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

400 North Fourth Street
Bismarck, ND 58501
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June 21, 2007

Illona Jeffcoat-Sacco
Executive Secretary
North Dakota Public Service Commission
State Capitol
Bismarck, ND 58505

Re: In the Matter of the Advance Determination of Prudence Application of Otter Tail Corporation Case No. PU-06-481

In the Matter of the Advance Determination of Prudence Application of Montana-Dakota Utilities Co., a Division of MDU Resources Group, Inc. Case No. PU-06-482

Dear Ms. Jeffcoat-Sacco:

On behalf of both Montana-Dakota Utilities Co. (Montana-Dakota) and Otter Tail Power Corporation (Otter Tail), enclosed for filing in the above matters please find the original and seven copies of the following documents:

Case No. PU-06-481 Otter Tail:

1. Rebuttal Testimony of Ward Uggerud
2. Rebuttal Testimony of Mark Rolfes (both cases);
3. Rebuttal Testimony of Tim Rogelstad (both cases);
4. Rebuttal Testimony of Kermit Trout (both cases);
5. Rebuttal Testimony of Jeff Greig (both cases) and
6. Rebuttal Testimony of Bryan Morlock.

Case No. PU-06-482 Montana-Dakota:

1. Rebuttal Testimony of Bruce Imsdahl;
2. Rebuttal Testimony of Mark Rolfes (both cases);
3. Rebuttal Testimony of Tim Rogelstad (both cases);
4. Rebuttal Testimony of Kermit Trout (both cases);
5. Rebuttal Testimony of Jeff Greig (both cases) and
6. Rebuttal Testimony of James Heidell.

In our June 13, 2007 Notice of Intent to File Rebuttal Testimony, we did not list Mr. Rogelstad, and we had listed Ms. Andrea Stomberg instead of Mr. Imsdahl. At the time of filing we had not identified Mr. Rogelstad as a potential rebuttal witness and have since decided that

Mr. Imsdahl will be addressing identified rebuttal issues and Ms. Stomberg will not be submitting rebuttal testimony. We do not believe these inadvertent omissions cause prejudice to any party.

Please acknowledge receipt by stamping or initialing the duplicate copy of this letter attached hereto and returning the same in the enclosed self-addressed, stamped envelope.

Please let me know if you have any questions. Thank you.

Sincerely,

Daniel S. Kuntz / Sara Graf

Daniel S. Kuntz
Associate General Counsel

c: The attached Service List (w/encl.)
Honorable Al Wahl

STATE OF NORTH DAKOTA

PUBLIC SERVICE COMMISSION

Otter Tail Corporation, Advance Determination of Prudence Application

SERVICE LIST

Montana-Dakota Utilities Co., a Division of MDU Resources Group, Inc., Advance Determination of Prudence Application

Case Nos. PU-06-481, PU 06-482

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STATE OF NORTH DAKOTA

PUBLIC SERVICE COMMISSION

Otter Tail Corporation, Advance Determination of Prudence Application

AFFIDAVIT OF SERVICE

Montana-Dakota Utilities Co., a Division of MDU Resources Group, Inc., Advance Determination of Prudence Application

Case Nos. PU-06-481, PU 06-482

Angie Berger, of Bismarck North Dakota, being sworn, says that on June 21, 2007, a copy of the Rebuttal Testimony filed, in the above referenced cases, has been served upon the North Dakota Public Service Commission and the attached service list via FedEx and email.

Angie Berger
Angie Berger

Subscribed and sworn to before me
this 21st day of June, 2007.

Norma E. Eslinger
Notary Public

NORMA E ESLINGER
Notary Public
State of North Dakota
My Commission Expires August 30, 2011

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

Before the Public Service Commission of North Dakota

Case No. PU-06-482

Rebuttal Testimony
of
Bruce T. Imsdahl

Q. Please state your name and business address.

A. My name is Bruce T. Imsdahl 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 President and CEO of Montana-Dakota Utilities Co. (Montana-Dakota), a Division of MDU Resources Group, Inc.

Q. Are you the same Bruce T. Imsdahl who filed direct testimony earlier in this proceeding?

A. Yes I am.

Q. What is the purpose of your rebuttal testimony?

A. The purpose of my rebuttal testimony is to address portions of Mr. Terry Deason's testimony filed on May 31, 2007 on behalf of the advocacy staff of the North Dakota Public Service Commission. In particular I will respond to Mr. Deason's request for clarification regarding what impacts the Big Stone II Station may have on the prospects of future generation in North Dakota. I will also address the conditions Mr. Deason recommends

that the Commission consider before granting an advance determination of prudence.

Q. What is your response to Mr. Deason's question regarding the impact Big Stone II will have on prospects of future generation in North Dakota?

A. While Montana-Dakota's participation in the Big Stone II project has been determined to be the best overall option for providing a reliable and stable resource addition to serve Montana-Dakota's electric customers in the near term, we continue to investigate additional resources for the future. One particular example is the plant under study by Montana-Dakota and three other regional utilities. This group, led by Minnkota Power Cooperative, is currently studying the feasibility of building a jointly owned 500 MW lignite-fueled generating station near Center, North Dakota. The generating station under study would be located at the existing Young Station site. This is but one example of opportunities Montana-Dakota continues to explore in developing reliable and cost effective supply resources for its customers.

Q. Would you please address each of the conditions Mr. Deason has suggested the Commission consider before granting an advance determination of prudence of the Big Stone II project?

A. Yes. Overall, Montana-Dakota is in agreement with the proposed conditions. As a partner in the Big Stone II project Montana-Dakota provides its commitment to ensuring that 1) periodic informational filings regarding the progress of obtaining all necessary approvals, permits and

licenses from other regulatory bodies and advisement of when construction commences will be submitted to the Commission 2) construction cost reporting on a forecasted and actual basis with explanations of deviations including status reports and reporting as deemed appropriate by the Commission 3) the Big Stone II partners will implement specific operational measures to enhance the timely and efficient delivery of coal. Mr. Mark Rolfes on behalf of the Big Stone II project will provide the specifics of this action plan in his rebuttal testimony 4) the Big Stone II partners will conduct a study to determine the number and type of rail cars necessary to serve the plant with a report filed with the Commission. Mr. Rolfes will provide the details of this study in his rebuttal testimony and 5) the Big Stone II partners will conduct a study to determine what a cost effective coal inventory level should be taking into account the cost of potential generation curtailments in the event of coal delivery issues. Again, Mr. Rolfes will provide the details of the study in his rebuttal testimony. Montana-Dakota also commits to working with the Commission Staff in developing the appropriate reports that will enable the Commission and its Staff to be apprised in a timely manner and in a fashion that will enable the Commission and its Staff to be aware of the status of this critical project. An affirmative decision from this Commission regarding the prudence of Montana-Dakota's participation in the Big Stone II project will allow Montana-Dakota to move forward with the development of the Big Stone II project in order to bring long term reliability and price

stability to its customers. Absent a determination of prudence, Montana-Dakota may be left with shorter term resource solutions in meeting its customers' needs that will unnecessarily subject customers to increased costs and price volatility.

Q. Does this complete your rebuttal testimony?

A. Yes it does.

CASE NOS. PU-06-481 & PU-06-482

BEFORE THE NORTH DAKOTA PUBLIC SERVICE COMMISSION

IN THE MATTER OF THE APPLICATION BY OTTER TAIL POWER CORPORATION D/B/A

OTTER TAIL POWER COMPANY

AND

MONTANA-DAKOTA UTILITIES CO., A DIVISION OF MDU RESOURCES GROUP, INC.

FOR AN ADVANCED DETERMINATION OF PRUDENCE

FOR THE BIG STONE II GENERATING PLANT

REBUTTAL TESTIMONY

OF

MARK ROLFES

PROJECT MANAGER

OTTER TAIL POWER COMPANY

JUNE 21, 2007

REBUTTAL TESTIMONY OF MARK ROLFES

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BEFORE THE NORTH DAKOTA PUBLIC SERVICE COMMISSION

REBUTTAL TESTIMONY OF MARK ROLFES

I. INTRODUCTION

Q: What is the purpose of your rebuttal testimony?

A: The purpose of my rebuttal testimony is to respond to various issues raised in the Direct Testimony of Mr. Terry Deason and the Direct Testimony of Mr. David Schlissel. I will provide additional information regarding the efforts and commitments made by the Big Stone co-owners to take into account potential fuel supply and delivery challenges. I will also respond to statements about the potential for increased costs.

II. FUEL SUPPLY ISSUES

Q: Have you had an opportunity to review the testimony of Mr. Terry Deason relating to the supply of coal to Big Stone?

A: Yes, I have read his testimony and I am aware that fuel supply and delivery are important issues relating to the long term operation of Big Stone II.

Q: Have Otter Tail Power, Montana Dakota Utilities, and Northwestern Public Service, the owners of Big Stone Unit I, experienced any fuel delivery problems at the Big Stone facility?

A: Yes. At certain times during the spring of both 2005 and 2006, we did not receive the expected shipments of coal and our supplies diminished to the point that in 2006 we operated at less than normal capacity. This has been the only serious reduction in generation that has been required since the Burlington Northern took over operation in the early 1980's. We have worked with the Burlington Northern Santa Fe Railway ("BNSF") to address this matter. The

BNSF has increased the number of shipments and upgraded a number of its facilities. Mr. Brautovich discusses the Railway's responsive actions in his testimony. The owners have also added a third train set.

Q: At page 37 of his testimony, Mr. Deason describes a number of operational measures that Otter Tail might take to minimize coal delivery problems. Have you begun to implement any of these measures?

A: Yes, we have implemented these operational measures at Big Stone I. The Fuel Supervisor continually monitors train cycle times and uses this information to plan deliveries. Also future delivery needs are projected well in advance. Also part of the changes planned for the coal yard with the addition of Unit II will make it easier to move coal into and out of the coal yard thus making the third suggestion much more practical to implement. Finally Big Stone II has not done the analysis yet regarding the purchase of aluminum cars. I can report that all past analyses have shown the superiority of the lighter cars and the Big Stone II co-owners will seriously consider acquisition of the lighter cars. Also, as Otter Tail's Vice President Ward Uggerud stated in his Rebuttal Testimony, the Big Stone II Co-Owners are committed to follow up on the suggestions by Mr. Deason.

Q: What is the company planning to do about expanding the storage capability to increase the coal inventory target level?

A: We are looking into that issue. We have not decided yet what target level to establish when Big Stone Unit II goes into operation. We have a couple more years of operation of Unit I to rely on before we have to decide on the target level. We have the room on site to

afford more than 30 days supply if we decide that is appropriate. This is a matter that we will continue to investigate and to report on as we follow up with Mr. Deason's recommendations.

Q: At pages 19-21 of his Direct Testimony, Mr. David Schlissel asserts that the Big Stone co-owners have failed to properly consider the risks and the cost impacts of coal deliverability problems. What response do you have?

A: Mr. Schlissel's criticism is unfounded. His basic complaint is that the co-owners have not made the same assumptions he would make in analyzing the various generation alternatives. We are fully aware that fuel supply and delivery disruptions can affect the operation and the cost of the energy produced by the facility. Fuel supply risks will exist regardless of what type of plant is proposed and what kind of fuel is burned. The costs of every type of fuel can go up or down. Mr. Schlissel recognizes at page 21 of his testimony that Burns & McDonnell did look at the potential effect of cost increases on various generation alternatives. The co-owners have responsibly taken into account that the cost of fuel, whatever it is, may go up, and that availability of the fuel is an important consideration. We not only have taken these risks into account, we are addressing the absolute need for a reliable coal supply on a number of fronts, as recognized by Mr. Deason and explained by Mr. Uggerud and me in our testimony.

III. ESTIMATED COSTS

Q: At page 11 of his testimony, Mr. Schlissel states that the Big Stone co-owners, including Otter Tail Power and Montana-Dakota Utilities, have assumed there will be no further capital cost increases in the Big Stone Project before it is completed. Is that right?

A: No, it is not, and I and other witnesses explained that in the Minnesota proceeding. The owners believe, and Black & Veatch has advised, that the capital cost of Big Stone Unit II will increase by approximately 6% per year because of inflation for any delay in the Commercial Operation Date, and there are still final design decisions that we expect will have some minor effect on cost.

Q: Mr. Schlissel asserts at pages 14-15 of his testimony that the cost of Big Stone Unit II has gone up another $199 million. Is that an accurate statement?

A: No, that is not accurate, and I explained the reason why in the Minnesota proceeding. I will reiterate what I said in Minnesota. I believe they got that figure from an August 24, 2006 Black & Veatch document entitled "Owners' Alternatives for Financial Risk Commitments Prior to CON and PSD." In that document, Black & Veatch set forth four possible cases for continuation of the Big Stone II project. Black & Veatch estimated that Case 3 would result in a delay in the in-service date to May 2012. With costs expected to escalate at 6 percent, and with increased project team and Black & Veatch costs, the delay was estimated to add $199 million to the project cost. Black & Veatch subsequently indicated their understanding that the Applicants were electing Case 3. However, the Applicants have had ongoing discussions with Black & Veatch resulting in a project path that differs from the August 2006 Black & Veatch Case 3. In particular, the August Case 3 stated that no activities would be undertaken by Black & Veatch other than as necessary to support permitting, with the result that the earliest procurement (for the boiler) would be issued for bid in October 2007. In contrast, under the present plan the owners have instructed Black &

Veatch to take needed actions to be ready to enter into critical contracts upon receipt of the finial critical permit.

Q: Can you once again state for the record what the co-owners' best estimate for the cost of Big Stone Unit II is?

A: Our best estimate is that Big Stone Unit II will cost $1.361 billion, excluding the cost of transmission, if the in service date is 2011. But for a number of reasons we expect the in service date will be delayed at least one year. We believe this will increase the cost of the plant by 6%. If the in service date is delayed further, we expect the costs to go up approximately $7 million per month.

IV. COMMERCIAL OPERATION DATE FOR UNIT II

Q: Mr. Schlissel asserts at page 13 of his direct testimony that "project documents reveal that that . . . actual commercial operation date for the Big Stone II Project [is] July 1, 2013." Is that right?

A: No.

Q: What is the anticipated commercial operation date for Big Stone II?

A: The actual commercial operation date is dependent on when permitting is complete, which is beyond the direct control of the project. But if permitting is completed later this year as anticipated, we would expect to have commercial operation in mid 2012.

Q: Does this conclude your rebuttal testimony?

A: Yes.

CASE NOS. PU-06-481 & PU-06-482

BEFORE THE NORTH DAKOTA PUBLIC SERVICE COMMISSION

IN THE MATTER OF THE APPLICATION BY OTTER TAIL POWER CORPORATION D/B/A

OTTER TAIL POWER COMPANY

AND

MONTANA-DAKOTA UTILITIES CO., A DIVISION OF MDU RESOURCES GROUP, INC.

FOR AN ADVANCED DETERMINATION OF PRUDENCE

FOR THE BIG STONE II GENERATING PLANT

REBUTTAL TESTIMONY

OF

TIMOTHY ROGELSTAD

MANAGER OF DELIVERY PLANNING

OTTER TAIL POWER COMPANY

JUNE 21, 2007

REBUTTAL TESTIMONY OF TIMOTHY ROGELSTAD

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BEFORE THE NORTH DAKOTA PUBLIC SERVICE COMMISSION

REBUTTAL TESTIMONY OF TIMOTHY ROGELSTAD

I. INTRODUCTION

Q: What is the purpose of your rebuttal testimony?

A: The purpose of my rebuttal testimony is to respond to the Direct Testimony of Mr. Terry Deason regarding the proposed new transmission lines and to provide some additional information regarding the benefits realized by the construction of the Big Stone to Granite Falls line at 345 kV capability.

II. 345 KILOVOLT CAPABILITY

Q: Why have the Big Stone co-owners decided to build the Granite Falls line to 345 kV capability?

A: In the course of conducting transmission planning to determine what was needed to interconnect the new Big Stone II facility to the grid, we looked not only at the Big Stone needs but also at how the transmission would fit into other long-range regional plans and at what other transmission needs might be present in the region.

After we completed the initial interconnection studies for the Big Stone Unit II project, we looked at what other transmission needs that could benefit form the Big Stone transmission corridor. We also looked at how the Big Stone Unit II Transmission Interconnection Project fit into long-range regional plans. The CapX 2020 Vision

Plan,[1] for example, identified two 345 kV transmission lines from the Dakotas into Minnesota. The Big Stone to Granite Falls transmission line advances that portion of the CapX 2020 Vision Plan. We also realized, of course, that the Dakotas and southwestern Minnesota were good wind resource areas and we knew that there was not enough transmission available to handle additional amounts of wind energy.

Knowing that a higher voltage line would provide additional transmission for a number of purposes, we began to look at some of the specific impacts of constructing a larger line. Initially, we determined that if the line was going to be larger than needed specifically for Big Stone, a 345 kV capability would be the only likely upgrade. We found that constructing the Granite Falls line to 345 kV capability would not require any significant new right-of-way over the 230 kV line. We determined that line losses would be measurably less with the line operated at 345 kV rather than at 230 kV. And we found that a 345 kV line would cost approximately $25 to $30 million more than a 230 kV line out of a total cost for transmission of approximately $110 million for transmission interconnection costs, and out of a total for both transmission interconnection *and* transmission delivery service facilities of $238 million.

Q: Please briefly explain the distinction between transmission "interconnection service" and transmission "delivery service."

[1] CapX 2020 is an effort of eight Minnesota and regional utilities including Otter Tail, who are putting focus and direction into strengthening the region's high voltage transmission system to better serve growing demand, enhance reliability, and provide generation outlet opportunities. The CapX 2020 Vision Plan is a report that was completed in May 2005, after an extensive planning effort to identify projects that may be needed to meet customer demand well into the future - perhaps as much as 8000 MW of generation. Based on several different hypothetical generation expansion scenarios, the Vision Plan sets forth a proposal for construction of over 1600 miles of 345 kV transmission lines in North Dakota and Minnesota at a cost of over $1.2 billion.

A: *Interconnection service* is access to the necessary transmission lines to safely and reliably allow a generating facility to connect to the grid. Transmission *delivery service* is access to the transmission grid to actually move the energy from the generator to different points on the transmission grid, including delivery of energy from Big Stone Unit II to the co-owners' customers.

Q: Why has a distinction between interconnection service and delivery service developed?

A: The distinction between "interconnection transmission service" and "transmission delivery service" has developed because in 1992, Congress made the wholesale generation market open to free competition – i.e., the Federal Energy Regulatory Commission (FERC), which has jurisdiction over the transmission of electric energy in interstate commerce, would no longer regulate the *sales* of (as opposed to the transmission of) electric energy in interstate commerce. In order to make good on that goal, however, FERC believed it needed to open up the transmission system so that persons who controlled the transmission system (i.e., utilities, who also owned competing generation facilities) could not unfairly discriminate against competitors by keeping them from having "open and comparable access" to the transmission grid. And FERC did just that by adopting Order No. 888 and related orders and rulemakings.

Q: What has been the result of this opening up of the transmission grid?

A: In the evolution of open access, FERC has found that while open access and Order No. 888 resolved for the most part the problems associated with parties obtaining comparable transmission service (i.e., comparable transmission *delivery* service), certain generators were still having difficulties getting access to the grid in the first place – i.e., having difficulty

getting *interconnection* service. Thus the FERC devised a process that utilities must undertake in response to a generator's request for interconnection service. That process requires that utilities (and Regional Transmission Organizations such as the Midwest Independent System Transmission Operator) undertake a study and identify the necessary transmission facilities that would need to be constructed and placed in service before the generator can interconnect to the system.

Q: Are interconnection service requirements and delivery service requirements evaluated separately when a new generating facility is proposed?

A: Yes, the FERC requires that they be evaluated separately, and they have been in this matter. Transmission delivery service requires its own study process, separate from the interconnection study process. And while the study process for delivery service is similar to that for interconnection, the transmission delivery service study process evaluates likely impacts of new generation on the transmission network over a much larger geographical area than does the interconnection study process – i.e., one that includes service to the generator's ultimate customers.

Another important distinction is that there are different "queues" for interconnection service and delivery service. In MISO, requests for interconnection far outnumber requests for delivery service. And the FERC has made clear that obtaining interconnection service does not guarantee delivery service – and vice versa – obtaining transmission delivery service does not guarantee interconnection service.

Q: Is the Big Stone to Granite Falls line part of the proposed interconnection facilities or transmission service delivery facilities?

A: The Granite Falls line is part of the proposed interconnection facilities. We do not anticipate any of the transmission delivery service facilities to be sized at 345 kV standards.

Q: When do the Big Stone co-owners anticipate that the Granite Falls line will be operated at 345 kV?

A: Once Big Stone Unit II goes into operation, the Granite Falls line will operate initially at 230 kV. The co-owners anticipate that a new 345 kV line being proposed by the CapX utilities from southwestern Minnesota through the Granite Falls area and on to the Twin Cities will be constructed and in operation sometime after 2012, and after Big Stone comes online. Once that new 345 kV line becomes available, the Big Stone line can be energized to 345 kV.

Q: Will the Big Stone to Granite Falls 345 kV line become part of the MISO Transmission Expansion Plan (MTEP)?

A: Yes, we believe that MISO will include all of the Big Stone II Transmission facilities in MTEP. At a recent MISO Planning Sub-committee, June 19, 2007, MISO staff indicated that the Big Stone Unit II interconnection facilities will become part of MTEP once an interconnection agreement is signed.

Q: What is the significance if MISO includes the facilities in its MTEP?

A: Once the MISO Board of Directors approves the plan and the facilities in the plan, MISO will have determined that the facilities in the plan are prudent and necessary for providing reliable transmission service. Equally important, by having a transmission project approved in MTEP, cost recovery of those facilities is allowed under the MISO tariff.

Q: What is the co-owners' schedule for constructing the transmission lines?

A: The co-owners intend to bring the Granite Falls online in fall of 2010 and the Morris 230 kV line online in early 2012. Construction will begin with the segment from Big Stone to the Canby substation in Minnesota, followed by the Canby to Granite Falls portion. Completing the Granite Falls line first provides capacity on the system above what is already present to accommodate the fact that the Morris line has to be taken out of service during construction, thus incurring less risk of service interruption to customers served by the Morris line.

Q: Is it prudent to spend the additional money to build the Granite Falls line to 345 kilovolt specifications when a 230 kV line would handle the Big Stone energy output?

A: Yes. Because part of an efficient transmission regional plan is to build one that will facilitate the development of new generation resources in the region, sizing the Big Stone to Granite Falls line at 345 kV is prudent. MISO agrees with this. Regional planning has long identified the need to increase the transmission capability from the Dakota's in order to deliver both new coal and wind resources, including through the findings of regional studies such as the Lignite Vision 21 Transmission study, MISO's Northwest Exploratory Study and the CapX Vision Study. Each of these studies identified the need to build 345 kV transmission facilities from the Dakota's. Building the Granite Falls line at 345 kV advances a portion of those long range plans. If we build just the minimum facilities required to interconnect Big Stone Unit II (i.e., 230 kV line from Big Stone to Granite Falls), we would need to have to build another 345 kV line some place else in the vicinity at 345 kV these long range plans. Building the Granite Falls line at 345 kV is the first step in the build-out of an

efficient transmission system from the Dakota's, one of the primary purpose of which is to enhance the ability of adding new generation in the Dakotas.

Q: At page 29, line 13, of his testimony, Mr. Deason is referring to your direct testimony when he states: "… the transient stability problem that arises when large amounts of generation are connected to distant loads with less than optimal transmission." Do you believe there is less than optimal transmission in the region?

A: No, from the perspective of the existing system, the system has been optimized. However, from the perspective of adding additional generators to the transmission system, there will need to be additional transmission necessary to optimize the system. With the Big Stone Unit II transmission plan, we have developed an optimal plan that takes into consideration some of the regional needs. I believe Mr. Deason may have misinterpreted my statement of a weak transmission system as meaning less than optimal, and that is not what I intended. A weak transmission system can be adequate, but a weak system will need to be expanded to add more generation or load.

Q: Does this conclude your rebuttal testimony?

A: Yes.

CASE NOS. PU-06-481 & PU-06-482

BEFORE THE NORTH DAKOTA PUBLIC SERVICE COMMISSION

IN THE MATTER OF THE APPLICATION BY OTTER TAIL POWER CORPORATION D/B/A

OTTER TAIL POWER COMPANY

AND

MONTANA-DAKOTA UTILITIES CO., A DIVISION OF MDU RESOURCES GROUP, INC.

FOR AN ADVANCED DETERMINATION OF PRUDENCE

FOR THE BIG STONE II GENERATING PLANT

REBUTTAL TESTIMONY

OF

KERMIT TROUT

VICE PRESIDENT – SENIOR PROJECT MANAGER

BLACK AND VEATCH CORPORATION

JUNE 21, 2007

REBUTTAL TESTIMONY OF KERMIT TROUT

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BEFORE THE NORTH DAKOTA PUBLIC SERVICE COMMISSION

REBUTTAL TESTIMONY OF KERMIT TROUT

I. INTRODUCTION

Q: At page 7 of Direct Testimony filed on behalf of Mark Trechock and Dakota Resource Council ("DRC") in this proceeding, David A. Schlissel notes there are risks and uncertainties associated with building "fossil plants," including coal and natural gas fired plants, and also risks and uncertainties associated with renewable alternatives. Do you agree with Mr. Schlissel that risks and uncertainties attend each approach to power supply planning?

A: Yes.

Q: Do you agree with Mr. Schlissel that the Big Stone II Project owners failed to consider the risks and uncertainties regarding the potential for further capital cost increases affecting the Project?

A: No.

Q: Please explain your answer.

A: The Big Stone II Project owners have included allowances for escalation of capital costs as well as allowances in the form of contingencies for those risks and uncertainties. While it is difficult to predict actual escalation and cost increases, reasonable allowances for both have been included in the capital cost estimates.

Q: Mr. Schlissel asserts that the Big Stone II Project owners, including Otter Tail Power Company ("Otter Tail") and Montana-Dakota Utilities ("Montana-Dakota") have skewed the results of their capital cost analyses by failing to recognize that the

impact of the factors that have led to increases in the estimated costs of Big Stone II will not be as great in the case of alternatives to Big Stone II, such as natural gas and renewables, including wind. Do you agree with this assertion?

A: No.

Q: Please explain your answer.

A: The factors that impacted the increases in the estimated costs of Big Stone II, such as engineered equipment price increases, commodity price increases, and labor increases for example, will impact all types of generating plants. All power projects use engineered equipment, commodities like copper and steel, and labor for constructing the plants.

Q: At pages 18 - 19 of his Direct Testimony, Mr. Schlissel attempts to paraphrase Black & Veatch's cost analyis by saying, "However, Black & Veatch further explained that simple cycle and combined cycle equipment costs have remained steady because the demand for combustion turbines 'is relatively low'." Is this a fair summary of your analysis?

A: No. Mr. Schlissel's statement needs quite a bit of additional context for it to be understood as anything but misleading. It is true that the costs of <u>some</u> components of simple and combined cycle natural gas "equipment" have not increased at the same rate that costs have increased for the major components of large pulverized coal-fired plants. The implication, however, that natural gas plants have not experienced dramatic cost increases is simply wrong. In addition, Mr. Schlissel notes that the labor cost element of the capital cost of a new natural gas plant is low relative to the labor cost component of a coal plant. While this point is true in isolation, in the overall scheme of things it can lead to wrong conclusions.

Q: Why do you say that?

A: The difficulty with comparing the future capital and busbar costs of alternative generating resources is, as Mr. Schlissel acknowledges, uncertainty. Estimating such costs is, inherently, an exercise in speculation and the application of one's best judgment based on history, experience and existing conditions. Magnifying the problem is the fact that conditions change over time, in many cases, over relatively short periods of time. Thus, we know today that if the Big Stone II Project owners decided to build a 630 MW CCGT plant instead of a 630 MW supercritical pulverized coal plant, their labor and equipment costs likely would be lower, but over the long-haul, their fuel costs would be dramatically higher. Whether these costs differentials would be great enough on a present value basis to justify switching to a natural gas project involves the exercise of one's best professional judgment. I find it significant that Mr. Schlissel has not advocated, and is not advocating here, that the Big Stone II Project owners build a natural gas plant instead of a supercritical pulverized coal plant.

Q: What market conditions have led to increases in the estimated costs of renewable supply-side alternatives such as wind, which Mr. Schlissel references at page 18 of this direct testimony?

A: The increased demand for the wind turbine technology has created some of the same market conditions as with other engineered equipment; that is, the demand for that equipment has put pressure on the manufacturing capacity. In addition, cost increases are due to several other factors:

– Euro/Dollar exchange rate, as most wind turbines are manufactured in Europe

– Steel/Concrete/Copper price increases

– Transportation Costs (Oil)

-- General increases in construction costs.

Q: Could you provide Black & Veatch's current assessment of the relative capital costs of wind turbines and supercritical coal plants adjusted for capacity factor and expected useful life?

A: No. An answer to this question as raised wouldn't be practical. It's like mixing apples (capital costs) with oranges (operating costs) directly. However, by making various assumptions, busbar cost or life-cycle cost comparisons (which is what the BSP II owners have done) can be made to include operational factors such as capacity factor and useful life with initial capital costs. Those life cycle type of analyses provide a better comparison than relative capital costs.

Q: It has been nearly six months since you testified in the Minnesota transmission Certificate of Need proceeding. Have market conditions affecting the cost of the major components of the Big Stone II plant materially changed since you testified?

A: While no specific assessment has been completed in the last few months, I believe that the allowances included previously for escalation and contingency are still valid. Nothing from a cost estimate impact has materially changed since then.

Q: Does this conclude your testimony?

A: Yes.

CASE NO. PU-06-481/482

BEFORE THE NORTH DAKOTA PUBLIC SERVICE COMMISSION

IN THE MATTER OF THE APPLICATION BY OTTER TAIL POWER CORPORATION D/B/A

OTTER TAIL POWER COMPANY

FOR AN ADVANCED DETERMINATION OF PRUDENCE

FOR THE BIG STONE II GENERATING PLANT

AND

IN THE MATTER OF THE APPLICATION BY MONTANA-DAKOTA UTILITES CO., A DIVISION

OF MDU RESOURCES GROUP, INC.

FOR AN ADVANCED DETERMINATION OF PRUDENCE

FOR THE BIG STONE II GENERATING PLANT

REBUTTAL TESTIMONY

OF

JEFF GREIG

GENERAL MANAGER, BUSINESS & TECHNOLOGY SERVICES

BURNS & MCDONNELL

JUNE 21, 2007

REBUTTAL TESTIMONY OF JEFF GREIG

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BEFORE THE NORTH DAKOTA PUBLIC SERVICE COMMISSION

REBUTTAL TESTIMONY OF JEFF GREIG

I. INTRODUCTION

Q: Please state your name and business address.

A: My name is Jeffrey (Jeff) J. Greig. My business address is Burns & McDonnell Engineering Co., 9400 Ward Parkway, Kansas City, MO, 64114.

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

A: I am employed by Burns & McDonnell Engineering Company. I am the General Manager of the Business & Technology Services Division of the company.

Q: What are your responsibilities in your current position?

A: The Business & Technology Services Division is a consulting group specializing in generation resource planning, transmission planning, financial and rate analyses, project development services, information management and technology consulting, security consulting, and energy services. We consult with utilities, government agencies, and private companies.

Q: What is your educational background?

A: I have Bachelors Degrees in Finance and Economics from Eastern Illinois University, and a Masters Degree in Economics from Iowa State University.

Q: What is your employment history?

A: I have 20 years of experience as a consultant in the electric power industry. My background includes generation resource planning, feasibility studies, siting studies, market assessments, project development, and asset due diligence.

Q: Have you provided written testimony in other state proceedings regarding the proposed Big Stone Unit II?

A: Yes I did. I provided testimony before the South Dakota, and the Minnesota Public Utilities Commission regarding the Big Stone Unit II project and proposed transmission interconnection facilities. My testimony here is based in part on my previous work and testimony in those states.

Q: Have you testified in other proceedings related to large energy facilities?

A: Yes. I have provided written and oral testimony before the Wisconsin Public Service Commission regarding a site certificate for a gas-fired project. I have provided written and oral testimony before the Ohio Power Siting Board regarding a site certificate for a gas-fired project. I have prepared written testimony regarding a site certificate and rate principles filing presented to the Iowa Utilities Board. I have prepared written testimony regarding power supply planning for the New Mexico Public Regulation Commission. I have prepared written testimony regarding a generation asset transfer for the Illinois Commerce Commission, and I have provided written and oral testimony regarding a generation asset transfer for the Federal Energy Regulatory Commission (FERC).

II. PURPOSE AND SUMMARY

Q: What is the purpose of your testimony?

A: The purpose of my testimony is to explain the analysis that Burns & McDonnell did to evaluate the economics of various baseload generation technologies and to describe the results of that analysis and to respond to certain points raised by Mr. Terry Deason in his Direct

Testimony. I also explain some errors in Mr. Schlissel's testimony about the Burns & McDonnell work.

Q: Please summarize your testimony.

A: Burns & McDonnell was hired by the Big Stone co-owners to evaluate the economies of various baseload generation technologies. Burns & McDonnell developed capital cost, performance, and O&M cost estimates for the different technologies in the initial studies. These cost estimates were input into an economic model to determine the cost of generating a unit of electricity for each baseload technology. We determined that a supercritical pulverized coal plant, like Big Stone Unit II, represented the lowest cost baseload generation technology for both investor-owned and publicly-owned utilities of the technologies considered.

We also prepared a subsequent report in October 2006 with updated costs to determine the busbar cost for three different baseload generation options: a 630 MW Big Stone Unit II supercritical pulverized coal plant, a 500 MW combined cycle gas turbine ("CCGT") plant, and a 500 MW combination CCGT plus market purchases of wind energy. We utilized the most recent cost estimates prepared by Black & Veatch. Our updated analysis continued to demonstrate that the Big Stone Unit II supercritical pulverized coal plant has the lowest busbar costs on a $/MWh basis of the three options, for both investor-owned utilities and public power utilities.

I respond to the issues raised by Terry Deason in his testimony, where he compares the Burns & McDonnell work with analyses completed by James Heidell for Montana-Dakota. I do not find that there are any serious inconsistencies between our work and Mr.

Heidell's work, and indeed, the fact that we both reach the same conclusion under different assumptions, strengthens the conclusion that Big Stone Unit II is a least cost alternative.

In order to clarify some misstatements by Mr. Schlissel about our analysis of the estimated costs of the Big Stone project and a natural gas/wind combination alternative, I explain how we did our analysis and that our assumptions regarding the size of a natural gas plant as an alternative to Big Stone and the value of the Production Tax Credit were appropriate.

III. ROLE OF BURNS & MCDONNELL

Q: What role did Burns & McDonnell play in evaluating the Big Stone proposal?

A: Burns & McDonnell conducted three separate studies for the proposed Big Stone Unit II owners to evaluate the economics of various technologies for generating electricity. As part of the Applicants' due diligence to construct Big Stone Unit II, Otter Tail Power Company ("Otter Tail") asked Burns & McDonnell to conduct a first study, referred to as the Phase I study, to examine several different technologies for generating baseload electricity. As part of that study, Burns & McDonnell developed capital cost, performance, and O&M cost estimates for the different technologies. Of the technologies considered, the Phase I study recommended that a supercritical pulverized coal plant, such as Big Stone Unit II, represented a low cost generation technology.

Burns & McDonnell utilized the work from the first study to conduct a second study, called "Analysis of Baseload Generation Alternatives – Big Stone Unit II" ("Baseload Generation Alternatives Study") in which an expanded set of generation alternatives, including integrated gasification combined cycle (IGCC) technology, were evaluated. The

Baseload Generation Alternatives Study confirmed that a 600 MW pulverized coal plant represented the lowest cost baseload generation alternative. A copy of this report was included as Exhibit MR-1 attached to the Direct Testimony of Mark Rolfes.

Finally, Burns & McDonnell updated the busbar cost analysis for three different generation options: the 630 MW Big Stone Unit II supercritical pulverized coal plant, a 500 MW combined cycle gas turbine ("CCGT") plant, and a 500 MW combination CCGT plus market purchases of wind energy. We utilized the most recent cost estimates prepared by the project's design engineer Black & Veatch. Our updated analysis continued to show that the Big Stone Unit II supercritical pulverized coal plant has the lowest per MWh busbar costs of the three options, for both investor-owned utilities and public power utilities. This report, entitled "Revised Analysis of Baseload Generation Alternatives" ("Revised Baseload Analysis") dated October 2, 2006, was also attached to the Direct Testimony of Mark Rolfes, Exhibit MR-2.

Q: What cost and performance assumptions were used by Burns & McDonnell in the Revised Baseload Analysis?

A: The capital cost estimate provided to Burns & McDonnell by Otter Tail for the Big Stone Unit II project was $1.366 billion excluding transmission construction. The net output of the Big Stone Unit II project was a nominal 630 MW net to reflect the new estimate of the dependable capacity that will be available from the project, and the net heat rate was estimated at 9,095 Btu/kWh.

Q: What were the cost and performance assumptions provided to Burns & McDonnell for the CCGT project?

A: Black & Veatch prepared a report entitled, "Supply-Side Technology Study" dated August 2006. The capital cost estimate for a generic 2 x 1 GE 7FA CCGT project was estimated in 2006$ at $281 million ($562/kW) plus $56.2 million of owner's costs. The net output of the CCGT project was 500 MW net, and the net heat rate was estimated at 6,704 Btu/kWh.

Q: Does the difference in size between the 630 MW supercritical PC unit and the 500 MW CCGT unit materially impact the results?

A: No. The nominal size of the supercritical PC unit and the CCGT unit are common block sizes of the technologies that are employed in the market. The economic evaluation was prepared on a busbar basis and expressed in terms of $/MWh of energy production. This allows the results to be compared directly. The objective of the Revised Baseload Analysis was to update the results for recent cost estimates and the nominal 630 MW supercritical PC unit and 500 MW CCGT unit cost estimates prepared by Black & Veatch were the most recent cost information available at the time.

Q: What was the basis for the cost of wind resources used in the Revised Baseload Analysis Report?

A: For the CCGT plus market purchase of wind energy alternative, it was assumed that non-firm wind energy would be purchased from independent power developers at a levelized cost of $60/MWh for a 2012 in-service date. These purchases would displace an equivalent amount of energy that would otherwise be generated at the CCGT. The $60/MWh does not

include the current federal Production Tax Credit ("PTC"). While the PTC was renewed in 2007 for one year, it may not be available in 2012 as a subsidy to lower the cost of wind energy. Burns & McDonnell estimated that current new wind farm development in the Midwest region costs $40/MWh in 2006 with the PTC in place. This compares with the $36/MWh estimated as 2005$ costs in the original Baseload Generation Alternatives Study. The price of wind turbines has increased significantly within the last two years due to material costs such as steel and copper, and market factors. Assuming a conservative escalation rate of 2.5% per annum in the cost of wind farms, the estimated 2012 cost of wind energy is $46.39/MWh if the PTC is extended. Both scenarios were evaluated.

Q: Mark Rolfes has testified that the cost of Big Stone II will increase by 6%/year if the in-service date of the plant is delayed. Does your 2.5%/year assumption for wind generation mean that the cost of wind farms is increasing slower than Big Stone II costs?

A: No. We expect the busbar $/MWh costs of wind energy and other alternatives will be largely affected by the same global market pressures on materials and labor that Big Stone II will experience. My point is that, even using a conservative 2.5% per annum escalation rate on the cost of wind generation, Big Stone II is still the cost-effective choice. If I had used a higher escalation rate assumption for wind generation, Big Stone II would have looked even better.

Q: What was the purpose of including the wind resource with the CCGT alternative?

A: For the CCGT project plus wind case, the 500 MW CCGT plant is the baseload alternative being compared to the supercritical PC plant. Both are reliable, dispatchable

generation resources that can be operated to meet baseload capacity and energy requirements. Wind is not a baseload resource because it does not produce dependable generation year-round at high capacity factors. Hence, our analysis did not assume construction of a wind resource. The wind component was added to the CCGT project alternative to enhance its economic performance by displacing higher cost gas-fired energy production with non-firm wind energy when available. The evaluation was focused on comparing baseload project alternatives, not developing combinations of resources on a system basis as a substitute for utility resource planning efforts.

Q: What was the assumption regarding the capacity factor of the wind resource?

A: The evaluation assumed that non-firm wind energy would be available to displace the equivalent of a 40 percent capacity factor for the CCGT plant. In this regard, the assumption was optimistic for typical wind farm production. Nevertheless, we utilized the 40 percent estimate to be conservative in testing Big Stone Unit II's economics against alternatives.

Q: What is the impact of the PTC on the price of wind power?

A: The value of the PTC in reducing wind costs is approximately $22/MWh in most applications. We have reflected a cost of wind of $60/MWh in 2012 in the absence of the PTC in an effort to be more than fair in our assumptions regarding how the wind energy market may react in the future to the expiration of the tax credit. The expiration of the PTC could result in the cost of new wind development being $66/MWh or higher in 2012.

Q: Were the financing assumptions in the Revised Baseload Analysis for the two different ownership structures the same as used in the prior studies?

A: Yes.

Q: Were the other key operating and economic assumptions the same?

A: Yes, with the exception that the fuel cost forecasts were updated based on 2006 information.

Q: What was the basis for the fuel cost forecasts used in the October 2006 Revised Baseload Analysis?

A: The Powder River Basin ("PRB") fuel cost forecast was provided by Otter Tail. Initially we used a cost of $1.31/MMBtu in 2011. In this round of examination, we used a cost of $1.71/MMBtu in 2010 for the overall delivered cost for PRB coal.

For natural gas, in September 2006, the NYMEX futures price for Henry Hub natural gas commodity supply in 2011 was $7.20/MMBtu. A conservative transportation cost of $0.40/MMBtu was added to this supply cost for a delivered cost of $7.60/MMBtu in 2011.

Q: What were the specific results reported in the Revised Baseload Analysis?

A: For the public power utility ownership model, the lowest cost generation alternative was the 630 MW supercritical Big Stone Unit II project with an estimated levelized busbar cost of $56.38/MWh over the 2012 to 2031 planning period. The CCGT plus market purchases of the wind energy alternative was $77.77/MWh, which is 38% higher than the Big Stone Unit II project. For the investor-owned utility ownership model, the lowest cost generation alternative was also the 630 MW supercritical Big Stone Unit II project with an estimated levelized busbar cost of $69.62/MWh over the 2012 to 2031 planning period. The CCGT plus market purchases of the wind energy alternative was $80.78/MWh, which is 16% higher than the Big Stone Unit II project.

IV. RESPONSE TO TERRY DEASON TESTIMONY

Q: At page 15 of his testimony, Mr. Terry Deason indicated that it was not clear why in the CCGT + Wind alternative, Burns & McDonnell assumed the wind component would be a power purchase. Can you explain that assumption?

A: Yes. There were two primary reasons for this assumption. First, the majority of wind generation developed in the U.S. has been implemented by independent power producers and sold to electric utilities under power purchase agreements. So this assumption reflects how the industry has currently evolved for the most part. Secondly and more importantly, we were preparing an analysis that could be used by both investor-owned utilities and public power utilities since this was consistent with the types of ownership entities involved in the Big Stone II project. We wanted to capture the value of the current production tax credit. Since public power utilities are generally tax-exempt utilities, the assumption that the wind component was developed by an independent power producer that could take full advantage of the current PTC – i.e., a developer with a full tax appetite - was reasonable.

Q: Mr. Deason continued at page 15 of his Direct Testimony that there may be an inconsistency between the cost estimate and escalation rate for wind assumed by Burns & McDonnell and the assumptions in that regard made by Mr. Heidell in Montana-Dakota's Generation Expansion Plan Analysis? Is there an inconsistency?

A: Yes, apparently there is an inconsistency. We have estimated that the cost of wind will increase, and Mr. Heidell has assumed that it will decrease.

Q: Does that inconsistency change any of your conclusions?

A: No it does not. Indeed, the fact that Montana-Dakota's Generation Expansion Plan Analysis was based on a declining capital cost for wind and still recommended the inclusion of the Big Stone II project in the generation expansion plan only strengthens the conclusion that Big Stone is least cost, since under both higher wind capital cost assumptions and lower cost assumptions, Big Stone II still comes out as least cost.

It may not have been unreasonable to assume that costs may decline at the time of Montana-Dakota's analysis. There had been some cost reduction in the 2002-2006 timeframe in the industry. However, I continue to believe that the cost of wind will increase in the next few years. The significant amount of wind development currently ongoing in the U.S. and around the world combined with significant cost escalation in labor and key material commodities such as steel and copper have caused price increases in the costs of installing new wind generation, not decreases. Several of the prominent manufacturers of wind turbines such as GE, Seimens, Vestas and Mitsubishi are currently sold out of manufacturing capability until 2009. The high market demand for these units plus the significant cost escalations that have impacted all types of generation projects, including wind, have increased wind costs recently and we believe there are no fundamental drivers in place that would mitigate these factors. Burns & McDonnell believes the assumption of only a 2.5% annual escalation in the current cost of wind generation is conservative.

Q: In his testimony at pages 15-16, Mr. Deason points out that another potential inconsistency between Burns & McDonnell and Montana-Dakota is the assumed capacity factor for wind generation. Is there any inconsistency here?

A: I don't believe so, because as Mr. Deason correctly notes, the assumptions reflect different factors. Burns & McDonnell's assumption of a 40% capacity factor from the wind component is used to reduce the amount of higher cost gas-fired generation from the CCGT plant. The 40% capacity factor assumption is conservative for wind generation performance. Mr. Heidell's assumption references the expected capacity contribution of wind generation during Montana-Dakota's peak. It may or may not be consistent with Burns & McDonnell's 40% overall capacity factor assumption.

Q: Yet another apparent inconsistency pointed out by Mr. Deason related to the capacity benefits for wind. Did Burns & McDonnell assume no capacity contribution for the wind component in the CCGT + Wind alternative?

A: No, I don't agree with the characterization that the wind component was expressly assumed to have no capacity value. I need to explain the purpose of our studies and the results to understand why this is a misconception of our work.

First, the purpose of our analysis was to compare the economics of baseload generation alternatives. In the CCGT + Wind alternative, the CCGT plant is the baseload alternative being compared to the Big Stone II project, not the wind energy purchase. Both plant alternatives – i.e., both the super-critical coal plant and the natural gas CCGT - offer firm, reliable, dispatchable capacity that can be operated at a high capacity factor to provide energy. A *non-firm* wind component was added to enhance the overall economics of the CCGT project by displacing higher cost gas-fired energy. It was not the purpose of our studies to replace utility resource planning efforts that would evaluate a number of supply-side and demand-side resources in combination that could meet a utility's overall capacity and

energy needs. Both Otter Tail and Montana-Dakota conducted separate resource planning analysis and that information, as I understand, has been introduced in this proceeding.

Second, Burns & McDonnell has noted concerns about assuming that the wind component in the CCGT + Wind case should have a firm capacity value without addressing transmission costs. The Baseload Generation Alternatives Study included a busbar analysis. It is reasonable to compare the busbar costs of a similar sized coal unit such as Big Stone II with a gas unit such as a CCGT plant. However, it is not reasonable to assume that hundreds of MW of wind generation should be combined with the CCGT plant with no additional transmission upgrade costs for the wind component added.

Finally, Burns & McDonnell did prepare an economic analysis assuming a 15% capacity value is assigned to the wind component in the CCGT + Wind case (even though no additional transmission costs were included). The results of this analysis indicated no change in the conclusion that the Big Stone II project remained a lower cost alternative, and the overall costs of the CCGT + Wind case actually changed very little. This case is driven by the high costs of gas-fired generation and not capacity value assumptions for wind (even incorrectly ignoring transmission impacts).

Q: Finally, at pages 19-20 of his testimony, Mr. Deason questions whether Burns & McDonnell and Montana-Dakota have made inconsistent assumptions regarding the future price of natural gas. Can you clarify this point for us?

A: I do not know the specific detail of how Mr. Heidell or PA Consulting made their natural gas cost forecasts, but the difference is likely explained by the timeframe in which the two analyses were prepared. Mr. Deason correctly notes that forecasting fuel costs is

difficult, particularly for a volatile commodity such as natural gas. Burns & McDonnell believes its natural gas cost forecast remains reasonable, but also recognizes that the PA Consulting forecast could also be viewed as reasonable at the time it was prepared. Significantly, under both cost forecasts, the conclusion reached is that the Big Stone II project is a lower cost baseload alternative.

I can explain how we made our forecasts. Burns & McDonnell referenced the NYMEX natural gas futures pricing as a base point for its forecast. In the original Baseload Generation Alternatives Study prepared in September 2005, the price for natural gas was estimated at $7.00/MMBtu for 2011. In the Revised Baseload Analysis prepared in October 2006, the NYMEX futures for natural gas commodity was $7.20/MMBtu for 2011. A transportation component was added in both analyses. For comparison, the 2011 NYMEX futures for natural gas is $8.16/MMBtu in June 2007, a 13% increase from less than one year ago. Natural gas prices have continued to rise in the futures market, and it is not unexpected that price forecasts at different times can be different.

V. RESPONSE TO DAVID SCHLISSEL TESTIMONY

Q: In the testimony of David Schlissel on behalf of the Dakota Resource Council at page 71, he claims that Burns & McDonnell biased the CCGT + Wind alternative in the Analysis of Baseload Generation Alternatives studies by assuming that a 600 MW natural gas-fired combined cycle facility would be required to backup the wind component. Is this correct?

A: No, Mr. Schlissel continues to try and mischaracterize the Burns & McDonnell Baseload Generation Alternatives Study. No where in the report does it state that 100%

backup capacity is required for wind generation. As outlined earlier, the purpose of the analysis was to compare *baseload* alternatives. The two baseload alternatives under comparison were the coal-fired Big Stone II project and a gas-fired CCGT plant. Those alternatives are directly comparable as both are capable of providing firm, reliable, baseload capacity to a system. Wind is not a baseload resource. However, wind energy was incorporated into the CCGT + Wind alternative on a non-firm basis to reduce the need to dispatch the higher cost gas resource when wind energy was available. Mr. Schlissel tries to characterize the alternative as a wind alternative with gas-fired backup, which is incorrect. It is gas-fired capacity with supplemental, non-firm wind to lower energy costs. The results indicated that the proposed Big Stone II project was a lower cost baseload alternative than the CCGT + Wind case, with or without an extension of the federal PTC included in the cost of wind.

Q: In Mr. Schlissel's direct testimony, he states that assuming a 100% capacity backup natural gas plant is required is inconsistent with Otter Tail's 2006-2020 Resource Plan, which credits wind with a capacity value of approximately 15 percent in the summer and approximately 20 percent in the winter. Does this imply Burns & McDonnell should have incorporated a capacity value into their analysis?

A: No. First, let me emphasize that the purpose of our baseload generation alternatives studies was to compare the economics of baseload generation alternatives. Within the CCGT + Wind alternative, the wind component was added as a non-firm energy resource to lower the overall costs. As indicated, Burns & McDonnell did not prepare resource planning studies for each of the utilities that evaluated a combination of supply-side and demand-side

resources. Each of the utilities prepared additional generation expansion evaluations with underlying assumptions regarding supply side alternatives. Each of those more comprehensive analyses confirmed the Big Stone II project as part of the recommended generation expansion plan.

The assumption that the wind component in the CCGT + Wind case should have a firm capacity value assumes that transmission capacity exists for delivery of wind energy to the utility's load. The Baseload Generation Alternatives Study was based on a busbar analysis comparison of alternatives. It was reasonable to compare the busbar costs of a similar sized coal unit such as Big Stone II with a gas unit such as a CCGT plant. However, Mr. Schlissel argues that hundreds of MW of wind generation should be combined with the CCGT plant and receive capacity credit, but no additional transmission upgrade costs for the wind component need to be added to the analysis. In fact, on page 73 of his direct testimony, Mr. Schlissel is critical of the study results of combining 600 MW of CCGT capacity with 600 MW of wind. He argues that a case with 800 MW or 1,200 MW of wind should have been studied, and that wind should have received a capacity credit. But he ignores the cost impact 1,200 MW of wind would have on transmission upgrades in order to receive capacity credit.

Q: Did Burns & McDonnell prepare any analyses that assumed wind was assigned a capacity value?

A: Yes. In order to evaluate the Mr. Schlissel's claim that the capacity value assumption was a material bias in the study, Burns & McDonnell waived the above criteria in an evaluation presented in the South Dakota hearing. An analysis was prepared assuming a 15%

capacity value is assigned to the wind component in the CCGT + Wind case (even though no additional transmission costs were included), and a smaller capacity of gas-fired generation is constructed. The results of this analysis indicated no change in the conclusion that the Big Stone II project remained a lower cost alternative, and the overall costs of the CCGT + Wind case actually changed very little.

Q: In his direct testimony, at page 74, Mr. Schlissel states that Burns & McDonnell understates the levelized value of the PTC at $12/MWh. Do you believe that you have understated the levelized value of the PTC?

A: No. Mr. Schlissel has used the fact that Burns & McDonnell reflected conservative assumptions regarding the cost of wind without the PTC to draw incorrect conclusions. In the September 2005 Baseload Generation Alternatives Study, the 2005$ cost estimate for wind was assumed to be $38/MWh with the PTC, and $50/MWh without the PTC. In the Revised Baseload Analysis prepared in October 2006, the 2012$ cost for wind was estimated at $46.39/MWh ($40/MWh in 2006$ escalated 2.5% annually) with the PTC and $60/MWh without the PTC. Burns & McDonnell reflected lower values for the cost of wind without the PTC to be conservative in the analysis. Mr. Terry Deason recognized in his testimony on page 14 that a value of $66/MWh for the cost of wind without the PTC was justified.

If these higher values were used, the economics of the Big Stone II project relative to the CCGT + Wind case would improve if the PTC expires as scheduled and is not extended. If Mr. Schlissel is suggesting that the $23/MWh - $28/MWh figures quoted in his testimony should be subtracted from the $60/MWh wind cost estimate, to result in a 2012$ cost of

$32/MWh - $37/MWh assuming the PTC is extended, he is displaying a fundamental lack of understanding of generation resource costs and would be misleading the Commission.

Q: On page 74 Mr. Schlissel states that the September 2005 Baseload Generation Alternatives Study did not include the currently estimated cost of the Big Stone II Project and/or any greenhouse gas regulations. Is this correct?

A: No. The September 2005 Baseload Generation Alternatives Study included the current cost estimate of the Big Stone II project and other resources available at that time. In the October 2006 Revised Baseload Analysis, the cost estimate of the Big Stone II project and other resource alternatives was updated based on the best available information at that time. Both studies included an evaluation of greenhouse gas costs that are consistent with the adopted regulatory values of the Minnesota Public Utilities Commission.

Q: Does this conclude your rebuttal testimony?

A: Yes.

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF NORTH DAKOTA

In the Matter of the Application of Montana-Dakota Utilities Co., a Division of MDU Resources Group, Inc., For an Advance Determination of Prudence of Montana-Dakota's Participation & Ownership Interest in the Big Stone II Generating Station	)	**Case No. PU-06-482**

REBUTTAL TESTIMONY OF James A. Heidell

June 21, 2007

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I. INTRODUCTION

Q. Please state your name, title, and business address.

A. My name is James A. Heidell. I am a Managing Consultant at PA Consulting Group, Inc. ("PA"), a global management and technology consulting firm. My business address is PA Consulting Group, 1700 Lincoln Street Suite 4600, Denver, Colorado 80203

Q. Did you prepare pre-filed direct testimony in this proceeding?

A. Yes.

Q. What is the purpose of your rebuttal testimony?

A. The purpose of my rebuttal testimony is explain differences in assumptions between the Burns & McDonnell Baseload Generation Alternatives Study and Montana-Dakota regarding the specific issues that staff witness Mr. Terry Deason raised as a concern. I also address the criticisms of the PA modeling that Mr. David Schlissel puts forth in his direct testimony on behalf of the Dakota Resource Council.

Q. How is your rebuttal testimony organized?

A. I first provide a summary of my rebuttal testimony. In Section II I address the potential issues with the PA analysis that Mr. Deason identified in his direct testimony. In Section III I point out that Mr. Schlissel's allegations are without merit regarding the characterization of PA's analysis.

Q. Do the assumption differences raised by Mr. Deason indicate any inconsistencies in PA's analysis in support of Montana-Dakota's identification of Big Stone II as the preferred new resource?

A. No. The differences in the assumptions result from Montana-Dakota and Burns & McDonnell performing separate and independent analyses of the economics of the Big Stone II power plant. These differences result from using slightly different modeling approaches and data sources. While the assumptions are different, I do not consider them to be inconsistent. The Montana-Dakota analysis with regards to gas costs and the cost of wind represent conservative assumptions at the time that the analysis was first developed. In addition, in November 2006 I also examined the impact of generation resources becoming more expensive and hence have already investigated the impact of a cost increase in Big Stone II.

Q. Mr. Schlissel, at page 65 of his direct testimony, asserts that the PA modeling is flawed, how do you respond?

A. Mr. Schlissel's assertion that the PA analysis is flawed appears to be based upon my analysis showing Big Stone II as having a lower capacity factor than what others are forecasting. This is not a flaw, the PA analysis shows the capacity factor of the plant in relationship to how it will be used to meet Montana- Dakota's retail load based upon its base load forecast. The analysis shows that Big Stone II is the preferred resource using the restrictive assumption that the plant will not be used for wholesale market sales. Additional generation from the plant for off-system sales has the potential to create additional value for Montana-Dakota's customers.

Mr. Schlissel also implies on page 67 of his testimony that making more wind units available would result in the Montana-Dakota resource model selecting wind instead of Big Stone II. The scenario of modeling up to 200 MW of available wind was investigated and Mr. Schlissel's conclusion is not correct. The fact that Mr. Schlissel has been able to create some alternative scenarios where Big Stone II is not the most cost effective option is not surprising. However, I disagree with his assumptions regarding the level of conservation penetration, the likelihood that only coal plants will increase in cost, and that Montana-Dakota necessarily has the option to take a smaller share of the coal plant. Therefore, I believe Mr. Schlissel has drawn incorrect conclusions.

II. ASSUMPTION ISSUES RAISED BY MR. DEASON

Q. Is Mr. Deason correct in indicating that PA modeled new wind as generation resources owned by Montana-Dakota as opposed to power purchase agreements (PPAs)?

A. PA modeled the Java Wind and Montana wind projects as PPAs while additional wind was modeled as Montana-Dakota owned resources to compete with thermal generation and conservation. Additional wind can be modeled in the optimization process as either a contract, or as a generation option. The approach used is not considered significant to the outcome of the analysis in that the Strategist optimization of the new resource mix considers both purchased power contracts and generation assets.

Q. Did PA model the production tax credit?

A. In the case of the wind PPAs, PA's analysis assumed that the owner of the wind project would realize the full benefit of any production tax credit (PTC), to the extent that the credit is in existence and available to the project. The price of the contract reflected the price that would be paid by Montana-Dakota. PA did not assume that Montana-Dakota would receive the PTC for any wind generation units it added under the least cost optimization. The PTC was not included in that the likely horizon for addition of new wind resources was beyond the then current 2008 life of the PTC.

Q. Is it possible that the PTC will be extended beyond 2008?

A. The PTC has been extended multiple times so it is possible that it will be extended beyond 2008. In fact, a five year extension was recently passed by the Senate Finance Committee and is intended to be included in this year's energy legislation. However, while I did not assume the PTC extension, I used a relatively low cost of new wind units. The PTC is a subsidy and the extent that the subsidy might be needed should also be considered in the context of the cost of new wind turbines. At $1,200 / kW for a wind turbine, wind becomes much more competitive with the alternative thermal generation options.

Q. Do you agree with Mr. Deason's suggestion that your assumption of $1,200 / kW for new wind units in 2011 is inconsistent with the direction of wind costs?

A. In the short run, the cost of new wind turbines appears to be increasing in cost as opposed to declining in cost. This trend is similar to the trend of cost escalation that has impacted the construction cost of new thermal generation. The

assumption that the wind units will become cheaper is based upon corresponding assumptions that there will be more wind plant production facilities and the near-term situation of significant demand with limited supply will ease. There is certainly the possibility that wind units will not come down in price relative to other generation resources. However, this would result in the model selecting less wind resources rather than more resources.

Q. Please explain the difference between the capacity factor and capacity accreditation that you assumed for wind energy.

A. The capacity factor of a wind project represents the average hourly energy, calculated on an annual basis, divided by the peak output of the wind project. In the resource modeling that I performed, I assumed that the capacity factor of each wind project is 52% which appears to be comparable to the 40% capacity factor used in the Burns & McDonnell report.

The assumed accredited summer capacity is an estimate, based upon MISO standards, of the relative capacity factor coincident with the summer peak hours. The accredited capacity is assumed to be 23% and is based upon an assumed wind speed profile analyzed in conjunction with a wind turbine power curve.

Q. Why is the assumed accredited summer capacity lower than the overall capacity factor?

A. The simplified answer is that the wind does not blow at a constant speed during all hours of the year and the higher capacity factor indicates that the wind is relatively stronger during periods outside of the summer on-peak period.

Q. Does Mr. Deason's comments regarding Big Stone II cost escalation change your conclusions?

A. Mr. Deason notes two different cost estimates for Big Stone II provided by the project sponsors. The first estimate is a busbar cost of $2,168 / kW in 2012 and the second estimate is for $2,300 / kW in 2013. The later estimate reflects a cost escalation of 6.5% assuming a thirteen month delay in the project.[1] First, I note that Mr. Mark Rolfes in his rebuttal testimony indicates that the cost of $2,168 is a 2011 nominal cost of the power plant without transmission. The first cost referenced by Mr. Deason is actually lower than what was used in my analysis. My analysis is based upon inputs entered in the model in 2006 dollars with an assumed annual inflation rate of 2.5% per annum. The 2006 cost that I started with is $2,051 / kW, excluding transmission. This results in the model assuming a cost of $2,378 / kW in 2012. Therefore, the assumption of higher inflation relative to Mr. Rolfes' assumption in the period of 2006 – 2011 and lower inflation for 2012 essentially nets out resulting in the Strategist runs assuming Big Stone II costs consistent with the current estimates.

As a point of reference, I also ran a case where all the generation options increase in cost 10% and concluded that does not change the result of the analysis; Big Stone II is still part of the least cost mix identified by the Strategist model.

[1] Testimony of Mr. Deason, pp 16 – 17.

Q. Do you agree with Mr. Deason's observation that there are "quite large" differences between the gas forecast used by Burns & McDonnell and the forecast used by PA?

A. I agree that the PA forecast is lower, but I do not endorse the characterization that the difference is "quite large".[2] There is uncertainty about future gas costs and that uncertainty is one of the factors that should be considered in the choice of relying on gas resources versus coal-fired generation resources. The PA forecast is based upon a long-term consensus forecast of Henry Hub gas that is adjusted for a basis differential and transportation costs assuming that new gas-fired generation units bypass transportation charges associated with the local distribution company (LDC). The consensus forecast is based upon fundamental gas price forecasts prepared by the Energy Information Administration (EIA), Global Insight, and Strategic Energy and Economic Research (SEER).

Q. Would the results of your analysis change if you used the higher gas prices used by Burns & McDonnell?

A. While I did not run the higher gas scenario, my opinion is that Big Stone II would still be part of the least cost generation mix identified by Strategist. The higher gas prices would result in the natural gas fired generation resources being less attractive compared to the coal plant option.

[2] Testimony of Mr. Deason P 21.

III. REBUTTAL OF DIRECT TESTIMONY OF MR. SCHLISSEL

Q. Do you agree with Mr. Schlissel's characterization that the PA analysis is flawed because it has lower forecasted capacity factors for Big Stone II than the capacity factor forecasts of the other co-owners?

A. No. Mr. Schlissel's allegation on page 65 of his testimony lacks any foundation. I explicitly modeled the Big Stone II resource excluding off-system sales. The capacity factor reflects how Big Stone II would be used to serve the Montana-Dakota retail load. I purposely tested whether Big Stone II is part of the least cost mix without relying on off-system sales. If off-system sales were incorporated into the modeling, I anticipate that the capacity factor modeled in Strategist would be higher.

Q. How would inclusion of off-system sales change your analysis?

A. First, I think it is important to clarify the role of off-system sales and joint ownership and how it would impact Montana-Dakota. As a jointly owned unit, I would anticipate that the optimization of the unit would consider a number of factors including the energy requirements of the other co-owners as well the wholesale market prices. Therefore, it is likely that the plant would operate at a higher capacity factor than my analysis suggests it would operate at as a stand-alone unit serving only Montana-Dakota retail load. If the plant operates at a higher capacity factor then it will create the opportunity for off-system sales for Montana-Dakota. Those additional sales will create additional value to Montana-Dakota and its customers and that value is not reflected in my analysis. These factors lead me to conclude that the coal plant is a more attractive option than numerically reported in the Strategist results.

Q. Do you agree with Mr. Schlissel's characterizations that the alternative Strategist runs that Synapse performed corrected "major errors in the modeling inputs"?

A. I disagree with the characterization made by Mr. Schlissel's on page 66 of his testimony. Mr. Schlissel presents the results of six alternative scenarios which presumably address what he concludes are "major errors". I address these scenarios below.

Q. Does increased availability of wind resources change the results of the analysis and result in wind being selected over Big Stone II?

A. In November 2006, I reviewed Mr. Schlissel's same allegation in the proceeding before the Minnesota Public Utilities Commission that increasing the availability of wind changes the results of the analysis. I tested this assumption by allowing the model to select more wind resources (up to almost 200 MW in 31 MW increments). The result was that the selection of resources did not change. In fact, upon completion of my modeling, I held a follow-up discussion with Synapse staff in which I indicated that I could not replicate their results. On that call, Synapse staff concluded that they had made an error in their modeling. In the Minnesota proceeding, Mr. Schlissel corrected his testimony and clarified that increasing wind availability does not result in displacing Big Stone II.

Q. Will changing the size of Montana-Dakota's participation in Big Stone II change the results of the analysis?

A. I did not run that scenario so I cannot confirm Mr. Schlissel's conclusion. However, I have some comments on the scenario described by Mr. Schlissel. First of all, his scenario name is misleading in that he describes this scenario as

"Increased Wind Availability" on page 69 of his testimony. In addition, on page 67 of his testimony when he describes his sensitivity analyses, he indicates that "in each of these scenarios we made no other changes to the model". This scenario appears to be about changing the size of Montana-Dakota's participation in Big Stone II and potentially other changes as well. It is interesting to note that Mr. Schlissel indicates that under his scenario Big Stone II was still selected, but at a lower participation rate.

Q. Does it make sense to test the economics of Montana-Dakota participating in Big Stone II at a lower level of participation?

A. Based upon my discussions with Montana-Dakota, I did not test the economics of a lower participation rate since I was informed that it was not a realistic option. Testing options that are not reasonably available to the utility does not have value. On page 69 of Mr. Schlissel's testimony he describes how he ran Strategies allowing the model to pick the Big Stone II coal plant in 11.6 MW shares. Mr. Schlissel has not identified whether it is practical for Montana-Dakota to participate at that level. In fact, my understanding is that is not a real option for Montana-Dakota.

Q. Will increasing DSM displace Big Stone II in the Strategist optimization?

A. There are certainly a set of assumptions regarding the cost and availability of DSM that could result in displacing Big Stone II. However, I do not agree that since Montana-Dakota does not endorse Mr. Schlissel's assumptions regarding DSM that there is a major error in the analysis. Montana-Dakota identified potential DSM programs and associated costs based upon its knowledge of its customer base and service territory. Those assumptions are reflected in my

analysis. Alternatively, I am not aware of any studies that Mr. Schlissel performed to reflect the potential cost and penetration of conservation as it would specifically apply to Montana–Dakota.

Q. Will increasing the cost of Big Stone II by 10% without changing the costs of the other alternatives change the selection of the least cost resource in the Strategist simulation?

A. It is possible that increasing the cost of the coal option without changing any other inputs could result in not selecting Big Stone II in the least cost mix. Again, I think Mr. Schlissel's suggestion that this is somehow a major error in the analysis is inappropriate. Mr. Schlissel has made an assumption without presenting any facts as to why he thinks it is likely that only the cost of Big Stone II will increase and not the cost of other resource options. Based upon my experience and discussions with other clients, the construction cost of all generation resources are under short-term pressure.

Q. Does this conclude your testimony?

A. Yes.