

BEFORE THE SOUTH DAKOTA PUBLIC UTILITIES COMMISSION

**In the Matter of the Application by Otter Tail Power)
Company on behalf of the Big Stone II Co-owners for)
an Energy Conversion Facility Siting Permit for the) Case No EL05-022
Construction of the Big Stone II Project)**

**Surrebuttal Testimony of
David A. Schlissel and Anna Sommer
Synapse Energy Economics, Inc.**

**On Behalf of
Minnesotans for an Energy-Efficient Economy
Izaak Walton League of America – Midwest Office
Union of Concerned Scientists
Minnesota Center for Environmental Advocacy**

June 22, 2006

1 **Q. Mr. Schlissel, please state your name, position and business address.**

2 A. My name is David A. Schlissel. I am a Senior Consultant at Synapse Energy
3 Economics, Inc, 22 Pearl Street, Cambridge, MA 02139.

4 **Q. Ms. Sommer, please state your name position and business address.**

5 A. My name is Anna Sommer. I am a Research Associate at Synapse Energy
6 Economics, Inc., 22 Pearl Street, Cambridge, MA 02139.

7 **Q. On whose behalf are you testifying in this case?**

8 A. We are testifying on behalf of Minnesotans for an Energy-Efficient Economy,
9 Izaak Walton League of America – Midwest Office, Union of Concerned
10 Scientists, and Minnesota Center for Environmental Advocacy (“Joint
11 Intervenors”).

12 **Q. Have you previously filed testimony in this proceeding?**

13 A. Yes. We filed direct testimony on May 19 and May 26, 2006 and rebuttal
14 testimony on June 9, 2006.

15 **Q. What is the purpose of this rebuttal testimony?**

16 A. This testimony responds to the Rebuttal Testimony filed by the Big Stone II Co-
17 owners on June 9 and June 16, 2006.

18 **Q. Have you proposed a wind-gas combination as an alternative to Big Stone II
19 as the Co-owners’ witnesses have repeatedly claimed?¹**

20 A. No. We have shown that there are alternatives that are more economical than Big
21 Stone II.

¹ For example, see Applicants’ Exhibit 42, at page 27, lines 14-17, and page 29, lines 14-19.

1 **Q. Why then did you examine such a wind-gas combination in your May 26,**
2 **2006 Direct Testimony?**

3 A. In their Testimony, the Co-owners relied upon several studies, two of which were
4 prepared by Burns & McDonnell. The first study was the July 2005 *Phase I*
5 *Report Big Stone Unit II*. The second study on which the Co-owners relied was a
6 September 2005 Burns & McDonnell *Analysis of Baseload Generation*
7 *Alternatives*.²

8 As we explained in our May 26, 2006 Direct Testimony, the *Phase I Study*
9 dismissed the potential for a wind alternative to Big Stone II in a single
10 paragraph.³ The *Generation Alternatives Study*, however, did examine a wind-gas
11 combination as an alternative to Big Stone II. When we reviewed the results of
12 this Study we found a number of significant flaws which unfairly biased its results
13 in favor of Big Stone II.⁴ Therefore, we set out in our May 26th Direct Testimony
14 to correct for the two most significant of these flaws: (a) the assumption that the
15 wind capacity had no capacity value and had to be backed-up by 600 MW of
16 combined cycle capacity and (b) limiting the wind alternative to 600 MW which
17 led to more than half of the required energy in the wind-gas combination being
18 generated by the far more expensive natural gas-fired combined cycle facility.
19 We also noted, but did not make a correction for, the fact that in its September
20 2005 *Generation Alternatives Study* Burns & McDonnell understated the
21 levelized value of the wind protection tax credit.⁵ We also noted that Burns &
22 McDonnell had not examined a combination of renewable resources, such as
23 wind, demand-side measures and hydro, to meet the projected needs of the Co-
24 owners.⁶

2 Applicants' Exhibit 23-A.

3 Joint Intervenors Exhibit 4, at page 9, line 1, through page 11, line 17.

4 Joint Intervenors Exhibit 4, at page 11, line 11, to page 14, line 19.

5 Ibid, at page 16, lines 5-17.

6 Ibid, at page 19, lines 1-13.

1 As we noted in our May 26th Direct Testimony, we believe that the type of
2 levelized cost analyses we were presenting was a useful tool in the screening of
3 possible alternatives to be studied in greater detail to capture the various factors
4 that have been noted by the Co-owners. We had merely revised the levelized cost
5 analysis presented in Burns & McDonnell's *Generation Alternatives Study* to
6 show that under more reasonable, but still extremely conservative, assumptions
7 different amounts of wind and gas capacity can be more economic than Big Stone
8 II. Finally, we noted further that we believed that there would be wind with hydro
9 and/or demand side management measures that would have lower costs than the
10 wind-gas combinations that Burns & McDonnell Study in their *Generation*
11 *Alternatives Study* and that we had examined in our May 26th Direct Testimony.

12 **Q. Did your Direct Testimony state that the Applicants do not need additional**
13 **baseload capacity in 2011, as a number of the Co-owner rebuttal witnesses**
14 **have claimed?**⁷

15 A. No. Our May 26th Direct Testimony clearly shows that our conclusions were that
16 (1) the Co-owners have not demonstrated that there is a regional need for new
17 baseload generating capacity in 2011 and (2) the Co-owners have not
18 demonstrated that they each need new baseload generating capacity beginning in
19 2011.⁸

20 **Q. Have you revised these conclusions in light of the information made in the**
21 **Co-owners' rebuttal testimony?**

22 A. We accept the fact that the Co-owners need to take serious action to address
23 projected peak hour demands starting in or about 2011 and energy requirements.
24 However, in spite of all of the claims made in the Co-owners' rebuttal testimony,
25 the evidence they have produced is still not sufficient to support the claim that all
26 of the Co-owners need, for reliability purposes, to build a new 600 MW central

⁷ For example, see Applicants' Exhibit 42, at page 3, lines 2-6.

⁸ For example, see Joint Intervenor Exhibit 4, at page 2, lines 1-4, and at page 3, line 24, to page 7, line 18.

1 station facility to meet their projected load and energy requirements and that
2 adding such a coal-fired facility will be a lower cost option than a portfolio of
3 renewable supply-side and demand-side alternatives.

4 **Q. Do you ignore the possibility that a new increment of baseload capacity**
5 **might not be needed for reliability purposes for its first several years of**
6 **operation but nevertheless might provide economic benefits because it has**
7 **lower operating and fuel costs than older generating facilities, as Mr.**
8 **Morlock claims?**⁹

9 A. No. In fact, we agreed in our May 26th Direct Testimony that it is possible that
10 the addition of a new baseload generating facility can be the lowest cost option
11 even if all of the capacity from that facility is not immediately needed to ensure
12 that an owner has adequate capacity to serve loads or for system reliability.¹⁰

13 **Q. Is it your position that the Applicants have to wait to install Big Stone II until**
14 **they are absolutely sure that actual weather conditions would result in**
15 **exactly 600 MW of capacity deficit in a particular year, as Mr. Morlock**
16 **testifies?**¹¹

17 A. No. We understand that the addition of new capacity is based on projected
18 conditions and that the addition of central station capacity can be “lumpy.” We
19 also understand, as we stated in our May 26, 2006 Direct Testimony that the
20 addition of a new increment of capacity in advance of when that capacity might
21 be needed for reliability may provide economic benefits. However, this does not
22 mean that there would not be greater economic benefits, without sacrificing
23 reliability, from adopting wind or other renewable supply-side alternatives that
24 permit capacity to be added to a system in smaller increments or demand-side
25 alternatives that reduce peak demands and energy requirements so that the
26 addition of new capacity can be deferred.

⁹ Applicants’ Exhibit 42, at page 6, line 18.

¹⁰ Joint Intervenors Exhibit 4, at page 7, lines 21-25.

1 **Q. Do you have any comment on the claim by Co-owner witness Morlock that it**
2 **was not appropriate to allocate any capacity value to wind because**
3 **Applicants' Exhibit 23-A was an analysis of Big Stone II alternatives based**
4 **on comparison of "plant-to-plant" characteristics?¹²**

5 A. Yes. Mr. Morlock's claim that it was inappropriate to reflect wind's capacity
6 value in Applicants' Exhibit 23-A is misleading at best. If Burns & McDonnell
7 wanted to perform a valid and meaningful plant-to-plant comparison it should
8 have reflected the reality that wind resources would receive a capacity value of
9 perhaps 15 percent under the existing MAPP capacity accreditation methodology.
10 Instead, Burns & McDonnell studied a 600 MW wind and 600 MW gas
11 combination that the Co-owners would never undertake because wind does have a
12 capacity value.

13 At the same time, to provide a meaningful comparison of plant-to-plant
14 characteristics, Burns & McDonnell would have to have included some additional
15 capacity to backup Big Stone II since it can be expected to have a non-zero forced
16 outage rate and, therefore, might not be available when the system experiences its
17 peak demands.

18 **Q. Mr. Morlock claims that the Applicants should not be using the methodology**
19 **used in the September 2004 *Wind Integration Study – Final Report*, that was**
20 **prepared for Xcel Energy and the Minnesota Department of Commerce, to**
21 **determine wind capacity values.¹³ Do you agree?**

22 A. No. As we explained in our May 26, 2006 Direct Testimony, we believe that the
23 Applicants should assume that wind resources would have a capacity value of
24 between 15 percent and 25 percent.¹⁴ The low end of this range would reflect the
25 existing MAPP capacity accreditation methodology. The high end of the range

¹¹ Applicants' Exhibit 42, at page 7, lines 5-13.

¹² Applicants' Exhibit 42, at page 14, lines 8-14.

¹³ Applicants' Exhibit 42, at page 18, lines 9-14.

¹⁴ Joint Intervenors Exhibit 4, at page 15, lines 11-20.

1 would reflect results similar to the 2004 study prepared for Xcel Energy and the
2 Minnesota Department of Commerce.

3 We believe that the results of the 2004 *Wind Integration Study* are important even
4 though they do not affect MAPP's current capacity accreditation methodology.
5 The 2004 *Wind Integration Study* used the same methodology that MAPP used in
6 its November 2003 LOLE study to evaluate the reasonableness of its current 15
7 percent reserve margin. Moreover, the methodology used in the 2004 *Wind*
8 *Integration Study* looked at all of the hours in the year, not merely a four hour per
9 month snapshot. We believe that it is reasonable to expect that over time MAPP
10 will reevaluate its accreditation methodology in light of the actual output of wind
11 facilities and the results of the modeling analyses analysis presented in the 2004
12 *Wind Integration Study* and other recent studies.

13 **Q. Mr. Morlock also claims that you have selected a high wind capacity value**
14 **that you “would prefer to see” from the results of the September 2004 *Wind***
15 ***Integration Study* that you have discussed in your May 26, 2006 Direct**
16 **Testimony.¹⁵ Is that true?**

17 A. No. We presented the Study's results as reported in the Study itself and only used
18 a 25 percent capacity value that was below the 27 percent low end of the Study's
19 results.

20 **Q. Have you taken the Burns & McDonnell Study out of context to try to show**
21 **that the Applicants did not assign wind a capacity value, as Mr. Morlock**
22 **claims?¹⁶**

23 A. No. As Mr. Morlock admits elsewhere in his Rebuttal Testimony, the September
24 25, 2005 Burns & McDonnell Study *did not* assign wind any capacity value.¹⁷

¹⁵ Applicants' Exhibit 42, at page 18, lines 15-16.

¹⁶ Applicants' Exhibit 42, at page 18, lines 21-22.

¹⁷ Applicants' Exhibit 42, at page 14, lines 8-13.

1 **Q. In your levelized cost analysis of Big Stone II versus more realistic wind-gas**
2 **combinations, did you use high externality costs, as Mr. Morlock claims?**¹⁸

3 A. No. We did not use a high CO₂ externality cost in the illustrative Big Stone II and
4 wind-gas analyses in our May 26, 2006 Direct Testimony. Indeed, we only used
5 the \$0/ton CO₂ externality cost that Burns & McDonnell used in their September
6 2005 Generation Alternatives Study. It is unfortunate and quite remarkable that
7 Mr. Morlock, as the Co-owners' lead rebuttal witness, apparently does not
8 understand the difference between externality costs and the costs of complying
9 with future carbon regulations that we discussed in our May 19, 2006 Direct
10 Testimony and used in the illustrative levelized cost analysis in our May 26, 2006
11 Direct Testimony.

12 **Q. Do you agree with Mr. Morlock that performing a system simulation analysis**
13 **between Big Stone II and wind would have been preferable to a levelized cost**
14 **analysis?**

15 A. Yes. As we noted above, a levelized cost analysis is performed as an initial
16 screening of possible alternatives. Promising alternatives then are examined in
17 greater detail in system simulation analyses. However, such a system simulation
18 analysis must be based on reasonable assumptions and treat all potential resources
19 the same. Such analyses also must not be biased in favor of any particular
20 resource alternatives.

21 For example, such system-level analyses must reflect reasonable projections of
22 the costs of complying with future greenhouse gas regulations. Unfortunately,
23 none of the system analyses undertaken by the Co-owners did so. Therefore, their
24 results are suspect and biased in favor of the high carbon emitting resource
25 alternatives.

¹⁸ Applicants' Exhibit 42, at page 29, lines 17-19.

1 **Q. Why then did you only prepare a levelized cost analysis?**

2 A. We did not have the resources to undertake a production simulation or generation
3 expansion analysis in this proceeding. We prepared an illustrative levelized cost
4 analysis because that is the type of comparison between Big Stone II and possible
5 alternatives that the Co-owners' consultant, Burns & McDonnell, had prepared in
6 its September 2005 *Generation Alternatives Study*.

7 **Q. Co-owner witnesses Morlock and Tielke discuss what they call a "system-**
8 **level analysis" of the specific wind/gas combination alternative that you**
9 **describe in your May 26, 2006 Direct Testimony?¹⁹ Have you had an**
10 **opportunity to review the detailed assumptions and the input and output**
11 **data files for this analysis?**

12 A. No. This new analysis was first discussed in the Co-owners' June 16, 2006
13 Rebuttal Testimony. We have not had any opportunity to review the assumptions
14 used in the analyses or any of the input or output data files for the analyses.
15 Therefore, we do not know what values MRES used for such critical assumptions
16 as the cost of wind or the present value rate or even what are the annual and total
17 nominal and present value costs of the different alternatives. All that we have
18 seen are the summary "results" presented in the table on page 17 of Applicants'
19 Exhibit 44.

20 **Q. Have you requested the workpapers for this new analysis?**

21 A. Yes. We requested the workpapers for this new analysis on Monday June 19th.

22 **Q. Do the Co-owners note any of the assumptions that MRES used in this new**
23 **analysis?**

24 A. Yes. MRES witness Tielke notes that the new analysis assumed:

- 25 • that the production tax credit (PTC) will be a levelized \$12 per MWh for
26 ten years

¹⁹ Applicants' Exhibit 42, at page 24, line 15, to page 35, line 9, and Applicants' Exhibit 44, at page 16, line 1 to page 17, line 14.

1 • the all new capacity would require transmission at a cost of \$129 per kW
2 in 2005 dollars

3 • a zero dollars per ton CO₂ externality cost.²⁰

4 **Q. Do these assumptions suggest that the results of the new analysis are biased**
5 **in favor of Big Stone II?**

6 A. Yes. Because it does not reflect any externality costs or costs of complying with
7 future greenhouse gas regulations, the new MRES analysis is heavily biased in
8 favor of Big Stone II, the largest emitter of CO₂. Similarly, the use of a levelized
9 \$12 per MWh production tax credit is simply wrong and is inconsistent with our
10 Direct Testimony and the testimony of Co-owner witness Grieg who stated that
11 Burns & McDonnell estimates a value of approximately \$22 per MWh for the
12 PTC.²¹

13 **Q. Is it reasonable to assume that all new generating capacity would require the**
14 **construction of new transmission capacity?**

15 A. Not necessarily. The Co-owners have not produced any evidence that the amount
16 of new transmission capacity that would be required under a wind-gas alternative
17 would be linear and completely tied to the amount of generating capacity being
18 added. Instead, the amount of new transmission capacity that would be needed
19 would depend on the specific locations of the new wind and gas-fired facilities
20 and their proximity to existing and planned transmission facilities and loads.

21 **Q. Have you seen any evidence whatsoever that the new MRES analysis**
22 **presents a reasonable system-level estimate of the relative costs of Big Stone**
23 **II and the illustrative wind-gas combinations you discussed in your May 26,**
24 **2006 Direct Testimony?**

25 A. No. Obviously, we would like to have an opportunity to review the workpapers
26 and assumptions used in the new MRES analysis. However, for the reasons

²⁰ Applicants' Exhibit 44, at page 16, lines 10-13.

²¹ Applicants' Exhibit 51, at page 5, lines 5-7.

1 explained above, we have no confidence that the new MRES analysis presents a
2 reasonable system-level estimate of the relative costs of Big Stone II.

3 **Q. Do you have any comment on Co-owner witness Morlock's claim that the**
4 **wind-gas combinations you consider in your illustrative levelized cost**
5 **analyses would require additional transmission capacity as compared to Big**
6 **Stone II?**²²

7 A. Yes. We agree that adding new generating capacity, whether coal-fired, gas-fired
8 or wind, may require the building of additional transmission capacity. However, a
9 determination of how much new transmission capacity will be needed to serve
10 new wind capacity is a complicated question based on the locations at which the
11 new wind facilities are sited, the relative locations of such sites to existing and
12 already planned transmission facilities, and the proximity of the wind sites to load
13 centers. Without such detailed studies, it is impossible to say how much more, if
14 any, additional new transmission would be needed to site 1,200 MW of wind than
15 will be needed to be built as a result of the addition of Big Stone II to the
16 electrical grid.

17 **Q. Do you have any comment on the claim by Co-owner witness Morlock that**
18 **there is an "operating standard" that limits the amount of wind in a utility**
19 **system to between 15% to 20%?**²³

20 A. Yes. We have seen no evidence that any of the Big Stone II Co-owners have
21 studied the amounts of wind capacity and energy that their systems or the
22 integrated electrical grid within MAPP and/or MISO can integrate without
23 adverse reliability effects. Therefore, we don't understand what basis Mr.
24 Morlock may have for his claim that the Co-owners would be limited to a
25 maximum of 15% to 20% wind on their systems.

²² Applicants' Exhibit 42, at page 36, lines 1-20.

²³ Applicants' Exhibit 42, at page 28, lines 9-21.

1 **Q. Haven't you testified in this proceeding that the amount of wind that can be**
2 **integrated into the electrical grid is limited to a maximum of 20 percent of**
3 **the peak demand, as Mr. Morlock has claimed?**²⁴

4 A. No. The studies on which we rely in our May 26, 2006 Direct Testimony support
5 the position that the electrical system can integrate up to twenty percent of wind
6 generation without having adverse impacts on the reliability or stability of the
7 electrical grid.²⁵ However, they do not say that an electrical system cannot
8 integrate more than twenty percent of wind generation.

9 Moreover, all seven of the proposed Big Stone II Co-owners are members of
10 MAPP. Six of the seven Co-owners (OTP, GRE, MRES, Montana-Dakota,
11 Heartland and SMMPA) are members of MISO. Even a twenty percent limit on
12 the amount of wind power that could be integrated into either of these electrical
13 systems would mean the potential for adding thousands of megawatts more wind
14 capacity than currently exists on either system.

15 For example, there is less than 2,000 MW of wind capacity currently in MAPP-
16 US or planned. The MAPP-US load forecasts provided by Mr. Koegel during
17 discovery project peak demands of 33,742 MW in the summer of 2011 and
18 27,668 MW in the winter of 2011/2012. Even if this meant that the total amount
19 of wind capacity that the MAPP-US system can integrate is only twenty percent
20 of the lower winter 27,668 MW peak load, this still would mean that the system
21 could integrate approximately 5,500 MW of wind without any reliability
22 concerns. Of course, a wind integration study would be necessary to examine how
23 much wind could be integrated without adversely affecting reliability and costs,
24 but this simplified analysis shows that the MAPP-US system could easily
25 integrate the levels of wind that we have assumed in our illustrative levelized cost
26 analyses.

²⁴ Applicants' Exhibit 42, at page 29, lines 1-4.

²⁵ See Joint Intervenors Exhibit JI-4-B.

1 **Q. Do the wind-gas combinations that you examined in your illustrative**
2 **levelized cost analyses have different output profiles than Big Stone II?**

3 A. Yes. However, this does not mean, as Mr. Morlock repeatedly claims, that the
4 wind-gas scenarios would be economically inferior to Big Stone II.

5 **Q. Do you have any comment on Mr. Morlock's Exhibit 42-D which he says**
6 **illustrates the importance of the variability of wind resources?**²⁶

7 A. Yes. Wind clearly is a variable power source. However, Mr. Morlock's Exhibit
8 42-D represents the output of one particular wind plant in, presumably, one
9 particular year. It makes no sense to draw general conclusions from the output of
10 this one plant.

11 In the same way, there surely are individual coal plants that have poor reliability
12 in individual years but this experience should not be used to represent Big Stone
13 II.

14 **Q. Mr. Morlock claims that when too much wind energy is produced compared**
15 **to Big Stone Unit II, during off-peak hours it will tend to offset lower-cost**
16 **energy that is available at that time.**²⁷ **Is this a reasonable claim?**

17 A. No. Wind would not be displacing a lower-cost resource during off-peak hours.
18 Wind has extremely low variable costs so it will be operating economically at the
19 beginning of the supply curve and will displace resources with higher variable
20 costs. Because he cites the \$50/MWh cost figure for wind, Mr. Morlock must be
21 comparing the all-in cost of wind to the variable cost of other resources, which is
22 simply wrong. Therefore, there is no evidence to suggest that the penalties that
23 Mr. Morlock claims will result from the generation of too much wind power
24 actually will be experienced. Instead, the wind will displaced higher cost units.

²⁶ Applicants' Exhibit 42, at page 31, lines 14-22.

²⁷ Applicants' Exhibit 42, at page 32, lines 6-11.

1 **Q. Have you assumed that the wind is equally likely to blow during any hour of**
2 **the year, as Co-owner witness Morlock claims?**²⁸

3 A. No. That's why we have recommended a 15 percent to 25 percent capacity value
4 for wind.

5 **Q. Are you "talking out of both sides" of your respective mouths, as Mr.**
6 **Morlock claims, when you include natural gas-fired combined-cycle gas**
7 **turbines as part of the wind/gas combinations in your illustrative levelized**
8 **cost analyses?**²⁹

9 A. Not at all. We are not proposing that natural gas definitely be included in a
10 portfolio of alternatives to Big Stone II. We are only suggesting that it be studied
11 as part of a possible portfolio of alternatives to Big Stone II. That is consistent
12 with our admonition that choosing to build a natural gas-fired plant *without*
13 *consideration* of the future volatility of natural gas costs would be imprudent.
14 Choosing to build a coal-fired plant without consideration of the possible costs of
15 complying with future greenhouse gas regulations would be equally imprudent.

16 **Q. Have you decided that a combination wind/gas plan would be "worth it"**
17 **regardless of what gas might cost in the future, as Mr. Morlock claims?**³⁰

18 A. No. Even though Mr. Morlock put the words "worth it" in quotes, we never said
19 that in our testimony that a combination wind/gas plan would be worth it
20 regardless of what gas might cost in the future, nor do we believe that the price of
21 natural gas is irrelevant in an examination of supply-side and demand-side
22 options. In our illustrative levelized cost analyses, we used the very same natural
23 gas costs that Burns & McDonnell had used in its September 2005 Generation
24 Alternatives Study.

²⁸ Applicants' Exhibit 42, at page 31, lines 20-22.

²⁹ Applicants' Exhibit 42, at page 36, line 21, to page 37, line 8.

³⁰ Applicants' Exhibit 42, at page 37, lines 9-14.

1 **Q. Do you have any comment on Mr. Morlock’s claim that the additional**
2 **wind/gas combination you suggest would be “pancaked on top of more than**
3 **800 MW of wind capacity that the Applicants already plan to do?”³¹**

4 A. We are pleased that the Co-owners are planning to add wind resources. However,
5 a plan to add 800 MW by the 2015 to 2020 timeframe does not offset or provide
6 justification for the addition of 600 MW of coal-fired capacity in 2011.

7 Moreover, as we have discussed earlier, the MAPP-US and MISO electrical
8 systems can reasonably be expected to be able to integrate both the planned 800
9 MW of wind and the wind resources that might be added in place of Big Stone II
10 without any adverse reliability effects.

11 **Q. SMMPA witness Anderson says that a statement on page 23 of your May 26,**
12 **2006 Direct Testimony “implies” that SMMPA failed to consider alternatives**
13 **to Big Stone II.³² Is this correct?**

14 A. No. The discussion concerning SMMPA on page 23 of our May 26, 2006 only
15 refers to the “next best” alternative to Big Stone II included in Applicants’ Exhibit
16 25-B.³³ Based on this incorrect representation of our testimony, Mr. Anderson
17 launches into a detailed discussion of the results of SMMPA’s 2003 IRP analyses.

18 **Q. Have you had any opportunity to examine the new generation expansion**
19 **analysis presented in the testimony of CMMPA witnesses Thompson and**
20 **Davis?**

21 A. No. We understand that this new material was filed in the Minnesota proceeding
22 on June 1, 2006. However, we have been fully occupied this month with the
23 following case-related work: preparing our June 9th Rebuttal Testimony;
24 examining workpapers for other Co-owner sponsored studies that the Joint
25 Intervenors had requested months ago but were only provided this month;

³¹ Applicants’ Exhibit 42, at page 38, lines 1-2.

³² Applicants’ Exhibit 45, at page 3, lines 15-19.

³³ Joint Intervenors Exhibit 4, at page 23, lines 22-24.

1 responding to Co-owner document discovery, traveling to Minneapolis to be
2 deposed by the Co-owners; reviewing the Co-owners' rebuttal testimony of June
3 9 and 16, 2006; and preparing this surrebuttal testimony.

4 **Q. Co-owner witness Nguyen testifies that "Montana-Dakota considered**
5 **performing additional system capacity expansion computer modeling to**
6 **examine the system-level results of adopting the Schlissel and Sommer**
7 **wind/gas combination scenarios..."³⁴ Have you seen any evidence that**
8 **Montana-Dakota has performed any system capacity expansion modeling**
9 **whatsoever to evaluate Big Stone II and alternatives?**

10 A. No. Montana-Dakota has not provided any evidence whatsoever that it has
11 performed any system modeling to evaluate participating in Big Stone II versus
12 any alternatives.

13 **Q. Mr. Nguyen's testimony says that you use environmental externalities to say**
14 **that Montana-Dakota and other Applicants should not install Big Stone II.³⁵**
15 **Is this correct?**

16 A. No. Like Mr. Morlock, Mr. Nguyen does not appear to understand the difference
17 between externality costs and the costs of meeting future greenhouse gas
18 regulations. Our forecasts of the cost impacts of greenhouse gas regulations do
19 not address externality costs.

20 **Q. Do you have any comment on Co-owner witness Grieg's claim that the**
21 **September 2005 Burns & McDonnell Analysis of Baseload Generation**
22 **Alternatives study did not claim that wind requires 100 percent backup?³⁶**

23 A. Regardless of what Mr. Grieg may claim, by assuming that 600 MW of combined
24 cycle capacity would be needed in addition to 600 MW of wind capacity, the
25 Burns & McDonnell September 2005 Study in fact reflected the assumption that

³⁴ Applicants' Exhibit 48, at page 4, lines 8-10.

³⁵ Applicants' Exhibit 48, lines 8-11.

³⁶ Applicants' Exhibit 51, at page 2, line 16.

1 the wind needed a 100 percent backup. It therefore burdened the wind alternative
2 with 600 MW of natural gas capacity.

3 **Q. Mr. Grieg has testified that the figures in Table 1 in rebuttal testimony**
4 **reflect a 15 percent capacity value for wind resources.³⁷ Do the results of the**
5 **revised analysis presented in this Table show that Big Stone II is a less**
6 **expensive alternative than a wind-gas combination?**

7 A. No. As Mr. Grieg notes, the figures in Table 1 reflect all of the remaining
8 assumptions from the September 2005 Baseload Generation Alternatives Study.³⁸

9 Therefore, Mr. Grieg's revised analysis still suffers from the following critical
10 flaws:

- 11 • It limits the amount of wind resources to 600 MW and thereby ensuring
12 that more than 50 percent of the required energy in the wind-gas scenario
13 would be generated by the far more expensive natural gas-fired facility.
- 14 • It uses the wrong levelized production tax credit as Mr. Grieg
15 acknowledges in his rebuttal testimony.³⁹
- 16 • It does not reflect any costs of complying with future greenhouse gas
17 regulations.

18 **Q. But doesn't Mr. Grieg reflect in some scenarios the establishment of the high**
19 **end of the Minnesota PUC CO₂ externality value at the federal or state level**
20 **as a direct cost?⁴⁰**

21 A. Yes, he does do that. But, the same as other Co-owner witnesses, Mr. Grieg
22 appears to be confusing the externality value set by the Minnesota PUC and the
23 cost of complying with future greenhouse gas regulations. Moreover, Mr. Grieg
24 provides absolutely no evidence or support for believing that the value that he
25 uses for the externality cost in his revised analysis would be numerically

³⁷ Applicants' Exhibit 51, at page 3, lines 18-19.

³⁸ Applicants' Exhibit 51, at page 3, line 21.

³⁹ Applicants' Exhibit 51, at page 5, lines 5-7.

⁴⁰ Applicants' Exhibit 51, at page 4, lines 7-9.

1 comparable to the costs of the greenhouse gas regulations that are currently under
2 consideration by the U.S. Congress or that can be expected in the future. As we
3 have explained in our May 19, 2006 Direct Testimony, the evidence indicates that
4 the cost of meeting future U.S. greenhouse gas regulations will be significantly
5 higher than the small cost that Mr. Grieg has assumed in his revised analysis.⁴¹

6 **Q. Have you had any opportunity to review the workpapers or input or output**
7 **data files for Mr. Grieg's revised analysis?**

8 A. No. Mr. Grieg's rebuttal testimony was filed last Friday. We asked for copies of
9 his workpapers, including input and output data files, on Monday, June 19th.
10 However, to date we have received no response to that request.

11 **Q. Do you have any comment on the claim by Co-owner witness Morlock that**
12 **the winter capacity surplus figures that you present in your Direct Testimony**
13 **are misleading because MAPP-US has about 7,900 MW of installed capacity**
14 **fired by oil and natural gas?**⁴²

15 A. Yes. A number of Co-owner witnesses, including Mr. Morlock and Mr. Koegel,
16 make this same claim.⁴³ However, the evidence they cite to support this claim
17 does not support the implication that if Big Stone II is not built, it would have to
18 be replaced by this expensive oil and natural gas capacity:

19 1. We note that the capacity surplus figures we cite in our May 26, 2006
20 Direct Testimony were taken directly from the September 2005 MRO
21 Load and Capability Report.

22 2. The Co-owner witnesses focus solely on the peak summer or peak winter
23 hours when the loads will be the highest. During the great majority of non-
24 peak summer season and non-peak winter season hours systemthe loads
25 will be lower (in many hours substantially lower) than the seasonal peaks.

⁴¹ See Joint Intervenors Exhibit JL-1.

⁴² Applicants' Exhibit 42, at page 8, lines 10-21.

⁴³ For example, see Applicants' Exhibit 50, at page 2, lines 10-18.

1 Therefore, the capacity reserves in those hours can be expected to be
2 significantly higher than the surplus capacity figures we discussed in our
3 May 26th Direct Testimony for the peak summer and peak winter hours.
4 Therefore, it is reasonable to expect that coal-fired capacity also will be
5 surplus during a number of those hours.

6 3. Mr. Koegel and Mr. Morlock compare the surpluses that MAPP forecasts
7 for the winters of 2011/2012, 2012/2013 and 2013/2014 with the amounts
8 of coal, nuclear, hydro, and other forms of capacity that existed as of the
9 summer of 2005. In so doing, they ignore the roughly 1,600 MW of coal
10 capacity projected to come online in 2007, 2008 and 2009, as shown on
11 Applicants' Exhibit 50-B, and the approximately 200 MW of new hydro
12 capacity projected to be on line in 2010, also shown on Applicants'
13 Exhibit 50-B.

14 4. The surplus capacity figures we cited in our May 26th Direct Testimony
15 are based on projections of very small levels of capacity purchases (i.e.,
16 approximately 67-69 MW) from outside of the MAPP region. It is
17 reasonable to expect that by the time that Big Stone II is scheduled to
18 begin commercial operations, the MAPP-US members will have
19 significantly more than this amount of firm transmission import capability
20 from neighboring areas. For example, Mr. Morlock notes that MISO
21 currently has the capability to import 1,850 MW from Manitoba.⁴⁴

22 5. If a utility only has a need for peaking capacity, it may be more economic
23 to run existing gas-fired units for a limited number of hours during the
24 year than to add a new increment of baseload coal capacity that isn't
25 needed for reliability purposes.

26 6. We do not propose that the Co-owners do nothing if they do not build Big
27 Stone II. We believe that the Co-owners should undertake aggressive

⁴⁴ Applicants' Exhibit 42, at page 11, lines 13-14.

1 actions to add renewable resources, such as wind, and demand-side
2 management measures to address projected capacity and energy needs.

3 **Q. Co-owner witness Hewson cites the Minnesota Public Utilities Commission**
4 **environmental costs as evidence that “the likely range of control would be**
5 **significantly less than \$14/ton.”⁴⁵ Do you agree?**

6 A. No. First, Mr. Hewson contradicts himself when he says that “it would be a
7 strange result if the cost of control turned out to be higher than the cost of the
8 damage the controls are intended to mitigate.”⁴⁶ Later in his testimony Mr.
9 Hewson then says, regarding the California Public Utilities Commission adder for
10 CO₂, that it “was not developed to estimate the environmental damage that would
11 result from CO₂ emissions. It was developed to estimate the cost of compliance
12 with possible future CO₂ regulation – a different concept.”⁴⁷

13 We agree that estimating environmental damage from CO₂ emissions and the cost
14 of compliance with future CO₂ regulation are different concepts, which is exactly
15 why the Minnesota Public Utilities Commission environmental costs for CO₂
16 receive little consideration in our forecast.

17 Mr. Hewson further claims that we “fail to give adequate consideration to the fact
18 that the Minnesota Public Utilities Commission has adopted environmental cost
19 values that do not apply to generation located outside the state of Minnesota.”⁴⁸
20 This criticism makes no sense. Our forecast of CO₂ allowance prices is of future
21 federal regulation. It would be illogical to assume, as the Minnesota Public
22 Utilities Commission (MNPUC) did for *environmental costs*, that generation in
23 South Dakota would be excluded from future federal greenhouse gas regulation.
24 Indeed, the MNPUC set the value at zero not because it was appropriate to do so
25 in the context of environmental externalities but because of “a concern for

⁴⁵ Ibid, page 3, line 3.

⁴⁶ Ibid, page 6, lines 13-14.

⁴⁷ Ibid, page 35, lines 21-22 and page 36, line 1.

⁴⁸ Ibid, page 3, lines 7-9

1 interstate comity in the process of establishing environmental cost values.”⁴⁹ The
2 MNPUC goes on to say that “While reducing the value for CO₂ beyond the border
3 of Minnesota to zero, the Commission clarified that it would continue the
4 qualitative evaluation of the CO₂ associated with such generation.”⁵⁰

5 **Q. Was Mr. Hewson aware that your forecast is of federal regulatory costs?**

6 A. We believe so. But at a minimum, he certainly agrees that federal regulation is
7 more likely than regulation by the State of South Dakota.⁵¹ It is, therefore, very
8 difficult to understand how he could claim that it would make sense to assign zero
9 CO₂ regulatory cost to resources in South Dakota.

10 **Q. Mr. Hewson also faults you for not properly weighing the fact that the**
11 **Regional Greenhouse Gas Initiative (RGGI) has projected CO₂ allowance**
12 **costs of \$1.00 - \$2.62/ton. How do you respond to his criticism?**

13 A. RGGI, as its full name suggests, is a *regional* program. While its implementation
14 lends credence to our assertion that federal action on greenhouse gas emissions is
15 coming, it is not surprising that modeling of the initiative would result in such low
16 allowance prices because it is regional. A federal program would result in higher
17 costs given supply and demand dynamics and avoiding the “leakage” problems of
18 RGGI.

19 It is also important to keep in mind that, as with the federal proposals to date,
20 larger reductions will be required to stabilize atmospheric CO₂ concentrations,
21 thus CO₂ allowance prices are reasonably expected to be higher in the future in
22 our forecast.

⁴⁹ Order of the MNPUC in Docket No. E-999/CI-00-1636 dated May 3, 2001, page 5.

⁵⁰ Ibid.

⁵¹ Applicants’ Exhibit 30, at page 8, lines 13-14.

1 **Q. Mr. Hewson also claims that your forecast of CO₂ allowance prices fails to**
2 **give adequate consideration to the fact that “legislation that Congress**
3 **actively debated but ultimately rejected last year had controls costs under**
4 **\$7/ton.”⁵² How do you respond?**

5 A. While the legislation Mr. Hewson refers to certainly did have a “safety valve”
6 price, it would be misleading to conclude that that price is the highest price CO₂
7 allowances will ever reach. Mr. Hewson’s conclusion to this effect is made in a
8 scientific and political vacuum. He assumes one piece of legislation, the most
9 recent, is the best indication of what Congress might pass in the future and that
10 politics and the will of the American people won’t change even as the impacts of
11 climate change become more apparent.

12 Atmospheric concentrations of carbon dioxide are going up, emissions of carbon
13 dioxide are going up and temperatures continue to rise. The debate on climate
14 change and how to deal with the issue is evolving and gaining more attention. For
15 example, the number of climate change related proposals introduced in the U.S.
16 Congress have risen from seven in the 105th Congress (1997-1998) to 25 in the
17 106th Congress (1999-2000) to over 80 in the 107th Congress (2001-2002) to
18 nearly 100 proposals in the 108th Congress (2003-2004) according to the Pew
19 Center on Global Climate Change.

20 **Q. What piece of legislation does Mr. Hewson rely upon in making his assertion**
21 **that carbon allowance prices will not rise above \$7/ton?**

22 A. Mr. Hewson relies upon the Climate and Economy Insurance Act of 2005, but he
23 mischaracterizes the legislative effort made and confuses the Senate activity. He
24 says “a strong effort was made last year in the Senate as a part of the debate of the
25 Energy Policy Act of 2005 to enact a program of mandatory CO₂ controls
26 proposed by Senator Bingaman. Although the Senate did not adopt such a
27 program, it did adopt a resolution endorsing the need for a mandatory program of

⁵² Ibid, page 3, lines 10-14.

1 CO₂ controls.”⁵³ Senator Bingaman declined to formally introduce his bill after
2 Senator Pete Domenici of New Mexico decided not to cosponsor it because of the
3 complexity of how allowances would be allocated so the Senate never actually
4 voted on the bill. The Sense of the Senate resolution supporting mandatory
5 controls was also proposed by Bingaman and approved by voice vote. The bill
6 that did receive a Senate vote at approximately the same time was the Climate
7 Stewardship Act of 2005 which contains no safety valve price.

8 **Q. Are you suggesting that \$7/ton is not an appropriate estimate of what federal**
9 **regulation of greenhouse gases will cost?**

10 A. The value itself may be appropriate to assume for a short number of years; it is the
11 basis for that value and the period over which it is used that we disagree with. It
12 is important to clarify that our forecast does not start out at \$19.1/ton. Mr.
13 Hewson overlooks the fact that our forecast is not a single number, but a range
14 and \$7/ton falls within what is our expected CO₂ price in 2010 - \$0 to \$10/ton.
15 The \$19.1/ton figure he consistently cites throughout his testimony is the mid-
16 case forecast levelized over a 20-year period.

17 If Mr. Hewson is suggesting that the price of CO₂ allowances under federal
18 regulation will never rise above \$7/ton in the period 2011-2030 he provides no
19 basis for such an assertion. If that is not his assertion is not clear what value Mr.
20 Hewson would suggest using and over what period nor whether he has a basis for
21 the value other than a single Congressional bill.

22 Finally, it is also important to keep these bills in context. None of the legislative
23 proposals upon which our forecast is based require emissions reductions sufficient
24 to stabilize atmospheric concentrations of CO₂. Our forecast assumes that the
25 legislation controlling greenhouse gas emissions that will be implemented in the
26 early part of the next decade won't be significantly different from the bills
27 introduced to date but that the stringency of carbon regulation *will* increase into
28 the future in recognition of this issue.

⁵³ Applicants' Exhibit 30, at page 14, line 12-14.

1 **Q. Do the other pieces of legislation you consider in your forecast differ from**
2 **the legislation Mr. Hewson refers to?**

3 A. Yes. The obvious difference is the target, cap or reduction in emissions required.
4 Table 1 compares the federal legislation considered in our forecast through
5 modeling studies. Certainly there are other legislative proposals introduced in
6 Congress that would cap carbon dioxide and/or greenhouse gas emissions from
7 various sources.

8 **Table 1. Federal Regulation with Modeling Studies**

Bill	Reduction Target	Introduced
Climate Stewardship Act (S.139)	2010 - 2015: 2000 levels 2016 and beyond: 1990 levels	2003
Climate Stewardship Act (SA. 2028)	2010 and beyond: 2000 levels	2003
Clean Power Planning Act (S. 843)	2009 - 2012: 2006 levels 2013 and beyond: 2001 levels	2003
Clear Power Act (S. 150)	2010 and beyond: 1990 levels	2005
Climate and Economy Insurance Act	2010 - 2019: reduction in GHG intensity of 2.4% 2020 – 2025: reduction in GHG intensity of 2.8%	2005 (was not formally introduced)

9

10 Additionally we considered Energy Information Administration (EIA) analyses
11 that were largely based on the National Commission on Energy Policy's
12 recommendations. Mr. Hewson unnecessarily and unreasonably limits his
13 analysis to just one bill. As the modeling studies themselves show, there is a
14 range of values to be considered, sometimes even within the modeling of the same
15 piece of legislation.

16 **Q. Mr. Hewson states that for planning purposes one cannot assume that the**
17 **production tax credit (PTC) will be extended. Do you agree?**

18 A. No. Mr. Hewson bases this conclusion on the simple fact that the PTC has lapsed
19 in the past. By that logic other lapsed tax credits could not be expected to be
20 renewed either. One of the largest federal tax credits is the research and
21 development tax credit which applies to companies performing research and

1 development (R&D) such as software companies, pharmaceuticals, defense and
2 others. At the end of 2005, the R&D credit expired for the 12th time and lapsed
3 for the second time. This despite the fact that both the House and Senate passed
4 versions of a bill that included the credit but was dropped in conference.⁵⁴
5 Politicians as powerful as President Bush have called for its permanent extension.
6 The PTC and the R&D credit are thus both victims of politics and money. It is
7 expensive to make tax credits permanent especially in the face of ballooning
8 budgets and politicians therefore are reluctant to enact permanent extensions. The
9 fact that the PTC and R&D credits must be periodically renewed is not a
10 judgment about their popularity with Congress, but rather evidence of the
11 compromise that must be made between giving tax breaks for desirable industry
12 activities and what the federal budget will allow.

13 The uncertainty of when the PTC and the R&D credit will be renewed is certainly
14 not desirable from an industry perspective. In the wind industry it does tend to
15 lead to high and low periods of new wind installations. However, with no serious
16 opposition to the PTC (the most recent extension was passed with the help of
17 Senator Charles Grassley (R-IA) and enjoyed support on both sides of the aisle)
18 and increasing concern about climate change it is unlikely that Congress would
19 decline to renew it in the future even if the PTC does not receive a permanent
20 extension.

21 **Q. Co-owner witness Klein states that “likely alternatives to supply 600 MW of**
22 **baseload power are few and would entail dependence upon expensive and**
23 **risky supplies of natural gas and/or petroleum fuels.”⁵⁵ Do you agree?**

24 **A.** No. Mr. Klein must not have read our testimony of May 26, 2006. We have not
25 suggested that as an alternative to Big Stone II that the co-owners build a 600
26 MW gas plant, nor have we suggested that they must build any gas capacity at all.

⁵⁴ National Association of Manufacturers, www.nam.org.

⁵⁵ Applicants’ Exhibit 31, at, page 3.

1 **Q. Mr. Klein states that one of the most direct effects of higher energy prices is**
2 **that “income diverted into higher power bills is no longer available to meet**
3 **other household uses.”⁵⁶ Do you agree?**

4 A. Yes.

5 **Q. Does this logically lead to the conclusion that coal power is preferable?**

6 A. No, of course not. Mr. Klein’s conclusion to that effect only holds to the extent
7 that other electric supply is more costly and the other benefits and costs of other
8 electric supply options favor coal power. The full paragraph from which the
9 previous quote came is

10 For South Dakota customers, higher energy prices can have many
11 effects. One of the most direct effects is that the income diverted into
12 higher power bills is no longer available to meet other household uses.
13 With less disposable income, other activities must be curtailed,
14 including some that promote better health and safety. This is
15 particularly true in lower income households, where just meeting the
16 basic necessities can consume most, if not all, available income.
17 Reductions in disposable income result in higher health and safety
18 risks.

19 As Mr. Klein notes, it is bills that matter, not rates. It is possible that demand-side
20 management, like supply-side resources, would increase rates, but it will decrease
21 bills, the measure that ultimately matters to consumers. Mr. Klein notes that the
22 effect of reduced income from higher power bills is particularly pronounced in
23 lower income households. Indeed, Ms. Sommer has seen this effect firsthand,
24 volunteering for a community group that, among other issues, assists low-income
25 households having trouble making ends meet while paying their electric, oil and
26 gas bills.

27 Demand-side management and renewable resources also have the positive health
28 benefit of emitting none of the pollutants that coal-fired plants do; a negative
29 aspect of coal-fired power that Mr. Klein fails to mention let alone quantify.

⁵⁶ Applicants’ Exhibit 31, at page 5.

1 Despite the evidence of their own witness, Montana-Dakota, for example, is
2 projecting a 20% rate increase from Big Stone Unit II but offers very limited
3 demand-side management programs and none that target low-income customers
4 specifically.

5 **Q. Do the options you suggest the Co-owners consider undertaking cost more**
6 **than Big Stone II?**

7 A. No, we have not suggested that, as an alternative to Big Stone II, the Co-owners
8 undertake resource options that are more expensive.

9 **Q. Does this complete your Surrebuttal Testimony?**

10 A. Yes.

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