

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

PREFILED REBUTTAL TESTIMONY

OF

MARK ROLFES

PROJECT MANAGER

OTTER TAIL POWER COMPANY

APRIL 23, 2008



**PREFILED REBUTTAL TESTIMONY OF MARK ROLFES**

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

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3   **I.       INTRODUCTION**

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

5   A:       Mark Rolfes, 48450 144th Street, Big Stone City, SD 57216.

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

7   A:       Yes. I submitted direct testimony on March 10, 2008 (OTP/MDU Exhibit 324).

8   **Q:       Did you testify before the Commission in June 2007?**

9   A:       Yes, I appeared before the Commission at the hearing on June 26, 2007. I also submitted  
10 written testimony in that proceeding (OTP/MDU Exhibits 301 and 302).

11 **Q:       Have you reviewed the testimony of Public Service Commission Advocacy staff**  
12 **witness Terry Deason?**

13 A:       Yes, I have.

14 **Q:       Have you reviewed the testimony of witness David Schlissel, who filed testimony on**  
15 **behalf of Intervenors Mark Trechock and Dakota Resource Council?**

16 A:       Yes, I have reviewed his testimony, too.

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

18 **Q:       What is the purpose of your rebuttal testimony?**

19 A:       The purpose of my rebuttal testimony is to respond to the supplemental testimony of  
20 witness David A. Schlissel dated April 9, 2008 regarding the estimated capital costs for the Big  
21 Stone II Unit and the projected schedule for construction and operation of the facility. Also, I

1 provide additional information regarding calculation of the capital costs in response to matters  
 2 raised by Mr. Deason.

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

4 A: Otter Tail and Montana-Dakota Utilities have made a reasonable estimate of the capital  
 5 cost for construction of Big Stone Unit II and continue to rely on it. Costs are escalating at 6%  
 6 per year. The companies continue to expect that the Big Stone II facility can be placed in  
 7 commercial operation in 2013, although the anticipated June 2013 date becomes more  
 8 problematic as delays in regulatory decisions are incurred.

9 **III. ESTIMATED CAPITAL COSTS**

10 **Q: Have you made any additional estimates for the capital cost of a 500 MW pulverized**  
 11 **coal plant since you submitted testimony on March 10, 2008?**

12 A: No, we have not made any additional cost estimates. We continue to rely on our \$1.272  
 13 billion estimate with a June 2013 operation date as determined through the mathematical method  
 14 based on information from the Electric Power Research Institute (EPRI) that I described in my  
 15 March 10 testimony.

16 **Q: Can you provide additional information about how the EPRI formula works?**

17 A: The EPRI formula is not all that mysterious or complicated; it is basically a simple  
 18 mathematical ratio. If there were no economies of scale, the cost of the plant would be directly  
 19 related to the size, so that a 250 MW plant would cost exactly half of what a 500 MW plant  
 20 would cost to build. However, we know there are economies of scale, so as the size of the unit  
 21 gets smaller, the cost per kW increases. EPRI has determined the mathematical relationship

1 between the capital cost and the capacities of two facilities. The EPRI formula is expressed as  
2 follows:

$$\begin{aligned} &3 \quad \text{Cost of Smaller Facility} = (\text{Cost of Larger Facility}) \text{ times} \\ &4 \quad (\text{Capacity of Smaller Facility}/\text{Capacity of Larger Facility})^{0.7} \end{aligned}$$

5  
6 In words, the equation says that the cost of a smaller facility is determined by multiplying  
7 the known cost of a larger facility times the ratio of capacity of the smaller facility divided by the  
8 capacity of the larger facility taken to the 0.7 power. The exponent is less than one (1) because  
9 the cost per kilowatt is higher for the smaller facility. We know the cost of a 630 MW facility  
10 based on the work that Black & Veatch did in 2006 so we can plug that number into the equation  
11 and calculate the cost for a 500 MW plant. We also made a minor reduction to the cost of the  
12 630 MW plant (2.5%) for savings we believe we can obtain.

13 **Q: Are you confident that the cost estimate for the 500 MW facility is reliable?**

14 A: We remain confident with our estimate based on the EPRI information. The EPRI data is  
15 recent and supports the 0.7 factor. In addition, we continue to monitor worldwide commodity  
16 prices and costs of other similar facilities. This information supports the cost figures we have  
17 come to rely on for Big Stone II. We know, too, that as the cost of pulverized coal plants  
18 continues to rise, the costs of other technologies are also increasing at a similar rate or even  
19 greater rate.

20 **Q: Mr. Schlissel suggests at page 22 in his testimony that he expects the worldwide**  
21 **demand for electric generating facilities to keep the prices of the components needed to**  
22 **construct a plant high and that these costs will continue to rise. Do you agree with his**  
23 **assessment?**

1 A: Only to a limited extent. I agree that there is currently a strong worldwide demand for  
2 coal-fired power plants. Projects the size of Big Stone II are coming on-line in China and India  
3 at the rate of approximately one per week. Europe, Africa and other regions are also building  
4 coal-fired plants. This indicates that the world demand for coal-fired plant equipment continues  
5 to be robust and that cost escalation rates higher than inflation are likely. That is why we  
6 continue to be concerned about further regulatory delay.

7 On the other hand, there are factors that we believe are moderating. The biggest one is  
8 labor. Labor is not an international commodity in the same respect that steel is. Labor  
9 availability and costs can change, and change quickly. As projects get cancelled or delayed, or  
10 concern about recession looms, the availability of labor can increase, and increase quite  
11 dramatically and swiftly. The law of supply and demand dictates that relative labor costs will  
12 decline as the size of the available labor pool expands. Mr. Schlissel does not consider the fact  
13 that some of the important cost factors are moderating.

14 **Q: In Mr. Schlissel's testimony at page 26 he cites a report by the Brattle Group**  
15 **entitled "Rising Utility Construction Costs" that was prepared for the Edison Foundation**  
16 **to support his allegation that the costs of power plants have risen significantly in recent**  
17 **years. Do you have any comment about what this report would indicate for the accuracy of**  
18 **your cost estimates?**

19 A. Yes. This report also confirms that our cost estimates are reasonable. If you consult the  
20 report, there is a lot of information on the construction cost changes for all products and facets of  
21 our industry. The report refers to two projects as examples of construction cost increases: our  
22 project and the Duke Cliffside project. As I indicated earlier in my March 2008 testimony, if

1 you look at the costs per kW on an equalized basis, i.e., accounting for different plant sizes, these  
2 two projects have the same cost.

3 The Brattle Group uses Big Stone II as the reference point for extrapolating project cost  
4 increases for application to other projects. We know our project and what is behind it, and we  
5 believe the Brattle report actually reinforces our confidence level in our knowledge and ability to  
6 make reasonable future cost estimates.

7 **Q: What have you observed regarding commodity price indices?**

8 A: An examination of the appropriate cost indices for the past year also strongly supports  
9 our cost methodology. In deriving the original cost estimate for the plant, Black & Veatch did a  
10 study of commodity indices. From that, Black & Veatch determined an overall blended  
11 escalation rate to use for commodities. That escalation rate for commodities in their analysis is  
12 8%. The 6% escalation rate for the entire project is a blended rate of many components; some  
13 greater than 6% and some less. The commodities component is 8%.

14 With that original work in mind, we went back and looked at the recent changes in the  
15 commodity indices for the same commodities used to prepare our cost estimates. This included  
16 eight representative commodities: steel mill products, iron and steel, iron and steel for industrial  
17 buildings, steel pipe and tubing, fabricated pipe and pipe fittings, nickel, copper, and power wire  
18 and cable.

19 For the time period of May 2006 through February 2008, six of these eight commodities,  
20 on an annualized basis, have been below the 8% used in the estimate, some significantly below  
21 8%. Price indices for these six commodities now range from 0.5% to 6.3%. Only two  
22 commodities are above, one at 9.44% and the other at 13.6%.

1           The overall range of these eight commodities is less than 6%, though we continue to use  
2 a conservative 8% escalation in our analysis.

3   **Q:    Mr. Schlissel raised a number of other concerns about the reliability of the cost**  
4 **estimate, such as how the figure compares with the cost estimates for the Duke Cliffside**  
5 **plant in North Carolina, that more sensitivity analyses should be performed, and the need**  
6 **for a more complete cost estimate by Black & Veatch, the company that did the 2006**  
7 **estimate. What is your response to these allegations?**

8   A:    I addressed all these concerns in my March 10, 2008, direct testimony in this proceeding  
9 (Exhibit 324). As I explained in that testimony, none of these concerns undermines our reliance  
10 on our cost estimate.

11   **IV.    IN-SERVICE DATE**

12   **Q:    Has there been any change in the summer 2013 projected in-service date?**

13   A:    Given the delays that have occurred in obtaining final regulatory decisions, the in-service  
14 date is likely to extend a couple of months into the fall of 2013. We are well aware that delays  
15 result in increased costs, and that is why we have sought an expeditious completion of the  
16 administrative processes. A few month delay, however, does not change the relative impacts on  
17 the various facilities under consideration because the delay is short and delay causes cost  
18 increases that affect every type of facility.

19   **V.     MERCURY CONTROL**

20   **Q:    Do the Applicants expect that recent developments at the federal level with regard**  
21 **to mercury control from power plants will require more action by the Applicants than**  
22 **what they have already committed to do with regard to controlling emissions of mercury?**

1 A: The Applicants have made a commitment to control emissions of mercury from both the  
2 existing Unit I and the new Unit II, by installing equipment that is expected to get 90% removal  
3 – as is required of certain large generating facilities in Minnesota. For a number of reasons, the  
4 Applicants do not expect that federal law will require greater reductions than what has been  
5 committed to already.

6 **Q: What is the estimated cost of mercury control equipment to meet the commitment?**

7 A: Activated carbon injection upstream of a fabric filter is the most mature technology and  
8 appears to be potentially effective in removing 90 percent of the mercury from coal combustion  
9 flue gases. Big Stone II capital costs for the carbon injection equipment are estimated at \$1.5  
10 million. Estimated operating costs of \$1.2 million to \$1.5 million per year are included in the  
11 Big Stone II projected operation and maintenances expenses.

12 **Q: Have these costs been included in the capital and operating cost estimates prepared**  
13 **for the Big Stone II project?**

14 A: Yes, these costs have already been taken into account.

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

16 A: Yes.