SUPPLEMENTAL STATEMENT OF BRADFORD CORNELL, PH.D.

I, Bradford Cornell, Ph.D., hereby state:

I provided a statement dated June 25, 2019 in support of the comments submitted by the Aluminum Association, American Chemistry Council, American Forest and Paper Association, American Public Power Association, Electricity Consumers Resource Council, Industrial Energy Consumers of America, National Rural Electric Cooperative Association, and Transmission Access Policy Study Group (collectively, "Associations") to *Inquiry Regarding the Commission's Policy for Determining Return on Equity*, 166 FERC ¶ 61,207 (2019) (the "NOI").

I make this supplemental statement in support of supplemental comments submitted by the Associations and to address certain issues raised in the submissions of other entities. I have personal knowledge of the matters stated herein.

My background and qualifications are summarized in my initial statement and described more fully in my curriculum vitae, which is attached as Appendix A thereto. A list of testimony I have given in deposition or at trial over the past four years may be found in Appendix B to my initial statement.

Specifically, I have been asked to respond to:

- Statements made by experts for the Interstate Natural Gas Association of America (the "INGAA), the New England Transmission Owners (the "NETOs"), and the Environmental Defense Fund (the "EDF") regarding investors' use of expected earnings and the Commission's inclusion of an Expected Earnings model (as defined below) to estimate the cost of capital;

- Statements made by Mr. McKenzie, an expert for the NETOs, regarding the use of the Empirical Capital Asset Pricing Model ("ECAPM"); and

- Statements made by the NETOs regarding the use of long-term expected growth rates and a multi-stage Discounted Cash Flow ("DCF") model to estimate the market risk premium when applying the Capital Asset Pricing Model ("CAPM").

THE EXPECTED EARNINGS APPROACH DOES NOT PROVIDE A RELIABLE ESTIMATE OF A FIRM'S COST OF EQUITY

In my initial statement dated June 25, 2019, I emphasized that the academic literature does not endorse the use of expected earnings and the book value of a firm's equity (the "Expected Earnings" model) as a procedure for estimating the cost of equity capital, because it is based on accounting measures rather than economic measures. Several of the Transmission Owners' experts appear to agree with this point.

To begin, Dr. Vilbert, an expert for the INGAA, acknowledges "that the Expected Earnings method has no theoretical basis as a means of estimating the market cost of capital."[1]

Next, Mr. Quackenbush, an expert for the NETOs, does not state that investors use the Expected Earnings model to estimate the cost of equity. Rather, he claims that investors may use evaluations of expected earnings to make investment decisions.[2] While this may be true, it does not mean that investors use the Expected Earnings model to estimate the cost of equity capital. The central problem with that model is its use of book value equity in the *divisor* of proxy firms' Earnings-to-Book ("E/B") ratios. That problem is not solved by assertions that investors consider the projected earnings that form the *numerator* of that ratio.

Finally, Mr. Murchie, an expert for the EDF, succinctly states why the academic literature does not endorse use of the Expected Earnings model to estimate the cost of equity:

> ... the cost of capital for a particular company or group of companies and
> the return those companies earn on that capital (which I will refer to as the

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[1] *See* Prepared Affidavit of Dr. Michael J. Vilbert on behalf of INGAA, dated June 26, 2019 ("Vilbert Affidavit"), page 47, paragraph 121.

[2] *See* Affidavit of John D. Quackenbush, dated June 26, 2019 ("Quackenbush Affidavit"), page 17.

Accounting ROE and is simply reported earnings divided by book value)
are two entirely different concepts.[3]

Mr. Murchie is correct, the ratio of a firm's reported earnings to a firm's book value does not

provide a reliable measure of the firm's cost of equity because the calculation is based on an

entirely different concept, *i.e.*, an accounting return on equity, not a market-based cost of equity.

Furthermore, replacing reported earnings with expected earnings does not solve the problem.

Both approaches erroneously divide returns by book value rather than market-priced equity;

neither approach provides a reliable measure of the firm's cost of equity.

The academically accepted methods of measuring the cost of equity all rely on market-

based measures, not accounting-based measures. Dr. Vilbert and Mr. Quackenbush appear to

agree with this statement as well. Dr. Vilbert emphasizes that the Expected Earnings model

provides an accounting rate of return, not a market-based estimate of the cost of equity. [4]

Similarly, Mr. Quackenbush states:

> … 3) because the end goal of utility regulation is to determine the ROE
> based on the cost of equity, it is sometimes easy to conjecture that the cost
> of equity estimates are an end goal of investors when they are not… and 7)
> by combining cost of equity models that investors are known to use with
> data that investors are known to access along with observed market values,
> it is possible to back into cost of capital estimates that investors may be
> using in the aggregate.[5]

These experts' statements highlight two important points.

First, the Expected Earnings model fails to provide an estimate of a firm's cost of equity

because it does not use observed market values, it uses book values. Second, Mr. Quackenbush

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[3] *See* Affidavit of James J. Murchie, dated June 25, 2019, page 3.

[4] *See* Vilbert Affidavit, page 47, paragraph 121.

[5] *See* Quackenbush Affidavit, page 18.

is correct: the end goal of investors likely differs from the end goal of utility regulation. Utility

regulation uses estimates of the cost of equity to determine a reasonable return on equity

("ROE"). The necessary input is a market-based estimate of the cost of equity. On the other

hand, investors typically analyze companies to make buy or sell decisions, e.g., they are looking

for undervalued or overvalued companies. Investors use lots of data other than estimates of the

cost of equity to reach those decisions, including forecasts of dollar or per-share earnings, cash

flow forecasts, price-earnings ("P/E") multiples, earnings before interest, tax, depreciation, and

amortization ("EBITDA") multiples, market to book ratios, *etc*. In fact, they may not estimate a

cost of equity to reach an investment decision. Because investors are highly heterogeneous, it is

difficult, if not impossible, to identify which inputs different investors use and how those

investors affect investment decisions. However, if the Federal Energy Regulatory Commission's

("FERC" or "Commission") goal is to set allowed ROEs at a reasonable economic rate of return

on equity, then reliable measures of the cost of equity based on market-data should be used, not

accounting rates of return relative to book value equity.

USE OF THE EMPIRICAL CAPITAL ASSET PRICING MODEL

With respect to his discussion of the CAPM, Mr. McKenzie, an expert for the NETOs,

offers what, in my view, are contradictory opinions. At the outset of his affidavit, he says, and I

agree, that, in contrast to factor pricing models, the CAPM is widely referenced by investors,

financial practitioners, and regulators. Moreover, because of its ubiquity, continued use of the

CAPM over multiple-factor approaches supports the goal of providing clarity and transparency in the Commission's determinations, consistent with the Coakley Methodology.[6]

But then his opinion goes off the tracks with the suggestion that the standard CAPM be replaced by the ECAPM.[7] This makes little sense. Rather than replace the CAPM by a widely studied factor model like those proposed by Fama and French, Mr. McKenzie advocates the use of a model that has not received support in the academic literature in decades. Furthermore, the ECAPM is not based on an economic theory; rather, it is based on an empirical regression comparing returns predicted by the CAPM to historical observed returns. Furthermore, making this comparison requires selecting inputs that are based on several debatable assumptions and the result of this comparison and the model itself are dependent on the specific data included in the analysis as well as the date the analysis is performed. Several of these issues are identified below.

First, the date on which the ECAPM regression is calculated, and the time interval over which observations are to be recorded, must be determined. Second, the number of time periods to include in the regression must be selected. Third, the ECAPM regression requires an estimate of systematic risks, which are unobservable; however, Beta can be used to fill this input. But, doing so requires an estimate of Beta. Furthermore, Beta must be estimated for not only the subject company, but also hundreds of other companies in order to conduct the ECAPM regression. Moreover, if Betas or the risk-free rate are not measured consistently for both the CAPM predicted return and the ECAPM regression, the ECAPM regression is subject to double

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[6] *See* Affidavit of Adrien M. McKenzie, CFA, dated June 26, 2019, pages 33–34.

[7] *Id.* at pages 34-36.

counting. For example, Value Line already adjusts Betas for low-Beta companies upward and high-Beta companies downward which increases the CAPM predicted returns for low-Beta companies and descreases the CAPM predicted returns for high-Beta companies versus CAPM returns based on unadjusted Betas. Furthermore, Dr. Morin concedes that "the use of a long-term risk-free rate rather than a short-term risk-free rate already incorporates some of the desired effect of using the ECAPM."[8] Finally, the companies included in the regression would need to be placed into portfolios to reduce estimation error when calculating the ECAPM regression. The methodology used to create these portfolios would need to be determined. Because of its complexity, cumbersome implementation, and lack of a theoretical basis, the ECAPM disappeared from the academic literature more than two decades ago.

If an ECAPM regression were to be used, the Commission would have to decide how to estimate the inputs for the regression, and it would have to develop an ECAPM regression which corresponds to the date on which it is setting an ROE; otherwise, since it is based on raw empirical data, the ECAPM regression will be stale. For instance, the Morin book cited by Mr. McKenzie in support of the ECAPM was published in 2006, and its basis for the ECAPM model applied by Mr. McKenzie relied on a data period ending in 1984.[9] If data from that book were used to estimate the ECAPM regression as of today, the results would be many decades out of date.

Conversely, the CAPM's formula does not become stale and the model does not have to be re-estimated at each decision point, because it is based on fundamental economic analysis. In

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[8] *See* Morin, *New Regulatory Finance* (2006), page 190.

[9] *Id.*, page 190 n.12.

my opinion, the Commission should not become involved in arcane debates about the proper

estimation process for the ECAPM regression. It should also not have the burden of having re-

estimate the ECAPM every time it faces a decision regarding the proper return on equity.

Instead, the Commission should use the standard CAPM until a clearly superior model has been

accepted by the financial community.

ESTIMATING THE MAREKT RISK PREMIUIM FOR THE CAPM

When it comes to estimating the market risk premium to include in the CAPM, the goal

should be to estimate it as accurately as possible. The NETOs argue that:

> The Commission's two-stage methodology for electric utilities is not an
> appropriate methodology with which to analyze the market risk premium.
> The market risk premium requires an analysis of investors' 'required
> return on the overall market,' not an analysis of a proxy group of electric
> utilities.[10]

In presenting this argument, they are making a conceptual error. To estimate the market risk

premium, a multi-stage DCF model should be applied to the S&P 500 portfolio. This is precisely

what Professor Aswath Damodaran (my former student, and now Professor of Finance at New

York University's Stern School of Business) has been doing for a decade. In the 2019 update to

his widely read posts on the equity risk premium, Prof. Damodaran explains how a two-stage

model can be used to estimate the market risk premium.[11]   His approach is not redundant of the

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[10] *See* Initial Comments of New England Transmission Owners, pages 91-92.

[11] Damodaran, Aswath, 2019, Equity Risk Premiums (ERP): Determinants, Estimation and Implications –
The 2019 Edition, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3378246. I note Prof. Damodaran
uses a lower long-run growth rate based on 10-year Treasury bond yields than I would recommend. I
recommend using long-run nominal growth rates for Gross Domestic Product ("GDP") forecast by the
Federal Reserve and leading private forecasting firms.

Commission's two-stage DCF methodology for electric utilities, because it does not rely solely on electric utility stocks, but all of the stocks in the S&P 500.

In addition, Prof. Damodaran specifically warns against using short-term growth rates that cannot be sustained in the long run. As I stressed in my initial affidavit, equating analyst projections of short-term growth rates to the constant growth rate required for a single stage DCF model is likely to overstate the cost of equity for single companies and the implied market risk premium derived from a broad market index.

In general, a two-stage (or three-stage) model should be used when applying the DCF model because it gives more accurate results. Failing to properly incorporate appropriate long-run growth rates will produce unnecessary error. These observations apply to the DCF approach whether applied to a single company or a broad market index.

The NETOs also cite Judge Coffman to suggest that the use of an estimate of the equity risk premium based on a two-step DCF approach in the CAPM is duplicative of an estimate of the cost of equity for utilities based on a two-step DCF approach - "[w]ere the methodologies identical in all respects, the CAPM would simply duplicate the results of the two-step DCF."[12] But, Judge Coffman's statement is a tautology, and the two methodologies, even if both are based on a two-step DCF approach, are not identical in all respects.

For the CAPM, the two-step DCF is applied to a portfolio of 500 stocks, not individual utilities. This is an important difference because the average growth rate of payouts to stockholders for a portfolio of 500 stocks can be estimated more accurately than the growth rate

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[12] *See* Initial Comments of New England Transmission Owners, page 91.

in payouts to stockholders for an individual stock because the measurement errors across

multiple companies tend to cancel each other. Furthermore, once the market risk premium is

estimated, it is multiplied by the company's Beta to obtain a cost of equity for each individual

company. Beta does not enter when the DCF model is applied to individual companies directly.

As noted above, a multi-stage procedure for estimating the market risk premium is required

because at various points in time expected short-term growth rates diverge from sustainable

long-term growth rates. Under such circumstances, failing to use the proper multi-stage model

will lead to a biased estimate of the cost of equity. If the DCF model applied to individual

companies and the CAPM applied to the same companies give similar answers for the cost of

equity, that is a good thing, not a bad thing. It indicates that two different approaches arrive at

the same final result, which should give the Commission added confidence in that result.[13]

 Finally, although the expected growth rate in payouts to stockholders for an individual

company may exceed the expected long-term growth rate of GDP for a substantial period of

time, it cannot do so forever. Likewise, although the expected growth rate in payouts to

stockholders for a broad index of companies may exceed the expected long-term growth rate of

GDP for a period of time, it cannot do so forever, nor for as long as a high performing individual

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[13] I also note that forward-looking estimates of the equity risk premium are routinely calculated using methodologies other than a DCF model. For example, in its annual Valuation Handbook, Duff & Phelps publishes a "long-horizon expected equity risk premium (supply-side)" and a "Duff & Phelps recommended equity risk premium (conditional)." (For example, *see* Duff & Phelps. (2017). *2017 Valuation Handbook: U.S. Guide to Cost of Capital.* Hoboken, N.J.: John Wiley. Chapter 3.) The long-horizon expected equity risk premium (supply side) has frequently been adopted by the Delaware Court of Chancery for use in the CAPM in appraisal actions. Again, if the Commission's equity risk premium based on a multi-stage DCF model results in an estimate similar to the long-horizon expected equity risk premium (supply-side) or the Duff & Phelps recommended equity risk premium (conditional) that is a good thing, not a bad thing. If the estimates are not similar, the Commission should understand why the approaches result in substantially different estimates.

company may. Accordingly, for the DCF model to produce a reasonable estimate of the cost of equity or the equity risk premium, it is necessary to cap the expected long-term growth rate at the expected long-term growth rate of GDP at some point in time. This is true for both an individual company and a broad index of companies.

I declare under penalty of perjury that the contents of the foregoing Statement are true and correct to the best of my knowledge, information and belief.

BRADFORD CORNELL, PH.D.

Executed in La Conada, California on July 26, 2019.