

**STATE OF NEW HAMPSHIRE
BEFORE THE
PUBLIC UTILITIES COMMISSION**

Docket No. DG 17-048

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Distribution Service Rate Case

**DIRECT TESTIMONY
OF
MELISSA F. BARTOS**

April 28, 2017

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ATTACHMENTS

Attachment	Pages	Title
MFB-1	1	Incremental Production Cost Summary - LNG Peaker Unit
MFB-1	2	Distribution-related Production Plant Investment
MFB-1	3	Marginal Capacity Related Distribution Plant Costs for Reinforcements
MFB-1	4	Marginal Capacity Related Distribution Plant Costs for Main Extensions
MFB-2	1	Services and Meters Plant Investment
MFB-3	1	Marginal Capacity Related Production (Pressure Support) Expense
MFB-4	1	Marginal Capacity Related Distribution Operations & Maintenance Expense
MFB-5	1	Marginal Customer Related Distribution Operations & Maintenance Expense
MFB-5	2	Class Weighted Customer Related Expense
MFB-5	3	Marginal Customer Accounting & Marketing Expense
MFB-5	4	Class Weighted Bad Debt Accounts Expense
MFB-6	1	Plant Related A&G Marginal Loading Factor
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MFB-6	3	Materials & Supplies and Prepayments Marginal Loading Factor
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MFB-7	1	Summary of Levelized Fixed Carrying Charge Rates
MFB-7	2	Levelized Fixed Carrying Charge Analysis: Input Data
MFB-7	3	Levelized Fixed Carrying Charge Analysis: Peaker Plant
MFB-7	4	Levelized Fixed Carrying Charge Analysis: Capacity Related Distribution
MFB-7	5	Levelized Fixed Carrying Charge Analysis: Services Investment
MFB-7	6	Levelized Fixed Carrying Charge Analysis: Metering Equipment
MFB-7	7A-1 to 7D-2	Levelized Fixed Carrying Charge Analysis: Peaker Plant Capacity Related Distribution, Services Investment, Metering Equipment
MFB-7	8	Development of Weighted Plant Book Lives and Net Salvage Values
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TABLES

Table 1	Total Marginal Costs by Rate Class
Table 2	Summary of Marginal Cost Study Schedules
Table 3	Marginal Cost of Distribution Capacity-Related Plant Additions
Table 4	Marginal Cost of Customer-Related Plant Additions

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1 **I. INTRODUCTION**

2 **Q. Please state your name, address, employer, position, and professional qualifications.**

3 A. My name is Melissa F. Bartos. I am an Assistant Vice President with Concentric Energy
4 Advisors, Inc. (“Concentric”), 293 Boston Post Road West, Suite 500, Marlborough,
5 Massachusetts 01752. My professional qualifications and experience have been provided
6 in Attachment MFB-12.

7 **II. SCOPE OF TESTIMONY**

8 **Q. What is your responsibility in this proceeding?**

9 A. In this proceeding, I am responsible for preparing the marginal cost study for Liberty
10 Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities (“EnergyNorth” or “the
11 Company”).

12 **Q. Please summarize your testimony concerning the marginal cost study.**

13 A. I have prepared a marginal cost study (“MCS”), which is contained in Attachments MFB-
14 1 through MFB-11. To prepare this MCS, I used approaches and methodologies that are
15 generally consistent with the marginal cost study that the Company filed in its most
16 recent distribution rate case, Docket No. DG 14-180. The marginal costs that I have
17 calculated in Attachments MFB-1 through MFB-11 are derived from data and special
18 studies that I obtained from the Company.

19 As also shown on Attachment MFB-11, and supported by the remainder of my schedules
20 and workpapers, the estimated annual marginal distribution costs by rate class are
21 summarized in Table 1.

Table 1: Total Marginal Costs by Rate Class (\$1,000)

	R-1	R-3 R-4	G-41	G-42	G-43	G-51	G-52	G-53	G-54	Total
Customer	\$2,071	\$50,732	\$6,355	\$2,410	\$120	\$940	\$401	\$138	\$232	\$63,399
Capacity	\$77	\$9,084	\$3,571	\$4,954	\$1,303	\$361	\$555	\$659	\$496	\$21,060
Total	\$2,148	\$59,815	\$9,926	\$7,364	\$1,423	\$1,301	\$956	\$797	\$728	\$84,459
	2.5%	70.8%	11.8%	8.7%	1.7%	1.5%	1.1%	0.9%	0.9%	100.0%

Source: Attachment MFB-10, Line 33 through Line 36

III. MARGINAL COST STUDY

A. Economic Theory and Marginal Costs

Q. Please provide an economist’s view of marginal cost.

A. “Marginal cost” is an economic concept; it is a measure of the additional cost that a firm incurs to provide an additional unit of a good or a service. A well-established principle of economic theory is that the price of a good that is sold in a perfectly competitive market will be set at the marginal cost to produce that good. It is a further well-established principle of economic theory that the best allocation of resources will occur, and the best consumption decisions will be made, in an economy in which the prices of goods are set at marginal costs.

It has been the Commission’s rate-design policy and precedent since the mid-1980s to apply the concepts of marginal cost pricing in a rate case (a) to determine the share of total rate case revenue requirement for which each rate class is responsible, and (b) to set base distribution rates in order to promote appropriate price signals and, therefore, proper energy consumption decisions. The basis for the Company’s current allocation of revenue requirement to classes, rate design, and current rate classifications was approved

1 by the Commission in Order No. 23,675 (Apr. 5, 2001) in the Company's 2000 revenue
2 neutral rate design proceeding, Docket No. DG 00-063.

3 **B. Marginal Cost Study Methodology**

4 **1. Overview**

5 **Q. Please describe the components of the Company's marginal costs that you estimated.**

6 A. I prepared calculations and analyses to estimate the marginal distribution function-related
7 costs¹ that the Company would incur to serve (a) additional demand when the Company
8 is experiencing design day conditions, and (b) additional customers. In general terms, to
9 estimate the costs that the Company would incur to serve additional design day demand, I
10 calculated (1) the additional plant-related distribution mains costs, and (2) the additional
11 operations and maintenance ("O&M") expense that would be caused by an increment to
12 design day demand. I also calculated (3) the additional general plant-related costs
13 associated with the additions to distributions mains, (4) the additional administrative and
14 general ("A&G") expenses associated with the additional plant and O&M expenses, and
15 (5) the additional materials and supplies ("M&S") and prepayment costs associated with
16 the additional plant. Lastly, I calculated additional factors to account for the effect of bad
17 debt and working capital on the marginal costs that I calculated.

18 In accordance with rate design precedents that were established in Docket No. DG 00-
19 063, I did not calculate Production Function-related marginal costs (i.e. gas supply costs
20 that are recovered through the Company's Cost of Gas mechanism).

¹ As I explain in Section III.C.2, I also developed an estimate of production plant marginal costs to account for production function facilities that serve a distribution function.

1 **Q. Please describe the data that you used to develop your estimates of the Company's**
2 **marginal costs.**

3 A. The Company provided Concentric with (a) distribution plant and general plant balances
4 by account from 1989 to the present, and (b) distribution, customer, customer accounting
5 and marketing, A&G, and Materials and Supplies and Prepayments Expenses, also for the
6 period 1989 to the present. I adjusted that data using an appropriate price index. I used a
7 Handy-Whitman index to restate plant additions in 2016 constant dollars, and I used the
8 Implicit Price Deflator for Gross Domestic Product, published by Bureau of Economic
9 Analysis, to restate expenses in constant 2016 dollars.

10 The Company provided engineering studies and unit cost estimates that I used in several
11 of the estimates of marginal costs.

12 **Q. Please describe the primary types of analysis that you used to calculate the**
13 **components of marginal cost that you listed in Section III.B.1, above.**

14 A. For many of the marginal cost components, I used a statistical process for estimating the
15 relationship between a specific "Cost Variable" (i.e., measure of costs)² and a specific
16 "Cost Driver" variable.³ The general form of the regression equations that I estimated is
17 as follows:

18
$$\text{Cost Variable} = a + b \times \text{Cost Driver Variable}$$

² Some of the Cost Variables that I used include mains-related distribution plant, customer-related O&M expense, and A&G Expense.

³ Some of the "Cost Driver" variables that I used include design day demand and number of customers.

1 Regression analyses are often used to estimate components of marginal costs because the
2 regression coefficient, the term “b” in the equation above, sometimes referred to as the
3 slope of the equation, is the estimated marginal cost of the Cost Variable that is
4 associated with a small change in the Cost Driver variable.⁴ To estimate the regression
5 equations, I generally used all years’ data that the Company provided to me.

6 **Q. Please describe the general approach that you used in performing the marginal cost**
7 **study regression analyses.**

8 A. I reviewed the regression equations that I developed to ensure that the estimates were
9 reasonable and that they did not violate important statistical requirements.

10 Specifically, I tested each equation to ensure that there is no statistically significant level
11 of autocorrelation in the regression equation. Autocorrelation is a violation of the
12 requirements of regression analysis⁵, which would inappropriately affect the regression
13 statistics, if not corrected. The statistical software that I used, SPSS, can identify and
14 correct for autocorrelation.

15 I also tested each equation to look for “structural shifts,” which are changes in the
16 relationship between the Cost Variable and Cost Driver variable starting in a specific year
17 and continuing for a number of years. I specifically looked for structural shifts that might
18 have been related to the acquisition of EnergyNorth by KeySpan in 2000, the later
19 acquisition of KeySpan by National Grid in 2007, and the acquisition of EnergyNorth by

⁴ The term “a” is the intercept of the equation. It is the level of the Cost Variable that is constant, regardless of the level of the Cost Driver variable.

⁵ Autocorrelation is a violation of the assumption that the regression equation error terms are uncorrelated. In the presence of autocorrelation, the regression does not produce Best Linear Unbiased Estimates.

1 Liberty in 2012. However, I did not limit the potential structural shifts to these years. If
2 I determined that a Cost Variable may have a structural shift, I tested additional
3 regression equations that allowed the slope and/or intercept terms to be different for the
4 time periods before and after the time of the potential structural shift. If a structural shift
5 was found to be significant, I used the slope associated with the latest (i.e., most recent)
6 time period as the marginal cost estimate because, all else being equal, costs from the
7 most recent time period are expected to be more representative of costs in the future.

8 **Q. What criteria did you use to accept or reject a regression equation?**

9 A. To assess whether a regression equation provided a reliable estimate of the marginal cost
10 component, I reviewed the regression equation statistics. Specifically, I reviewed:

- 11 • The reasonableness of the regression equation results; I considered that an
12 equation was reasonable if the slope coefficient of the Cost Driver variable had
13 the “right sign,”⁶ and was the “right size.”⁷
- 14 • The explanatory power of the regression equation as a whole, as measured by the
15 R-squared statistic.
- 16 • The explanatory power of the slope coefficient on the Cost Driver variable, as
17 well as all other variables included in the model, as measured by the t statistic.

⁶ The slope coefficient is the “right” sign if the coefficient is positive. A negative slope would mean, for example, that as design day demand increased, the distribution mains plant additions in a year would decrease.

⁷ The “right size” is a subjective test to ensure that the slope coefficient is not implausibly large or small.

1 **C. Marginal Cost Study Results**

2 **1. Overview**

3 **Q. Please describe how you have organized the marginal cost study.**

4 A. The schedules that make up the marginal cost study are provided in the List of
5 Attachments. Table 2 provides a summary of the marginal cost study schedules.

6 **Table 2: Summary of Marginal Cost Study Schedules**

Attachment	Topics
MFB-1	Calculation of Marginal Capacity-related Plant Additions
MFB-2	Calculation of Marginal Customer-related Plant Additions
MFB-3	Calculation of Marginal Production Capacity-related Expense
MFB-4	Calculation of Marginal Distribution Capacity-related O&M Expense
MFB-5	Calculation of Marginal Customer-related Expense
MFB-6	Development of Marginal Loading Factors
MFB-7	Calculation of Levelized Fixed Carrying Charge Rates
MFB-8	Summary of Marginal Capacity Costs
MFB-9	Summary of Marginal Customer Costs
MFB-10	Summary of Marginal Cost Estimates
MFB-11	Marginal Unit Costs per Dth

7
8 **2. Marginal Distribution Capacity-related Plant Addition Costs**

9 **Q. Please provide an overview of the approach that you used to estimate marginal
10 distribution capacity-related plant addition costs.**

11 A. I estimated three separate components of marginal distribution capacity-related plant
12 addition costs that are associated with: (a) production plant capacity that is used in lieu of
13 mains reinforcement projects to address low pressure in an area of the distribution system
14 at times of high (design day) demand; (b) main-related plant additions associated with
15 system reinforcement projects, which are constructed to meet forecast design day

1 demand; and (c) main-related plant additions that are associated with main extensions to
2 connect new, off-the-main customers.

3 **Q. Please describe the Company study that you used to estimate the marginal cost of**
4 **production plant capacity that is used in lieu of main reinforcement projects.**

5 A. I asked the Company to prepare an engineering study to estimate the capacity from the
6 Company's liquefied natural gas ("LNG") or liquid propane ("LP") facilities that would
7 be needed during design day conditions to deliver gas to customers in a specific section
8 of the distribution system because the capacity of the distribution system is not sufficient
9 to deliver gas from the Company's gate stations to that section of the distribution system.

10 **Q. Please explain how you estimated production plant capacity that is used in lieu of**
11 **main reinforcement projects.**

12 A. The results of the Company's engineering analysis, which indicates the percentage of the
13 LNG and LP vaporization capacity that would be used to address distribution pressure
14 issues on design day, are provided in Attachment MFB-1, page 2.

15 Because I needed to determine the marginal cost associated with the production plant
16 capacity that is used in lieu of main reinforcement projects, I also asked the Company to
17 estimate the cost of hypothetical additions to existing Liberty LP and LNG facilities, and
18 the cost of new LNG and LP production facilities constructed in the Company's service
19 territory. From the Company's estimated costs of new LNG and LP production facilities,
20 I determined that the estimated cost in 2016 dollars of a hypothetical 10,000 Mcf
21 additional LNG capacity was the best representation of the marginal cost-based value of

1 the production capacity that is currently being used to address pressure issues. The
2 calculation of the marginal cost of production plant that has a distribution function
3 (pressure support) is provided in Attachment MFB-1, page 1, Line 11.

4 **Q. Please explain why you determined that the estimated cost in 2016 dollars of a**
5 **hypothetical 10,000 Mcf additional LNG capacity is an appropriate measure of the**
6 **marginal cost of production plant capacity that is used in lieu of main reinforcement**
7 **projects.**

8 A. I used the “peaker” approach to estimate the marginal capacity costs of production plant
9 capacity that is used in lieu of main reinforcement projects. The peaker approach is a
10 commonly used method to estimate production capacity costs in gas and electric marginal
11 and avoided cost analyses. According to the peaker method, the production capacity cost
12 is set at the cost of the least-cost capacity available. I determined that the costs of adding
13 an incremental 10,000 Mcf of daily LNG capacity at the Tilton LNG facility was the
14 most appropriate measure of the least-cost capacity available.

15 **Q. Please describe the Company study that you used to estimate the marginal cost of**
16 **distribution main additions that are associated with system reinforcement projects.**

17 A. I asked the Company to prepare an engineering study of forecasted system reinforcement
18 projects that the Company would be required to construct from 2016 to 2026 to meet the
19 Company’s projected design day demand during that period. The engineering study that I
20 asked the Company to prepare is different from the Company’s actual distribution asset
21 plan, which takes into account (a) projects that will be required to meet projected load
22 growth, (b) projects that are included in the Company’s Cast Iron Bare Steel (“CIBS”)

1 replacement program, and (c) other distribution replacement and relocation plans. The
2 Company's distribution asset plan is different from the projections that I requested
3 because the actual asset plan may combine a reinforcement project with a CIBS
4 replacement project or other replacement or relocation projects, which is likely to affect
5 the timing and location of reinforcement projects.

6 **Q. Please explain how you estimated the costs of Distribution main additions that are**
7 **associated with system reinforcement projects.**

8 A. I prepared a regression analysis to estimate the statistical relationship between the
9 projected cost of system reinforcement projects and projected design day demand. The
10 regression equation that I estimated is provided in Attachment MFB-1, page 3.

11 **Q. Please describe the data that you used to estimate the marginal cost of main**
12 **extensions.**

13 A. The Company provided data on the cost of main extension projects from 1989 to 2016.

14 **Q. Please explain how you estimated the marginal cost of main extensions.**

15 A. I prepared a regression analysis to estimate the statistical relationship between the cost of
16 main extensions and design day demand, based on the historical data from 1989 to 2016.
17 The regression results are summarized in Attachment MFB-1, page 4.

18 **Q. In summary, what is the marginal cost of distribution capacity-related plant**
19 **additions?**

20 A. The total marginal cost of distribution capacity-related plant additions is summarized in
21 Table 3.

Table 3: Marginal Cost of Distribution Capacity-related Plant Additions

Marginal Plant Additions Component	\$ per Dth	Source (Attachment)
Production in lieu of Reinforcement	\$56.05	MFB-1 page 1
Reinforcement	\$63.33	MFB-1 page 3
Extension	\$505.18	MFB-1 page 4
Total	\$624.56	

3. Marginal Customer-related Plant Addition Costs

Q. Please explain how you estimated marginal Customer-related plant addition costs.

A. Marginal Customer-related plant addition costs measure the marginal cost to connect a customer, which includes the current installed cost of a meter and a service. Because the cost of a meter and a service is generally correlated with the size of the customer, I asked the Company to provide an analysis of the current installed cost of a meter, and installed cost of a service that is typical for each rate class. The Company’s analysis is provided in Attachment MFB-2.

The Company directed me to use the results of the analysis of the number of customers per service that had been used in the Company’s 2014 MCS.⁸ Also, the Company directed me to assume that there is one meter per customer.⁹

⁸ The estimate of the customers per service in Attachment MFB-2 is based on the understanding that some residential and small C&I customers (rate classes R-1, R-3 and R-4; G-41 and G-51) are located in an apartment building, condominium complex, office building, strip mall, or shopping center, and are served from a single gas service. The Company believes that it more likely that medium and large use C&I customers are served by a dedicated service.

⁹ As stated in the Company’s tariffs, the Company’s policy is generally to separately meter and bill each customer / meter.

1 **Q. In summary, what is the marginal cost of customer-related plant additions?**

2 A. The total marginal cost of customer-related plant additions is summarized in Table 4.

3 **Table 4: Marginal Cost of Customer-Related Plant Additions**

	R-1	R-3 R-4	G-41	G-42	G-43	G-51	G-52	G-53	G-54
Service	\$3,738	\$3,738	\$3,738	\$7,300	\$10,913	\$3,738	\$7,300	\$23,006	\$54,416
Meter	\$310	\$310	\$979	\$2,433	\$6,025	\$979	\$1,617	\$7,312	\$9,675
Total	\$4,048	\$4,048	\$4,717	\$9,733	\$16,937	\$4,717	\$8,917	\$30,318	\$64,091

4 Source: Attachment MFB-2, Lines 4, 8, 9

5 **4. Marginal Capacity Related Production (Pressure Support) Expense**

6 **Q. Please explain how you estimated Marginal Capacity-related Production (Pressure**
7 **Support) Operations and Maintenance costs.**

8 A. I prepared a regression analysis to estimate the statistical relationship between (a) the
9 capacity-related operations and maintenance expense associated with the Company's
10 LNG and LP facilities, and (b) design day demand, based on historical data from 1989 to
11 the present that the Company provided. The regression results are summarized on
12 Attachment MFB-3.

13 **5. Marginal Distribution Capacity-related Operations and Maintenance**
14 **Expense**

15 **Q. Please explain how you estimated the Marginal Cost of Capacity-related Distribution**
16 **Operations and Maintenance Expense.**

17 A. I prepared a regression analysis to estimate the statistical relationship between (a) the
18 capacity-related distribution operations and maintenance expense, and (b) design day
19 demand, based on historical data from 1989 to the present that the Company provided.
20 The regression results are summarized on Attachment MFB-4.

1 **6. Marginal Customer-related Operations and Maintenance Expense**

2 **Q. Please explain how you estimated Marginal Customer-related Distribution**
3 **Operations and Maintenance Expenses.**

4 A. I prepared a regression analysis to estimate the statistical relationship between (a) the
5 customer-related distribution operations and maintenance expense associated with
6 operating and maintaining customer meters and services, and (b) the number of annual
7 customers, based on historical data from 1989 to the present that the Company provided.
8 The regression results are summarized on Attachment MFB-5, page 1.

9 I prepared additional analysis, which is provided in Attachment MFB-5, page 2, to
10 allocate the customer-related O&M expense to rate classes in a way that reflects that the
11 cost to maintain meters and services is related to the size of the meter and service, which
12 varies by rate class. As shown in Attachment MFB-5, page 2, column (C), the marginal
13 customer-related O&M expense was allocated to rate classes based on the marginal
14 service and meter plant per customer, Attachment MFB-2, page 1. The results of this
15 allocation process are shown in Attachment MFB-5, page 2, column (G).

16 **7. Marginal Customer Accounting and Marketing Expense**

17 **Q. Please explain how you estimated Marginal Customer Accounting and Marketing**
18 **Expenses.**

19 A. I prepared a regression analysis to estimate the statistical relationship between (a)
20 customer accounting and marketing expenses, excluding bad debt expense, and (b) the
21 number of annual customers, based on historical data from 1989 to the present that the

1 Company provided. The regression results are summarized on Attachment MFB-5, page
2 3.

3 Because marginal customer accounting and marketing expenses, excluding bad debt
4 expense, generally do not vary by rate class, the marginal cost per customer as shown on
5 Attachment MFB-5, page 3, applies to all EnergyNorth rate classes.

6 Lastly, I prepared Attachment MFB-5, page 4, to calculate the proforma bad debt expense
7 rate by rate class, based on data provided by the Company.

8 **8. Marginal Loading Factors and Adjustment Factors**

9 **Q. Please explain how you estimated Marginal Loading Factors.**

10 A. I calculated several loading factors to account for cost components that are relatively
11 small or for which it is difficult to develop marginal cost-type statistical relationships. I
12 developed loading factors for the following four cost components: (a) plant-related A&G
13 expense; (b) non-plant-related A&G expense; (c) M&S and prepayments; and (d) general
14 plant. For each of the loading factors, I prepared regression analyses for the period 1989
15 to the present using the loading factor cost component as the dependent variable, and an
16 appropriate measure of cost, utility plant or total O&M expense as the independent
17 variable. The loading factor analyses for (a) plant-related A&G expense, (b) non-plant-
18 related A&G expense, (c) M&S and prepayments, and (d) general plant are provided in
19 Attachments MFB-6, pages 1 through 4.

1 **Q. Please explain how you calculated a sendout/sales adjustment factor.**

2 A. The measures of capacity-related marginal cost that are used in the MCS are calculated
3 unit costs per dekatherm (or therm) of design day demand, measured at customers'
4 meters. The total distribution system demand is greater than the demand measured at
5 customers' meters to account for the difference between the measured amount of gas
6 entering the distribution system (from interstate pipelines at city gates and from on-
7 system peaking resources) and the measured amount of gas leaving the distribution
8 system (through customer and company meters).¹⁰ I calculated a sales/sendout
9 adjustment factor based on the lost and unaccounted factor that was included in the
10 Company's 2016/2017 Cost of Gas proceeding. This adjustment factor is used in
11 Attachment MFB-8, page 1, line 24.

12 **9. Fixed Carrying Charge Rate**

13 **Q. Please explain how you calculated the Fixed Carrying Charge Rates.**

14 A. The marginal cost that I calculated for production facilities, mains, services, and meters is
15 the initial cost of an asset that is placed into service. Fixed carrying charge rates
16 ("FCCR") are used to convert the marginal cost of plant additions from a cost that
17 represents the estimated marginal investment into the levelized annual cost of that
18 investment. Attachment MFB-7 Page 1 is a summary of the FCCRs for (a) production
19 plant, (b) mains, (c) services, and (d) meters. This page shows Economist's and
20 Engineer's FCCR results.

¹⁰ The primary sources of these differences include meter measurement; adjustments for atmospheric pressure, gas distribution pressure, or gas temperature; gas theft; and leaks caused by third party damage to the distribution system, corrosion, or breaks.

1 An Economist's FCCR is based on annual streams of costs that are fixed in real dollars,
2 and therefore vary in nominal dollars. An Engineer's FCCR is based on annual streams
3 of costs that are constant in nominal dollars and therefore vary in real dollars. However,
4 the present values of the Economist's and Engineer's costs and revenues are identical.
5 For marginal cost analyses, the Economist's FCCR calculations are generally accepted as
6 being the appropriate version because the Economist's FCCR appropriately accounts for
7 the reduced value, due to price inflation, of the revenue requirements of that plant
8 addition in future years and therefore better reflects the economic and financial
9 implications of regulated ratemaking.

10 Attachment MFB-7, pages 2 through 7, provide the assumptions that were used in the
11 calculation of the FCCR and the detailed calculations of the four FCCRs. The
12 calculations of the FCCR follow standard rate making principles to determine revenue
13 requirements associated with plant additions, including return, taxes, depreciation,
14 salvage value, etc.

15 **D. Summary of Marginal Cost Study Results**

16 **Q. Please explain the schedules that you have prepared to summarize the Marginal Cost**
17 **results.**

18 A. Attachment MFB-8 shows the calculation of unit marginal distribution capacity costs,
19 including all loading factors and adjustments.

20 Attachment MFB-9 shows the calculation of unit marginal customer costs, including all
21 loading factors and adjustments.

1 Attachment MFB-10 shows the calculation of unit marginal customer and capacity costs,
2 adjusted for bad debts. Attachment MFB-10 also shows the calculation of total marginal
3 costs by rate class, which is used in designing the Company's proposed base distribution
4 rates in this proceeding to allocate the Company's requested distribution revenue
5 requirement to firm rate classes.

6 Attachment MFB-11 shows unit customer-related and demand-related marginal costs by
7 rate class.

8 **Q. Does this conclude your testimony?**

9 A. Yes, it does.

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