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

Before the South Dakota Public Utilities Commission

Docket No. EL15-____

Direct Testimony
of
Sara J. Cardwell

Q. Would you please state your name and business address?

A. Yes. My name is Sara J. Cardwell, and my business address is 400 North Fourth Street, Bismarck, North Dakota 58501.

Q. What is your position with Montana-Dakota Utilities Co.?

A. I am the Manager, Regulatory Affairs–Pricing & Tariffs for Montana-Dakota Utilities Co. (Montana-Dakota), a Division of MDU Resources Group, Inc.

Q. What are your responsibilities as Manager, Regulatory Affairs-Pricing & Tariffs?

A. My responsibilities include the preparation of the embedded class cost of service studies, rate designs and miscellaneous tariff revision filings. I also administer utility tariffs and rules and regulations effective for each of the jurisdictions in which Montana-Dakota provides utility service.

Q. Would you please outline your educational and professional background?

A. I graduated from the University of Wisconsin-Stout with a Bachelor of Science degree in Business Administration and received my Masters in Business Administration from the University of Portland. I have worked for PacifiCorp, Portland General Electric Company, Xcel Energy and the

North Dakota Public Service Commission. I started working in my current position at Montana-Dakota in 2014.

Q. Have you testified in other proceedings before regulatory bodies?

A. Yes. I have previously presented testimony before the Public Service Commissions of North Dakota and Montana as well as the California and Idaho Public Utilities Commissions, the Oregon Public Utility Commission and the Washington Utilities and Transportation Commission.

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

A. The purpose of my testimony is to present the results of the class cost of service study.

Q. What statements and exhibits are you sponsoring in this proceeding?

A. I am sponsoring Statement N.

Q. Would you please explain the embedded class cost of service study contained in Statement N?

A. Yes. Statement N, Schedule N-1, pages 1 through 10 provides a report entitled "Cost of Service by Component." This report shows the total dollars and unit cost required under each rate if the overall requested rate of return of 7.588 percent is to be earned for the demand, energy and customer cost components of each rate schedule. The rate of return before allocation of the requested increase is also shown on Statement N. As an example, the resulting rate of return on the rate base allocated to residential customers under Residential Service Rate 10 is 3.193 percent and a revenue increase of approximately $1,385,000 would be necessary to bring the residential rate of return to the overall average return.

Statement N, page 1 also indicates that the customer related component associated with providing service to the residential class is $20.45 per month with the demand and energy components comprising the remaining requirement at 9.2 cents per Kwh. This same information is shown for each rate schedule on pages 2 through 10 of Statement N.

A summary of the results by the major rate classifications, Residential, Small General Service, Large General Service, Municipal Pumping and Lighting is provided in Statement N, N-1, pages 11 and 12.Statement N, Schedule N-2, pages 1 through 110 is a detailed report of the rate base, income statement and pro forma adjustments as allocated to each rate schedule. The allocation factor applied to the total South Dakota electric amount is shown on each line item.

Statement N, Schedule N-3 provides a list of the allocation factors used to allocate the total South Dakota electric amount to each class and cost component as referenced in Schedule N-2.

Q. What were the results of the embedded cost of service study?

A. The overall South Dakota electric rate of return based on the 2014 pro forma test period presented by Mr. Jacobson is 3.400 percent. The returns by rate schedule as shown on Statement N, Schedule N-1, pages 1 through 10 are as shown below:

Rate Schedule	ROR
Residential Service – Rate 10	3.193%
Small Primary General Service – Rate 20	-5.774%
Small Sec. General Service – Rate 20	5.180%
Irrigation Service – Rate 25	-7.457%
Large Sec. General Service – Rate 30	3.754%
Space Heating – Rate 32	-3.892%
Municipal Pumping Service – Rate 48	-0.430%
Outdoor Lighting Service – Rate 24	-10.353%

Company Owned Streetlighting – Rate 41	7.534%
Municipal Owned Streetlighting – Rate 41	2.077%

Q. How did you determine what costs should be assigned to each class of customers?

A. The starting point was classifying the functionalized costs by FERC account for all rate base and income statement items as demand, energy or customer related based on the component of service being provided. Demand-related costs are costs that vary with the Kw demand imposed by the customer, energy-related costs vary with the energy or Kwh the customer uses and customer-related costs are fixed costs driven by the number of customers served.

Next the plant, expense and revenue items that were identified as directly related to a specific class of customers were directly assigned to the appropriate class. Finally, the remaining costs were allocated using the various allocation factors shown on Statement N, Schedule N-3.

Q. Would you please provide an overview of the allocation process including the rationale underlying the choice of allocation factors?

A. Yes. I will start with the plant in service items on the rate base schedule starting on Statement N, Schedule N-2, page 1. The plant allocation serves as the basis for allocating many of the other rate base items. The investment in production related plant items was allocated on an average and excess demand (AED) allocator to account for the contribution of each class based on a combination of the classes' average

demand and non-coincident peak demands. The AED factor is comprised of the sum of the average demand of each class and the difference between the total system peak demand and the average demand as allocated to each class based on the non-coincident demand in excess of the average demand. The production investment related to the Company's wind facilities was allocated on a factor based 84.5 percent on the energy allocation factor (Factor No.1) and 16.5 percent on the AED allocator to reflect the fact the wind facilities are primarily an energy resource. The investment in transmission plant related items was allocated on the AED factor.

Turning now to the distribution plant investment; each distribution plant account is analyzed and allocated based on the cause for the investment. Station equipment and the associated land and land rights are allocated on the non-coincident peak demand of each class, representing the maximum demand on the system. The next set of plant items - Poles, Towers & Fixtures; Overhead Conductors & Devices; and Underground Conduit & Devices were classified as customer and demand related based on an analysis of the minimum and normal system design for a typical distribution system, with the minimum system representing the percentage of the plant accounts assigned to the customer component, and the remainder classified as demand related. Based on this analysis, the minimum investment necessary to connect a customer was determined to be 85 percent of the total required investment. The

amounts classified as customer related were then allocated to each rate class based on the number of customers served in each rate class, or Factor No. 8.0. The dollar value of the Poles, Towers & Fixtures; Overhead Conductors & Devices; and Underground Conduit & Devices classified as demand related (15 percent of the total) was allocated to each rate class based on the maximum demand of each rate class (non-coincident peak Factor No. 4.1). The investment in Line Transformers was also classified as customer and demand related. The percentage assigned to the customer component was determined based on the minimum intercept method which seeks to identify the portion of the transformer investment associated with a hypothetical no-load condition. Based on an analysis of the type and size of transformers, representing the minimum equipment necessary to provide service to secondary system customers, the zero intercept was determined to be $1,604. Applying this amount to the number of transformers resulted in a customer component of 77 percent with the remaining 23 percent classified as demand related. The classified costs were allocated on weighted customer transformers (Factor 11) and the non-coincident secondary demand factor (Factor 5) accordingly.

The four remaining distribution accounts; Services, Meters, Installation on Customer Premises and Street Light & Signal System are all related solely to a customer connection and were classified as customer related. Services were allocated to the rate classes based on a

factor representing services weighted by customer class derived by comparing the installed cost per service for each rate class to the cost necessary to serve Residential service customers. The weights were then applied to the number of customers in each rate class. The same process was used to fashion an allocation based on weighted meter costs (Factor No. 6) for allocating the embedded investment in meters. The investment in Installation on Customer Premises was directly assigned to Outdoor Lighting and the investment in Street Light & Signal Systems was directly assigned to Municipal Lighting. The allocation of the remainder of the rate base items is self explanatory with the allocation factor noted for each line item.

Q. Would you please continue with an explanation of the income statement items in the class cost of service study?

A. Yes. The allocation of the income statement items starts on Statement N, Schedule N-3, page 3 with the allocation of revenues. As shown, revenues are directly assigned based on the revenues produced under each rate schedule.

Operation and maintenance expenses consisting of fuel, purchased power costs, transmission, distribution and administrative and general expenses are shown starting at Schedule N-2, page 4. The production expenses are classified as demand and energy related with the fuel, purchased power and variable production expenses classified as energy and allocated based on the energy requirements of each class. The other

production expenses and purchased capacity costs are classified as demand costs and allocated on the same demand allocator used to allocate production plant costs. Transmission operation and maintenance costs are also classified as demand related and allocated on the AED demand allocator (Factor No. 2). Customer Accounts Expense and Customer Service and Information Expenses were allocated on a weighted customer factor (Factor No. 12) based on the estimated cost of meter reading and customer billing for each class relative to the residential weighting set equal to 1.0. The remaining operation and maintenance expenses are allocated based on cost causation and typically follow the plant investment previously described in the rate base section. The remainder of the income statement reflects the allocation of depreciation expense, taxes other than income and income taxes as denoted by each line item.

Q. For what purpose has the embedded class cost of service study been used?

A. The study results have been used for the purpose of analyzing the various components comprising the total rate applicable to each customer class. In addition to providing the rate of return provided by each customer class, the class study provides the basis for the customer related costs to be collected under the Basic Service Charge component of each rate schedule and the demand related costs to be collected under the Demand Charge component of those rate schedules where demand is

metered and measured for billing purposes.

Q. Does this conclude your direct testimony?

A. Yes, it does.