SOUTH DAKOTA PUBLIC UTILITIES COMMISSION

CASE NO. EL05-022

IN THE MATTER OF THE APPLICATION BY OTTER TAIL POWER COMPANY

ON BEHALF OF THE BIG STONE II CO-OWNERS

FOR AN ENERGY CONVERSION FACILITY SITING PERMIT FOR THE

CONSTRUCTION OF THE BIG STONE II PROJECT

DIRECT TESTIMONY

OF

BRYAN MORLOCK

MANAGER OF RESOURCE PLANNING

OTTER TAIL POWER COMPANY

MARCH 15, 2006

TESTIMONY OF BRYAN MORLOCK

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BEFORE THE SOUTH DAKOTA PUBLIC UTILITIES COMMISSION

DIRECT TESTIMONY OF BRYAN MORLOCK

I. INTRODUCTION

Q: State your name and business address.

A: Bryan Morlock, 215 South Cascade Street, Fergus Falls, Minnesota 56538-0496.

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

A: I am Manager of Resource Planning for Otter Tail Power Company ("Otter Tail"), and am responsible for all resource planning activities at Otter Tail, including the Integrated Resource Plans (IRP) filed periodically with the Minnesota Public Utilities Commission (MPUC).

Q: What is your educational background?

A: I received Bachelor of Science degrees in Electrical Engineering and Business Administration from the University of North Dakota in 1978. I am a registered professional engineer in the State of Minnesota.

Q: What is your employment history?

A: My entire professional career has been with Otter Tail. I started with the company in 1978 as a staff engineer. A description of my job duties as staff engineer and my subsequent positions at Otter Tail is contained in the resume attached as Applicants' Exhibit 10-A to this testimony.

My work experience includes the transmission and distribution area, system operations, and resource planning. I have had responsibility in the resource planning function since 1986. My experience also includes almost 20 years of work and

representation on a variety of committees and working groups at the power pool level at the Mid-Continent Area Power Pool (MAPP). These groups have included the Reserve Requirements Working Group, Accreditation Working Group, Engineering Committee, Engineering Steering Committee, Power and Energy Market Committee, Generation Reserve Subcommittee, and Management Committee. Much of this work has involved the issues associated with reserve requirements and accreditation of generation and capacity transactions.

II. PURPOSE AND SUMMARY OF TESTIMONY

Q: What is the purpose of your testimony?

A: The purpose of my testimony is to describe the resource planning process Otter Tail undertakes to develop its load forecast and meet the requirements of its customers, and how Otter Tail plans on meeting those requirements through Big Stone Unit II, among other generation resources.

Q: Please summarize your testimony.

A: In developing its long-range load forecast, Otter Tail uses econometric forecast models to develop low-growth, base-growth, and high-growth energy and demand projections, based on historical data and assumptions regarding, among other things, weather, demographic trends and macroeconomics.

Otter Tail's energy requirements are forecast to increase steadily from approximately 4,000,000 MWhr in 2005 to approximately 4,600,000 MWhr in 2014, as illustrated in Exhibit 3-13 of the Application. Otter Tail's capacity needs show summer season capacity deficits beginning in 2006 (5 MW) and increasing to 173 MW by 2014,

as illustrated in Exhibit 3-12 of the Application. The capacity deficit increases due to system load growth and the expiration of certain purchased power contracts.

A series of planning scenarios are developed from the load forecast information. Otter Tail uses a long-range probabilistic integrated resource planning model (IRP-Manager) to evaluate supply-side and demand-side resources, in conjunction with the existing resources, to develop an optimized resource plan for each of the planning scenarios. The results form the basis for the Company's resource plan.

Q: What regulations relating to the Big Stone Unit II project are covered in your testimony?

A: My testimony provides the information for Otter Tail required by ARSD 20:10:22:10. I helped prepare Section 3.1.4.5 and Exhibits 3-12 and 3-13 of the Application, which address Otter Tail's forecasted capacity needs and annual energy requirements, and which are incorporated herein by reference.

III. RESOURCE PLANNING

Q: Does Otter Tail engage in resource planning?

A: Yes. Otter Tail's Resource Planning Department is continually engaged in assessing the energy and capacity needs of its customers and its existing resource mix. Otter Tail prepares IRPs on a periodic basis for filing with the MPUC. Its most recent IRP was filed in July 2005, and its next IRP is currently scheduled to be filed in July 2007. Because Otter Tail plans and operates its system as a single multi-state system, the Company also provides copies of the IRP to the South Dakota Public Utilities Commission.

Q: Please explain how Otter Tail's integrated resource planning process works.

A: The process begins with a forecast of customer energy and demand requirements. For the current resource plan (i.e., 2005), Otter Tail hired Christenson & Associates of Madison, Wisconsin to develop the forecast using econometric techniques. Otter Tail then applies the existing load management capability to the demand forecast. Three planning scenarios are then developed – low load growth, baseload growth, and high load growth conditions.

Otter Tail then uses the IRP-Manager software tool to develop a series of optimized resource plans. The utility's entire system (i.e., Minnesota, North Dakota, and south Dakota) is modeled within IRP-Manager, including the load forecast, existing generating and capacity transaction resources, all existing assets of the utility, and the financial structure. IRP-Manager contains a detailed financial sub-model that calculates all financial parameters, tracks cash flow, and can issue new financings based on the need for capital to finance operations and construction. Available supply-side and demand-side alternatives are then input to the model and the model is executed to select the optimized resource plan for the given scenario.

More specifically, IRP-Manager uses an iterative cost-effective module (ICEM) to evaluate each alternative one at a time. ICEM is a multi-step process in which each supply-side and demand-side alternative is evaluated one alternative at a time to determine if implementing the alternative would result in reduced costs, thereby demonstrating cost-effectiveness. Alternatives that the model determines to be cost-effective are then implemented and the model re-executes to determine if capacity and reserve requirements have been satisfied. If the model determines that additional resources are necessary to meet reserve requirements, each remaining alternative is re-

evaluated again, one at a time, to determine the lowest cost alternatives. The lowest cost alternatives are implemented until sufficient resources have been added to ensure all requirements have been satisfied. In some instances, the model will do three or four iterations for each year in the planning period until all requirements have been met.

Under Minnesota law, Otter Tail must develop a number of resource plans to satisfy regulatory requirements. The resource planning process also considers the low and high environmental externality values applied as required by the MPUC. Otter Tail also must discuss its efforts to provide 10% of the energy sold in Minnesota retail sales from renewable resources by 2015. Table 1 identifies the resource plans and the specified objective function. Otter Tail has committed to meeting this renewable energy objective across its entire system, including South Dakota, as long as it can be done cost-effectively.

Table 1
Otter Tail Power Resource Plans and Objective Functions

Scenario	Objective Function
Low Growth – No externalities	**Minimize present-worth of revenue requirements**
Base Growth – No externalities	**Minimize present-worth of revenue requirements**
High Growth – No externalities	**Minimize present-worth of revenue requirements**
Low Growth – Low externalities	**Minimize present-worth of revenue requirements and low externality values**
Base Growth – Low externalities	**Minimize present-worth of revenue requirements and low externality values**
High Growth – Low externalities	**Minimize present-worth of revenue**

	requirements and low externality values
Low Growth – High externalities	**Minimize present-worth of revenue requirements and high externality values**
Base Growth – High externalities	**Minimize present-worth of revenue requirements and high externality values**
High Growth – High externalities	**Minimize present-worth of revenue requirements and high externality values**
Base Growth – 50% of all new resources from DSM and renewables	**Minimize present-worth of revenue requirements**
Base Growth – 75% of all new resources from DSM and renewables	**Minimize present-worth of revenue requirements**

IV. FORECASTING

Q: Please describe the manner in which Otter Tail forecasts future power and energy demands of its customers?

A: In developing its long-range forecast, Otter Tail incorporates key variables along with historical data and assumptions regarding, among other things, weather, demographic trends and macroeconomics. Otter Tail's latest forecast was performed in connection with its application for Resource Plan Approval 2006-2020, submitted on July 1, 2005 to the MPUC, Docket No. EO17/RP-05-968. Otter Tail's long-range forecast was completed using econometric forecast models in accordance with the MPUC's Order approving Otter Tail's last Resource Plan, Docket No. E017/RP02-1168. Aggregate econometric models of energy sales were developed for each customer class, using historical data on monthly sales, economic activity, and weather conditions. Monthly sales forecasting models were estimated as a function of these explanatory variables, plus month-specific variables to capture any seasonal patterns that are not related to the other

explanatory variables. To forecast system peak demand, an econometric model was developed that explains monthly system peak demands as a function of weather, economic conditions, the number of households in the Otter Tail service territory, and month-specific variables.

Q: What are the future energy requirements for Otter Tail according to its forecasts?

A: Otter Tail's energy requirements are forecasted to steadily increase from the present through 2014 and beyond. Over the 10-year period shown from 2005-2014 on Exhibit 3-13 of the Application, Otter Tail's energy needs are projected to grow at an average annual rate of 1.6%.

Q: What are the future capacity requirements for Otter Tail according to its forecasts?

A: The utility experiences summer season capacity deficits beginning in 2006 with the expiration of a 50 MW capacity and energy contract coupled with the expiration of a seasonal "diversity" agreement under which Otter Tail was providing 75 MW of summer capacity to another utility. The net effect of these two transactions ending is a deficit of 5 MW in 2006. This deficit increases each year due to system load growth, and then takes another increase in 2010 to 116 MW with the expiration of a second 50 MW contract. Continued forecasted load growth results in a projected capacity deficit of 173 MW by 2014. Otter Tail's projection of future capacity requirements is shown on Exhibit 3-12 of the Application.

V. GENERATION RESOURCES

Q: What are Otter Tail's existing generation resources?

A: Otter Tail utilizes a variety of generation resources to meet the energy needs of its customers, including its own generating facilities, the radio load management system, the MAPP/MISO, purchases from other utilities, and customer-owned generation, to name just a few. Current Otter Tail capacity resources are about 60% coal-fired in the winter and 65% in the summer. Applicants' Exhibit 10-B attached to this testimony shows the composition of Otter Tail's 2004-05 winter season capacity, and Applicants' Exhibit 10-C shows the composition of Otter Tail's 2004 summer season capacity. Applicants' Exhibit 10-D shows Otter Tail's capacity resource breakdown by fuel type for the 2004-05 winter season, and Applicants' Exhibit 10-E shows Otter Tail's capacity resource breakdown by fuel type for the 2004 summer season. Capacity resources that were resold to other utilities under wholesale transactions are included in this data.

Otter Tail owns both baseload and peaking plants. Otter Tail has partial or full ownership of three large baseload plants: (1) the Hoot Lake Plant with two generators totaling 143 MW of summer capacity; (2) the Big Stone Plant with one generator (Unit I) of 244 MW (Otter Tail's share) of summer capacity; and (3) Coyote Station with one generator of 149 MW of summer capacity. Otter Tail owns approximately 4.2 MW of small baseload hydro. Otter Tail also owns peaking units at Jamestown, North Dakota totaling 43 MW of summer capacity, a unit at Lake Preston, South Dakota totaling 19.74 MW of summer capacity, a unit at Solway, Minnesota totaling 45 MW of summer capacity, and several smaller diesel units that total approximately 3 MW of summer capacity.

Otter Tail has a number of other units under contract. Baseload resources include 2 MW of a coal-fired facility in western North Dakota, 50 MW of Canadian hydro

facilities, and approximately 5.8 MW of a wood waste-fired biomass facility. Otter Tail has a number of customer-owned diesel units under contract for peaking duty totaling approximately 8.4 MW of summer capacity. Finally, Otter Tail has approximately 25 MW (nameplate capacity) of wind generation under contract.

Q: Is Otter Tail's cost of generating resources accurately represented as part of Exhibit 3-3 in the Application?

A: Yes.

Q: Are Otter Tail's existing generating resources sufficient to meets its forecasted energy and demand requirements?

A: No. As indicated earlier in my testimony, Otter Tail forecasts a deficit of 5 MW this year, which increases to 173 MW by 2014. Until Big Stone Unit II begins operation in 2011, Otter Tail will need to purchase capacity and energy from the market to cover its requirements. Otter Tail's proposed 116 MW share of Big Stone Unit II will replace the expiring purchases and help satisfy some of the forecasted load growth. Otter Tail's capacity needs beyond those satisfied by the Big Stone Unit II will be met by peaking capacity resources (either purchases, if economic and available, or construction of a new unit) and demand-side management activities.

VI. DSM AND CONSERVATION PLANNING

Q: Does Otter Tail consider the effects of demand-side management and conservation measures as part of its resource planning?

A: Yes. As I alluded to earlier, Otter Tail uses the IRP-Manager optimization model to develop its IRPs. A variety of resource alternative inputs to the model are used,

including DSM. The model performs a side-by-side consideration of demand-side and supply-side resources to identify the most economic plan.

Q: Please explain Otter Tail's ongoing DSM efforts.

A: Conservation has been identified as part of Otter Tail's preferred resource plan filed with the MPUC in July 2005 (Otter Tail Power Company Application for Resource Plan Approval 2006 – 2020, submitted July 1, 2005, Docket No. E017/RP-05-968). Approximately 13% or more of the capacity needs in that resource plan are identified as coming from conservation and DSM measures.

While Otter Tail is a winter peaking utility, its baseload capacity needs are being driven by forecasted summer season capacity deficits that exceed its forecasted winter season capacity deficits. Knowing this, Otter Tail began pursuing projects and rates a number of years ago to increase its ability to manage its summer peak demand. This included typical programs such as cycling of central air conditioners in return for a customer incentive per month. In addition, rate modifications have been recently approved and plans are underway to include cycling cooling load in the summer that historically has not been controlled. Additional programs that historically have not been cost-effective due to summer demand and energy savings are now yielding cost-effective potential and are being either studied or launched. Primarily these programs target summer cooling loads that continue to grow. The company believes this prudent yet resourceful plan points to its historical diligence in aggressively pursuing demand-side management and conservation opportunities.

The projected incremental annual DSM energy savings in Otter Tail's preferred plan over the 2006-2019 planning period are typically in the 8,000,000 kWh to 9,000,000

kWh range. As a comparison, Otter Tail expects to receive about 900,000,000 kWh annually from its 116 MW share of Big Stone Unit II. Achieving the level of energy and demand savings necessary to replace the annual energy and capacity the company expects to receive from Big Stone Unit II simply is not practical or economically viable.

VII. SELECTION OF BIG STONE UNIT II

Q: What are the results of Otter Tail's resource planning activities?

A: Big Stone Unit II was selected as part of a least-cost resource plan for Otter Tail's customers.

Q: Is Big Stone Unit II projected to meet all the demand that is anticipated by 2020?

A: No.

Q: What alternative resources will be available to meet Otter Tail's future power and energy requirements if Big Stone Unit II is not constructed?

A: In the development of Otter Tail's most recent IRP, the second most cost-effective baseload resource appeared to be a purchase from the Manitoba Hydro Electric Board (MHEB) in Canada. Otter Tail received three power supply proposals from MHEB as part of its development of the IRP. Those proposals have long since expired. If Big Stone Unit II is not constructed, Otter Tail could resume negotiations with MHEB and/or contact other baseload generation evaluations taking place in the region to see if there is an economic potential for the company to participate in those projects. The risk with these alternate resource options is that Otter Tail will have lost its negotiating position by not having the Big Stone Unit II alternative available. Otter Tail may also rely on purchases for the market to cover some of its requirements.

Q: Does this conclude your testimony?

A: Yes.