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

HOA NGUYEN

POWER SUPPLY COORDINATOR

MONTANA-DAKOTA UTILITIES COMPANY

MARCH 15, 2006

BIG STONE II
PARTNERS IN GENERATION

TESTIMONY OF HOA NGUYEN

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BEFORE THE SOUTH DAKOTA PUBLIC UTILITIES COMMISSION

DIRECT TESTIMONY OF HOA NGUYEN

I. INTRODUCTION

Q: Please state your name and business address.

A: Hoa Nguyen, 400 North 4th Street, Bismarck, North Dakota.

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

A: I am employed as a Power Supply Coordinator by Montana-Dakota Utilities Company, a Division of MDU Resources Group, Inc. I am responsible for the technical aspects of the integrated resource planning and load forecasting activities for Montana-Dakota. I also coordinate activities on issues concerning power supply, reliability, and power purchase and sales contracts, and participate in MRO (the Midwest Reliability Organization) and NERC (the North American Electric Reliability Council) reliability committees.

Q: What is your educational background?

A: I graduated from the Vietnam National Institute of Technology in Saigon, Vietnam, in 1970 with a degree in electrical engineering. In 1972, I received a Master of Science degree in electrical engineering from the University of Saigon in Saigon, Vietnam, and was completing my Doctorate of Engineering program in 1975 when I had to leave Vietnam to seek political asylum in the Unites States. From 1993 to 1998, I pursued my graduate studies in business administration and public administration at the University of North Dakota in Grand Forks, North Dakota. I earned a Master of Business Administration degree in 1995 and a Master of Public Administration degree in 1998.

Q: What is your employment history?

A: Prior to joining Montana-Dakota, I worked as a college professor at Minh Duc University and Thu Duc Polytechnic University, both in Saigon, Vietnam. At Minh Duc University I served as a Physics instructor and then an Assistant Professor of Electrical Engineering and Director of Electric Machines Laboratory. At Thu Duc Polytechnic University I served as an Assistant Professor of Electrical Engineering and Director of Faculty Affairs. I began my career with Montana-Dakota in 1975 as a staff engineer with the Transmission Department and was responsible for designing transmission lines and related facilities. In 1976, I transferred to the System Operations and Planning Department, with responsibilities involving a wide range of utility planning and operations studies and related functions. I was promoted to Senior Staff Engineer in 1984, and assumed my current position in 1997.

Q: What professional organization do you belong to?

A: I am a registered professional engineer in North Dakota and am a Senior Member of the Institute of Electrical and Electronics Engineers.

Q: Have you submitted testimony in other administrative or judicial proceedings dealing with energy and relevant issues?

A: Yes. I have submitted testimony dealing with energy and related issues in Montana-Dakota's rate cases before the North Dakota and Montana Public Service Commissions.

II. PURPOSE AND SUMMARY OF TESTIMONY

Q: What is the purpose of your testimony?

A: The purpose of my testimony is to (1) describe Montana-Dakota's Integrated Resource Planning (IRP) process, (2) describe the role of Montana-Dakota's IRP Public Advisory Group in the IRP process, (3) describe Montana-Dakota's current generation mix and how that generation mix changes in the future, and (4) describe Montana-Dakota's need for its share of Big Stone Unit II.

Q: Please summarize your testimony.

A: Montana-Dakota's IRP process encompasses load forecasting, demand-side analysis, supply-side analysis, and integration analysis. Montana-Dakota uses an end-use forecasting model to develop a long-range electric load forecast for its integrated system in Montana, North Dakota and South Dakota. Energy use is forecasted to grow at an average rate of 1.3% over the next ten years as indicated in Exhibit 3-11 of the Application. Montana-Dakota's integrated system is projected to incur a capacity deficit of 75 MW in 2007, 102 MW in 2011, and 159 MW in 2020. Big Stone Unit II is the "best-cost" resource option for the Company to meet its customer's demands for electricity in the future.

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

A: My testimony provides the information required by ARSD 20:10:22:10. I helped prepare Section 3.1.4.3 and Exhibits 3-10 and 3-11 of the Application, which are incorporated herein by reference. I have also prepared Applicants' Exhibits 11-A, 11-B and 11-C attached to this testimony, which provide additional and updated information on Montana-Dakota's integrated resource planning process and forecasts.

III. RESOURCE PLANNING

Q: Does Montana-Dakota engage in resource planning?

A: Yes. Integrated resource planning is the process Montana-Dakota undertakes to forecast and plan the future power and energy resources to meet its customers' electric energy needs.

Montana-Dakota began formal integrated resource planning in 1987 as a result of an order by the North Dakota Public Service Commission. In 1993, the Montana legislature passed legislation authorizing the Montana Public Service Commission to require utilities under its jurisdiction, including Montana-Dakota, to file Integrated Resource Plans. The Montana Public Service Commission issued guidelines on Integrated Resource Planning and ordered Montana-Dakota to file its first Integrated Resource Plan in 1993. Montana-Dakota filed its most recent IRP with the two states' public service commissions in September 2005. Its next IRP filings are in July 2007 for North Dakota and September 2007 for Montana.

Q: Please explain how this integrated resource planning process works.

A: As shown in Applicants' Exhibit 11-A, Montana-Dakota's IRP process encompasses four main areas: load forecasting, demand-side analysis, supply-side analysis, and integration analysis.

Q: Please describe what is meant by load forecasting.

A: The load forecasting activities employ an end-use forecasting method to predict the customers' future demand for electricity. The long-term forecast is an estimate of energy requirements and peak demand and is a representation of the customers' energy usage pattern in the future. To address the load forecast uncertainty, high-growth and low-growth scenario forecasts were developed. These scenario forecasts, together with the base forecast, are used as the basis for the determination of Montana-Dakota's IRPs.

Q: What is meant by a demand-side analysis?

A: Demand-side analysis is an evaluation process to determine the potentially feasible demand-side management (DSM) programs applicable to Montana-Dakota's system. Using both ratepayer impact and societal tests, DSM evaluation is performed for Montana-Dakota's residential and commercial sectors.

Q: What is meant by supply-side analysis?

A: Supply-side analysis is an evaluation process to determine the most promising supply-side alternatives to be added to the Montana-Dakota generation system. In its latest IRP dated September 15, 2005, which has been submitted to the South Dakota Public Utilities Commission for informational purposes, Montana-Dakota proposed a supply-side resource plan that relied on the traditional IRP approach of "least cost" but also considered economic, societal, governmental, and customer issues.

Q: What is meant by integration analysis?

A: Integration analysis is the final process to determine Montana-Dakota's most economically feasible resources to meet its customers' future demand and, at the same time, maintain system reliability. Integrating the potentially feasible DSM programs and the most promising supply-side alternatives provides a framework to identify the Integrated Resource Plans that reflect the most appropriate course of action for resource acquisitions based on two sets of planning requirements: (1) the ratepayer impact test, which identifies benefits to Montana-Dakota's ratepayers, and (2) the societal test, which minimizes the societal costs, including environmental "externalities."

Q: Please describe the role of Montana-Dakota's IRP Public Advisory Group in the IRP process.

A: Montana-Dakota's IRP Public Advisory Group (PAG) is a broad-based advisory board that participates in the review and evaluation of the company's IRP process. The objective of the

PAG is to provide Montana-Dakota with input to its IRP process from a non-utility perspective. This advisory group reviews, evaluates, and recommends modifications to Montana-Dakota's planning process, resource plans, resource acquisition processes, and efficiency programs from the perspective of customers, government agencies, and public interest organizations.

Participants in the PAG are non-utility personnel from the three states served by Montana-Dakota's integrated system – Montana, North Dakota and South Dakota. The PAG is structured to approximately reflect the proportions of Montana-Dakota's load in each state: Montana - 30%, North Dakota - 60%, and South Dakota - 10%. The PAG members are also selected to balance representation from consumer advocacy groups, government agencies (including regulatory bodies), business concerns, and academia. As a result, the PAG consists of three members from Montana, five members from North Dakota, and one member from South Dakota. In addition, the North Dakota Public Service Commission appoints a staff member to participate as an observer. The public advisory process has resulted in better study assumptions and information that enable Montana-Dakota to produce better analyses and reports in its IRP process. The public involvement has also provided useful information to both the company and the PAG participants and their constituents. In particular, for Montana-Dakota's 2005 IRP, the DSM evaluation was performed on a list of residential and commercial programs selected through a joint effort between Montana-Dakota and the PAG.

IV. FORECASTING

Q: Please describe the process how Montana-Dakota forecasts future power and energy demands of its customers.

A: Montana-Dakota uses an end-use forecasting model to develop a long-range electric load forecast for its integrated system in Montana, North Dakota and South Dakota. The end-use forecasting procedure consists of essentially three steps: (1) total company sales are identified by customer class; (2) the customer classes are segregated into end-use components and each end-use is represented by a particular mathematical model; and (3) the end-users are totaled by customer class to arrive at the forecast by customer class.

Q: What are the sources of information for Montana-Dakota's forecasts?

A: Available in-house include the company's load research data, residential energy use surveys and rate projections, as well as historical sales, energy, peak demand, and number of customers. In addition, most of the economic and demographic information used in the load forecasts is obtained from Woods & Poole Economics, Inc., of Washington, D.C., an independent firm that specializes in long-term county economic and demographic projections. The Woods & Poole data are apportioned and adjusted to represent the applicable information for the Montana-Dakota service territory.

Other data sources include the National Oceanic and Atmospheric Administration, Edison Electric Institute, Association of Home Appliance Manufacturers, Gas Appliance Manufacturers Association, Association of Edison Illuminating Companies, United Power Association's compilation of residential appliance information, U.S. Department of Commerce Bureau of Economic Analysis, and numerous economic information websites on the Internet.

Q: What are the future capacity and energy requirements for Montana-Dakota according to the forecasts?

A: The forecasts show Montana-Dakota's energy use growing at an average annual rate of 1.3% over the next ten years. Montana-Dakota's energy requirements are forecast to be approximately 2,440 gigawatt hours (GWh) in 2006, 2,650 GWh in 2011 and 2,744 GWh in 2016. The compounded average rate for energy requirements is 1.0 percent per year. Montana-Dakota's most recent forecast shows capacity deficits beginning in 2011 (101 MW) and increasing steadily through 2021 (164 MW) as illustrated in Applicants' Exhibit 11-C, attached.

V. GENERATION RESOURCES.

Q: What are Montana-Dakota's existing generation resources?

A: As shown in Applicants' Exhibit 11-B, as of January 1, 2006, Montana-Dakota projects its generating resources for the summer of 2006 to consist of 478.3 MW of owned generation and 94.2 MW of purchased capacity. Of the owned generation, 366.2 MW (76.6%) is from coal-fired steam units, 109.8 MW (22.9%) from natural gas-fired combustion turbines, and 2.3 MW (0.5%) from liquid fuel-fired internal combustion units. Montana-Dakota's 2006 summer purchase capacity consists of power from the Antelope Valley Unit No. 2 (AVS II) (66.4 MW) (leased and operated by Basin Electric Power Cooperative), power received from Western Area Power Administration (2.8 MW), and summer peaking capacity purchased from NorthPoint Energy (25 MW).

Q: Is Montana-Dakota's cost of generating resources accurately represented as part of Exhibit 3-3 to the Application?

A: Yes.

Q: Will there be any changes in the generation resources available to Montana-Dakota in the immediate future?

A: After the 2006 summer season, 25 MW of peaking capacity purchased from NorthPoint Energy, which is purchased for the 2006 summer only, will no longer be available, and the AVS II baseload purchase agreement with Basin Electric Power Cooperative expires on October 31, 2006. The upgrade of one of the existing owned coal-fired units in the fall of 2006 is expected to add 2 MW to the system. In addition, Montana-Dakota has signed a contract to purchase all of the energy and capacity output from a proposed wind farm to be constructed in South Dakota by the end of 2007. It is estimated that this wind farm, if constructed, would have a nameplate capacity of 31.5 MW with an accredited capacity of up to 7.0 MW.

To fulfill the power requirements from the time the AVS II power purchase agreement expires until the Big Stone Unit II plant comes on-line, referred to as "bridge power," Montana-Dakota has entered into an agreement with Northern States Power Company for the purchase of peaking capacity for the following summer seasons: 2007 - 85 MW, 2008 - 90 MW, 2009 - 95 MW, and 2010 - 100 MW.

Q: Are Montana-Dakota's existing generation resources sufficient to meet its forecasted demand and energy requirements?

A: No. The information in Exhibit 3-10 of the Application has been updated, and is shown on Applicants' Exhibits 11-B and 11-C, attached to this testimony. The updated information shows that Montana-Dakota experiences a capacity deficit in 2011 of 101 MW, and the capacity deficits increase to 134 MW in 2016 and 164 MW by the summer of 2021. The deficits are largely caused by the 2006 expiration of a 66.4 MW baseload purchase agreement with Basin Electric Power Cooperative and increases in annual peak demand that grows at a rate of 1.1% per year.

VI. DSM AND CONSERVATION PLANNING

Q: Please explain how Montana-Dakota takes demand-side management and conservation into consideration in doing its resource planning?

A: As mentioned above, demand-side analysis is part of Montana-Dakota's Integrated Resource Planning process. For its 2005 IRP, Montana-Dakota plans to implement an additional 6.5 MW of demand-side management and conservation measures, including high-efficiency residential central air-conditioning and commercial lighting retrofit programs during the 2006-2010 time period.

VII. SELECTION OF BIG STONE UNIT II

Q: What are the results of Montana-Dakota's resource planning activities?

A: Montana-Dakota's 2003 Integrated Resource Plan filed with the North Dakota Public Service Commission on July 1, 2003 and the Montana Public Service Commission on September 15, 2005 included:

- 78 MW from two combustion turbines to be added in 2007 to replace the 66.4 MW capacity and energy purchased from Basin Electric Power Cooperative,
- Modifications to existing combustion turbines at Glendive and Miles City in Montana for an additional 7.72 MW in 2010 and 2011, respectively, and
- Another new 39 MW combustion turbine to be added in 2012.

Subsequent to filing the 2003 IRP, Montana-Dakota determined that the plan's heavy reliance on gas-fired generation exposed our customers to considerable price and reliability risk associated with fuel cost and availability. The company believes that coal-fired generation, which has lower and less volatile fuel prices, offers a more stable fuel supply than natural gas, and provides a better value for our customers.

As a result, a number of coal-fired generation alternatives were studied and the share in Big Stone Unit II was shown to be Montana-Dakota's "best cost" alternative. In its 2005 IRP, Montana-Dakota proposed a supply-side plan which relied on the traditional IRP approach of "least cost" but also considered economic, societal, governmental, and customer issues.

Q: Will Big Stone Unit II meet all of the Montana-Dakota's projected demand?

A: No. Montana-Dakota's 116 MW share of Big Stone Unit II will satisfy its customers' demand for capacity and energy requirements through 2013, but additional generation capacity will be necessary beyond 2013. The updated information in Applicants' Exhibit 11-C shows that an additional 48 MW will be needed by 2021.

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

A: At the present time, Montana-Dakota has identified a lignite-fired plant near Gascoyne, North Dakota, referred to as the Lignite Vision 21 plant, as its next best alternative to replace its share (116 MW) of Big Stone Unit II. The Lignite Vision 21 plant is proposed to be sub-critical, circulating fluidized bed, steam-electric generating station, designed for baseload operation with a nominal net power output of 175 MW.

Q: Does this conclude your testimony?

A: Yes.

MONTANA-DAKOTA UTILITIES CO.
INTEGRATED RESOURCE PLANNING PROCESS

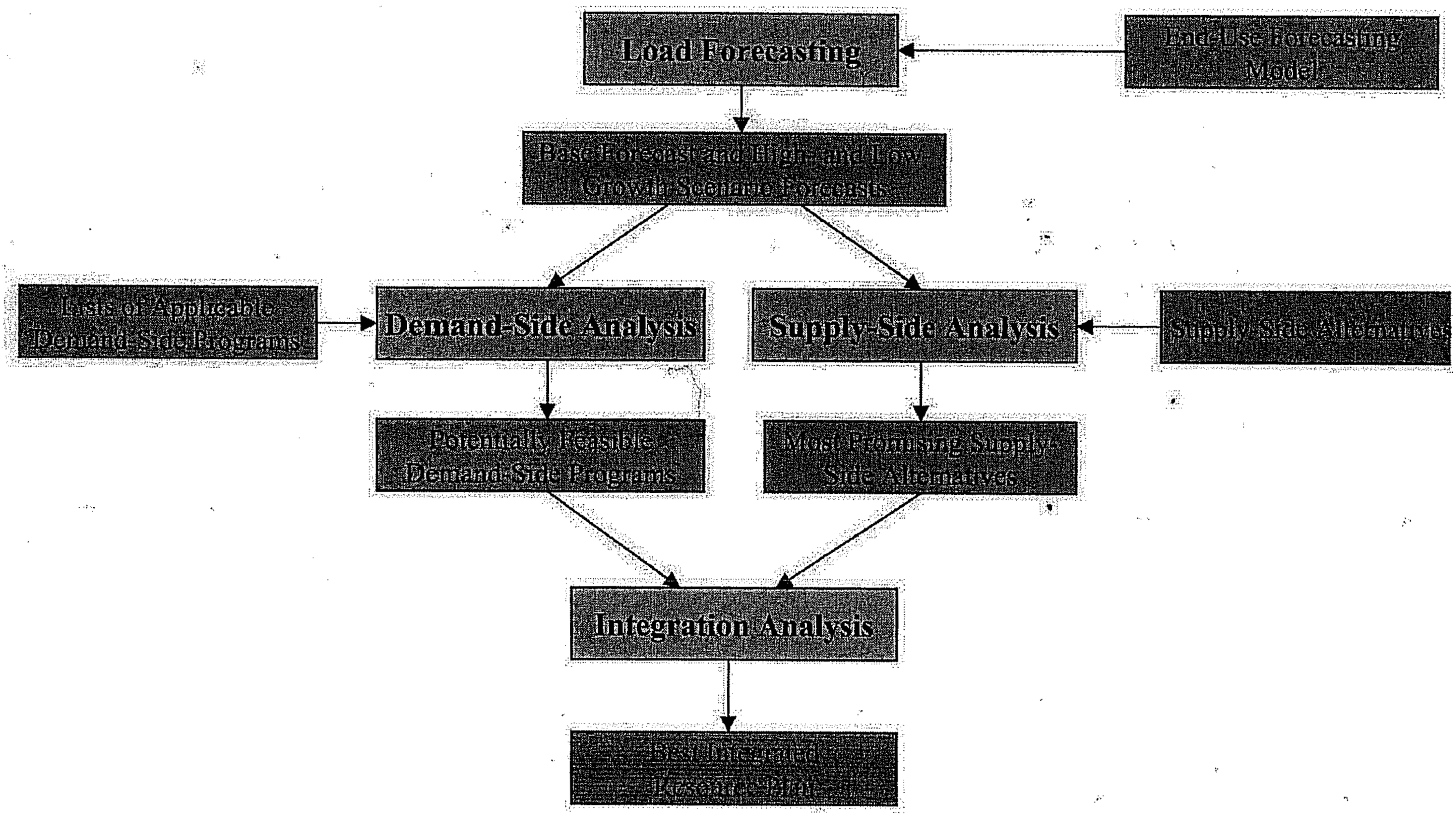


EXHIBIT
APPLICANTS' EX11-A

Montana-Dakota Utilities Co.
Load and Capability Comparison -- 2006-2015
Projected as of January 1, 2006

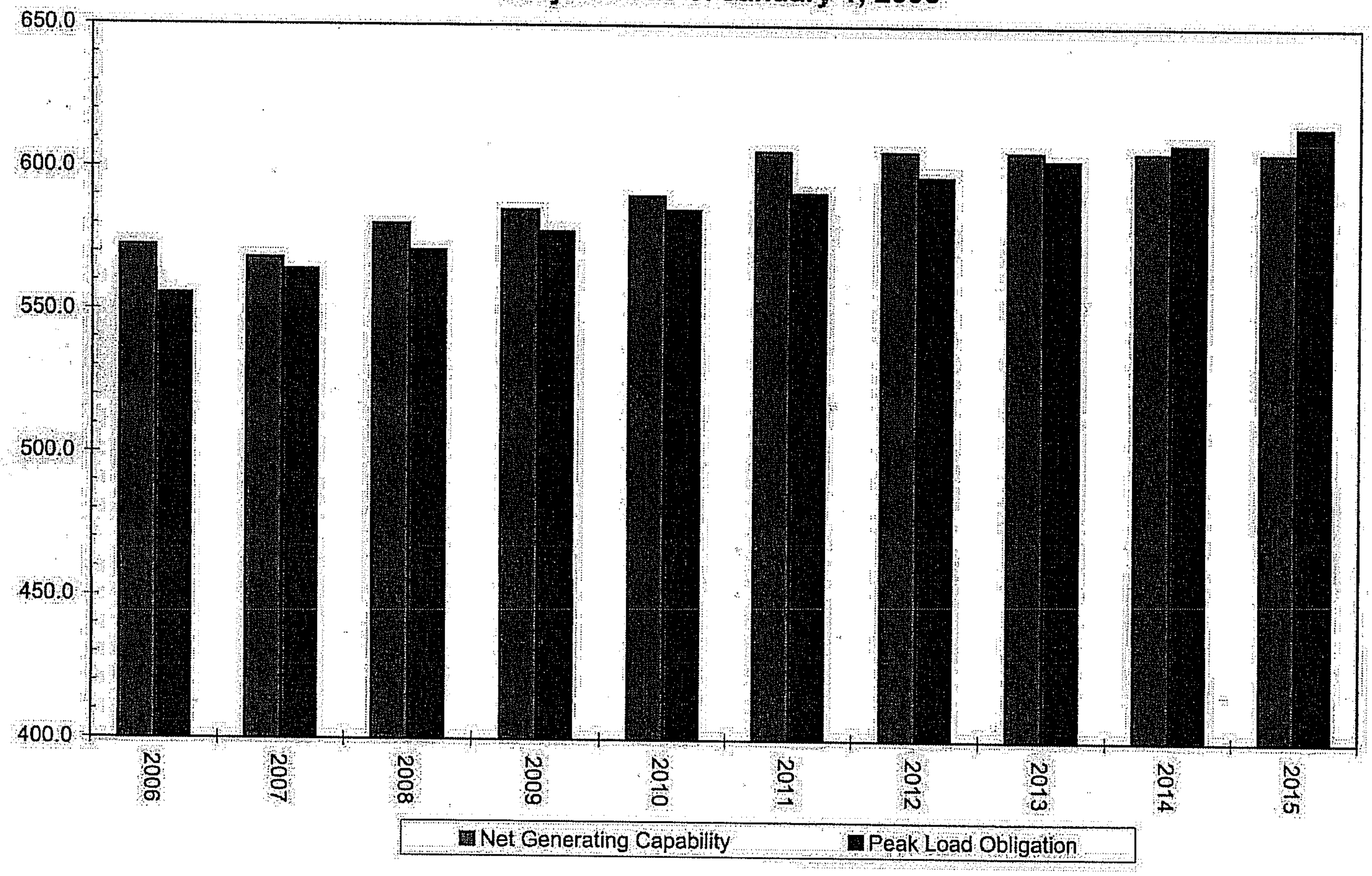


EXHIBIT
APPLICANTS' EX11-B

1311

Montana-Dakota Utilities Co.
Load and Capability Comparison -- 2006-2015
Projected as of January 1, 2006

Year	Own Generating Capability	WAPA Bill Crediting	AVS II Purchase	NorthPoint Peaking Cap. Purchase	NSP Peaking Cap. Purchase	Proposed Wind Farm	Big Stone II	Total Capability	Summer Peak Demand	Summer Peak Load Obligation	Surplus/Deficit (+)/(-) With Big Stone II	Surplus/Deficit (+)/(-) Without Big Stone II
2006	478.3	2.8	66.4	25.0		-	-	572.5	483.1	555.6	16.9	16.9
2007	480.3	2.8	-	-	85.0	-	-	568.1	490.5	564.1	4.0	4.0
2008	480.3	2.8	-	-	90.0	7.0	-	580.1	496.5	571.0	9.1	9.1
2009	480.3	2.8	-	-	95.0	7.0	-	585.1	502.3	577.6	7.5	7.5
2010	480.3	2.8	-	-	100.0	7.0	-	590.1	509.0	585.4	4.8	4.8
2011	480.3	2.8	-	-		7.0	116.0	606.1	514.2	591.3	14.8	-101.2
2012	480.3	2.8	-	-		7.0	116.0	606.1	519.4	597.3	8.8	-107.2
2013	480.3	2.8	-	-		7.0	116.0	606.1	524.6	603.3	2.8	-113.2
2014	480.3	2.8	-	-		7.0	116.0	606.1	529.8	609.3	-3.2	-119.2
2015	480.3	2.8	-	-		7.0	116.0	606.1	535.0	615.3	-9.1	-125.2

Montana-Dakota Utilities Co.
Summer Surplus/Deficit Forecast

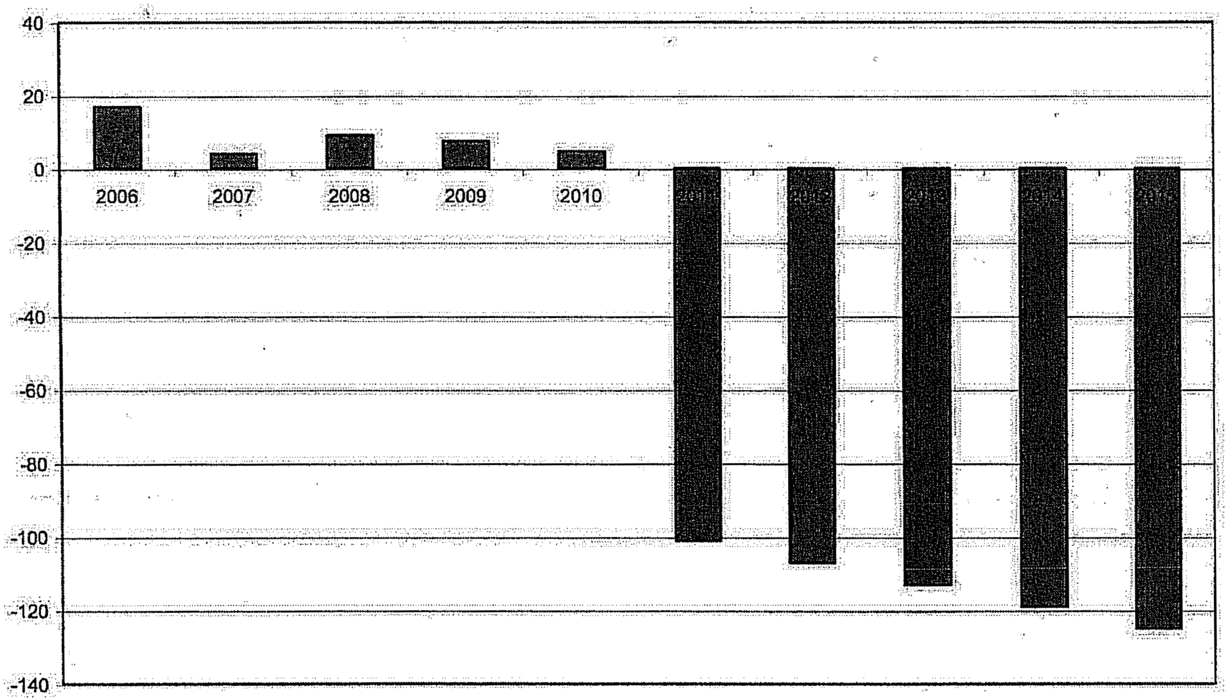


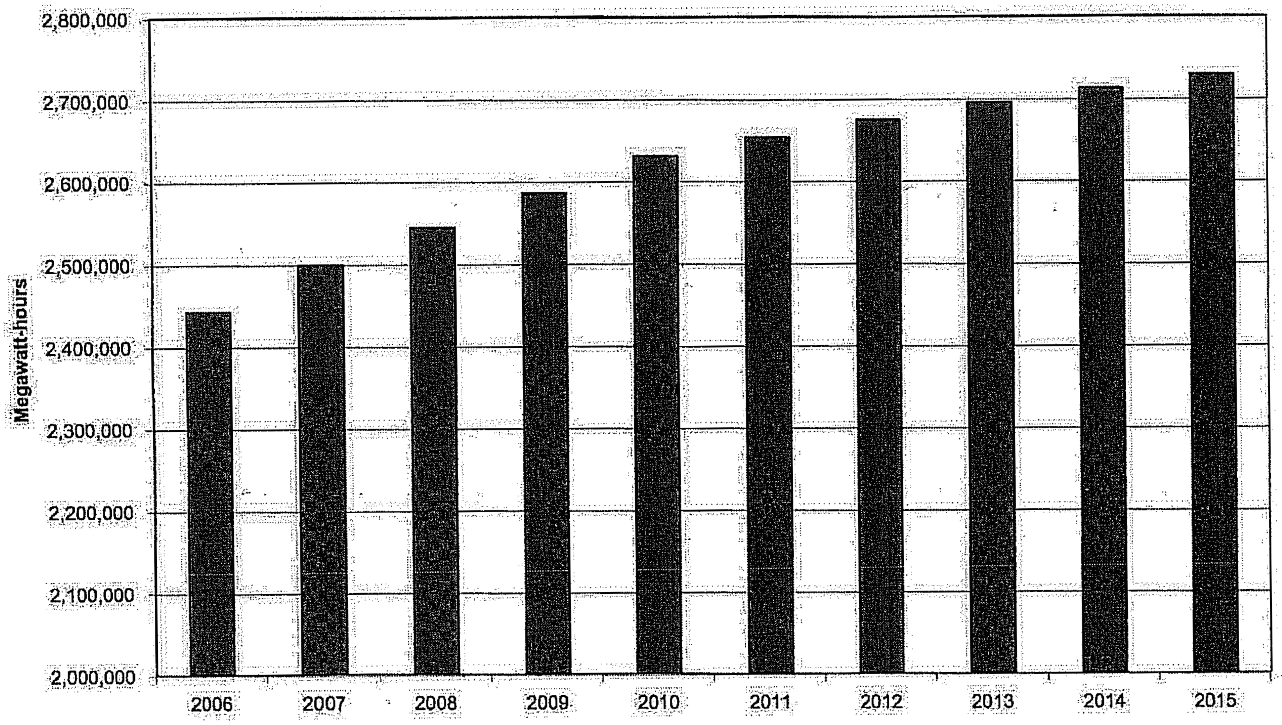
EXHIBIT
APPLICANTS'
EX11-C

1313

Montana-Dakota Utilities Co.
Summer Surplus/Deficit Forecast

Year	Capacity (MW) Surplus/Deficit (+)/(-)
2006	16.9
2007	4.0
2008	9.1
2009	7.5
2010	4.8
2011	-101.2
2012	-107.2
2013	-113.2
2014	-119.2
2015	-125.2

Montana-Dakota Utilities Co.
Energy Requirements Forecast



Montana-Dakota Utilities Co.
Energy Requirements Forecast

Year	Annual Energy Requirements (GWh)
2006	2,440,312
2007	2,496,503
2008	2,541,294
2009	2,582,892
2010	2,627,768
2011	2,650,238
2012	2,671,964
2013	2,692,643
2014	2,709,812
2015	2,726,990