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March 10, 2008

VIA FEDERAL EXPRESS & EMAIL

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

Re: Montana Dakota Utilities Co., and Otter Tail Corporation; Advance Determination of Prudence, Big Stone II Generating Station Case Nos. PU-06-481 and PU-06-482

Dear Ms. Jeffcoat-Sacco:

On behalf of Applicants Otter Tail Corporation and Montana-Dakota Utilities Co., enclosed for filing in the above matter please find the following supplemental direct testimony and attached exhibits of Applicants:

Ward Uggerud (OTP Exhibit 112);
Bryan Morlock (OTP Exhibit 117);
Andrea Stomberg (MDU Exhibit 213);
James Heidell (MDU Exhibit 214);
Mark Rolfes (OTP/MDU Exhibit 324);
Tim Rogelstad (OTP/MDU Exhibit 325);
Jeffrey Grieg (OTP/MDU Exhibit 326); and
Thomas Crowley (OTP/MDU Exhibit 328).

Please direct any questions to Montana-Dakota's Mr. Daniel Kuntz (701-530-1016), Otter Tail's Mr. Mark Bring (218-998-7152), or to the undersigned.

Thank you for your consideration.

Very truly yours,

/s/ Todd J. Guerrero

TJG/kas

cc: Attached Service List (w/encl.)

Doc# 2570973\1

282 PU-06-482 Filed 03/10/2008 Pages: 167
Supplemental Direct Testimony & Attached Exhibits of
Applicants
Lindquist & Vennum
Todd Guerrero

CASE NOS. PU-06-481 & PU-06-482
BEFORE THE NORTH DAKOTA PUBLIC SERVICE COMMISSION
IN THE MATTER OF THE APPLICATION BY OTTER TAIL 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

SUPPLEMENTAL PREFILED DIRECT TESTIMONY

OF

WARD UGGERUD

Senior Vice President

Otter Tail Power Company

MARCH 10, 2008



SUPPLEMENTAL PREFILED DIRECT TESTIMONY OF WARD UGGERUD

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1 **BEFORE THE NORTH DAKOTA PUBLIC SERVICE COMMISSION**

2 **SUPPLEMENTAL PREFILED DIRECT TESTIMONY OF WARD UGGERUD**

3 **I. INTRODUCTION**

4 **Q: Please state your name and business address.**

5 A: Ward Uggerud. My business address is 215 South Cascade Street, Fergus Falls,
6 Minnesota 56538-0496. I am Senior Vice President, Otter Tail Power Company.

7 **Q: Did you previously submit testimony in this proceeding?**

8 A: Yes. I submitted testimony as OTP's Exhibits OTP Exs. 101, 101-A, and 102.

9 **II. PURPOSE AND SUMMARY OF TESTIMONY**

10 **Q: What is the purpose of your supplemental testimony?**

11 A: The purpose of my supplemental testimony is to speak on behalf of Otter Tail Power
12 Company and the Big Stone II Project owners¹ and explain the decision that the project owners
13 have made with regard to construction of a second unit at Big Stone following the withdrawal
14 last fall from the project by Great River Energy and Southern Minnesota Municipal Power
15 Agency.

16 **Q: Please summarize your testimony.**

17 A: Based on the latest available information, including another round of resource expansion
18 modeling, and considering all the relevant factors, the Big Stone Project owners, including Otter
19 Tail Power and Montana-Dakota Utilities Co., have determined that constructing a supercritical
20 pulverized coal plant at Big Stone, South Dakota, remains the best, most cost effective
21 alternative for these utilities to meet their need for additional baseload generating capacity by

¹ In addition to Otter Tail Power Company and Montana-Dakota Utilities Co., the other Big Stone owners are Missouri River Energy Services, Central Municipal Power Agency, and Heartland Consumers Power District.

1 2013. The economic analysis of a 500 MW unit has been demonstrated and would be an
2 appropriate size for the five utilities. Discussions are being held with other potential owners. At
3 this point either a 500 MW plant with the current five participants or a 580 MW plant if an
4 additional participant is added are viable and attractive options. The transmission facilities
5 originally proposed would remain the same, regardless of whether the plant were 500 MW or
6 580 MW.

7 **III. REGIONAL CAPACITY DEFICITS**

8 **Q: Could you provide information regarding the status of the regional generation**
9 **capacity in the coming years?**

10 A: In October 2007, the North American Electric Reliability Corporation (NERC) issued a
11 Long Term Reliability Assessment 2007-2016 on the reliability and adequacy of the bulk power
12 system in North America for the next ten years. NERC reported that nationwide our long-term
13 capacity margins remain inadequate, that integration of wind, solar, and nuclear resources will
14 require special consideration in planning, design, and operation, that a high reliance on natural
15 gas in some parts of the country requires special attention to reduce risks of supply and delivery
16 interruptions, and that while the transmission grid has shown some improvements, more is still
17 required.

18 More locally, the Midwest Reliability Organization (MRO), a nonprofit regional
19 organization dedicated to ensuring the reliability and security of the bulk power system in the
20 north central part of North America, including North Dakota, believes that this area faces
21 looming capacity deficits. I have incorporated as part of this supplemental testimony a graphic
22 illustration from the NERC Assessment as OTP's Exhibit 113. As shown on this exhibit, the

1 MRO will see installed generation capacity reserve margins of less than 10% in 2010, unless
2 additional accredited generation is installed. This compares to the current minimum reserve
3 margin requirement of 15%in the Mid-continent Area Power Pool. The projected MRO reserve
4 margin continues to decline, reaching less than 5% by 2014.

5 Even in calculating current MRO supply adequacy, the Assessment notes that certain new
6 resource projects not yet built are assumed as being built, including Big Stone Unit II. Clearly
7 something needs to be done, and quickly, to address these looming deficits or the reliability of
8 electric service to consumers and businesses in this region will be impaired.

9 **Q: What does the NERC Assessment say about natural gas?**

10 A: It concludes that imported natural gas supplies from Canada will decline and that the U.S.
11 will be even more dependent on increasing amounts of imported Liquefied Natural Gas. An
12 increasing reliance on foreign energy sources is inconsistent, in my opinion, with the country's
13 energy-independence goals. I have included as OTP's Exhibit 114 a chart that illustrates the
14 country's growing dependence on imported LNG.

15 **IV. RECONSIDERATION PROCESS**

16 **Q: Can you describe the process the remaining five utilities undertook following the**
17 **withdrawal of Great River Energy and Southern Minnesota Municipal Power Agency?**

18 A: When GRE and SMMPA withdrew, the remaining five utilities sought to determine
19 whether a nominal 630 MW plant remained an optimal size. We determined that the withdrawal
20 of these two utilities by itself did not change the underlying need of the five remaining utilities
21 for additional baseload generation. We had to act expeditiously to re-evaluate the situation,

1 because the timeframe for accomplishing the needed additional generating capacity and energy
2 continues to shrink.

3 **Q: What did you do?**

4 A: Each of the five utilities conducted additional resource planning analysis to see how the
5 withdrawal of GRE and SMMPA affected the results of their earlier resource planning efforts.
6 We also knew that withdrawal of GRE and SMMPA was not the only factor that should be taken
7 into account in these new modeling runs. We determined that there were other factors to take
8 into account as well. Two obvious factors were updated cost figures and a delay in the in-service
9 date.

10 **V. NEW ASSUMPTIONS**

11 **Q: What timeframe did you use for the in-service date?**

12 A: Knowing that there would be a delay in the certificate of need matter in Minnesota and a
13 delay in the advanced prudence determination before this Commission, we determined that
14 construction and ultimate operation of the plant would be delayed up to a year, so we selected an
15 in-service date of the summer of 2013.

16 **Q: What size facility did you analyze?**

17 A: The Applicants had originally evaluated the costs of a 630 MW nominal baseload coal
18 plant as part of their evaluation of resource options. When GRE and SMMPA withdrew, there
19 was a question of whether the remaining utilities could continue to justify a 630 MW plant.

20 On a project level, we couldn't be certain what size plant would best match the needs of
21 the remaining utilities, because the cost structure of each plant size, all else being equal, is
22 different. That is, while an analysis with cost and operating characteristics for a particular plant

1 may demonstrate a particular level of need, cost and operating characteristics for a different sized
2 unit will likely show a different level of need.

3 Thus, the partners needed to start somewhere, and largely based on our existing forecasts
4 and previous analysis, it was reasonable to begin the supplemental resource planning analysis for
5 two different nominal plant sizes: a 500 MW plant and a 580 MW plant.

6 **Q: What cost figures did you use in this latest round of analysis?**

7 A: We assumed a cost of \$1.272 billion for a 500 MW facility and \$1.411 billion for a 580
8 MW facility. Mark Rolfes, the Project Manager, provides testimony on how he and his team
9 calculated the cost estimates for the two different size units.

10 **Q: What other new factors did you take into account?**

11 A: Even though we had taken conservation into account in our earlier rounds of modeling,
12 and planned for construction of wind and other renewables, Otter Tail also wanted to consider
13 what effect new energy conservation and renewable energy goals, as described in Otter Tail's
14 Bryan Morlock's supplemental testimony, would have on Otter Tail's resource plan.

15 **Q: Did you take into account the possibility of carbon dioxide regulation?**

16 A: In the Minnesota CON proceeding, for those participants with load in Minnesota, we
17 instructed our resource planners to assume a \$9/ton tax imposed on all carbon dioxide emissions,
18 whether the energy was destined for Minnesota customers or not. But for purposes of our
19 resource plan in North Dakota, and for purposes of our testimony here, we did not include a CO₂
20 tax or regulatory risk value because of the state's prohibition against using such values in
21 resource planning or in resource acquisition proceedings.

1 **VI. FREIGHT ISSUES**

2 **Q: During the hearing last year, Commissioner Clark voiced concern regarding the fact**
3 **that the Big Stone site is a captive shipper to BNSF Railway. Are there steps that the**
4 **Applicants can take to help ensure that the cost of coal does not escalate beyond what is**
5 **expected?**

6 A: There are at least two steps that the Applicants could take to address this issue. The price
7 of delivered coal will reflect shipping costs, so anything that can be done to control shipping
8 costs will help to keep the price of the fuel down. One step available to the Applicants would be
9 to initiate a proceeding before the U.S. Surface Transportation Board under that agency's Coal
10 Rate Guidelines² to determine whether a rate increase is reasonable. A second step would be to
11 enter into a long term contract with the Burlington Northern Santa Fe Railway, the railroad that
12 will supply Big Stone with coal, establishing the future pricing for coal delivery.

13 **Q: Do either of these steps guarantee that unexpected coal fuel and delivery charges**
14 **will not occur?**

15 A: No, neither one provides any guarantees.

16 **Q: What protections does the Surface Transportation Board provide?**

17 A: Presently there is a process in place where a captive customer like the Big Stone owners
18 can petition the Surface Transportation Board to determine whether a particular tariff for
19 shipping coal is reasonable. Captive customers are entitled to price protection under the Coal

² The Coal Rate Guidelines Nationwide can be found at 1 (Interstate Commerce Commission) I.C.C.2d 520 (1985).

1 Rate Guidelines against pricing practices by railroads that have monopoly status with regard to a
2 particular customer.

3 **Q: Do you feel that a proceeding before the Surface Transportation Board provides the**
4 **Big Stone Applicants with adequate protection against unexpected price increases?**

5 A: Yes, Otter Tail believes that the company can protect itself from unreasonable shipping
6 charge increases through such a mechanism. An administrative proceeding is always time
7 consuming and the result uncertain but the regulations are designed to protect captive customers
8 from unreasonable shipping charges. We realize we have not been successful in other claims,
9 but the STB regulations are designed to prevent a railroad from acting unreasonably in raising
10 rates.

11 **Q: What options are you pursuing presently?**

12 A: The Big Stone II project owners have been in discussions with BNSF Railway since
13 2004. During that period, in response to our requests, the BNSF has made proposals for long-
14 term supply contracts. Each of these proposals has typically been priced at the BNSF common
15 carrier tariff rate in effect at the time, with an annual price adjustment based on a defined index
16 such as the AAR All Inclusive Index (less fuel) along with the BNSF coal fuel surcharge. The
17 term of the proposals ranged from 10 to 15 years.

18 **Q: How did the project owners respond to the proposals?**

19 A: During the period of time in which the owners received proposals from the BNSF, Otter
20 Tail, on behalf of the Big Stone I owners, was litigating BNSF's tariff rate before the Surface
21 Transportation Board. As BNSF proposals for a long-term contract were provided, the Big Stone
22 II owners could have accepted the BNSF proposal, but this would have meant that we would

1 have had to forego the potential rate relief that would accrue to deliveries to Big Stone II had Big
2 Stone I prevailed at the STB. In each case, we made the judgment that it was more prudent to
3 wait for the decision of the STB instead of accepting a BNSF offer, which was essentially the
4 current tariff rate plus an annual index adjustment and fuel surcharge.

5 **Q: What options are available to the Big Stone II project owners now?**

6 A: As the Commission is aware, the Surface Transportation Board did not side with Otter
7 Tail over the tariff rate for Big Stone I. Given the STB decision, Big Stone I is currently
8 receiving transportation service under BNSF's common carrier tariff. The cost of this
9 transportation is the basis for the fuel cost assumptions that both Otter Tail and Montana-Dakota
10 used in our updated resource planning modeling in this case, and in past resource planning
11 assumptions. But both Otter Tail and Montana-Dakota, as do the other Big Stone II owners,
12 remain interested in pursuing a long-term contract for Big Stone II from BNSF.

13 In October 2007, we met with the BNSF in Fort Worth, Texas, to update the BNSF on
14 our project following the withdrawal of Great River Energy and Southern Minnesota Municipal
15 Power Agency. We have continued to stay in regular communication with BNSF since that time,
16 and BNSF has continued to indicate its willingness to make a new proposal for a long-term
17 contract.

18 **Q: Has Otter Tail asked for a long-term contract proposal from BNSF?**

19 A: Yes. We recently asked BNSF representatives to provide us with another written
20 proposal for a long-term contract and we expect they will provide us with a proposal sometime in
21 early April of this year.

22 **Q: What do you intend to do with the proposal?**

1 A: We will review the proposal with all of the Big Stone II owners to see whether it makes
2 sense to commit to a long-term contract at this time. Given that there are five owners to the
3 project, we will need to make sure that all owners have an opportunity to review the proposal and
4 provide their comments and recommendations. The proposal will be for rail service to the Big
5 Stone II unit. All five Big Stone II owners would need to agree that the long-term contract
6 would be in the project's interest.

7 **Q: What is your analysis as to whether the Commission should require as a condition**
8 **to a finding of advanced prudence that Otter Tail and Montana-Dakota enter into a long-**
9 **term contract?**

10 A: On its face, we are not necessarily opposed to such a condition. But whether such a
11 condition is reasonable depends on the actual terms of any proposal by BNSF. So I think the
12 most prudent course at this point is for the owners to carefully review the proposal we receive
13 from the BNSF.

14 The Commission is aware of Otter Tail's and Montana-Dakota's efforts to seek rate
15 protection on behalf of all our customers. We will continue those efforts, and we appreciate the
16 Commission's concerns and efforts to help us address these issues.

17 That said, there could be disadvantages to entering into a long-term contract, particularly
18 at this time. For instance, a long-term contract, either as a condition of advanced prudence
19 determination or simply as an exercise of business judgment, would foreclose the opportunity to
20 pursue lower rates during the term of the contract – either under a promulgated rate that could
21 result from a future successful challenge at the STB by the Big Stone project owners should the
22 tariff rate be unreasonable, or under a future long-term contract. The benefit of a contract is that

1 it provides price certainty. That same advantage could turn into a disadvantage if greater
2 regulatory oversight on railroad pricing reduces tariff rates or provides an opportunity to lock
3 into a long-term contract with better terms. A contract, unlike a tariff, would likely not be
4 subject to future review even under a new regulatory environment.

5 **Q: Do you have any other comments regarding the Commission's concern that Big**
6 **Stone is a captive shipper to BNSF?**

7 A: Otter Tail and Montana-Dakota share the Commission's concerns regarding the cost of
8 transportation for coal. We will continue to strive to keep our fuel costs low and reasonable, just
9 as we do with all costs for all our facilities, as I believe our track record demonstrates that we
10 have done. But I do not believe that it would be reasonable to reject a decision to build a new
11 coal-fired, baseload power plant, which by all accounts is the least cost and most reliable
12 generation alternative, simply because the project is dependent on rail transportation for coal. A
13 significant portion of the country's electric generation has been dependent on rail transportation
14 of coal for decades while providing some of the most economic sources of electric energy.

15 I believe the evidence in the record conclusively demonstrates that there is no resource
16 alternative that is preferable to Big Stone II. Indeed, the evidence suggests that all other
17 alternatives – including other coal plants, natural gas, and any renewable/nonrenewable
18 combination – are less cost effective. That Big Stone II is dependent on rail transportation does
19 nothing, in my opinion, to change this fact.

20 **VII. FUEL COSTS**

21 **Q: Does Otter Tail expect to utilize the same fuel at a smaller Big Stone facility as was**
22 **anticipated for the 630 MW unit?**

1 A: Yes. We expect to use the same Powder River basin sub-bituminous coal that was
2 planned for the original Big Stone II facility.

3 **Q: Has Otter Tail revised its cost estimates for fuel from what was presented in the**
4 **hearings in June 2007?**

5 A: Yes, we have.

6 **Q: How was this revised fuel cost estimate developed?**

7 A: The fuel cost estimate was developed in a very similar manner to the delivered fuel cost
8 estimate that was used in the June hearings. The basis for the forecast was information received
9 from Hill & Associates. In July of 2007, Otter Tail contracted with Hill & Associates (now a
10 Wood & MacKenzie Company) to provide a long term fuel and freight forecast that would be
11 specific to the Big Stone site. This data was initially intended for Otter Tail's internal fuel and
12 freight planning purposes, but with the withdrawal of GRE and SMMPA, that data was then also
13 used for BSP II purposes. Railcar maintenance, railcar lease costs and sales tax were also added
14 to the base fuel and freight information that had been provided by Hill & Associates to produce a
15 delivered fuel forecast for BSP II, hereafter referred to as the 2007 delivered fuel forecast.

16 **Q: What cost for coal did you use in this latest round of analysis?**

17 A: We used a cost of \$1.74 per million BTU in 2010 and an average escalation rate of 3.5%.

18 **Q: How does this compare with the cost estimate used in the 2006 analysis?**

19 A: In the 2006 analysis, we used a cost of \$1.71 per million BTU in 2011 and an average
20 escalation rate of 2.9%. We have prepared a graph comparing the 2007 cost estimates with the
21 2006 cost estimates. This graph is attached as Exhibit 115.

22 **Q: Is Otter Tail confident in these fuel cost estimates?**

1 A: Yes, we are quite confident in these cost estimates for future coal prices, for at least two
2 reasons. One is that the Commission's expert witness, Terry Deason, stated in the 2007
3 proceeding that an assumed escalation rate of 2.9% was reasonable at that time. Second, in
4 February 2008, we hired L.E. Peabody, an economics firm from Virginia that specializes in fuel
5 and transportation issues, to develop an independent forecast of delivered fuel prices to the Big
6 Stone site. The delivered fuel forecast prepared by L.E. Peabody for the Big Stone site
7 compared very well to the forecast being used by OTP and MDU. In fact, the L.E. Peabody
8 estimates were lower in nearly all years than the 2007 forecast that OTP and MDU used. A
9 graphical comparison of all three of the delivered fuel forecasts – the 2006 estimate, the 2007
10 estimate, and the L.E. Peabody estimate – is attached as Exhibit 116.

11 **Q: Did you use the L.E. Peabody delivered fuel forecast in your latest analysis?**

12 A: No, we did not. The L.E. Peabody forecast was used solely for the purpose of providing
13 a second opinion regarding fuel cost forecasts that were used in our analysis.

14 **Q: Why didn't the Applicants choose to use the L.E. Peabody forecast?**

15 A: The purpose of the L.E. Peabody forecast was to provide a comparison for the forecast
16 the BSP II project had been using, not to have it replace the forecast currently in use. There was
17 also a timing difference because the L.E. Peabody forecast was not developed until February of
18 2008, too late for purposes of our analysis. It should be noted, however, that the 2007 forecast
19 used by OTP and MDU is higher over the period than the L.E. Peabody forecast (see Exhibit
20 116), providing a more conservative analysis than if the L.E. Peabody forecast had been used.

21 **VIII. MODELING/SUPPLEMENTAL ANALYSIS RESULTS**

22 **Q: What did the results of the new round of resource planning modeling show?**

1 A: Bryan Morlock describes the results of Otter Tail’s additional modeling and analysis with
2 more specificity, but generally the results showed that even with aggressive renewable and
3 conservation savings “hard-wired” in the models, participation in a supercritical pulverized coal
4 plant at Big Stone remains the most prudent choice for Otter Tail. Even after taking into account
5 all of Minnesota’s very aggressive energy conservation goals and after assuming for purposes of
6 the modeling full compliance with the Minnesota Renewable Energy Standard and the North
7 Dakota Renewable Energy Objective, our analysis confirms that there is not a less expensive
8 generation resource (renewable or non-renewable) available to satisfy Otter Tail’s baseload
9 needs.

10 It is important to emphasize again, however, that Big Stone II represents only a part of
11 Otter Tail’s balanced resource approach. Otter Tail, along with the other Big Stone II co-owners,
12 continues to aggressively pursue a balanced portfolio of renewables, conservation, peaking and
13 intermediate resources. Big Stone II does not replace any of these other resources.

14 **Q: How much baseload capacity does Otter Tail need?**

15 A: Based on the results of the revised resource planning analysis, Otter Tail shows a need for
16 170 MW, and collectively all owners show a need for baseload energy from a supercritical
17 pulverized coal plant (as represented by Big Stone Unit II) of between 516 MW and 556 MW,
18 beginning in 2013, as shown in Exhibit 118 attached to the testimony of Bryan Morlock. This
19 range of optimized Big Stone II plant participation appears to be relatively insensitive to the cost
20 of a 500 MW unit versus the costs of a 580 MW unit.

21 **Q: Is there reason to believe that Otter Tail could need even more than 170 MWs of**
22 **additional generating capacity?**

1 A: Yes. Otter Tail chose not to run a model that assumed we would only achieve one half of
2 the 1.5% Minnesota energy savings goal, or 0.75%. This was because Otter Tail's "worst case"
3 analysis already justifies its intended participation in a 500 MW plant using the higher,
4 1.5%/year energy conservation savings rate. Thus, it wasn't necessary for Otter Tail to run a
5 0.75% case where it would have undoubtedly selected even greater increments of Big Stone II
6 due to an increased load forecast. Similarly, as described by Bryan Morlock in his supplemental
7 testimony, Otter Tail chose not to run models that incorporated costs for a 580 MW plant size,
8 because it would have likely produced an even larger share of Big Stone II for Otter Tail, given
9 the comparatively favorable economics of a 580 MW plant versus a 500 MW plant.

10 **Q: How much of Big Stone II Is Otter Tail planning to take as its share?**

11 A: Even though according to our modeling analysis we have a need for up to 170 MW of
12 Big Stone II by 2013, we propose that our share of Big Stone II be in the range of 120 MW to
13 133 MW, depending on the actual division of the plant among the five owners. Our megawatt
14 share will be the same regardless of whether Big Stone II is sized at 500 MW or 580 MW.

15 **Q: Why is Otter Tail limiting its participation in Big Stone II to only 120 MWs?**

16 A: While Otter Tail's resource expansion models show that Otter Tail could select more than
17 its approximate 120-133 MW share of Big Stone II, we have determined that remaining at that
18 lower level would provide opportunity for a more diversified mix of new resources. Given the
19 level of uncertainty that exists in the electric industry today, there appears to be merit in
20 maintaining as much balance and diversity as practicable in our resource expansion mix.

1 **IX. SELECTION OF BIG STONE II**

2 **Q: Is resource expansion computer modeling the sole determinant of what a utility's**
3 **resource plan will be?**

4 A: No, of course not. Computer modeling is only one piece of information that is used in
5 the resource planning process. We do not select a course of action based solely on modeling
6 results.

7 **Q: What other factors go into deciding what option to pursue besides the capacity**
8 **expansion modeling results?**

9 A: We also take into account the level of certainty in our modeling, weighing the confidence
10 we have in our assumptions. We also take into account the ramifications associated with certain
11 assumptions not holding true. We apply our experience and best judgment to the selection of the
12 ultimate resources to pursue. And, as I discussed previously, we try to maintain a level of
13 balance and diversity in our resource selection.

14 **Q: Are there assumptions that went into your updated modeling that are of concern?**

15 A: Yes, there are. Achieving our conservation goals, which we have done for modeling
16 purposes, is not only going to be difficult from a technological standpoint of finding ways to do
17 it, but it is also likely to be expensive. We essentially had to force the models to accept large
18 amounts of energy savings through conservation and to ignore its costs. While Otter Tail is
19 committed to attempt to achieve the 1.5% Minnesota conservation goal, cost-effectively
20 achieving those conservation goals is going to be challenging. Otter Tail is equally committed,
21 and obligated, to making cost effective decisions. In fact, the Minnesota statutes setting forth
22 both the renewable energy and conservation goals provide for a cost-effectiveness determination.

1 We are also concerned, like many others, about the cost of natural gas and the choice of
2 burning natural gas for electricity generation, since natural gas facilities are likely to be required
3 to back up renewable energy sources. We are concerned about the costs of the transmission
4 infrastructure that is going to be required to achieve the amount of renewable energy, primarily
5 wind, that will be required to meet renewable energy goals, and whether this infrastructure will
6 even be available in a timely fashion.

7 In the resource planning process, we need to take these policies into consideration, and
8 we have. But energy policy isn't always synonymous with valid energy planning assumptions.
9 Though we consider these state policies, planners also have to assess and consider the technical
10 and practical constraints on the system, the maturity and availability of any technology and the
11 supporting infrastructure required, the cost effectiveness of any such policy, and likely customer
12 response. In the final analysis, the choices made from the planning studies must ensure system
13 reliability, reasonable costs to consumers, and acceptable environmental and socio-economic
14 impacts.

15 **Q: How are these concerns taken into account in making a final decision?**

16 A: The concern is that if we abandon Big Stone II, and rely solely on natural gas,
17 conservation and renewable energy instead, and we cannot as a society achieve the expected
18 goals, that we won't have the baseload generation our customers require. We are also concerned
19 that over-reliance on natural gas is a dangerous choice, with supply and price considerations
20 looming as huge issues.

21 **Q: What do you perceive are the potential consequences of certain assumptions not**
22 **coming to fruition?**

1 A: Our primary concern is that we be able to meet demand for energy at all times in the
2 future. Society simply cannot tolerate a situation where there is not enough generation and
3 transmission to supply the electricity required. Otter Tail will pursue conservation aggressively,
4 and will continue to expand its renewable resources, but in the end there has to be generation
5 available when it is needed.

6 **Q: Are you concerned about the future regulation of carbon dioxide?**

7 A: Otter Tail takes the position that the decision to participate in Big Stone II is the right
8 decision even if there should be future carbon regulation. Otter Tail believes that any
9 governmental action to control carbon emissions will result from serious deliberations among all
10 affected parties, including the private sector. It is possible that Congress could impose a high
11 carbon dioxide cost for every ton of carbon emitted, but it is our judgment that Congress will
12 likely establish some kind of cap and trade program. In a cap and trade environment, the market
13 will try to produce as much electricity as possible within the constraint of the cap. Power plants
14 that produce electricity more efficiently – like Big Stone II – will have a significant price
15 advantage over plants that produce it less efficiently. The relatively high fuel efficiency that
16 will be built into Big Stone II compared to existing regional plants will give Big Stone II an
17 advantage in any conceivable carbon dioxide management future.

18 **Q: Are there other policy considerations you are concerned about?**

19 A: A primary concern is the development and integration of utility infrastructure facilities
20 that are built to serve regional, not just state needs. In contemplating the construction of a
21 second baseload unit at Big Stone, and the delivery service and transmission lines needed to
22 interconnect that facility to the regional grid, the owners have continually strived to be cognizant

1 of the laws and policies of all the states in which we serve. Sometimes, some of those policy
2 objectives are not entirely consistent with one another.

3 In building regional power plants and interstate transmission lines, however, we feel
4 strongly that states must find ways to work together in a collaborative manner to facilitate and
5 promote the regional interest while at the same time ensuring that state policies are considered
6 and respected. We have attempted to facilitate this multi-state approach in a number of ways,
7 including coordinating concerns over Big Stone Lake issues, sizing the transmission lines to
8 better facilitate renewable generation for the entire region, and implementing steps to
9 dramatically reduce emissions from both units and at the same time significantly increase energy
10 production.

11 **X. ALTERNATIVES**

12 **Q: What is the most likely alternative to Big Stone Unit II?**

13 A: The most likely alternative to Big Stone Unit II is some combination of wind and natural
14 gas. Hydro and nuclear are other baseload options, but neither of those technologies is a realistic
15 option in this case.

16 **Q: What concerns do you see with a wind and natural gas combination?**

17 A: Aside from the fact that we are pursuing additional wind and other renewables in addition
18 to Big Stone II, and aside from the fact that the resource planning we conducted did not show
19 wind to be a more economical alternative even under assumptions favorable to wind, there are
20 other concerns about pursuing a wind and natural gas combination for a baseload resource. We
21 all know that wind is not a baseload energy source, so it has to be backed up with a natural gas
22 facility, and we are very concerned about the need to use natural gas in a baseload facility. We

1 need a baseload facility. Burning natural gas still emits carbon dioxide into the atmosphere. The
2 transmission required to handle the amount of wind that would be required to replace a plant like
3 Big Stone would be extensive, and expensive.

4 **Q: Has anybody proposed a specific alternative to Big Stone II?**

5 A: No. Even though intervenors in this proceeding oppose the construction of Big Stone II
6 and argue that wind would be a better alternative, they have not suggested with any specificity an
7 alternative to Big Stone II. There is no other specific alternative of any type that has been put
8 forth by anybody.

9 **XI. PROJECT PROPOSAL**

10 **Q: What have the five Applicants decided to do?**

11 A: Based on the results of our supplemental analysis, combined with all of the other
12 previous studies we have done with respect to this project, and subject to my testimony with
13 respect to potential additional partners, Otter Tail, along with Montana-Dakota and the other
14 three owners, intend to go forward with a 500 MW supercritical pulverized coal plant at the Big
15 Stone location in South Dakota. The owners have not yet finalized their actual ownership
16 interests in the unit, but we don't expect material changes at this time from the allocations to
17 which we had previously agreed.

18 **Q: Is there any change in the transmission lines that were proposed?**

19 A: No, as Tim Rogelstad states in his testimony, the same two lines are required to connect a
20 500 MW plant as are required to connect a 630 MW plant, or as are required to build a 580 MW
21 plant.

22 **Q: What are you asking the Public Service Commission to do?**

1 A: We are asking that the Public Service Commission issue an advanced determination that
2 it is prudent for Otter Tail to invest in between 120 to 133 MWs of a second baseload unit at the
3 Big Stone site and associated delivery service and transmission lines that would interconnect that
4 plant to the transmission grid.

5 **XII. EFFECT OF DENIAL OF ADVANCED PRUDENCE**

6 **Q: If Otter Tail does not receive approval by the Commission regarding the prudence**
7 **of this project, what is Otter Tail’s likely next course of action with respect to additional**
8 **generation resources?**

9 A: Likely, Otter Tail believes that it would be forced to construct additional natural gas
10 plants. This alternative is less preferable, environmentally and economically, than is the current
11 proposal.

12 This project owners have done a lot of analysis regarding the risks that additional reliance
13 on natural gas use has for Otter Tail and the other owners. Given that Minnesota in particular is
14 moving to increase significantly its reliance on natural gas as a source of electric power
15 generation, we are very concerned about what that may mean for our customers’ energy bills.

16 **XIII. POTENTIAL NEW PARTNERS**

17 **Q: Is it possible that the Applicants may accept additional entities into the Big Stone II**
18 **project beyond the five current owners?**

19 A: Yes, that is possible.

20 **Q: Are the Applicants open to the prospect of finding new partners?**

21 A: Yes, it makes sense for the Applicants to determine whether there are other entities that
22 may be interested in participating in the project before all final decisions are made.

1 **Q: Have any entities expressed an interest in joining the Big Stone II project?**

2 A: The five owners have received a number of inquiries of interest in ownership
3 participation in the project from area load-serving utilities and other power marketers. These
4 parties represent baseload needs in amounts that are far larger than the need shown by the current
5 owners. There continues to be a need for baseload energy in this region.

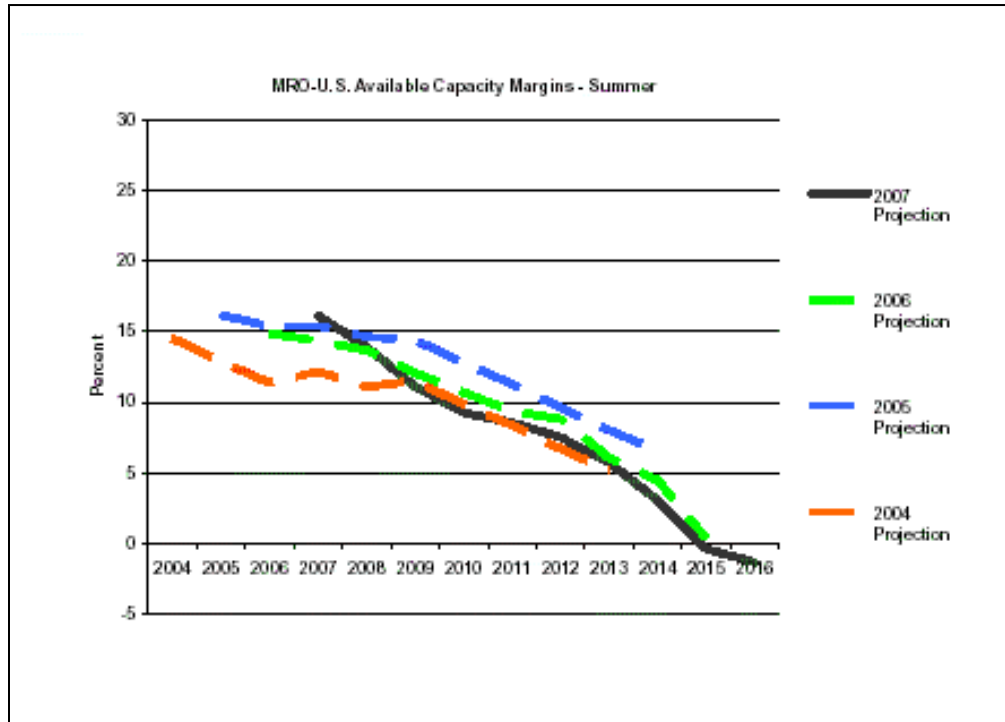
6 **Q: What would the five owners do if additional partners joined?**

7 A: If we are able to secure an additional partner or partners in a reasonable timeframe, the
8 Applicants intend to build a 580 MW plant to take advantage of the comparatively better
9 economies of scale for the larger unit. In a 580 MW plant, the respective shares of the five
10 current Applicants would not increase above the amounts the Applicants are committed to in a
11 500 MW plant. Thus, any “increment” in going from 500 MW to 580 MW would likely be taken
12 by any new partner.

13 **Q: Does this conclude your testimony?**

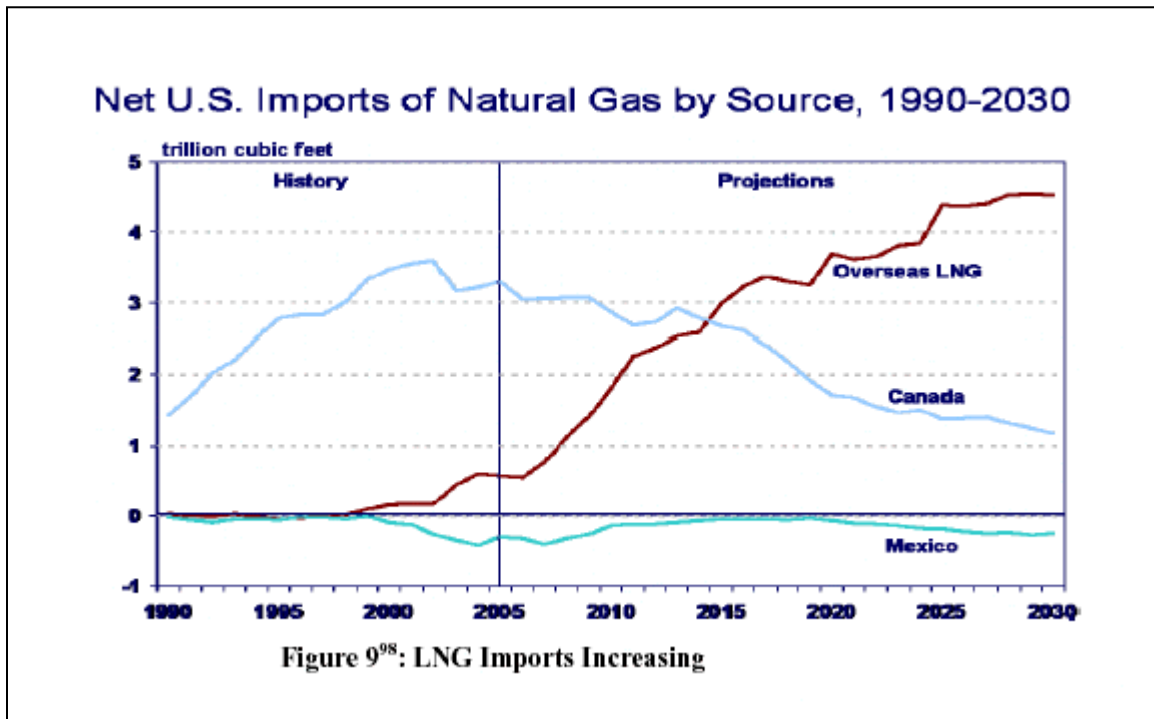
14 A: Yes.

**Midwest Reliability Organization-U.S. (MRO-U.S.)
Available Capacity Margins Forecast
Summer Seasons¹**



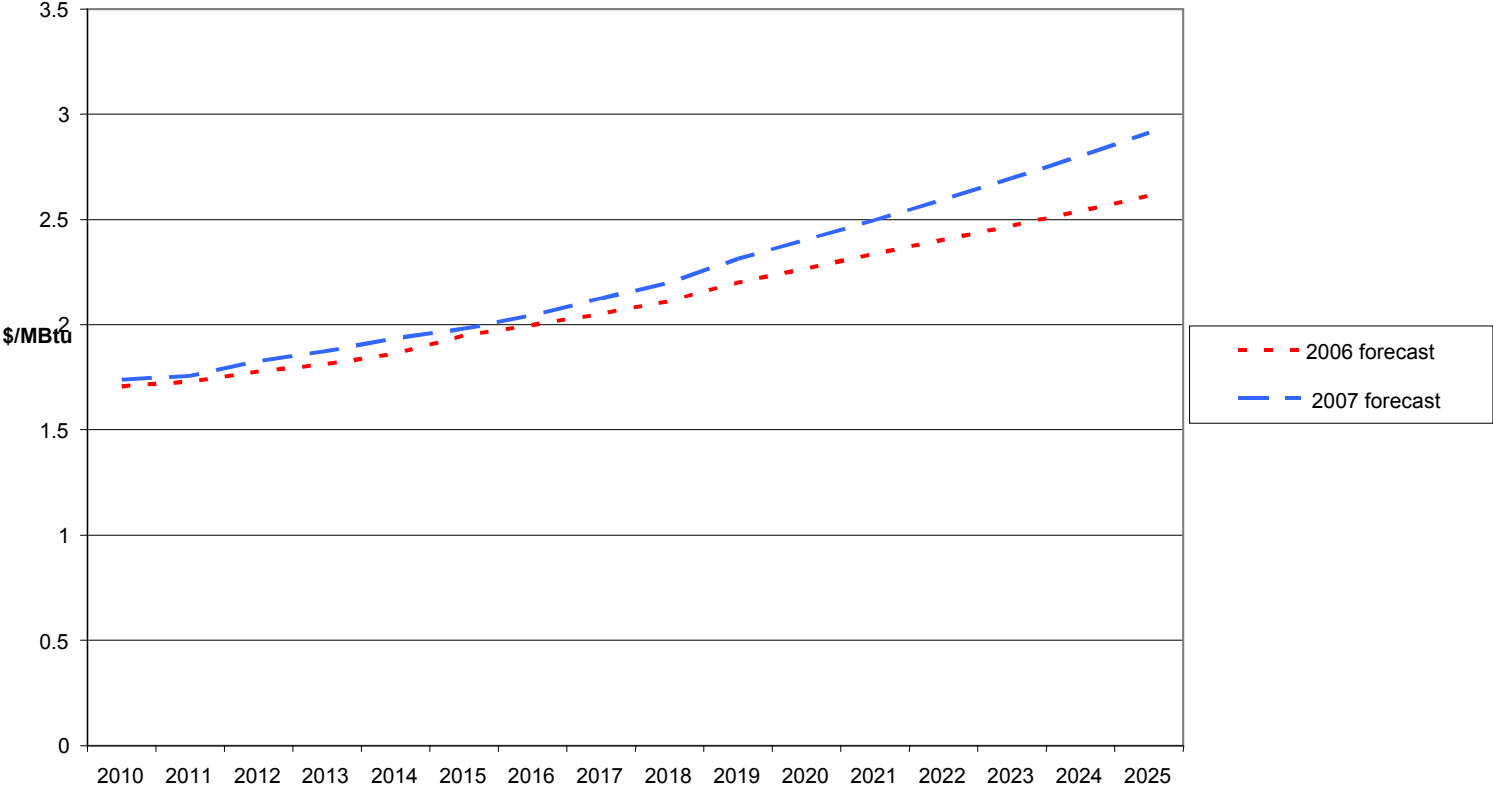
¹ Source: “2007 Long-Term Reliability Assessment 2007-2016”, North American Electric Reliability Corporation, October 2007, at page 133.

**Net U.S. Imports of Natural Gas by Source
Years 1990 to 2030¹**

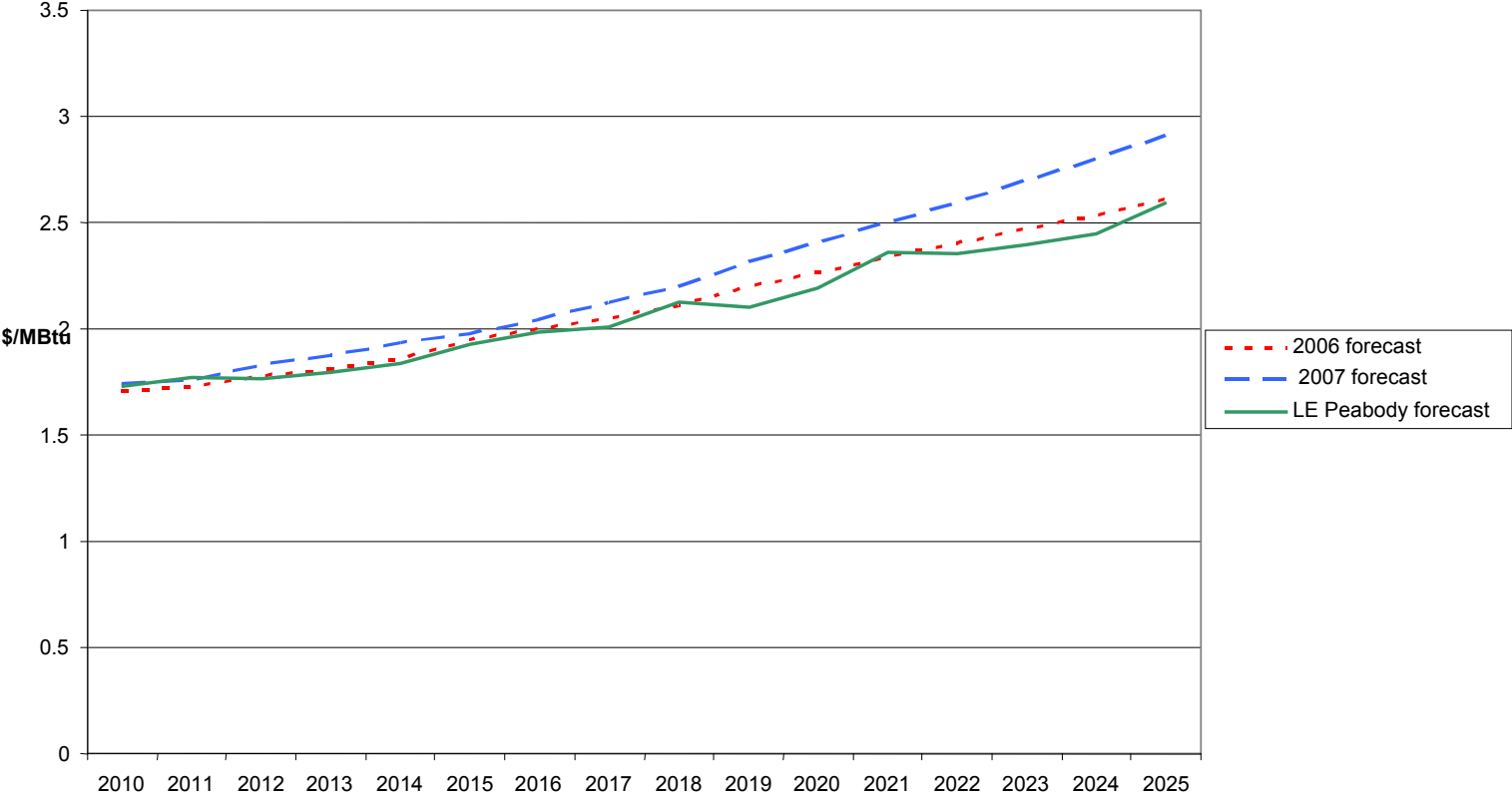


¹ Source: “2007 Long-Term Reliability Assessment 2007-2016”, North American Electric Reliability Corporation, October 2007, Figure 9 at page 92.

Comparison of BSP II delivered fuel forecasts
Nominal dollars



Comparison of BSP II delivered fuel forecasts
Nominal dollars



CASE NOS. PU-06-481 & PU-06-482
BEFORE THE NORTH DAKOTA PUBLIC SERVICE COMMISSION
IN THE MATTER OF THE APPLICATION BY OTTER TAIL 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

SUPPLEMENTAL PREFILED DIRECT TESTIMONY

OF

BRYAN MORLOCK

Manager of Resource Planning

Otter Tail Power Company

MARCH 10, 2008



SUPPLEMENTAL PREFILED DIRECT TESTIMONY OF BRYAN MORLOCK

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1 **BEFORE THE NORTH DAKOTA SERVICE COMMISSION**

2 **SUPPLEMENTAL PREFILED DIRECT TESTIMONY OF BRYAN MORLOCK**

3 **I. INTRODUCTION**

4 **Q: Please state your name and business address.**

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

6 **Q: Did you previously submit testimony in this proceeding?**

7 A: Yes. I submitted both Direct Testimony (OTP Exhibit 103) and Rebuttal Testimony
8 (OTP Exhibit 111) and I also introduced OTP Exhibits 103-111.

9 **Q: Assuming Big Stone Unit II is constructed and placed in commercial operation,**
10 **what portion of Otter Tail’s share of Big Stone Unit II will be used to serve North Dakota**
11 **customers?**

12 A: Approximately 40% of Otter Tail’s customer load is in North Dakota. Accordingly, the
13 same percentage of our Big Stone Unit II share will serve North Dakota.

14 **II. PURPOSE AND SUMMARY OF TESTIMONY**

15 **Q: What is the purpose of your supplemental testimony?**

16 A: The purpose of my supplemental testimony is to describe the results of additional
17 capacity expansion modeling and other analyses undertaken to evaluate the extent to which
18 recent project ownership, project timing and cost, and other changes have an effect on Otter
19 Tail’s preferred resource plan. These changes include analysis of recent legislation in Minnesota
20 that requires aggressive conservation and renewable energy goals.

21 **Q: Please summarize your testimony with respect to your revised modeling.**

22 A: Several recent changes have occurred that had the potential of changing or otherwise
23 affecting the Big Stone Unit II project, including the withdrawal of two participants, potential

1 changes in project size and associated costs, and recent Minnesota legislation regarding
2 renewable energy and conservation. Taking these factors into account, and relying on updated
3 assumptions for a number of factors, our analysis continues to show the Big Stone Unit II project
4 remains an essential component of Otter Tail's overall plan. The latest round of computer
5 modeling demonstrates that Otter Tail has a need for 170 MW of Big Stone Unit II.

6 **III. UPDATED PLANNING ASSUMPTIONS**

7 **Q: Have any of your planning assumptions changed since your prior testimonies in this**
8 **proceeding?**

9 A: There are a number of model inputs that have been updated or modified. These inputs
10 include:

- 11 • an updated load forecast,
- 12 • updated Big Stone II plant and transmission costs,
- 13 • a change in the Big Stone II commercial operating date to 2013,
- 14 • an increase in conservation to comply with the MN 1.5% kWh savings goal and
15 increased conservation efforts in North and South Dakota,
- 16
- 17 • an increase in the Minnesota renewable energy standard as well as the
18 incorporation of a North Dakota renewable energy objective,
- 19
- 20 • an updated natural gas price forecast, and
- 21 • an updated Big Stone II coal price forecast.

22 **Q: How does the new load forecast compare to the load forecast used in your prior**
23 **modeling described in your 2007 testimony?**

24 A: The new load forecast was developed for use in the Company's next resource plan filing
25 in Minnesota. That forecast shows a slight increase in energy requirements compared to the
26 previous forecast. The new load forecast has increased energy requirements approximately

1 0.93% by 2020 over the previous forecast. The forecasted demand in 2020 has increased by
2 about 5.7% from the previous forecast.

3 Since the 2007 forecast was developed, Otter Tail was selected to provide service to a
4 new ethanol plant located in North Dakota. This new ethanol plant is the Tharaldson Ethanol
5 project to be located west of Casselton. Otter Tail was originally informed that the plant would
6 have a peak demand of approximately 14 MW and 102,000 MWh annual energy use, and these
7 figures were used in estimating future load forecasts. Since the analysis was completed, the
8 estimate has been raised to a demand of approximately 22 MW because the facility has higher
9 electricity usage than normal for an ethanol plant this size because it will be using technologies
10 to reduce other forms of energy use. As a result, our forecasts are likely on the low side if
11 anything.

12 **Q: How does the new Big Stone II project timing compare to the timing used in your**
13 **prior modeling described in your 2007 testimony?**

14 A: Previously Big Stone II was modeled as being available in 2011. With the recent project
15 delays, the new modeling was completed assuming a 2013 commercial operating date.

16 **Q: How do the new Big Stone II project costs compare to the costs used in your prior**
17 **modeling described in your 2007 testimony?**

18 A: Previously, Big Stone II was modeled as a 630 MW unit. The new modeling was
19 completed assuming costs based on a plant size of 500 MW. As a result of the assumed smaller
20 plant size, the costs per kW of capacity increased as some economies of scale would be lost. We
21 used a cost of \$1.272 billion (\$2,545/kw) for a 500 MW unit. This figure was supplied to me by
22 Project Manager Mark Rolfes, who is also testifying in this supplemental hearing.

1 Otter Tail had originally intended to also conduct modeling based on a 580 MW plant
2 size, but the results of the “worst-case” scenario at 500 MW made such additional modeling
3 unnecessary. I use the term worst-case scenario because the higher per-unit costs of a 500 MW
4 plant size would tend to yield a lower Otter Tail share size for Big Stone Unit II. Although such
5 additional modeling for a 580 MW plant size would likely have suggested an even larger Big
6 Stone Unit II share size for Otter Tail than for a 500 MW plant size, Otter Tail decided to adopt
7 the worse-case modeling result based on the 500 MW plant size as reasonable for the 580 MW
8 plant size option as well.

9 **Q: Were any changes made to the costs associated with other resources?**

10 A: Yes, several changes were made. In previous analysis, Otter Tail had used transmission
11 costs of approximately \$200/kW for most resources. Due to increases in the cost of building
12 transmission, this was increased to \$250/kW, except for wind and the IGCC option.

13 For wind, we revised our transmission costs as I will describe later. For the IGCC option,
14 it was previously assumed that such an option would possibly be constructed at the Hoot Lake
15 Plant site with the retirement of the two remaining coal units there, and that it would be able to
16 use the existing transmission infrastructure. However, we have subsequently determined that it
17 is impractical to assume that a new baseload generating facility could be constructed and tied to
18 existing, older substation equipment. So we included \$100/kW for substation and transmission
19 upgrades with the IGCC option for this Hoot Lake, site-specific option. The cost of the IGCC
20 option was also increased to be compatible with the construction cost increases being observed in
21 all resource technologies. The IGCC option was made available to the model in 2013, compared
22 to 2015 in previous analyses.

1 Finally, the costs of natural gas-fired technologies were not changed from the base cost,
2 but the cost escalation rate over time was increased to 4.5%.

3 Construction costs continue to escalate at rates faster than inflation. The basic equipment
4 cost of a combustion turbine, without the auxiliaries, had not changed much over the past few
5 years, so price increases were basically in the construction materials and labor area. Predictions
6 are now being made that a carbon-constrained environment will materially increase the demand
7 and prices for combustion turbines will rise dramatically as a result.

8 **Q: What changes were made to incorporate new conservation goals?**

9 A: The level of conservation in the model was a significant change. We took into account
10 conservation goals in all three states where Otter Tail has retail customers – North Dakota, South
11 Dakota, and Minnesota. Otter Tail is expecting to implement more North Dakota conservation
12 programs in the future, has filed a conservation plan in South Dakota, and has a new statutory
13 directive to reduce the growth of retail sales in Minnesota. Otter Tail attempted to account for all
14 these reductions in energy consumption in its modeling.

15 Otter Tail did not allow the model to evaluate and select conservation technologies based
16 on cost effectiveness. Left to its own evaluation of cost-effectiveness, the model would not
17 otherwise select enough conservation to comply with the new Minnesota legislation, so the
18 required amount of conservation was manually forced into the model. The modeling did not
19 include any cost assumptions or evaluate the technical feasibility of actually achieving the
20 required level of conservation. Otter Tail simply assumed in the model that the new
21 conservation requirements would be met.

22 With regard to North Dakota and South Dakota, Otter Tail incorporated kWh savings
23 equal to about 0.5% of annual retail sales in those two states. With regard to Minnesota sales,

1 the model was scaled up to realize conservation savings of 1.5% of Minnesota retail sales
2 averaged over the previous three years as specified by the new Minnesota law. Historically,
3 Otter Tail has obtained conservation savings of approximately 0.6 – 0.7% of annual Minnesota
4 kWh sales, so this assumption was quite conservative.

5 **Q: What changes were made to incorporate new renewable energy requirements ?**

6 A: The incorporation of a 10% renewable energy objective in North Dakota and the increase
7 in the Minnesota renewable energy standard to 25% by 2025 represented a minimal change to
8 the modeling. Otter Tail has already identified enough qualifying renewable resources in its
9 resource planning to achieve more than 16% renewable energy across the entire system based on
10 2006 system-wide retail kWh sales prior to the Big Stone Unit II commercial operation date.
11 Because we were already planning levels of renewable energy that approached the North Dakota
12 and Minnesota renewable energy goals, these new goals did not really impact the results of our
13 analysis.

14 **Q: How much additional renewable energy did you add to previous plans in your
15 revised analyses?**

16 A: To ensure compliance with all applicable state goals for renewables, an additional 20
17 MW of wind generation were forced into the model in 2018, and 40 MW more in 2024. In
18 addition, we incorporated the 160 MW of new wind already approved into the model within the
19 first few years. Otter Tail's 60 MW share of the Langdon Wind Energy Center, which recently
20 commenced commercial operation, is part of that 160 MW.

21 **Q: Were there other changes made to your modeling of renewable resources?**

22 A: Yes there were. First, it was assumed that the Federal Production Tax Credit (PTC)
23 would be renewed for five years through 2013, but then not be available after that point.

1 Additional wind resources beyond the RES levels were made available to the model, either with
2 or without the PTC, depending on the time frame. Another 100 MW were made available
3 through 2013 with the PTC included, and 100 MW of additional wind generation without the
4 PTC were made available beginning in 2014.

5 **Q: Did you revise your approach to wind energy with regard to transmission import or**
6 **cost considerations?**

7 A: Yes. In previous analysis Otter Tail had restricted the amount of wind available to the
8 model because of concerns with energy import capability to the region to back up the wind
9 generation when the wind isn't blowing. Those concerns still have not been addressed by the
10 Midwest Independent Transmission System Operator (MISO) and others, but they are being
11 discussed by transmission planners. Otter Tail is working with MISO and transmission planners
12 to determine an appropriate modeling limit on import capability to the Otter Tail system and into
13 the western MISO area in general.

14 Otter Tail had not previously included any transmission cost associated with wind
15 resources but had restricted the amount of wind generation available. In our latest modeling this
16 restriction was removed and replaced by estimated transmission costs of approximately
17 \$200/kW. \$200/kW is still less than the estimated transmission cost for other resources. This
18 reduced cost level was chosen because Otter Tail believes that some small developments may
19 occur without the need for significant transmission upgrades.

20 **Q: Were changes made to your assumed pricing of renewable resources?**

21 A: No changes to wind pricing prior to the expiration of the PTC were made other than to
22 incorporate a \$4.50/MWh wind integration cost, which was developed as part of the Minnesota
23 Wind Integration Study. The pricing used is consistent with the costs of Company ownership of

1 wind resources, but possibly \$4 - \$5 /MWh below current PPA prices being discussed with
2 developers. And, of course, the wind prices of the additional wind generation made available
3 after expiration of the PTC are much higher than with the PTC included.

4 **Q: What updated natural gas price forecast did you use?**

5 A: The price used in the modeling was based on an adjusted Energy Information
6 Administration (EIA) forecast contained in the 2007 Annual Energy Outlook.

7 **Q: What adjustments were made to the EIA natural gas forecast?**

8 A: The EIA forecast data was at Henry Hub, so the first adjustment was for basis difference,
9 i.e., the price differential between a Minnesota location and the EIA forecast location. The
10 second adjustment made was because of an inherent underestimation bias contained within the
11 EIA model. A number of studies have documented this bias. One of the most recent was a study
12 by Ernest Orlando Lawrence Berkeley National Laboratory which identified a levelized
13 understatement of the EIA forecast price of \$0.73/MBTU. This amount was added to the EIA
14 forecast. Finally, a 2.5% escalator was used to convert the EIA forecast from 2005 dollars to
15 nominal dollars.

16 **IV. OTHER FACTORS**

17 **Q: What is the status of the 50 MW Manitoba Hydro alternative that was considered in**
18 **your earlier analysis?**

19 A: Manitoba Hydro has informed Otter Tail that it no longer has capacity and energy
20 available to provide Otter Tail. The Manitoba Hydro purchase is no longer within the options
21 under consideration.

22 **Q: Did you incorporate costs based on the potential for future carbon dioxide**
23 **regulation?**

1 A: Yes, we did for our Minnesota analysis and testimony, because that is a major point of
2 interest in Minnesota. In Minnesota, we assumed a simple carbon dioxide tax effective as of
3 2013. However, based on the North Dakota statute prohibiting inclusion of such costs here, new
4 analysis and modeling were completed for North Dakota planning purposes without the inclusion
5 of any costs for future CO₂ regulation.

6 **V. REVISED RESOURCE PLANNING ANALYSES**

7 **Q: With regard to your revised capacity expansion planning analyses including the**
8 **latest costs and assumptions for Big Stone Unit II and other resource alternatives, did you**
9 **use the same analytical approach described in your previous testimony in North Dakota?**

10 A: Yes, I did.

11 **Q: Did your development of your optimized resource expansion plans include**
12 **wholesale transactions?**

13 A: No. Wholesale sales are made from all OTP resources, not just from a single unit such as
14 Big Stone II. OTP has certain obligations to sell available generating capacity and energy into
15 the MISO market, and does so as and when excess generation is available. However, to ensure
16 that the resource planning process did not add facilities to make wholesale sales, the wholesale
17 sales option was turned off.

18 **Q: Is computer-based capacity expansion modeling the sole determinant of what your**
19 **utility's resource plans should be?**

20 A: No. As I previously discussed, the modeling runs were completed assuming compliance
21 with the renewable energy and conservation goals. There was no consideration as to whether
22 such compliance is cost-effective or technically feasible, so these results are not fully optimized
23 by the computer modeling.

1 Beyond that, computer modeling is only one input to our resource planning process. It is
2 a useful tool; but only a tool. It is not a substitute for expert management experience and
3 judgment.

4 **Q: Does forcing the model to accept a given level of a resource increase costs?**

5 A: Possibly. If the model would not have picked such a resource as an economic alternative
6 or as a least-cost alternative to meet load and reserve requirements, the answer is yes. If such a
7 resource would have been selected anyway, then there isn't an increase in costs.

8 **Q: Please summarize the results of the revised capacity expansion modeling you**
9 **performed, compared to the results reported in your previous testimonies?**

10 A: In general, through 2020 the amount of total baseload capacity decreased by
11 approximately 80 MW, peaking capacity increased approximately 85 MW, demand-side
12 management (DSM) impacts increased by about 35 MW, and nameplate wind capacity increased
13 approximately 60 MW.

14 In the prior analysis, baseload generation consisted of 50 MW of Canadian hydro and 201
15 MW of coal, comprised of 120 MW of Big Stone II and 81 MW of IGCC. In the new analysis,
16 all 170 MW of baseload in 2013 is in Big Stone II, and the 81 MW of IGCC in 2018 is
17 eliminated. And, as previously mentioned, the Canadian hydro alternative is no longer available.

18 The conservation impacts increased because we forced Minnesota energy conservation
19 goals into the updated model. The updated model also selected more wind, as long as the PTC is
20 available. The selection of additional wind and an increase in peaking capacity worked to
21 eliminate the need for the IGCC alternative.

22 **Q: Please elaborate on the drivers behind these differences.**

1 A: The increase in energy conservation reduced the need for baseload capacity, which is
2 typically energy-driven. The change in ownership participation made more of Big Stone II
3 available to Otter Tail and Manitoba Hydro withdrew their capacity and energy proposal, which
4 eliminated a potential resource. Finally, increased wind generation, assuming the PTC is
5 available, combined with natural gas peaking eliminated the need for the IGCC unit.

6 **Q: Did new renewable and conservation goals have an impact on your revised resource
7 planning results?**

8 A: Yes, to some extent. The renewable energy goals had little impact on the results, as Otter
9 Tail's previous plans for renewables already went most of the way toward meeting those goals.
10 The increased conservation goals clearly had an impact, reducing baseload capacity needs by 81
11 MWs.

12 **Q: Did you conduct a sensitivity analysis of the new modeling?**

13 A: Yes I did. A sensitivity analysis was completed using a 10% higher capital cost for the
14 Big Stone II project. The model continued to pick the full 170 MW amount of the project that
15 was allowed.

16 **Q: Did you conduct a fuel cost sensitivity?**

17 A: We did not conduct a specific fuel cost sensitivity analysis. We did look at the capital
18 cost sensitivity analysis to see what that would translate to as an equivalent fuel cost sensitivity.
19 The result of that analysis was that the capital cost sensitivity was equivalent to conducting a fuel
20 cost sensitivity of approximately 30%.

21 **VI. CONCLUSIONS**

22 **Q: What do you conclude from your revised capacity expansion analyses with regard to
23 Otter Tail's need for Big Stone Unit II in this proceeding?**

1 A: The modeling has clearly shown that Otter Tail's proposed participation of up to 170
2 MW in Big Stone II is the most economic baseload alternative available to it, whether Big Stone
3 II is constructed at a nominal 500 MW or a nominal 530 MW.

4 **Q: Can you summarize the baseload capacity needs of the five Big Stone owners?**

5 A: Yes, I can. The revised modeling results conducted by all five Applicants show that the
6 five Big Stone owners have a total need for Big Stone II starting in 2013 ranging from 516 MW
7 to 556 MW, regardless of whether Big Stone II is constructed at 500 MW or 580 MW. I have
8 summarized the data in a table identified as OTP Exhibit 118. Previously, in the Minnesota
9 proceeding I testified that the range was from 531 to 556 MW; the reduction is due to a drop of
10 15 MW of MDU's needs on the low side as determined by the analysis conducted by witness
11 James Heidell.

12 **Q: Does this conclude your supplemental testimony?**

13 A: Yes.

OTP EXHIBIT 118
Summary of Resource Planning Modeling Results
Shares of Big Stone Unit II by Applicant
(in Megawatts)

Applicant	Range (500 MW plant size)		Range (580 MW plant size)	
	Low	High	Low	High
MDU ¹	116	131	116	131
OTP ¹	170	170	170	170
CMPMA	40	50	40	50
Heartland	30	30	30	30
MRES ²	<u>160</u>	<u>175</u>	<u>160</u>	<u>175</u>
Totals	516	556	516	556

Notes:

1. Values for 580 MW plant size assumed same as for 500 MW plant size.
2. MRES values shown include Hutchinson.

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

Kristen A. Swenson, of the City of Minneapolis, County of Hennepin, in the State of North Dakota, being duly sworn on oath says: that on the 10th day of March, 2008, she served the following:

Ward Uggerud (OTP Exhibit 112);
Bryan Morlock (OTP Exhibit 117);
Andrea Stomberg (MDU Exhibit 213);
James Heidell (MDU Exhibit 214);
Mark Rolfes (OTP/MDU Exhibit 324);
Tim Rogelstad (OTP/MDU Exhibit 325);
Jeffrey Grieg (OTP/MDU Exhibit 326);
Thomas Crowley (OTP/MDU Exhibit 328); and
An Affidavit of Service.

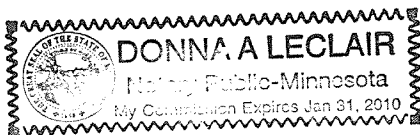
A copy has also been served upon the attached service list via electronic mail and U.S. Mail.

Kristen A. Swenson

Subscribed and sworn to before me
this 10th day of March, 2008.

Donna A LeClair

Notary Public



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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