

**BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF NORTH DAKOTA**

**In the Matter of the Application of)
OTTER TAIL CORPORATION, d/b/a)
Otter Tail Power Company, for an)
Advance Determination of Prudence)
for the Big Stone II Generating Plant)**

Case No. PU-06-481

DIRECT TESTIMONY

OF

WARD UGGERUD

SENIOR VICE PRESIDENT

OTTER TAIL POWER COMPANY

DECEMBER 1, 2006

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

2 **DIRECT TESTIMONY OF WARD UGGERUD**

3 **I. INTRODUCTION**

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

5 A: My name is Ward Uggerud. My business address is 215 South Cascade St.,
6 Fergus Falls, Minnesota.

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

8 A: I am Senior Vice President for Otter Tail Power Company (“Otter Tail”).

9 **Q: What is your educational background?**

10 A: I am an electrical engineering graduate from North Dakota State University
11 (1971).

12 **Q: What is your employment history?**

13 A: My employment background with Otter Tail is as follows: From 1971 – 1974 I
14 was an engineer in Computer Services working on engineering software applications for
15 our System Operations function. From 1974 – 1978 I was an engineer in our System
16 Engineering Department working on transmission, substation and protective relaying
17 activities. From 1979-1988 I was the manager of the System Operations Department.
18 From 1988 to the present I have been an Executive Officer of the electric utility
19 supervising our Generation, Environmental Engineering and Wholesale marketing
20 activities. I am currently Senior Vice President for Otter Tail Power Company. During
21 my career with Otter Tail I have served in various positions with the Mid-Continent Area
22 Power Pool (MAPP) and with the North American Electric Reliability Council (NERC),

1 including having served as the Chairman of the Operating Committees of both
2 organizations.

3 **Q: What work experience have you had that is relevant to your testimony?**

4 A: My job is, and always has been, to provide electricity as reliably and
5 economically as possible to our customers while at the same time operating within all
6 regulatory and legal standards. All of my work experience is relevant to my testimony.
7 My work experience has made me keenly aware of the interaction of the relationship
8 between the supply and demand of electricity. I've been able to observe first hand the
9 functioning of the market and I understand the causes of price volatility. I've remained
10 close to our customers and know directly their concern about the price of electricity. I've
11 been involved in negotiations for new agri-processing industrial development where
12 decisions are made based on tenths of a cent per KWhr of electric cost differentials. As
13 chairman of the NERC Operating Committee, I helped develop reliability standards and
14 monitoring protocols to insure compliance with them. I was directly involved in
15 discussions with the committees of jurisdiction when the Clean Air Act Amendments of
16 1990 and the National Energy Policy Act of 1992 were passed. All of my experiences
17 have prepared me to represent that Otter Tail Power Company's participation in the Big
18 Stone Unit II power plant has been thoughtfully developed and is consistent with rule,
19 regulation and our customers' expectations.

20 In my responsibilities as Senior Vice President, I have had to become
21 knowledgeable and familiar with the laws and regulations that govern our industry. I
22 have had the requirement to become familiar with contracts and legal relationships. I've

1 had to learn the intricacies of the relationships among stakeholders, customers,
2 shareholders, employees, regulators, legislators, suppliers, vendors, but most certainly,
3 customers first. No business survives without first and foremost serving its customers.
4 And I believe I know our customers. Otter Tail serves a rural, sparsely populated service
5 territory and I grew up in the northern reaches of it. My dad and brother still farm the
6 family farm and I know first hand the economic struggle our customers face to provide
7 for themselves, their families and their customers. I know first hand their concern about
8 the price of all of their inputs and I understand the relationship between each component
9 of the cost and reliability of the electricity our company provides to our customers.

10 **Q: Have you submitted testimony in other judicial proceedings dealing with**
11 **energy and related issues?**

12 A: I have submitted testimony in numerous proceedings involving electric supply
13 issues for the company. This includes having provided testimony in company rate cases
14 for previous generation projects and in judicial proceedings involving contested issues for
15 fuel and freight contractual issues. I have provided testimony before the United States
16 Congress involving rail transportation issues and electricity policy issues. In addition to
17 testimony provided in the above-mentioned proceedings, I have also spoken widely on
18 the matter of interconnected utility operations throughout the United States and Canada.
19 Also, I have been responsible for the development of a demand-side management
20 technology that holds both United States and international patents.

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

22 **Q: What is the purpose of your testimony?**

1 A: The purpose of my testimony is to explain why the Big Stone Unit II project
2 provides the best solution to meeting our customers' growing needs for electricity. While
3 I am not the person who performed the actual computer modeling to analyze the best way
4 to meet forecasted demand, or the person who developed and studied the impacts of
5 various alternatives or conducted other evaluations, I am one of the officers who had to
6 decide what to do based on the best information available. My testimony explains the
7 rationale behind the choice to pursue the Big Stone Unit II project.

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

9 A: Otter Tail Power Company has determined through its resource planning process
10 that we will need additional baseload power by 2011. We decided to pursue construction
11 of a supercritical pulverized coal plant at the Big Stone site as a joint project with several
12 other electricity providers because of the proposed plant's low busbar cost and high
13 reliability.

14 If we don't address this need, we will be left without sufficient generation.
15 Insufficient electric supply in the face of rising electric demand could trigger significant
16 price increases to the detriment of our customers, particularly those of more modest
17 economic means. Indeed, insufficient electric supply could even cause supply
18 interruptions. Our planning process concluded that other types of generation, such as
19 natural gas and renewables or some combination of the two, were not appropriate means
20 of producing this amount of baseload power. Natural gas prices have proven to be
21 extremely volatile, making reliance on natural gas for significant new generation a very
22 risky undertaking for our customers.

1 Also, as described below, construction of Big Stone Unit II provides the
2 opportunity to install a common sulfur dioxide removal system on both Big Stone units,
3 with the result that sulfur dioxide emissions from the two units will be substantially
4 reduced as compared with current levels, even though power generation from the site
5 would more than double.

6 Before committing to a coal plant, we performed detailed analysis of other ways
7 to generate the electricity that we need to serve our customers, particularly through our
8 respective resource planning processes. We looked at renewable energy sources,
9 particularly wind, at demand-side management, at distributed generation, at integrated
10 gasification combined cycle, among others. None of these options is capable of assuring
11 the sound economic baseload supply of electricity that our customers require in the
12 timeframe available.

13 **III. OTTER TAIL POWER COMPANY**

14 **Q: Please describe your company.**

15 A: Otter Tail is an investor-owned electric utility headquartered in Fergus Falls,
16 Minnesota. Otter Tail was founded in 1907 in Fergus Falls. Initially, the company
17 generated and distributed only hydroelectric power from dams it owned and operated on
18 the Otter Tail River in and near Fergus Falls. Over time, Otter Tail added additional
19 generating resources and expanded its service territory to rural areas and small towns and
20 municipalities in Minnesota, North Dakota and South Dakota. Today, Otter Tail provides
21 electricity and energy services to more than 128,000 customers in western Minnesota,
22 eastern North Dakota and northeastern South Dakota. Otter Tail's service territory is

1 approximately 50,000 square miles and includes service to 423 communities. The
2 company's electric load is predominantly rural and only three towns have a population of
3 10,000 or more, with no town having a population exceeding 20,000. Over half of the
4 communities Otter Tail serves have a population of less than 200 people.

5 Otter Tail has a historical peak load obligation, including reserve requirements, of
6 772 MWs and in 2005 had total retail sales of 3,894,435 MWhrs. Otter Tail has
7 company-owned generation resources of 699 MWs and provides the rest of its required
8 capacity from purchases from other utilities. In 2005, company-owned resources
9 provided 3,513,705 MWhrs of generation. Otter Tail is the operating agent for the Big
10 Stone Unit I generation facility owned jointly by Otter Tail (53.9% ownership),
11 Northwestern Energy (23.4%) and Montana Dakota Utilities Company (22.7%). Otter
12 Tail is also the operating agent for the Coyote generation facility that is jointly owned by
13 Otter Tail, Northwestern Energy, Montana Dakota Utilities Company and the Northern
14 Municipal Power Agency.

15 **Q: Describe the governance structure of your company.**

16 A: Otter Tail is a division of Otter Tail Corporation – an investor-owned company
17 with diversified interests that include the electric utility, plastics, manufacturing, health
18 services, food ingredient processing and other businesses. The electric utility does
19 business under the name of Otter Tail Power Company, providing retail electrical service
20 to customers in Minnesota, North Dakota and Eastern South Dakota, but is not a separate
21 legal entity from Otter Tail Corporation. Otter Tail Corporation does not have any parent

1 companies and no publicly held corporation has a ten percent or greater ownership
2 interest in Otter Tail Corporation.

3 **IV. WHY MORE GENERATION**

4 **Q: Why have Otter Tail and the other Big Stone II Co-owners determined that**
5 **they need more generation?**

6 A: Otter Tail and the other Big Stone II Co-owners are in the business of planning
7 and meeting the electric energy resource needs of our customers. We are constantly
8 evaluating how we are going to assure that we have the electricity available that our
9 customers will demand, and at the lowest cost. The best information available – from
10 increasing growth in demand in our service areas, to population projections, to computer
11 models – indicates that demand for electricity for Otter Tail and the other Big Stone II
12 Co-owners is rising. Otter Tail’s electrical consumption continues to grow at
13 approximately 2.4% per year and regional consumption continues to grow at over 2% per
14 year. The utilities predict a capacity deficit in the region by 2011.

15 **Q: Is Otter Tail continuing to look at future needs?**

16 A: Yes, certainly. Otter Tail is constantly analyzing its anticipated needs. We
17 cannot allow a situation to develop where our existing facilities are overloaded or where
18 we are unable to meet customer demands, and we obviously want to be able to provide
19 the required electricity economically. Otter Tail makes every attempt to avoid
20 purchasing expensive power. At the same time, it is in no one’s interest to construct
21 facilities that are not needed. As part of our Integrated Resource Plan, our analyses,
22 including the capacity expansion modeling that we undertook, shows that a proposed

1 supercritical pulverized coal unit to be constructed at the existing Big Stone site is the
2 most economical and reliable way to meet the long-term electrical energy needs of Otter
3 Tail's customers. This same modeling found that optimal levels of DSM, renewables and
4 other resources do not displace the need for Otter Tail's share of Big Stone Unit II.

5 **Q: Is Otter Tail Power Company going to need more new generation than what**
6 **its share of Big Stone Unit II will provide?**

7 A: Otter Tail recently secured 23 MW of new, industrial customer load to its system,
8 which will have a high load factor requiring a reliable baseload source of generation.
9 This new load was not included in our planning for Big Stone Unit II and underscores the
10 growing need for electricity in our service area. In addition, our capacity expansion
11 planning modeling that determined optimized levels of DSM, renewables and other
12 resources including Big Stone Unit II, indicated in various scenarios that more than our
13 proposed share of Big Stone Unit II would be beneficial to our customers. More details
14 of our resource plan results are discussed in Bryan Morlock's direct testimony.

15 **V. WHY PULVERIZED COAL**

16 **Q: Why did Otter Tail choose a coal-fired power plant to meet the increasing**
17 **demand for electricity?**

18 A: Otter Tail (and the other Big Stone II Co-owners) chose a super-critical
19 pulverized coal plant because our analysis and considerable experience in operating
20 power plants shows that coal plants, in general, are optimal for a baseload plant, which
21 this proposes to be. Our customers will require a dependable source of electricity that
22 will be available on a 24/7 basis. We also chose coal because this plant can be built in

1 the timeframe required. We seek to provide our customers not only with reliable
2 electricity, but also with economical power. Coal was the most-economical form of
3 generation available. Oil prices hit \$75 per barrel in April 2006. Natural gas is
4 expensive and prices have fluctuated and most certainly will do so in the future, and
5 using natural gas to satisfy a baseload need is, we believe, imprudent energy policy for
6 our utilities, and for the country in general. We believe that coal should be a part of this
7 country's energy future as we seek to attain energy independence. This country has a
8 large supply of coal that has provided and will continue to provide the backbone of our
9 electrical generation system for the foreseeable future.

10 **Q: Did you consider alternatives to a super-critical pulverized coal plant?**

11 A: Of course. Our goal is to provide reliable, low cost power for our customers in an
12 environmentally sensitive manner. When looking at ways to best meet our needs, we
13 didn't presume one technology over another. We looked at various resources, including
14 DSM, renewable energy sources such as wind and hydropower, and we looked at an
15 emerging integrated gasification combined cycle (IGCC) technology, a system that
16 gasifies the coal and then burns the syngas in a combined cycle system to generate
17 electricity.

18 It should be emphasized that Big Stone II is not our only resource expansion
19 being contemplated. It is simply the proposal subject to this proceeding. Optimum
20 resource expansion usually includes a mix of resources and in Otter Tail's case, we are
21 also planning for additional DSM, additional wind, renewal of a hydro purchase power

1 agreement, and additional peaking capacity. Our expansion needs and plans are not a Big
2 Stone II only proposition.

3 **Q: Why can't you install more of wind instead of participating in Big Stone II?**

4 A: Wind is currently part of our energy portfolio, and is going to be an increasing
5 part of our energy future. There is a terrific potential for wind in the Dakotas and
6 southwestern Minnesota.

7 The decision to build a supercritical pulverized coal plant at the site of the
8 existing plant is based on a number of different factors that are unique to each Co-owner.
9 It makes sense for each Co-owner to be in the generation project only if each Co-owner's
10 respective planning scenario indicates that Big Stone Unit II is the right choice. On the
11 basis of technology and costs, we evaluated whether a wind farm would compete against
12 what we know to be the cost of a supercritical pulverized coal plant such as Big Stone
13 Unit II. Our analysis shows that a large-scale wind project would need to be backed up
14 by at least some measure of a firm resource, most likely natural gas.

15 Otter Tail's and the other Big Stone II Co-owners' respective resource plans and
16 related planning efforts did not show that wind was least cost to serve as a baseload
17 facility. Generally, industry and government will assume that a wind resource will
18 provide, on average, about 30-35% of the nameplate capacity over a period of time, and
19 is accredited at MAPP for significantly less than this. Therefore, significantly more than
20 630 MW of wind would have to be developed to even come close to satisfying a 630 MW
21 demand. Alternatively, a wind project would require some kind of other more reliable
22 facility to be built as a backup to the wind project so that there would be a source of

1 electricity even when the wind is not blowing. The backup is often considered to be a
2 natural gas plant. For all the reasons a natural gas plant was rejected in the first place –
3 supply, cost fluctuation, expense, no natural gas pipeline in the area – a wind project with
4 a natural gas backup is also not least cost.

5 **Q: Why did you decide not to propose an IGCC facility?**

6 A: Integrated gasification combined cycle holds potential for future development.
7 We expect that we will obtain some amount of our electricity in the future from IGCC
8 plants, either ones we own or through power purchase agreements with other generators.
9 However, IGCC has not proven itself at this time. There are only two IGCC power plants
10 in operation in the United States at this time, and both of them use eastern bituminous
11 coal and are significantly smaller than 630 MW. Presently, the capital costs of an IGCC
12 plant are higher than the pulverized coal plant we are proposing.

13 There are new IGCC plants in the active planning stage. However, most of these
14 plants are being proposed by electric utility systems that are much larger than Otter Tail
15 and the other Big Stone II Co-owners. Moreover, one of these plants (proposed by
16 Southern Company) is receiving federal financial support and two others (proposed by
17 AEP and Cinergy) are unlikely to proceed without pre-approval for recovery of all costs
18 by the applicable state regulatory commission. The Mesaba Plant here in Minnesota,
19 while proposed by an independent power producer, also has significant federal and state
20 financial support. As small utilities that do not have government support for an IGCC
21 plant, Otter Tail and the other Big Stone II Co-owners could not possibly accept the
22 technological risk and higher cost such a plant would entail. A negative outcome of

1 developing such a plant could literally bankrupt us. However, if these new plants
2 successfully demonstrate IGCC technology, and succeed in reducing IGCC costs, Otter
3 Tail and the Big Stone II Co-owners would likely be very interested in IGCC for future
4 power needs.

5 It should also be kept in mind that the currently proposed IGCC plants would not
6 capture and store CO₂ and do not have a CO₂ emissions profile that is significantly
7 different from that of Big Stone Unit II. CO₂ capture from IGCC plants would add very
8 significantly to IGCC costs and is probably a decade or more away from commercial
9 availability. Very significant questions also need to be addressed as to the long-term
10 storage of CO₂ captured from an IGCC plant.

11 **Q: Did Otter Tail take into account the possibility of enacting additional**
12 **demand-side management (DSM) efforts to reduce energy demand?**

13 A: Yes, we did. DSM is a term we use for energy conservation and load
14 management programs. Otter Tail is proud of our achievements in obtaining significant
15 reductions in energy use. We will continue our efforts to promote energy conservation
16 and load management but our best judgment is that we cannot count on DSM reductions
17 beyond what have been taken into account in our modeling efforts to predict future
18 demand.

19 **Q: Did you consider building a nuclear plant?**

20 A: No, not seriously. While we are aware that some organizations and people, for
21 instance Greenpeace, have come down in favor of nuclear power as a response to global
22 warming concerns, no new nuclear power plant has been built in this country for

1 approximately 30 years. There is ongoing uncertainty over what to do with the spent
2 nuclear fuel that is generated.

3 **VI. WHY BIG STONE?**

4 **Q: Why did the Big Stone II Co-owners decide to join together to build the**
5 **proposed Big Stone Unit II?**

6 A: Otter Tail and the other Big Stone II Co-owners joined together to propose a 630
7 MW supercritical pulverized coal unit at Big Stone to benefit from the economies of
8 scale, saving our customers money. A new plant will add diversity to our energy mix and
9 reduce the risks to our customers of power outages. A baseload facility, utilizing proven
10 technology with the latest pollution control technology, will become an essential
11 component of all Big Stone II Co-owners' energy resources.

12 **Q: How did the Big Stone II Co-owners determine each one's respective share?**

13 A: The respective proposed share of each Big Stone Unit II partner utility was the
14 best balance we could strike between the various participants' needs within the available
15 size of the overall Big Stone Unit II project. Having multiple participants in the project
16 enables the benefits of Big Stone Unit II's economies of scale to be available to smaller
17 municipal utilities whose total peak load may only be in the magnitude of a few
18 megawatts. In addition, allocating shares of Big Stone Unit II among the various
19 participants allows each to better fit their individual annual customer growth rate
20 patterns. It also allows them to diversify their energy supply portfolios such that they are
21 not over-dependent on any one energy source. It is also significant that participation in

1 Big Stone Unit II is with utilities with customers in the plant's footprint and generally
2 indicative of their load ratios in the area.

3 **Q: Why did the Big Stone II Co-owners propose to build at the Big Stone site?**

4 A: The Big Stone site was chosen for a number of reasons. Using the existing Big
5 Stone site takes advantage of the existing infrastructure, including railway lines, coal-
6 handling facilities, and water supply. The Big Stone site is located within and close to
7 the Big Stone II Co-owners' service areas.

8 **Q: Does the Big Stone Unit II project meet all of the region's growing energy
9 needs?**

10 A: No, not even close. Big Stone Unit II an important component in an overall
11 portfolio of energy development in the coming years. However, it alone is not the entire
12 picture, nor is it intended to be. Energy conservation, renewables, other projects, other
13 technologies and other resources will be needed in addition to Big Stone Unit II in the
14 coming years.

15 **VII. ENVIRONMENTAL PROTECTION**

16 **Q: What have the Big Stone II Co-owners done to minimize the impacts of the
17 Big Stone Plant on the environment?**

18 A: The combined project has a number of significant environmentally sound
19 attributes. First, the Big Stone Unit II owners have committed to installing a joint,
20 common wet flue gas desulfurization system that will also scrub the gases of Unit I.
21 Thus, we will add 630 MW of generation and at the same time significantly cut SO2
22 emissions. Second, the Big Stone Unit II selective catalytic reduction system, together

1 with more aggressive operation of Big Stone Unit I's over-fire air system, will result in
2 the addition of 630 MW of generation without an increase in NOx emissions. Third, the
3 emissions control system will also include a fabric filter that, together with the wet flue
4 gas desulfurization system, will result in greater mercury removal than other
5 conventional control configurations when firing subbituminous coal. And the Big Stone
6 II Co-owners have recently committed to a site cap for mercury that will result in a no net
7 increase in mercury, despite adding 630 MWs to the system. Last, the plant's
8 supercritical design will result in an unusually high efficiency for a pulverized coal plant.
9 This higher efficiency will result in lower CO2 emissions. The unit will produce
10 approximately 20 percent less CO2 per megawatt-hour than existing coal-based power
11 plants in the region. This has in immediate impact on CO2 emissions, and it will make
12 the later addition of CO2 controls, when such controls are commercially available and
13 required, more cost-effective.

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

15 **A:** Yes it does.