MONTANA-DAKOTA UTILITIES CO.

Before the North Dakota Public Service Commission

Case No. PU-20-___

Direct Testimony
of
Matthew T. Shoemake

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

A. Yes. My name is Matthew T. Shoemake, 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 a Regulatory Analyst in the Regulatory Affairs Department for Montana-Dakota Utilities Co. (Montana-Dakota) and Great Plains Natural Gas Co. (Great Plains), herein referred to collectively as "Company."

**Q. Would you please describe your duties as a Regulatory Analyst?**

A. I assist in the preparation of the Company's monthly purchase gas adjustment filings, weather normalization of volumes, assist in monthly fuel cost adjustment filings, and other filings required by state commissions.

**Q. Would you please describe your education and professional background?**

A. I graduated from Texas A&M University in College Station, Texas with a Bachelor of Science degree in Economics with a minor in Business Administration. I have been in my current position with Montana-Dakota

for 4 years. Prior to starting in my current role May of 2016, I was a quality control analyst for Knife River, a subsidiary of MDU Resources, for approximately 8 years.

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

A. Yes. I have previously presented testimony before this Commission, the Public Service Commission of Montana, and the Public Utilities Commission of Minnesota.

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

A. The purpose of my testimony is to present the methodology used by the Company to forecast sales data, including weather normalized volumes, projected volumes and projected customers. The totality of this process and its results are the foundational basis for the underlying projected sales and transportation revenues used in this rate case.

**Q. What statements, schedules and exhibits are you sponsoring?**

A. I am sponsoring the development of the forecasted billing units as presented on Exhibit No. ____ (MTS-1 and MTS-2) and ultimately used in the forecasted revenues on Statement F, Schedule F-1 pages 1 through 37. I am also sponsoring the regression models included in Workpapers Statement F, Schedule F-1 pages 1 through 92.

**Q. Would you describe the development of the normalized volumes?**

A. Volumes for residential, firm general, propane, the Minot Air Force Base and select interruptible and transportation customers were adjusted to reflect normal weather patterns, where appropriate. Each of the

aforementioned customer classes was adjusted separately. Further, the normalization models was separated between Montana-Dakota and Great Plains which I will detail later in my testimony. Billing period sales volumes and customers, by month, were the starting point for the data utilized in the models.

First, customer classes were analyzed to determine whether natural gas usage was associated with heating purposes and therefore correlated with weather input from the Company's Gas Supply Department. The general idea of heat-sensitivity is that some customers will increase the amount of natural gas that they consume as the outside temperature drops. Typically, this increase in consumption is cyclical with the calendar – as fall and winter set in, natural gas volumes sold to customers tend to increase. However, there are certain customers and instances in which colder weather is not correlated with the amount of natural gas consumed – these customers are considered non-heat-sensitive.

All firm service customer classes were determined to be heat-sensitive. Interruptible and transportation customers were analyzed on an individual basis and grouped into heat-sensitive and non-heat-sensitive by each customer class.

**Q. How were the normalized volumes calculated for heat-sensitive customers?**

A. For customer classes and individual customers that were determined to be heat-sensitive, weather and billing data were

incorporated into a model using an Ordinary Least Squares (OLS) regression for each respective class of service. To incorporate seasonal weather patterns, billing period degree days based on a 60-degree day were included as an input in the modeled regressions. Billing data used as inputs in the model were the monthly distinct count of customers and the actual dekatherms of gas consumed. The time period for each customer class in the modeled regressions was 36 months, or 3 years.

The structured equation for the OLS models used for heat-sensitive customers is as follows:

$$y = b_0 + b_1 x_i$$

Where, *y* is the natural gas volumes consumed in a month, $b_0$ is the daily baseload, $b_1$ is the use per degree day, and $x_i$ is the number of degree days per month.

Using the results of the regression analysis for residential and firm general service customer classes, the daily baseload use per customer (the intercept of the OLS) was multiplied by the respective number of days in each calendar month to arrive at the monthly baseload use per customer. The use per degree day per customer (the slope of the OLS) was then applied to the normal billing period degree days (based on normal weather for 30 years) to determine the normalized heating use per customer. The Company has historically used 30-year normals for weather normalization purposes and believes that using a 30-year normal weather is most appropriate to capture historical weather trends. The

results of each of these equations was then combined by the number of customers in each respective month to determine the normalized usage for the twelve months ended December 31, 2019.

**Q. How were the normalized volumes calculated for non-heat-sensitive customers?**

A. For customers that were determined to be non-heat-sensitive, simple averages of historical consumption patterns were utilized. These averages are considered to be the normalized volumes for the non-heat-sensitive customers. These averages were calculated at an individual customer level. For most non-heat customers, a 36-month average was calculated (January 2017 – December 2019). In some instances, either a 24-month average was calculated or a customer's per books consumption for the most recent 12 months was used. In these cases, either there was not enough historical data for the customer, or the customer cut in and out of service and using longer periods of consumption was deemed inappropriate.

**Q. Was any consideration given to customers which changed rate classes?**

A. Yes. The Company analyzed the historical data for interruptible and transportation customers that changed rate classes during the time period in the data. During the time period of 2017 through 2019 there were a number of customers that changed rates under which they took service. In its normalization models and projections, the Company

ensured that customers were represented in the rate class in which they are currently billed.

The Company also discussed internally with its field operations and gas supply departments to determine if there were any foreseeable changes to the classifications of its interruptible and transportation customers. Any discussions or agreements with customers to change their service rate or stop service altogether that were known at the time of filing were incorporated within the forecasted sales data.

**Q. Were other considerations necessary for customers?**

A. Yes, the removal of select customers from Rate 71 was also required. Due to the margin sharing adjustment for Montana-Dakota's grain dryers through the purchased gas adjustment as authorized in Case No. PU-13-803 and maintained in PU-15-90 and PU-17-295, all grain drying customers were removed from the Company's normalized and projected volumes. To further ensure the integrity of the projected volumes, customers that were not active at the end of 2019 were completely removed from the entirety of the underlying data for rate 71.

**Q. How were the projected volumes calculated for heat-sensitive customers?**

A. The projected volumes were based upon the calculated normalized volumes for each customer class. For the residential and firm general rate classes, the Company applied projected customer growth to the normalized volumes to obtain projected volumes. For other heat-sensitive

customers and classes, the projected volumes were set equal to the normalized volumes as calculated and described previously.

**Q. How were the projected volumes calculated for non-heat sensitive customers?**

A. The projected volumes for these customers were set equal to their normalized volumes.

**Q. You previously mentioned calculating volumes and customers independently for Montana-Dakota and Great Plains. Would you describe how this affects the normalization models and projected volumes?**

A. As has been described by Ms. Kivisto, Ms. Vesey and Ms. Bosch, Montana-Dakota is proposing to incorporate Wahpeton, North Dakota, currently provided for under the Great Plains North Dakota rate book, into Montana-Dakota's North Dakota gas rate book. As this relates to the normalization models and projected volumes, it is prudent and necessary to calculate normalized and projected volumes for Wahpeton independently of those calculated for Montana-Dakota. As an example, Wahpeton residential volumes are calculated in a similar manner as those of the rest of North Dakota's residential volumes, but they are calculated independently using only residential customers, volumes and weather data for Wahpeton.

**Q. How will the incorporation of Wahpeton into Montana-Dakota affect future models and volumes?**

A. The models and volumes will remain separate in future rate cases until said time that the billing phases are converged and separate rate schedules for Wahpeton are no longer necessary. At that time, it is expected that all North Dakota models and projections will be incorporated into a single model for rate case purposes.

**Q. Would you describe the weather data utilized in developing weather normalized gas sales?**

A. The Company purchases raw daily weather data from DTN. The data utilized in the weather normalizations is the average temperature in degrees Fahrenheit for areas of North Dakota that the Company provides natural gas service in. The daily average temperature is compared to an industry standard 60 (sixty) degrees Fahrenheit and if the temperature is below 60 degrees, the difference is considered the degree day value. For example, if the average daily temperature is 55 for March 1st, then the amount of degree days is 5 (60-55=5). These temperatures are collected from seven regional weather stations in North Dakota (Bismarck, Devils Lake, Dickinson, Jamestown, Minot, Wahpeton and Williston) and the differences for each day are considered calendar degree days. The data from these individual weather stations are then weighted based upon billing period cycles to match up with the Company's meter reads and billing process. These calendar degree days for each respective area are

then weighted based upon the amount of historical number of bills that are sent to customers in each respective billing period cycle to calculate a billing period degree day (BPDD) for each of the six regions. For Montana-Dakota, these regional BPDDs are then weighted based upon the historical number of firm customer service points to calculate a system-wide North Dakota BPDD. For Great Plains, the BPDD utilizes only Wahpeton weather information.

**Q. Would you describe the methodology used to calculate customer counts?**

A. The Company's Customer Care and Billing System (CC&B) was the starting point for the development of the customer counts. A Microsoft Excel file containing the service identification numbers (SA IDs) for each rate class was extracted from CC&B. The method to determine customer counts is a feature in Excel named Distinct Count, which counts the number of unique values. The Count feature in Excel counts the total number of values corresponding to a range of data, regardless if a specific value has multiple entries in the data set. The Distinct Count feature has been utilized by Montana-Dakota and Great Plains to determine its customer counts in previous rate cases as it accounts for adjustments and corrections to customer bills in the CC&B data set.

**Q. How were growth rates for customers for the projected years calculated?**

A. A 3-year average growth rate for the Residential, Small Firm General and Large Firm General was determined to be representative of the growth expected for the future. For the remaining classes, no growth was used so customer counts were left at their respective levels at the end of 2019. Average growth rates were applied to the year-end 2019 customer counts for each rate to project 2020 and for 2020 to project 2021. The percentage of each rate's respective monthly customer counts for 2019 were applied to each of the total projections for 2020 and 2021 to obtain monthly customer projections that were used to determine projected volumes based on the OLS models.

**Q. Does this complete your direct testimony?**

A. Yes, it does.