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

Before the Public Service Commission of North Dakota

Case Nos. PU-11-395 and PU-11-396

Direct Testimony
of
Alan L. Welte

Q. Please state your name and business address.

A. My name is Alan L. Welte and my business address is 400 North Fourth Street, Bismarck, North Dakota 58501.

Q. By whom are you employed and in what capacity?

A. I am the Generation Manager in the power production department of Montana-Dakota Utilities Co. (Montana-Dakota), a Division of MDU Resources Group, Inc.

Q. Please describe your duties and responsibilities with Montana-Dakota.

A. I have manager responsibility for the day-to-day operations of Montana-Dakota's electric generation facilities, represent Montana-Dakota's interests in joint owned generation facilities operated by other companies, and I am also responsible for new generation development.

Q. Please outline your educational and professional background.

A. I hold a Bachelor's Degree in Mechanical Engineering from North Dakota State University. My work experience includes eight years of experience as a plant engineer, twelve years of experience as a plant

manager, and seven years of generation development and operational responsibilities in my current position which includes coal-fired, gas-fired, and renewable generation.

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

A. The purpose of my testimony is to describe the 88 MW combustion turbine project (Project) identified as part of the Montana-Dakota's least cost generation expansion plan and the analysis performed to determine the equipment type, location, and Project cost estimate.

Q. Please describe Montana-Dakota's 88 MW combustion turbine Project?

A. The Project includes a natural gas-fired, 88 MW, Simple Cycle Combustion Turbine (SCCT) and the facilities to interconnect with Montana-Dakota's existing electric system. The Project is proposed to be located near Mandan, North Dakota adjacent to Montana-Dakota's R.M. Heskett Station. The Project also includes a 10-inch natural gas pipeline, approximately 24 miles in length, interconnecting with the Northern Border Pipeline Company (Northern Border) near St. Anthony, North Dakota to supply the natural gas requirements for the SCCT.

Q. What is a Simple Cycle Combustion Turbine?

A. Simple Cycle Combustion Turbines are generally built to start up quickly to serve peak capacity needs. They usually supply a limited amount of energy because they are fueled by natural gas which results in a higher fuel cost than with coal base load generation facilities. In the

SCCT, air is drawn in at the front of the unit and is compressed using rows of rotating blades. The compressed air is then sent to a combustion chamber where it is mixed with fuel and the mixture is ignited. The hot combustion gas is then expanded through rotating turbine blades delivering power through a shaft connected to the generator where electricity is produced.

Q. What type of combustion turbine is proposed for Montana-Dakota's Project?

A. The two primary SCCT types were analyzed. The heavy-duty (Frame) type designed to drive stationary generation resources, and the aero-derivative (Aero) type derived from engines used in the aircraft industry. The results indicated that the lower capital cost, lower operation and maintenance cost, better emissions control, ability to perform on-site maintenance, lower natural gas inlet pressure requirement, less susceptibility to cold weather operational issues, and Montana-Dakota's operating experience associated with the Frame SCCT outweighs the lower fuel cost and shorter on-site construction time offered by the Aero SCCT.

Q. What locations were considered for the construction of the SCCT?

A. Locations near Baker, Montana; Mobridge, South Dakota; Bismarck/Mandan, Linton, Richardton, Tioga, and Williston, North Dakota were originally screened with the Richardton, Linton, and Mandan, North Dakota sites selected for final consideration.

Q. What criteria were used to evaluate the Richardton, Linton, and Mandan, North Dakota sites?

A. The primary criteria used to evaluate the sites were natural gas supply, electric transmission interconnection, and water supply. Environmental permitting and other factors such as synergies and cost reductions that could be achieved by locating the SCCT near an existing Montana-Dakota generating facility were also considered. Unit capital cost and capacity estimates were developed for each site.

Q. What were the results of the site evaluation study?

A. The Mandan site has the lowest estimated capital cost, the highest projected capacity, and lowest potential operating costs if integrated with the Heskett Station. Higher natural gas pipeline costs for the Mandan site are offset by reduced electric transmission interconnection and upgrade costs, and the ability to share the existing Heskett Station water intake.

The capital cost estimate of $71.59 million for the Mandan site was lower than the $73.47 million cost for the Richardton site and $74.61 million for the Linton site. A lower elevation at the Mandan site yields a projected capacity of 88,054 kW, which is higher than the 87,388 kW capacity projected for the Linton site and the 86,279 kW capacity projected for the Richardton site. A lower site elevation translates to an increase in the amount of air that can be combusted with the fuel in the SCCT and an increase in the capacity. The base load cost estimate of $813 per kW for the Mandan site was lower than the $851 per kW cost for

the Richardton site and $854 per kW cost for the Linton site.

Detailed operation and maintenance cost estimates were not developed as part of the preliminary engineering, but the sharing of facilities, equipment, supervision, and labor with the R.M. Heskett Station is anticipated to result in cost reductions at the Mandan site in comparison to the other sites.

Q. What costs were used in the generation expansion modeling?

A. Adjustments were made to the Mandan capital cost estimate to address potential environmental permitting complexities. A conservative case capital cost of $75.42 million or $857 per kW was used in the generation expansion modeling reflecting a contingency for these additional costs. Even with these adjustments, the Mandan total was still comparable to the Richardton and Linton site costs. The preliminary capital cost and other factors were developed from site visits, manufacturer's budgetary pricing, consulting engineers, Montana-Dakota's experience and expertise, and other available sources.

Q. Please provide a breakdown of the capital costs for the combustion turbine, transmission interconnection, and natural gas pipeline portions of the project that were provided in the advance determination of prudence application (ADP).

A. A capital cost estimate before adding allowance for funds used during construction (AFUDC) is $75.0 million. Of the total, the SCCT cost is estimated at $54.4 million, the transmission interconnection cost is

estimated at $2.2 million, and the natural gas pipeline is estimated at $18.4 million. This results in a total project cost, including $10.6 million of AFUDC, of $85.6 million.

Q. Would you please explain the difference between the total costs utilized for the generation expansion modeling and in the costs identified in the ADP?

A. The difference of $10.2 million is the result of refining the cost estimate from the time the IRP was developed until the ADP application was submitted. The increase is primarily due to adding AFUDC and due to adjustments related to the natural gas pipeline size and a contingency for environmental controls equipment. The difference however, is within the High Combustion Turbine Cost sensitivity model scenario cost and therefore, does not change the result of the modeling analysis and the recommended least-cost plan for future resources.

Q. What is the anticipated schedule for commercial operation of the SCCT?

A. The SCCT Project is anticipated to be available for commercial operation on March 1, 2015. To achieve this date, a number of studies, permits and agreements will need to be completed during 2012 and early 2013. These include the air permit, siting permit, as well as the MISO Definitive Planning Study, MISO Facilities Study, and the MISO Generator Interconnect Agreement execution. Construction of the SCCT project is anticipated to start at the beginning of the second quarter 2013. This

schedule will allow the SCCT to receive MISO planning reserve credits for the summer of 2015.

Q. Does this conclude your direct testimony?

A. Yes, it does.