	<b>16.0%</b>
Energy Transfer LP	8.2%	2.1%	21.5%	11.4%	18.1%	23.8%	21.5%
Enterprise Products	6.4%	2.1%	8.3%	7.1%	7.9%	12.9%	12.6%
Magellan Midstream	6.5%	2.1%	5.4%	9.7%	6.8%	10.9%	11.9%
ONEOK Inc.	5.4%	4.2%	14.1%	13.2%	13.8%	16.5%	16.3%
Plains All Amer. Pipe.	5.2%	2.1%	6.2%	7.8%	7.0%	10.2%	10.8%
<b>Core Sample</b>					Average	13.5%	14.7%
					<b>Median</b>	<b>14.2%</b>	<b>15.4%</b>
					Range	7.3% - 16.9%	9.2% - 17.6%
<b>Expanded Sample</b>					Average	13.2%	14.7%
					<b>Median</b>	<b>13.3%</b>	<b>15.4%</b>
					Range	7.3% - 16.9%	9.2% - 21.5%

Sources and Notes:

\*Core Sample Companies are displayed in bold.

\*Summary values and ranges exclude estimates where:

- (a): Estimate is less than the 6-month average BBB rated utility bond yield + 100 bps (as of 3/31/2019 equals 5.83%).
- (b): Estimate is greater than the upper end outlier test for its respective sample. (1.5x median estimate of sample)
- (c): Company has a negative growth rate.

[1]: 6-month average dividend yield though 3/31/2019.

[2]: Nominal GDP estimate calculated as average of EIA, SSA, and Blue Chip Economic Indicators forecasts. Halved for MLPs per Commission precedent.

[3]: Thomson Reuters as of 3/31/2019. The IBES consensus growth estimates for Kinder Morgan Inc. and TC PipeLines LP are identified by Thomson Reuters as having expiration dates of 1/17/2019 and 8/7/2018, respectively.

[4]: ValueLine as of 3/28/2019.

[5]: Calculated by giving ValueLine estimate weight of 1 and IBES estimate weight based on the number of analysts estimates included.

[6]: Cost of Equity result of FERC DCF methodology using [3] as the company growth rate.

[7]: Cost of Equity result of FERC DCF methodology using [5] as the company growth rate.

<sup>47</sup> In Figure 5, TransCanada’s *IBES* growth rate as reported by Thompson Reuters as of 3/31/2019 is 0.9%. I am using this reported figure although the number appears to be anomalously low due to a negative 5.57% growth rate estimate from Credit Suisse. Specifically, Credit Suisse on March 11, 2019 reported the 2018 EPS of Cnd. \$4.12 for TransCanada, while TransCanada’s annual report lists Cnd. \$3.86 and Credit Suisse’s May 28, 2019 report lists (adj) Cnd. \$3.92. As the starting EPS impacts the growth rate, the March 31, 2019 EPS figure used by Credit Suisse would downward bias the growth rate. Sources: Credit Suisse, “TransCanada Corp.” 11 March 2019, Credit Suisse, “TC Energy” 28 May 2019 (TransCanada Corp. changed name to TC Energy on May 3, 2019), TransCanada Corp., 2018 Annual Report, p. 21.

1 **Q. What conclusion do you draw from these estimates?**

2 A. Based on the Commission's DCF applied to the Core Sample, I recommend a ROE of  
3 14.2 percent. This is the median for the Core Sample.

4 To ensure this estimate is reasonable, I undertake additional tests. For example, I  
5 implement the same model using a weighted average of the *IBES* and Value Line growth  
6 rates, which simply adds an additional source for the growth rates.

7 Looking to the estimates from using a weighted average of the *IBES* and Value Line  
8 growth rates rather than just the *IBES* growth rates, I find that the weighted average confirms  
9 the *IBES* based estimate, but are slightly higher. Because the weighted averages of *IBES*  
10 and Value Line growth rates are based on an additional analyst, which is significant given  
11 the few analysts that follow pipeline companies, I find that this is important. The presence  
12 of more equity analysts improve the estimates in that there is a larger group of analysts  
13 contributing to the estimate. I also note that Value Line is a respected source of financial  
14 data and the Commission's approaches in the NETO Briefing Order relied on Value Line  
15 for input to both the CAPM and Expected Earnings model. Therefore, the weighted average  
16 confirms the traditional DCF result and shows it may be a conservative estimate.

17 I also estimate the DCF-based ROE using the Expanded Sample. These tests result  
18 in a range of 7.3 to 21.5 percent with the medians showing 13.3 to 15.4 percent. To further  
19 investigate the reasonableness of the recommendation, I also implement the CAPM and  
20 Expected Earnings methodologies used to generate the ROE in the Commission's NETO  
21 Briefing Order. I also review the results of Mr. Nigh's Risk Premium Method calculation.  
22 The results of my calculations are described below.

**B. Results from the Alternative Methods**

**Q. What are the results from CAPM?**

A. The results obtained by implementing the CAPM as outlined in the NETO Briefing Order are displayed in Figure 6 below. The results from the implementation of the NETO Briefing Order's CAPM result in ROE estimates that overlap the medians from the DCF model, but mostly point to a higher ROE.

**Figure 6: Results from the CAPM in the NETO Briefing Order**

Company	Unadjusted Cost of Equity Estimate				Size Premium Adjustment		Size Adjusted Cost of Equity
	Risk Free Rate	Market Risk Premium	ValueLine Beta	Unadjusted Cost of Equity	Market Cap (\$ millions)	Size Adjustment	
	[1]	[2]	[3]	[4] = [1] + [2] x [3]	[5]	[6]	
<b>Enable Midstream Part.</b>	<b>3.1%</b>	<b>10.8%</b>	<b>1.20</b>	<b>16.1%</b>	<b>\$6,130</b>	<b>0.9%</b>	<b>17.0%</b>
<b>Enbridge Inc.</b>	<b>3.1%</b>	<b>10.8%</b>	<b>1.05</b>	<b>14.4%</b>	<b>\$83,479</b>	<b>-0.4%</b>	<b>14.1%</b>
<b>EQT Midstream Part.</b>	<b>3.1%</b>	<b>10.8%</b>	<b>1.25</b>	<b>16.6%</b>	<b>\$5,399</b>	<b>1.0%</b>	<b>17.6%</b>
<b>Kinder Morgan Inc.</b>	<b>3.1%</b>	<b>10.8%</b>	<b>1.40</b>	<b>18.2%</b>	<b>\$45,130</b>	<b>-0.4%</b>	<b>17.9%</b>
<b>TC PipeLines LP</b>	<b>3.1%</b>	<b>10.8%</b>	<b>1.25</b>	<b>16.6%</b>	<b>\$2,676</b>	<b>1.5%</b>	<b>18.1%</b>
<b>TransCanada Corp.</b>	<b>3.1%</b>	<b>10.8%</b>	<b>1.10</b>	<b>15.0%</b>	<b>\$39,503</b>	<b>-0.4%</b>	<b>14.6%</b>
<b>Williams Cos.</b>	<b>3.1%</b>	<b>10.8%</b>	<b>1.90</b>	<b>23.6%</b>	<b>\$34,694</b>	<b>-0.4%</b>	<b>23.3%</b>
Energy Transfer LP	3.1%	10.8%	2.15	26.3%	\$39,832	-0.4%	25.9%
Enterprise Products	3.1%	10.8%	1.30	17.1%	\$63,057	-0.4%	16.8%
Magellan Midstream	3.1%	10.8%	1.20	16.1%	\$13,872	0.6%	16.7%
ONEOK Inc.	3.1%	10.8%	1.55	19.8%	\$28,540	-0.4%	19.5%
Plains All Amer. Pipe.	3.1%	10.8%	1.50	19.3%	\$17,767	0.6%	19.9%
<b>Core Sample</b>		Average	1.31	17.2%			17.5%
		<b>Median</b>	<b>1.25</b>	<b>16.6%</b>			<b>17.6%</b>
		Range	1.05 - 1.90	14.4% - 23.6%			14.1% - 23.3%
<b>Expanded Sample</b>		Average	1.40	18.3%			18.4%
		<b>Median</b>	<b>1.28</b>	<b>16.9%</b>			<b>17.7%</b>
		Range	1.05 - 2.15	14.4% - 26.3%			14.1% - 25.9%

Sources and Notes:

\*Core Sample companies are displayed in bold.

\*Summary values and ranges exclude estimates failing the outlier test for each respective sample. (1.5x median estimate of sample.)

[1]: 6-month average of 30-year U.S. Treasury Constant Maturity Rate series up to 3/31/2019, St. Louis FRED.

[2]: See Workpaper #2 to Table No. BV-8. Also see BV Direct Testimony for description of methodology.

[3], [5]: Valueline Investment Analyzer as of 3/28/2019.

[6]: Duff & Phelps 2017 Valuation Handbook - U.S. Guide to Cost of Capital, pp. 7-10, 11.

1 **Q. What are your results from implementing the Expected Earnings model as specified**  
2 **in the NETO Briefing Order?**

3 A. The results are displayed in Figure 7 below.<sup>48</sup> The results from the Expected Earnings  
4 model overlap the DCF results and range from 8.6 percent to 19.4 percent for the Core  
5 Sample, while the results from the Expanded Sample are higher.

6 **Figure 7: Results from the FERC's Expected Earnings Model in the NETO Order**

Company	2022-2024 Expected Return on Equity	Adjustment Factor Calculation				Adjusted Return on Equity
		2019 Total Common Equity (\$ millions)	2022-2024 Expected Total Common Equity (\$ millions)	Change in Equity (%)	Adjustment Factor	
	[1]	[2]	[3]	[4]	[5]	[6] = [1] x [5]
<b>Enable Midstream Part.</b>	<b>14.0%</b>	<b>\$7,450</b>	<b>\$8,000</b>	<b>1.4%</b>	<b>1.007</b>	<b>14.1%</b>
<b>Enbridge Inc.</b>	<b>8.5%</b>	<b>\$69,150</b>	<b>\$76,620</b>	<b>2.1%</b>	<b>1.010</b>	<b>8.6%</b>
<b>EQT Midstream Part.</b>	<b>19.0%</b>	<b>\$5,200</b>	<b>\$6,500</b>	<b>4.6%</b>	<b>1.022</b>	<b>19.4%</b>
<b>Kinder Morgan Inc.</b>	<b>10.0%</b>	<b>\$35,170</b>	<b>\$39,715</b>	<b>2.5%</b>	<b>1.012</b>	<b>10.1%</b>
<b>TC PipeLines LP</b>	<b>n/a</b>	<b>n/a</b>	<b>n/a</b>	<b>n/a</b>	<b>n/a</b>	<b>n/a</b>
<b>TransCanada Corp.</b>	<b>16.0%</b>	<b>\$20,598</b>	<b>\$25,200</b>	<b>4.1%</b>	<b>1.020</b>	<b>16.3%</b>
<b>Williams Cos</b>	<b>12.5%</b>	<b>\$14,930</b>	<b>\$20,160</b>	<b>6.2%</b>	<b>1.030</b>	<b>12.9%</b>
Energy Transfer LP	NMF	\$750	\$1,000	5.9%	1.029	n/a
Enterprise Products	23.5%	\$22,950	\$24,600	1.4%	1.007	23.7%
Magellan Midstream	42.0%	\$2,700	\$3,350	4.4%	1.022	42.9%
ONEOK Inc.	27.0%	\$7,000	\$8,000	2.7%	1.013	27.4%
Plains All Amer. Pipe.	15.5%	\$12,450	\$12,865	0.7%	1.003	15.6%
<b>Core Sample</b>					Average	13.6%
					<b>Median</b>	<b>13.5%</b>
					Range	8.6% - 19.4%
<b>Expanded Sample</b>					Average	15.1%
					<b>Median</b>	<b>14.8%</b>
					Range	8.6% - 23.7%

Sources and Notes:

\*Core Sample companies are displayed in bold.

\*Summary values and ranges exclude estimates failing the outlier test for each respective sample. (1.5x median estimate of the sample.)

[1] - [3]: Value Line as of 3/31/2019. Enbridge Inc. values reported in millions of Canadian dollars. NMF = Not meaningful as reported by Value Line. Value Line does not report data estimates or projections for TC Pipelines after 2017.

[4] = ([3] / [2]) ^ (1/5) - 1

[5] = (2 + 2 x[4]) / (2 + [4])

7

<sup>48</sup> TC PipeLines does not have forecasted earnings from Value Line, and therefore, I cannot implement the model for that company.

1 **Q. How do the results in Figure 6 and Figure 7 compare to those from the traditional**  
2 **DCF model?**

3 A. The CAPM results are higher, while the results from the Expected Earnings model are  
4 slightly lower for the Core Sample and slightly higher for the Expanded Sample. I view  
5 these results as an indication that the results from the traditional DCF model are reasonable  
6 in the light of the NETO Briefing Order's methodology. I note that the average of the  
7 medians of the three methods (DCF, CAPM and Expected Earnings) for the Core Sample  
8 is higher at 15.1 percent than the FERC's traditional DCF method calculation at 14.2  
9 percent. For the Expanded Sample, the average of all three methods is 15.3 percent, while  
10 the FERC's traditional DCF method calculation results in a ROE of 13.3 percent.

11 **Q. How do your calculations compare with the results of Mr. Nigh's Risk Premium**  
12 **calculations?**

13 A. Mr. Nigh's Risk Premium calculation generates a result of 16.2 percent, which is also higher  
14 than my 14.2 percent DCF calculation and similar to my unadjusted CAPM results. Mr.  
15 Nigh's calculation of the Risk Premium Method further corroborates the reasonableness of  
16 that results from the traditional DCF and my alternative models.

17 **C. Zone of reasonableness**

18 **Q. How would you use the cost of equity estimates for the companies in the Core Sample**  
19 **and the Expanded Sample to derive an estimate of the appropriate ROE for Northern?**

20 A. Using the methodology in the NETO Briefing Order, the estimates for the proxy companies  
21 are used to establish a range of reasonableness, and the corresponding median is set as the

1 benchmark estimate of the cost of equity for companies of average business risk. The  
2 Commission's decision in *Enbridge* provides a summary of this approach:

3           Once the rates of return for the proxy companies are determined, thereby  
4           establishing a range of reasonable returns, the Commission must determine  
5           where to set the pipeline's return in that range based upon how the pipeline's  
6           risk compares with that of other pipelines. The Commission begins its risk  
7           analysis with the assumption that pipelines generally fall within a broad  
8           range of average risk, absent highly unusual circumstances that indicate and  
9           [sic] anomalously high or low risk as compared to other pipelines. As a  
10          result, the Commission has generally placed pipelines at the middle of the  
11          range, using the median of the proxy group returns to calculate the middle.<sup>49</sup>

12          Looking to the Commission's traditional DCF method, the median for the Core Sample is  
13          14.2 percent, while the Expanded Sample shows a slightly lower figure at 13.3 percent.<sup>50</sup>  
14          However, looking to the NETO Briefing Order's methodology, the average of the median  
15          for the three methods (DCF, CAPM, and Expected Earnings) is 15.1 percent for the Core  
16          Sample and 15.3 for the Expanded Sample.<sup>51</sup>

17          These results are summarized in Figure 8 below.

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<sup>49</sup> *Enbridge* at P 216.

<sup>50</sup> If Value Line growth estimates are included as one of many growth rates, the results are higher.

<sup>51</sup> The reported ROE values rely on *IBES* growth rates only.

1

**Figure 8: Summary Results**

Sample	DCF		CAPM	Expected Earnings
	IBES	Weighted Average		
	Growth Rates	Growth Rates		
	[1]	[2]	[3]	[4]
<b>Core Sample</b>				
Average	13.5%	14.7%	17.5%	13.6%
Range	7.3% - 16.9%	9.2% - 17.6%	14.1% - 23.3%	8.6% - 19.4%
<b>Median</b>	<b>14.2%</b>	<b>15.4%</b>	<b>17.6%</b>	<b>13.5%</b>
<b>Expanded Sample</b>				
Average	13.2%	14.7%	18.4%	15.1%
Range	7.3% - 16.9%	9.2% - 21.5%	14.1% - 25.9%	8.6% - 23.7%
<b>Median</b>	<b>13.3%</b>	<b>15.4%</b>	<b>17.7%</b>	<b>14.8%</b>

Source: Exhibit No. NNG-00055.

[1]: Table No. BV-3(a).

[2]: Table No. BV-3(b).

[3]: Table No. BV-8.

[4]: Table No. BV-9.

2

3

4 **Q. What conclusions do you draw from these results?**

5 A. First, based on the analysis. I find that an ROE of 14.2 percent is consistent with the  
6 Commission's traditional DCF model. It is on the conservative side when considered in  
7 context of the results of the other estimation methodologies proposed in the NETO Briefing  
8 Order, and based on Dr. Carpenter's business risk analysis in Exhibit No. NNG-00056.

9 As Dr. Carpenter finds that Northern faces elevated exposure to competition  
10 (bypass) risk and has higher business risk than the median of the Core Sample due to  
11 Northern's relatively lower contract coverage, higher capital expenditures, and higher  
12 storage-related risks, my conclusion to a recommended ROE of 14.2 percent is well within  
13 the zone of reasonableness. Viewed in combination with the higher estimates from  
14 alternative inputs to the DCF model (e.g., the inclusion of Value Line growth rates) or

1 additional models from the NETO Briefing Order, I find that the 14.2 percent derived from  
2 the Commission's traditional DCF is conservative.

3 I recommend that Northern be allowed an opportunity to earn a ROE of 14.2 percent  
4 on its Commission-regulated gas pipeline assets and find it to be a reasonable, albeit  
5 conservative, estimate.

#### 6 **D. Capital Structure Considerations**

##### 7 **Q. What capital structure does Northern propose to use in this proceeding?**

8 A. Northern is using its actual capital structure, which is expected to be 59.4 percent equity  
9 and 40.6 percent debt as of the end of the Test Period on December 31, 2019.<sup>52</sup> In my  
10 opinion, Northern's use of its actual capital structure for ratemaking purposes is reasonable  
11 and consistent with Commission policy.

12 The Commission's established precedent is to "use a pipeline's own capital structure  
13 for rate making purposes so long as the pipeline (1) issues its own debt; (2) has its own  
14 separate bond rating; (3) has an equity ratio that is not excessive in light of the other equity  
15 ratios approved by the Commission and in comparison with the equity ratios of the proxy  
16 companies."<sup>53</sup> Northern's actual capital structure meets each of these criteria.

17 Northern issues its own debt and has its own separate bond rating.<sup>54</sup> An equity ratio  
18 of 59.4 percent is also in line with what the Commission has approved in prior cases. For

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<sup>52</sup> See Witness Joseph Lillo Testimony, Exhibit No. NNG-00038.

<sup>53</sup> *Transco*, 84 FERC ¶ 61,084, at 61,414.

<sup>54</sup> See Witness Joseph Lillo Testimony, Exhibit No. NNG-00038.

1 example, the orders for *Pacific Gas Transmission Company* and *Williams Natural Gas*  
2 *Company* used 68.86 percent and 64.29 percent equity, respectively.<sup>55</sup>

3 Finally, an equity ratio of 59.4 percent is not excessive when compared with the  
4 equity ratios of the proxy companies. For example, the data relied upon to derive the  
5 recommended ROE for Northern shows that the median market equity percentage for the  
6 Core Sample is 59 percent and the median market equity percentage for the Expanded  
7 Sample is 61.5 percent.<sup>56</sup>

8 **Q. Please explain further your findings with respect to the equity ratios of the proxy**  
9 **companies.**

10 A. The capital structure of the Core and Expanded Samples is reported below on both a book  
11 value and a market value basis. The table also summarizes the capital structure used in the  
12 responses of FERC regulated pipelines to the Commission's Form No. 501-G filing  
13 requirement, instituted last year in response to changes in law and policy related to income  
14 taxes.<sup>57</sup> According to the guidelines for the FERC's Form No. 501-G, natural gas  
15 companies must report the common equity consistent with FERC Form No. 2 / 2A and also

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<sup>55</sup> *Pacific Gas Transmission Company*, 62 FERC ¶ 61,109 at 61,779 (1993) (finding pipeline's actual equity ratio of 68.86 percent to be "appropriate" and "not atypical"); *Williams Natural Gas Co.*, 84 FERC ¶ 61,080, at 61,355-56 (1998) (finding pipeline's actual equity ratio of 64.29 percent to be "reasonable compared to equity ratios approved in other cases," as opposed to "equity ratios of 90 percent and above" which the Commission previously found "to be atypical").

<sup>56</sup> As for the Core Sample and the Expanded Sample, the market value capital structure is the relevant benchmark because the DCF and CAPM cost of equity estimates are derived based on market stock price and return data that reflects market value leverage and financial risk.

<sup>57</sup> FERC Form No. 501-G in Docket No. RM18-11-000 is a one-time report on the rate effect of the TCJA. The form required natural gas companies to report data to the FERC regarding their assets, rate base, ROE, capital structure, income taxes and certain regulatory accounts and approaches. *Interstate and Intrastate Natural Gas Pipelines: Rate Changes Relating to Federal Income Tax Rate*, Order No. 849, 164 FERC ¶ 61,031 (2018) ("Order 849").

1 report whether the figure pertains to the “books and records” of the parent company.<sup>58</sup> As  
2 shown, the equity percentage of the Core and Expanded Samples is consistent with the  
3 reporting done in the Form No. 501-G natural gas companies’ regulatory filing.

4 **Figure 9: Capital Structure Summary Data**

Company		Book Value Equity Ratio (%) [1]	Market Value Equity Ratio (%) [2]
<b>Enable Midstream Part.</b>	[a]	<b>62.6%</b>	<b>59.1%</b>
<b>Enbridge Inc.</b>	[b]	<b>50.4%</b>	<b>61.2%</b>
<b>EQT Midstream Part.</b>	[c]	<b>54.2%</b>	<b>69.6%</b>
<b>Kinder Morgan Inc.</b>	[d]	<b>50.8%</b>	<b>57.8%</b>
<b>TC PipeLines LP</b>	[e]	<b>25.2%</b>	<b>57.3%</b>
<b>TransCanada Corp.</b>	[f]	<b>36.2%</b>	<b>54.1%</b>
<b>Williams Cos</b>	[g]	<b>41.8%</b>	<b>61.9%</b>
Energy Transfer LP	[h]	40.7%	52.8%
Enterprise Products	[i]	48.5%	71.2%
Magellan Midstream	[j]	39.4%	77.3%
ONEOK Inc.	[k]	41.0%	75.3%
Plains All Amer. Pipe.	[l]	51.3%	64.8%
<b>Core Sample</b>			
Average		49.3%	60.1%
<b>Median</b>		<b>50.6%</b>	<b>59.1%</b>
Range		36.2% - 62.6%	54.1% - 69.6%
<b>Expanded Sample</b>			
Average		47.0%	63.5%
<b>Median</b>		<b>48.5%</b>	<b>61.5%</b>
Range		36.2% - 62.6%	52.8% - 77.3%
<b>Form 501-G</b>			
		<b>2017 Actual</b>	<b>Used for 501-G</b>
Average	[m]	63.4%	56.0%
<b>Median</b>	[n]	<b>62.0%</b>	<b>57.0%</b>
Range	[o]	-6.5% - 100.0%	34.0% - 64.4%

Sources and Notes:

\*Core Sample Companies are displayed in bold.

[a] - [l]: Capital IQ. Data accessed 5/13/2019. Preferred Equity allocated evenly between equity and debt portion of capital structure. Market Value of equity as of 3/31/2019.

[1][e]: Excluded from summary statistics.

[m] - [o]: From the reported capital structure in Form 501-G for natural gas pipeline companies with greater than \$500 million rate base.

5  
6 I note that if I allocate preferred equity to debt and equity based on the characteristics of the  
7 outstanding series, Enable Midstream Partner’s book value equity increases to 63.3 percent,

<sup>58</sup> *Id.* at P 107.

1 while the change for other companies is smaller. With this change, the upper end of the  
2 range of the book value equity ratio of the Core Sample and Expanded Sample is slightly  
3 higher. Regardless, Figure 9 above shows that Northern's requested capital structure is in  
4 line with that used to determine the book value cost of equity, the market cost of equity as  
5 well as the equity percentage reported on pipelines' Form No. 501-G filings. Because  
6 Northern is requesting the use of its actual equity ratio in this proceeding and because  
7 Northern's actual equity ratio is well within the range of both the Core Sample and the  
8 Expanded Sample, as well as within the range of that used by other natural gas pipelines, I  
9 conclude Northern's actual equity ratio is reasonable.<sup>59</sup>

10 I also find that a capital structure of 59.4 percent equity is reasonable for developing  
11 Northern's revenue requirement. This value is based on Northern's actual capital structure,  
12 is below the level of equity ratios approved by the Commission in prior cases, and is within  
13 the range of the book value and market value capital structures of the proxy companies as  
14 well as the capital structures of other natural gas pipelines as reported in the Form No. 501-  
15 G filings.

16 **Q. Does this conclude your direct testimony?**

17 A. Yes. I note that the Commission prefers to use up-to-date information for cost of capital  
18 issues, so it may be necessary as the proceeding progresses to adjust the members of the  
19 proxy group or otherwise revise my conclusions to reflect more recent information.

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<sup>59</sup> I exclude TC PipeLines from the summary statistics and consideration of representative book value equity ratios of the sample companies due to its anomalously low value reported for 2018, which was influenced by an asset impairment charge of \$537 million recorded in Q4 2018. *See* TC PipeLines 2018 10-K, p. 12. I note that while TC PipeLines' market value equity percentage is very close to the median and average for the proxy companies, its reported book value percentage is anomalously low and unrepresentative.

**UNITED STATES OF AMERICA  
BEFORE THE  
FEDERAL ENERGY REGULATORY COMMISSION**

Northern Natural Gas Company )

Docket No. RP19-\_\_\_\_-000

**AFFIDAVIT OF BENTE VILLADSEN**

I, Bente Villadsen, state that the information contained in my Prepared Direct Testimony is true and correct to the best of my knowledge and if asked the questions that appear in the text of this Prepared Direct Testimony, I would give the answers that are also set forth therein, and I adopt this Prepared Direct Testimony as my sworn testimony in this proceeding.

Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Executed this 26 day of June, 2019.



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Bente Villadsen