

**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 Construction of the Big
Stone II Project**)
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Case No. EL05-022

**POST-HEARING BRIEF OF JOINT INTERVENORS
MINNESOTANS FOR AN ENERGY-EFFICIENT ECONOMY,
IZAAK WALTON LEAGUE OF AMERICA – MIDWEST OFFICE,
UNION OF CONCERNED SCIENTISTS,
MINNESOTA CENTER FOR ENVIRONMENTAL ADVOCACY**

INTRODUCTION

Minnesotans for an Energy-Efficient Economy, Izaak Walton League of America – Midwest Office, Union of Concerned Scientists, and Minnesota Center for Environmental Advocacy (collectively, “Joint Intervenors”) submit this brief in opposition to the application of Otter Tail Power Company and the Big Stone II Co-owners (collectively, “Applicants”) for a permit to construct the 600 MW Big Stone II coal plant.

Applicants have failed to meet their burden of proving under SDCL 49-41B-22 that the Big Stone II plant will not cause serious harm to the environment and that it will not unduly interfere with the orderly development of the region. In fact, the record in this case shows that Big Stone II will cause serious harm to the environment, particularly through its long-term contribution to global warming. Moreover, the record shows that Big Stone II, by consuming investment resources and demand that could otherwise be channeled into the development of

South Dakota's wind resource, unduly interferes with the orderly development of the region. Finally, Applicants' failure to give meaningful consideration to the very real prospects that future federal regulation of CO₂ emissions would adversely impact the economic viability of the proposed Big Stone II plant, poses a threat of serious economic harm to the Applicants and their customers, harm that could also interfere with the orderly development of the region. The South Dakota Public Utilities Commission ("Commission") should accordingly deny the application to construct Big Stone II.

FACTS

Applicants seek permission to construct a new 600 MW pulverized coal plant on the eastern border of South Dakota. Applicants represent seven different utilities serving load in North Dakota, Minnesota, and Iowa as well as South Dakota. Two of the utilities, which together propose to own about forty percent of the plant's output, are investor-owned utilities whose South Dakota retail sales are subject to rate regulation by this Commission. The others are a mix of cooperative and municipal utilities, some of which provide power in South Dakota but which are not rate-regulated.

If built, Big Stone II will emit over 4.5 million tons of carbon dioxide (CO₂) into the atmosphere. See Joint Intervenors Exhibit (hereinafter "JI-__") 2 at 27, l. 3-17 (Direct Testimony of Dr. Ezra Hausman). CO₂ is a heat-trapping gas that is a major contributor to global warming. Exhibit JI-2 at 5, l. 10-15. Big Stone II is proposed to be built when scientists, policy-makers, and businesses are growing increasingly apprehensive about the impact of global warming, and when the federal government is debating various policy responses, all of which target CO₂ emissions from coal plants. See, Exhibit JI-2 at 6-11; JI-1 at 5-6. Applicants did not factor the costs of such federal limits into their cost estimates that informed their decision to

build Big Stone II. Not until filing rebuttal testimony did Applicants even discuss any of the pending federal proposals to regulate CO₂. See, Exhibit JI-6 at 21-22. Throughout these proceedings, Applicants have at most emphasized scenarios to reflect the state of Minnesota's externality value for CO₂ environmental damage, a different concept entirely from federal CO₂ regulatory costs.

I. APPLICANTS HAVE FAILED TO MEET THEIR BURDEN UNDER SDCL 49-41B-22(2) OF PROVING THAT BIG STONE II WILL NOT POSE A THREAT OF SERIOUS INJURY TO THE ENVIRONMENT.

A. The Record Establishes that Global Warming Poses a Threat of Serious Injury to the Environment.

As Joint Intervenors' witness Dr. Ezra Hausman testified in this proceeding, if trends continue, global warming is "likely to bring about a climate well outside the range of anything ever experienced by our species, with the potential for severe and irreversible changes that will forever alter our environment, our economies and our way of life." See Exhibit JI-2 at 3, l. 9-12 (Direct Testimony of Dr. Hausman).

Dr. Hausman's conclusion reflects the consensus among the world's preeminent scientists, who have concluded that global warming is a very serious threat meriting the immediate attention of the world's policymakers. See Exhibit JI-2 at 6-11. For example, the scientific academies of 11 nations, including the National Academy of Sciences in the U.S., recently issued a joint statement urging all nations "to acknowledge that the threat of climate change is clear and increasing" and to "take prompt action to reduce the causes of climate change." Exhibit JI-2-D (Joint Science Academies Statement).

The record in this case also includes the conclusions of the Intergovernmental Panel on Climate Change (IPCC), representing the world's leading researchers in the field of climate

science, brought together to assess the science and advise the world's policymakers. See Exhibit JI-2 at 6-9. The IPCC finds that the planet is currently experiencing unnatural warming, predicts much more serious warming ahead if current energy trends continue, and identifies a range of likely harmful consequences. Exhibit JI-2, Exhibit JI-2-B (IPCC Working Group I Summary for Policymakers); and Exhibit JI-2-C (IPCC Working Group II Summary for Policymakers).

The cause of global warming is the buildup in the atmosphere of heat trapping gases, known as “greenhouse gases,” due to human activity. Exhibit JI-2 at 4, l. 15-24. Carbon dioxide (CO₂), a heat-trapping gas of particular concern, is emitted when we burn fossil fuels, and particularly coal because it has such a high carbon content. Id. at 5, l. 4-9. Already, humans have increased background levels of CO₂ by roughly one-third above pre-industrial levels, which is considerably higher than it has been in 400,000 years (over four ice-age cycles), and probably higher than it has been in tens of millions of years. Id. at 13-14. With the continued “business as usual” path of fossil fuel use, CO₂ levels will continue rising steeply, increasing the likelihood that the earth will experience dangerous or even catastrophic warming. Id. at 14, l. 10-17.

The global average surface temperature of the earth rose by 0.6°C over the twentieth century, with additional record-breaking warming in the first few years of the twenty-first century; four of the five hottest years on record have occurred since 2000, with the ten hottest years since 1990. Exhibit JI-2 at 15-17. This warming is consistent with predictions by computer models of the climate response to today's elevated CO₂ concentrations. Id. at 17. The IPCC predicts that warming in the twenty-first century will be from 1.5 to 5.8° C – or 2.5 to 9.7 times greater than in the past century. Id. at 17, l. 11-14. To put this in geo-historical context, the average surface temperature differential between the last ice age and today was only about 5°C. Id. at 18, l. 3-5.

Among the serious negative impacts associated with this predicted warming are rising sea levels, damaged or lost ecosystems, greater species extinction, expansion of disease and pest vectors, greater heat waves, more intense precipitation causing more flooding, landslides and erosion, and in continental interiors like South Dakota, increased summer drying causing more droughts, reduced crop yields, and reduced water availability and quality. Exhibit JI-2 at 18, l. 17-29. The more CO₂ emitted, the more severe the impacts are likely to be. Id. at 18, l. 30-32. There is reason to worry that the warming ahead will not be gradual, given evidence that in the past the earth has often made climate changes in “abrupt, lurching fashion,” which would be even more disruptive than linear warming. Id. at 19, l. 4-8.

In South Dakota, global warming is predicted to manifest itself in decreased soil moisture likely to harm both crops and natural vegetation; greater morbidity and mortality from heat stress; increased summer drought; displacement of today’s plant and animal species; more agricultural pests and diseases; and increased storm intensity, causing greater flooding, water pollution, and erosion. Exhibit JI-2 at 21-22. The region’s Prairie Pothole Region, is particularly vulnerable to climate warming, threatening the ducks and other migratory waterfowl for which the region is a critical breeding ground. Id. at 23-24.

The evidence in the record establishing the gravely serious nature of the global warming threat is overwhelming and wholly un rebutted. Applicants have not submitted any scientific evidence countering the testimony and studies submitted by Joint Intervenors, nor could they credibly do so. Not only does the evidence submitted by Joint Intervenors reflect the global scientific consensus, but it is the same evidence that is prompting the growing policy response on

the global, national, state and local level.¹ Joint Intervenors do not ask the Commission in this case to put itself in the position of the global scientific community, and predict the impacts of global warming. *That work has been done by the global scientific community already*, and the Commission is only duty-bound to recognize these scientific findings, findings which are wholly un rebutted in the record before it.

B. Big Stone II would be a Major Source of Global Warming Pollution.

According to Applicants, Big Stone II would emit approximately 4.7 million tons of CO₂ per year. Applicants' Exhibit (hereinafter, "A-__") 29 at 6, l. 9-10 (Rebuttal Testimony of Mr. Uggerud).² Every year, this plant would emit the equivalent global warming pollution of nearly 670,000 cars, or roughly two-thirds more than the CO₂ emissions of all the cars registered in South Dakota combined. Exhibit JI-2 at 27, l. 11-17. This single project increases the CO₂ emissions of the entire state of South Dakota by 34%, and more than doubles the current emissions from the state's power sector (currently 3.79 million tons). *Id.* at 27, l. 3-10. It is difficult to imagine anything that the state of South Dakota could do to worsen global warming more than permitting Big Stone II, unless it would be to permit an even bigger coal plant instead.

1. Big Stone II would cause irreversible changes to the environment that will remain beyond the operating lifetime of the facility.

South Dakota's siting rules clearly demonstrate a concern over an energy facility's long-term environmental impacts. Applicants are required to provide "estimates of changes in the existing environment which are anticipated to result from construction and operation of the

¹ Indeed, it is the same scientific evidence that has prompted the Western Governor's Association, now headed by Governor Rounds, to pass resolution 06-03 on June 13, 2006, urging action to reduce greenhouse gases. See, <http://www.westgov.org/wga/policy/06/climate-change.pdf>.

² Joint Intervenors had calculated the emissions from the plant to be about 4.5 million tons per year, meaning that our testimony regarding the financial and environmental risks associated with the plant's CO₂ emissions are slightly underestimated.

proposed facility, and identification of irreversible changes which are anticipated to remain beyond the operating lifetime of the facility.” ARSD 20:10:22:13. Applicants failed to provide any such estimate, but such information is included in testimony submitted by Joint Intervenors.

Large baseload coal plants are designed to operate for decades. Exhibit JI-2 at 26, l. 8-10. Some of today’s coal plants have been operating for as long as 70 years. Id. Assuming an operating lifetime for Big Stone II of 50 years, the plant will emit over 225 million tons of CO₂ before it closes Id. at 26, l. 25-26.

Moreover, the CO₂ emitted from Big Stone II would continue warming the planet for centuries after the plant itself closes its doors. The IPCC states that “several centuries after CO₂ emissions occur, about a quarter of the increased CO₂ concentration caused by these emissions is still present in the atmosphere.” Exhibit JI-2-B at 17. The decision this Commission makes in 2006 will therefore still have implications for the warming the Earth experiences centuries from now.

While global warming is very much a long-term problem, it is also one that calls for immediate action. The recent statement from the U.S. National Academy of Sciences and its counterpart academies from 10 other nations calls it “vital” to take immediate steps to reduce CO₂ emissions now because “[f]ailure to implement significant reductions in net greenhouse gas emissions now, will make the job much harder in the future.” Exhibit JI-2-D. Action taken now to reduce greenhouse emissions will lessen the rate and magnitude of climate change ahead; the academies note that a lack of full scientific certainty about some aspects of climate change is “not a reason for delaying an immediate response that will, at a reasonable cost, prevent dangerous anthropogenic interference with the climate system.” Id.

2. The Commission must consider the cumulative and synergistic impact of Big Stone II's emissions along with those of other power plants.

South Dakota's siting rules do not focus solely on the impact of the energy facility in question, but on the cumulative environmental impact of that facility with other energy facilities. Specifically, Applicants were required to calculate Big Stone II's environmental effects "to reveal and assess demonstrated or suspected hazards to the health and welfare of human, plant and animal communities which may be cumulative or synergistic consequences of siting the proposed facility in combination with any operating energy conversion facilities, existing or under construction." ARSD 20:10:22:13. Applicants did not provide any such calculation, and indeed generally ignored the global warming impact of Big Stone II, individually and cumulatively, in their application and testimony. See, e.g., Exhibit A-34, at 4-5

The cumulative impact of America's coal plants on global warming is, as Dr. Hausman testified, "staggering." The United States is the source of more greenhouse gas emissions than any nation by far, on both a per capita and total basis. Exhibit JI-2 at 25, l. 23-26. We contribute 24% of world CO₂ emissions from fossil fuel consumption, and almost one-third of those emissions come from coal plants. Id.

Applicants have not attempted to rebut any of the evidence that global warming is a tremendous problem, that coal plants are a major cause of it, or that Big Stone II will greatly increase South Dakota's contribution to it for many decades to come (indeed centuries, considering the lingering impact of its emissions). They are apparently content to point out that Big Stone II will amount to just a fraction of global anthropogenic emissions. Exhibit A-29 at 6, l. 9-18. Applicants' cavalier dismissal of the biggest contribution South Dakota has ever made to this severe and urgent environmental threat runs counter to the requirement of the Commission's siting rules that long-term and cumulative environmental impacts be considered.

Moreover, Applicants overlook the fact that a fractional share of a huge problem can be very significant indeed. If global warming were a small problem, then Big Stone II's share of it would indeed constitute a small amount of environmental harm. As the record shows, though, global warming is a problem of overwhelming proportions, and even a fractional share of the damages associated with it represents an enormous amount of environmental damage. Just how enormous is indicated by the testimony of Commission Staff witness Dr. Olesya Denney, discussed further below.

C. Big Stone II's Global Warming Emissions Would Cause Enormous Damage to the Environment.

Staff's analysis of the environmental damage caused by Big Stone II's CO₂ emissions shows that *Big Stone II will cause from tens of millions to billions of dollars worth of environmental damage*. Staff Exhibit (hereinafter "S-__") 2, at 38, l. 4-8 and Table 6A. Surely, such phenomenal damage qualifies as "a threat of serious injury to the environment" under SDCL 49-41B-22(2).

In the absence of any calculation of Big Stone II's environmental impacts by Applicants, Staff conducted its own calculation, beginning with a survey of existing environmental externality estimates per unit of air emissions. Exhibit S-2 at 22-23.³ It relied mainly on an EPA survey of externality studies that shows costs per ton of CO₂ ranging from \$1.50 to \$51.00 dollars per ton of CO₂ emitted. *Id.* at 25. Staff also calculated externalities costs using the average of EPA's high and low values, and using an example state "midrange value" of \$8 per ton of CO₂. *Id.* at 25, 29 and 33. In addition, Staff calculated the CO₂ damages using a 3%

³ Environmental externalities represent environmental impacts that are not reflected in the costs of the party that causes the impact. *Id.* at 23. They are completely different from the future CO₂ regulatory costs projected and discussed by Joint Intervenors; the latter, by definition, are costs that coal plants are expected to pay in the future. Exhibit JI-1 at 4, l. 14. Applicants' persistent efforts to suggest that environmental costs (borne by the world at large) and future regulatory costs (to be borne by Applicants) are the same, *see, e.g.*, T. 37, l. 2-5 and T. 340, l. 10-24, suggest a failure to take seriously either environmental damages or financial risk.

discount rate rather than the 10% discount rate used in Staff's base case analyses. Id. at 40-41. Joint Intervenors strongly agree with the position described by Staff that it is inappropriate to discount the health and well-being of future generations as deeply as the 10% discount rate does. The 3% "social discount rate" which Staff notes is used by EPA in its cost-benefit analyses, is far more appropriate when discussing long-term global damages. Id.

Although there is a wide range of quantified CO₂ environmental damages Staff reviewed and applied to Big Stone II, depending on the CO₂ cost value chosen and the discount rate applied, the environmental damages of Big Stone II are enormous even when one focuses analysis on the lower end of Staff's range of values.⁴ For example, the low EPA value for annual CO₂ damages (\$1.50 per ton) associated with Big Stone II (at 4.36 million tons CO₂ per year), yields \$50,098,876 in CO₂ damages over 40 years of plant operation at a 10% discount rate.⁵ Applying a 3% discount rate, these minimum EPA-quantified damages increase to \$154,043,273.⁶ Using the Minnesota PUC externality value of \$3.64 per ton of CO₂ would obviously more than double the low-end EPA damages. The California PUC value of \$8.00 per ton of CO₂ would obviously double again the Minnesota-based calculation of damages. Clearly, even using any of these low externalities values shows hundreds of millions of dollars of environmental damage from Big Stone II's CO₂ emissions. Using an average of high and low EPA values (\$26.00 per ton) would easily put Big Stone II damages into the billions of dollars.

⁴ We note that in calculating Big Stone II's environmental damages, Staff underestimates Big Stone II's CO₂ emissions, counting them as only 4,363,868 tons per year, id., at 25 (Table 3), rather than at the approximately 4.7 million tons per year that Applicants state it will emit. Exhibit A-29 at 6, l. 9-10. We also note that Staff's cumulative damages assume only forty years of operation, which would be a short lifetime judging by coal plants in operation today.

⁵ Exhibit S-2, Table 6A (calculation derived from subtracting "Lower Boundary" Total Externalities Excluding CO₂ from Total Externalities Including CO₂).

⁶ Exhibit S-2, Table 7A (calculation derived from subtracting "Lower Boundary" Total Externalities Excluding CO₂ from Total Externalities Including CO₂).

The highest level of damages Staff reviewed (EPA’s \$51 value) represents five billion dollars worth of cumulative harm caused by the CO₂ emissions of this one plant.⁷

In stark contrast to Applicants’ attempts to dismiss Big Stone II’s global warming impacts as minimal, Staff’s calculations demonstrate that Big Stone II poses a threat of serious injury to the environment even under the most optimistic of assumptions. Applicants have failed utterly to meet their burden to prove otherwise under SDCL 49-41B-22(2).

C. Big Stone II’s Mercury and Other Emissions Cause Additional Damage to the Environment, Particularly in the Siting Area.

During its first three years of operation, Big Stone II will greatly exceed the EPA’s mercury emissions allocation for South Dakota, and indeed, during that time period, the Applicants do not commit to emissions of less than 210 pounds of mercury per year for just the new Big Stone II unit.⁸ While the EPA has established a South Dakota “budget” of 144 pounds per year of mercury emissions for 2010-2017, Applicants seek “flexibility” to exceed South Dakota’s mercury allocation by approximately 256 pounds of mercury per year for the first three years of operation.⁹

The costs of Big Stone II’s annual mercury emissions are nontrivial. According to Commission Staff witness Dr. Denney, the average cost of the annual environmental damage associated with Big Stone II’s mercury emissions is equal to \$3,953,015, meaning that the proposed project’s mercury emissions will cost \$11,859,045 over its first three years of

⁷ Id. (calculation derived from “Upper Boundary” totals for CO₂ externalities.

⁸ The only enforceable requirement that impacts Big Stone II’s mercury emissions level in the first three years of operation is the CAMR New Source Performance Standard, which would limit Big Stone II emissions of mercury to 210 lbs/year, to be added to that emitted by Big Stone Unit I, which in 2004 was about 189 lbs., for a site total of about 400 lbs. See, Exhibit A-34 at 2-3.

⁹ This number equals the difference between projected emissions for Big Stone I and Big Stone II and the mercury emissions budget for South Dakota. Emissions of 210 pounds per year for Big Stone II and 189 pounds per year for Big Stone I were assumed. Applicants can still comply with the federal CAMR rule by purchasing “credits”, rather than reducing mercury emissions.

operation. Exhibit S-2 at 33, Table 4. Based on the Commission Staff's higher cost scenario of mercury emissions damages, costs could run as high as \$22,203,525 over these first three years.

Id.

While Applicants have agreed to a voluntary emissions cap after the first three years of operation, it is uncertain how or if they will be able to meet this cap. According to Dr. Denney, "Applicants do not know specifically how the commitment will be met, but rather gamble that by 2014 some mercury-control technology will become commercially available." Exhibit S-3 at 16, l. 5-7. Even if mercury-control technology is available, Applicants do not know if they will be able to afford it. Id., at 16, l. 8-12. Given these uncertainties, it is possible that Applicants will have to cut plant output in order to meet their voluntary emissions cap.¹⁰

Even after three years have passed and Big Stone II falls under its voluntary emissions cap, South Dakota mercury emissions are estimated to be approximately the *same level* they are today.¹¹ The purpose of new federal regulations of mercury emissions at power plants is quite obviously to *reduce* mercury emitted from the electricity sector across the nation, not to maintain the status quo. The health risks are too grave. See, Exhibit S-2 at 21, l. 8-11. The South Dakota siting statute does not permit the Commission to ignore the environmental damages brought about by Big Stone II mercury emissions. Between \$11 million and \$22 million in environmental damage from mercury is a "serious threat" to the environment and public health.

¹⁰ See, T. at 128, l. 5-14.

¹¹ The Applicants' consolation that "at least mercury emissions aren't going to get worse" after the first three years of commercial operation of Big Stone II is not persuasive; it would have been far easier to substantially reduce existing mercury emissions of Big Stone Unit I, without more than doubling the size of the coal-fired source next door.

II. THE SITING STATUTE DOES NOT ALLOW THE PERMITTING OF A PLANT THAT POSES A THREAT OF SERIOUS INJURY TO THE ENVIRONMENT, REGARDLESS OF ITS PURPORTED ECONOMIC BENEFITS.

After showing how Big Stone II would cause potentially billions of dollars worth of damage to the environment, Commission Staff take the unusual step of comparing those damages to the economic benefits that Big Stone II would purportedly provide to South Dakota, and ultimately recommend approval of this highly destructive project. Exhibit S-2 at 56-57.¹² However, Applicants' statutory burden to show that Big Stone II will not pose a threat of serious injury to the environment under SDCL 49-41B-22(2) is unqualified. There is simply no language allowing the Commission to approve a project that clearly does pose a threat of serious injury to the environment as long as it also provides enough offsetting economic benefits. To approve Big Stone II on the grounds Staff suggests would be a violation of South Dakota's siting law.

Moreover, approving Big Stone II in this case would violate the most basic principles of equity. If the environmental costs and the economic benefits of Big Stone II were each borne by the same set of people (and South Dakota's statute were written otherwise), there might be an argument that the economic benefits could offset the environmental damages. However, the record shows this is clearly not the case. See, Exhibit S-2 at 30-31. Most of the millions to billions of dollars worth of damage caused by Big Stone II CO₂ emissions will be borne by the world at large and by future generations. While a much greater share of the additional environmental harm caused by its mercury emissions will be borne locally, given the plant's location on the Minnesota border, a great deal of the harm caused by the mercury will also be borne outside of South Dakota. In contrast, the claimed economic benefits would be far more local.

¹² Staff did not change this position during the evidentiary hearings.

Approving Big Stone II using Staff's reasoning would require this Commission to say to the world that it is quite willing to intentionally impose upon it potentially billions of dollars of environmental damage in exchange for an unsupported promise of slightly lower electric rate increases and about 35 permanent jobs in South Dakota. We do not believe this Commission should, or would, take such an inequitable step, or that the people of South Dakota would want it to.

III. ENVIRONMENTALLY SAFE WIND-BASED AND DSM ALTERNATIVES WOULD COST RATEPAYERS LESS THAN BIG STONE II.

Even if South Dakota's siting statute (and fundamental principles of equity) allowed the Commission to justify huge, long-term environmental damages by pointing to a project's economic benefits, the record shows that Big Stone II would actually cost ratepayers more than cleaner alternatives and provide less economic development benefits. By failing to compare Big Stone II to cleaner alternatives, and indeed, simply *assuming* that Big Stone II is Applicants' least cost alternative,¹³ Staff's analysis would suggest that the plant's environmental damages are necessary to obtain the benefits it promises. In fact, the record shows that the environmental damages caused by Big Stone II are wholly avoidable. Although Joint Intervenors strongly disagree that Applicants have shown need for a new baseload resource, the sought-after power can be obtained more cheaply by following a cleaner technology path.¹⁴ Moreover, building predominantly wind-based alternatives would result in even greater economic development benefits to the state. Exhibit JI-3 (Direct Testimony of Marshall Goldberg).

¹³ See, S-3, p. 5, l. 17-18.

¹⁴ Although Applicants have demonstrated as a group that they may require additional capacity during peak demand hours in the 2011 time frame, they have not shown need a 600 MW baseload resource. See, Exhibit JI-4.

A. Even if 600 MW of Baseload Were Needed, the Record Shows that A Predominantly Wind-Based Alternative Can Reliably Provide That Power.

Applicants' selection of Big Stone II as the best way to meet their perceived capacity needs was the result of an artificially constrained process that biased the conclusion toward coal and against wind. In their first analysis comparing Big Stone II to alternatives, Applicants simply compared Big Stone II against other coal plants, and to a lesser extent natural gas plants. Exhibit JI-4 at 8. In a second analysis of alternatives to Big Stone II, Applicants again focused mainly on other fossil-fuel based options. *Id.* at 11. In the one instance where Applicants looked that a comparably-sized alternative that included wind, it limited the amount of wind to only 600 MW and then, employing out-dated assumptions that substantially diminished the value of wind power, paired it with a full 600 MW of high-cost natural gas power. *Id.* at 11 *et seq.*

Applicants' consultants assumed in looking at wind that it had zero capacity value, therefore requiring complete backup with dedicated natural gas plants. *See*, Exhibit A-23-A. This unwillingness to give any capacity value to wind reflects outdated thinking about wind power. The recent *Wind Integration Study – Final Report*, a statutorily required analysis¹⁵ prepared for Xcel Energy and the Minnesota Department of Commerce, noted that:

Many of the earlier concerns and issues related to the possible impacts of large wind generation facilities on the transmission grid have been shown to be exaggerated or unfounded by a growing body of research studies and empirical understanding gained from the installation and operation of over 6000 MW of wind generation in the United States.

Exhibit JI-4 at 9-10. Other studies and operating experience have shown that the electricity system can handle fairly high penetrations of wind generation (20% of system peak demand or more) without adverse impacts on the reliability of the grid. *Id.* at 10.

¹⁵ Minn. Laws 2003, 1st Special Session, Ch. 11, Art. 2, Sec. 21.

The *Wind Integration Study* conducted detailed modeling of wind resources in the same general geographic area as South Dakota; in contrast to Applicants' assumption of zero capacity value, it found the wind resource to have capacity values of between 27 and 34%. *Id.* at 13. Already, wind power is accredited to be available 20% of the time for MAPP load and capability planning purposes, *id.* at 12, and it is reasonable to expect MAPP to eventually respond to empirical studies by accrediting wind power in the best areas with an even higher capacity value. Exhibit II-6 at 6, l. 3-12.

Applicants' own witness acknowledged that 5 MW of wind capacity would be the MAPP-accredited capacity equivalent of 1 MW of Big Stone II. Exhibit II-4 at 12, l. 8-12. Moreover, in the Integrated Resource Planning of two of the Applicants, they employ capacity values of 15 to 20%. Applicants' refusal to grant wind power any capacity value in the sole instance where their consultants compare Big Stone II to wind, runs counter to MAPP accreditation policies, to empirical studies, and to some of their own planning protocols.

Joint Intervenors' witnesses David Schlissel and Anna Sommer, of Synapse Energy Economics, Inc., corrected Applicants' extreme underestimate of wind's capacity value and lifted the artificial cap on wind imposed in their comparison of Big Stone II to alternatives.¹⁶ They looked at multiple options, employing what are still very conservative capacity values of only 15% and 25%. *Id.* at 14-17. They identified four combinations that would provide the same amount of reliable energy and capacity as Big Stone II: 800 MW of wind paired with either 400 or 480 of combined-cycle gas turbines (CCGT), or 1200 MW of wind with either 300 or 420 MW of CCGT. In reality, the wind power would be integrated into and receive backup

¹⁶ Moreover, Synapse's analysis accepts Applicants' assumptions that tend to overstate the reliability of Big Stone II. The Big Stone II claimed capacity factor of 88% is clearly a "best case scenario", since it ignores facts that the plant operator could be required to cut back production to comply with its post 2014 mercury commitment (T. 128, l. 5-14), or because of drought conditions (T. 273, l. 12-17), or because of coal delivery problems.

from the entire system, and not depend on dedicated backup plants; by adopting Applicants' approach on this point, Synapse overestimates the amount of CCGT capacity actually needed.

Id. at 14.

Joint Intervenors recognize the critical importance of providing reliable power to ratepayers, and that the variable nature of wind power poses new challenges to system operators when compared to the more familiar reliance on coal power. However, Applicants' failure to grant wind any capacity value when comparing it to Big Stone II represents a wholly unfounded devaluation of wind, and it does ratepayers a disservice by depriving them of a clean and affordable source of energy. The record shows how predominantly wind-based alternatives can provide energy of comparable reliability as Big Stone II.

B. Wind Power Would Actually Cost Less – and Perhaps Much Less -- Than Big Stone II in the Carbon-Constrained World Ahead.

Without analyzing comparable costs or rate impacts of alternatives to Big Stone II, Staff states that the economic benefits of Big Stone II are underestimated because they do not include the benefits to consumers from the production of electricity. Exhibit S-1 at 34-35. However, the record shows that wind-based alternatives would cost less than Big Stone II. In pricing Big Stone II, Applicants make the reckless assumption that throughout the many decades of its operation it will be allowed to emit its 4.7 million annual tons of heat-trapping CO₂ for free, despite increasing policy efforts to battle global warming. As a result, Applicants substantially underestimate the price of Big Stone II. When realistic estimates of future CO₂ costs are factored into the price of Big Stone II, it becomes more expensive, and under some scenarios dramatically more expensive, than wind-based alternatives. Because ratepayers could obtain the same power for less money by rejecting Big Stone II in favor of cleaner options, it is illogical, as well as contrary to South Dakota's siting statute, for Applicants to justify Big Stone II's

environmental damage by pointing to the economic benefits derived from Big Stone II's allegedly low electric rate increases.

1. Federal climate regulations are coming, and they will increase the cost of Big Stone II.

Policy responses to global warming are emerging throughout the U.S., as they have already in the rest of the developed world. Mainstream figures such as U.S. Senator John McCain, R-AZ, forecast the coming global warming policies; just several weeks ago, he stated, “the culmination of evidence is going to force us to act – the question is if we will act soon enough.” T. 762, l. 23-25.

Synapse conducted and submitted into the record an analysis of the likelihood of future federal climate policies affecting power plants. They concluded that “[s]cientific developments, policy initiatives at the local, state, and federal level, and actions of corporate leaders, all indicate that climate change policy will affect the electric sector – the question is not “whether” but “when” and “in what magnitude.” Exhibit JI-1-F at 1. Synapse’s detailed analysis of the accelerating policy response at every level of government -- and of the growth in scientific concern driving these policies – amply supports this conclusion.

In June of 2005, the U.S. Senate passed a Sense of the Senate resolution calling for mandatory, market-based limits on emissions of greenhouse gases, and the House Appropriations Committee adopted similar language in 2006. Exhibit JI-1-F at 12. Several proposals that would impose such mandatory, market-based limits on CO₂ emissions have been proposed in Congress. Id. at 13. These proposals would employ a cap-and-trade regulatory technique that would require power plant operators to own an allowance for each ton of CO₂ emitted. Exhibit JI-1-F at 12-13. Allowances would be tradeable among emitters, and market forces would set the price of

the allowances. Legislators are increasingly educating themselves on the impact of such proposals, laying the groundwork for a national regulatory program. Exhibit JI-1 at 11.

A survey of electric generating companies conducted in 2004 showed that about half of the companies expected Congress to enact CO₂ limits within five years, while nearly 60% expected them within the next ten years. Exhibit JI-1-F at 23. A 2005 survey of the North American electricity industry said that 93% of respondents expected increased pressure to take action on global climate change. Id. Both surveys were conducted before the Senate and the House Appropriations Committee adopted language calling for mandatory CO₂ limits. Several utilities are already building future CO₂ regulatory costs into their planning, in some cases in response to state regulators who increasingly require these costs to be factored into resource decisions. Id. at 28-30. A growing number of power companies openly support some form of cap-and-trade regulation of CO₂, and have participated in hearings held by the Senate Energy and Natural Resources Committee to work out the details of such a proposal. Id. at 14.

The federal Energy Information Administration and others have conducted computer modeling to project how much CO₂ allowances would cost under various federal regulatory proposals. After reviewing several such studies, and based on their larger review of climate science and policy and the risk-management practices of a growing number of utilities, Synapse has prepared low-, mid-, and high-case forecasts of likely future CO₂ costs. Exhibit JI-1-F at 39-42. Synapse forecasts not only reflect studies of existing federal proposals, but are in line with CO₂ cost projections used in planning by other utilities. See Id. at 30.

Clearly, the costs of future CO₂ allowances is subject to considerable regulatory uncertainty, but that uncertainty makes it more important to factor them into planning, and certainly does not justify the now reckless assumption that such costs will remain at zero for the

operating lifetime of a new coal plant. As Synapse notes, “the challenge, as with any unknown future cost, is to forecast a reasonable range of costs based on analysis of the information available.” *Id.* at 44. Synapse’s extensive analysis of the climate issue contrasts sharply with the unstudied approach taken by Applicants. At hearings before the Commission, Applicants’ rebuttal witness Hewson showed how little study of policies gaining widespread support in Congress informs any advice about future CO₂ regulatory costs he gives to his clients like Applicants, when he glibly answered that the only reason for revising his previous year’s forecast of \$5.50 per ton of CO₂ regulatory costs to \$6 per ton was “[m]aybe just to be an even number. It’s always fun, you can imagine my partners and I always get together and we talk about what the future is and what the values are going to be.” T. at 577 l. 18 to 578.¹⁷

Synapse’s forecasts of future CO₂ costs would add significantly to the cost of Big Stone II on a megawatt/hour (MWh) basis. The lowest cost trajectory would add \$7.60 to the cost of energy from the plant, the mid-case costs would add \$18.61 per MWh, and the high-case costs would add \$29.72 per MWh. Exhibit JI-1 at 23. In percentage terms, the mid-case costs, which Synapse considers most likely, would increase the plant’s cost by 37-46%. *Id.*

2. Wind-based alternatives will provide ratepayers with cheaper power than Big Stone II.

Synapse witnesses Mr. Schlissel and Ms. Sommer provided a detailed cost analysis comparing Big Stone II to four wind-based alternatives. Exhibit JI-4 at 14-18. The analysis looked at each option with and without the extension of the Production Tax Credit (PTC) for

¹⁷ See also, T. 342 l. 4 to 343 l. 4 (testimony of Applicant witness Greig, stating that he has no researched basis for CO₂ regulatory cost sensitivities he runs for his clients).

wind.¹⁸ It also compared how each option would fare under its three projected cost estimates of future CO₂ allowance prices. Finally, it compared the results against the prices faced by investor-owned utilities and by those faced by publicly-owned utilities. Id.

Synapse alternatives three and four, which assume 1200 MW of wind and between 300 and 420 MW of CCGT, under low, mid, and high-case assumptions about future CO₂ allowance prices, clearly show that an alternative that maximizes wind power and minimizes natural gas will be far more economical in the carbon-regulated world ahead than Big Stone II will be. Id. Even in most of the comparisons assuming the lowest CO₂ allowances prices, the wind/gas combination still comes out ahead. Id. In only one of the low-CO₂ cost scenarios Synapse analyzed does Big Stone II come out cheaper than the wind/gas option, and then only barely so (assuming Public Power ownership, 420 MW CCGT, no PTC). Id. In all the mid-case CO₂ cost scenarios, Big Stone II is more expensive. Id. In fact, Big Stone II is up to 71% more expensive for investor-owned utilities and 61% more expensive for public utilities than the wind/gas option. Id. Under high CO₂ costs, the cost difference is of course even more dramatic: Big Stone II would cost roughly twice as much as the best wind/gas option. Id.

It is important to realize that the Synapse analysis overestimates the cost of the wind-gas alternative in several significant ways, including:

1. The benefits of low-cost financing for public utilities is reflected in the costs of Big Stone II, but this benefit is not reflected in the price of wind power, which is assumed to be the same for public utilities as for investor-owned ones. Exhibit JI-4_{at 15}.
2. Capacity values for wind are assumed to be only 15% and 25%, despite evidence that wind power in the region actually achieves capacity values of 27-34%. Id. at 13-15.

¹⁸ It is reasonable, however, to assume that Congress will renew the PTC “given (1) its history, (2) increasing concern over U.S. dependence on foreign sources of energy, and (3) mounting concern over global warming” Exhibit JI-4 at 18, l. 18-24.

3. As noted above, the assumption that dedicated natural gas plants would be built to support the wind power is unrealistic and increases the cost of the wind/gas options. *Id.* at 14.

Because ratepayers could obtain the same power for less money by rejecting Big Stone II in favor of cleaner options, the economic benefits derived from allegedly lower electric rate increases is not a relevant offset to the environmental damage the plant would cause.

IV. APPLICANTS HAVE FAILED TO MEET THEIR BURDEN OF PROVING UNDER SDCL 49-41b-22(4) THAT BIG STONE II WON'T UNDULY INTERFERE WITH THE ORDERLY DEVELOPMENT OF THE REGION'S WIND RESOURCE.

Big Stone II Applicants must prove that the plant will “not unduly interfere with the orderly development of the region” under SDCL 49-41B-22 (4). This statutory provision essentially requires the Commission to consider alternative forms of economic development that the region might be suited for, and consider how the proposed plant might interfere with that development. The most obvious alternative path of economic development that Big Stone II interferes with is the exploitation of South Dakota’s ample – and as yet almost completely undeveloped – wind resource.

A. Big Stone II Would Drain Capital and Market Share Away from Wind.

South Dakota has one of the best wind resources in the nation. According to the American Wind Energy Association, South Dakota ranks third in the nation among states with the best wind resource. Exhibit JI-4 at 9, l. 8-11. And yet South Dakota lags behind its less windy neighbors in its development of that wind resource.¹⁹ Now that utilities in the region are looking to expand their energy supplies, South Dakota has a natural opportunity to finally

¹⁹ T. at 713-714, and see, Department of Energy National Renewable Energy Laboratory web site, http://www.eere.energy.gov/windandhydro/windpoweringamerica/wind_installed_capacity.asp.

develop its wind resource, and as the record shows, wind is not just a viable option to Big Stone II, but a financially preferable one. Exhibit JI-3 at 6-11. However, if the 600 MW of additional supply that Applicants say they need are met with Big Stone II, those 600 MW of need cannot be met with a wind-based alternative. That market share – and the investment sunk into Big Stone II – will be lost to the regional wind industry as long as Big Stone II operates. T. 712, l. 11-20.

B. Wind Power Would Bring About Much Greater and More Sustainable Economic Development of the Region Than Big Stone II.

If the need being used to justify the Big Stone II plant were met with wind power instead, the economic benefits to South Dakota would be far greater than the benefits that might flow from Big Stone II. Joint Intervenors' witness Marshall Goldberg conducted a modeling analysis of the economic benefits associated with the development of 1320 MW of wind rather than the 600 MW of coal represented by Big Stone II. Exhibit JI-3 at 6-11. This modeling was conducted on behalf of the U.S. National Renewable Energy Laboratory (NREL), and was summarized and submitted into the record on behalf of Joint Intervenors. Id. at 2, l. 12-17. Mr. Goldberg's qualifications include developing computer models for NREL precisely for the purpose of identifying economic benefits associated with wind, as compared with fossil-fueled power plants. Id. at 1-2.

Comparing the long-term and short term economic benefits of Big Stone II with the economic benefits of 1320 MW of wind power, Mr. Goldberg showed that wind investment provided more jobs and more economic output for the state of South Dakota. Exhibit JI-3. Even if an alternative scenario that only installed 1200 MW of wind (slightly over 90% of the

amount Mr. Goldberg modeled), the economic benefits provided to South Dakota would *still* substantially outweigh those claimed for Big Stone II.²⁰

V. IF THE COMMISSION DOES PERMIT BIG STONE II, IT SHOULD WARN RATE-REGULATED APPLICANTS THAT THE IMPRUDENT NATURE OF THE INVESTMENT WILL PREVENT FULL RATE RECOVERY IN THE FUTURE.

The record in this proceeding clearly establishes that Applicants have failed to meet their burdens of proof under SDCL 49-41B-22, and this Commission should accordingly deny the site permit. However, if the Commission decides to grant this permit, Joint Intervenors argue in the alternative that the Commission should take action in this docket to protect South Dakota ratepayers from the financial risks attached to Big Stone II. As Commission Staff have noted, and Applicants have admitted, if the Commission actually permits Big Stone II, the day will come when the Applicants, or at least the two that are rate regulated, will seek to recover in their rates the costs associated with building and operating it. Exhibit S-2 at 50.²¹ Because these Applicants are able to pass financial risks on to ratepayers, they may “have less of an aversion to taking financial risk and making financially risky management decisions” than if responsibility was borne solely by the shareholders. *Id.* at 51.

²⁰ Ninety percent of the wind plant construction related expenditures Mr. Goldberg modeled (equivalent to about 1200 MW of wind) would amount to creation of over 3,600 jobs, \$90 million in wage and salary income, and over \$320 million in economic output within the state of South Dakota. Once 90% of the plants Mr. Goldberg analyzed are up and running, that would amount to 156 annual on site plant jobs (compared to Big Stone’s projected 35) and \$7.24 million in wage and salary income in South Dakota. Ninety percent of total statewide impacts that Mr. Goldberg modeled, would amount to creation of 439 jobs (compared to Big Stone II’s projected 64), \$14.32 million in wage and salary earnings, and \$31.71 million in economic output each year (compared to Big Stone’s estimated \$6.8 million).

²¹ See, also, T. 57-58 and Exhibit JI-10 (Otter Tail admissions regarding Big Stone II rate increases) and MDU response to Joint Intervenors’ Information Request 44 in MPUC Docket No. CN-05-619, incorporated by reference in this docket through Response to Joint Intervenors Fourth Set of Request for Production of Documents (MDU expectation of 20% rate increase for Big Stone II).

The record shows that to date, Applicants have paid dangerously little attention to this financial risk. They claim to be ignorant of the global climate treaty to which the United States has long been a party, deny knowing about the high-level scientific findings of the IPCC and the National Academy of Sciences, and persistently fail to appreciate the distinction between externality costs, which will not affect their bottom line, and future CO₂ regulations, which most surely will. Exhibit JI-1 at 18-21; Exhibit JI-1-H. They have, in essence, chosen to largely ignore the one issue that most obviously and profoundly threatens the financial viability of their billion-dollar investment. These failures render Applicants' choice to pursue Big Stone II a threat to the economic welfare of the region. SDCL 49-41B-22(2), (3) and (4).

PUC Staff appropriately warns that "poor decision-making at this point in time may haunt this Commission in the future." Exhibit S-2 at 53, l. 18-19. The most obvious way in which Big Stone II will haunt the Commission is by requiring it to someday make the difficult choice of deciding whether to burden ratepayers with the substantial new costs of CO₂ regulation or burden shareholders, thereby possibly undermining the economic health of the investor-owned Applicants. However, the Commission need not passively wait until that difficult choice is forced upon it. It can exercise its authority to protect South Dakota ratepayers in this docket by warning Applicants now that Big Stone II carries heavy financial risks that make it an imprudent investment. This would give fair warning to the Applicants and their investors that they assume the risk of future climate regulation themselves. Applicants, who confidently dismiss CO₂ regulations as merely speculative or likely to be too small to matter, would not be deterred, but such a warning would give them a powerful incentive to track the progress of these regulations and to constantly rethink the prudence of investing so heavily in a major source of CO₂.

History shows how critically important it is for utilities in the process of making large, long-term investments in baseload power to closely track relevant current events and respond accordingly. It also shows how unlikely they are to do so, once caught up in the momentum of a major construction project.

In the late 1960s and 1970s, many of the nation's utilities believed two things that turned out to be wrong: first, that electricity demand would keep growing at the fast rate of prior years, and second, that nuclear power plants would be an inexpensive way to meet that demand.²² Utilities did not foresee the impact of the OPEC oil embargo and subsequent energy crisis, which lessened demand, nor did they foresee Three Mile Island, and the resulting increase in safety requirements and costs for nuclear construction. As a result, many utilities found themselves with coal plants they did not need, and with costs associated with scores of abandoned nuclear plants. PUCs around the nation were forced to make the difficult choice of whom to burden with the bill for these expensive mistakes.

The canceled nuclear plant cases are particularly instructive. In most jurisdictions, the standard for rate recovery was the prudence of management decisions when made. The issue was not just the prudence of the decision to build the plant in the first place, but the prudence of continuing to invest in it after it was obvious costs were rising well above originally assumed levels. Utilities that were found to have imprudently failed to stop construction in light of these changes were denied recovery of costs incurred after the point where regulators found they

²² For overviews of these issues and the resulting cases see Richard J. Pierce, Jr., "The Regulatory Treatment of Mistakes in Retrospect: Canceled Plants and Excess Capacity," 132 U. Pa. L. Rev. 497 (1984); "Abandoned Nuclear Plant Recovery," 83 ALR4th 183 (1991); and Roger D. Colton, "Excess Capacity: Who Gets the Charge from the Power Plant?" 34 Hastings L.J. 1133 (1983).

should have cancelled the project.²³ While in these cases ratepayers ultimately received some protection from the utilities' imprudence, that protection was hard-won; these cases involved extensive, costly litigation and they required PUC's to go through the laborious and uncomfortable process of retrospectively analyzing a series of utility management decisions.²⁴ It is obviously far better for ratepayers, utilities, and regulators alike if such imprudent investments can simply be avoided in the first place.

Our nation's last major burst of coal plant construction also forced upon regulators difficult choices about how to distribute the costs of what turned out to be excess capacity. In some cases, even where regulators did not find any imprudence on the utilities' part, they still denied full rate recovery so as to give shareholders an incentive to track unfolding events that affected the wisdom of their baseload investment.²⁵ The Iowa PUC put it this way:

In the real world of competitive enterprise, management officials must continuously rethink prior decisions as new events unfold. Those who fail to stay on top of current events lose out to their competition. Iowa utilities should also maintain surveillance over costs associated with a particular decision, and in the absence of the kind of incentive provided by a competitor, the responsibility falls upon us to provide the requisite incentive.²⁶

The events undermining the financial prudence of Big Stone II are far more predictable than the changes that surprised utilities in the 1970s. Indeed, they are looming. Given how quickly the science and policy response to climate change are evolving, and how long it takes to

²³ See, e.g., Association of Businesses Advocating Tariff Equity [ABATE] v. Public Service Commission, 527 N.W.2d 533 (Mich. App. 1994), app. den. ABATE v. Mich. P.S.C., 539 NW2d 507 (Mich. 1995); In Re Interstate Power Co., 416 NW2d 800 (Minn. App. 1987); Re Boston Edison, 46 PUR4th 431 (Mass. D.P.U, 1982), aff'd 455 N.E.2d 414.

²⁴ The Massachusetts D.P.U. called one such case "probably the lengthiest and most complex rate case to have come before the department in recent years." Re Boston Edison, *supra*. See also the discussion of how difficult it is for consumer groups and government agencies to bring prudence challenges in rate cases by Pierce, *supra*, at 7.

²⁵ See Re Iowa Public Service Company, 46 PUR4th 339 (IA Commerce Commission, 1982); and Re Montana-Dakota Utilities Co., 44 PUR4th 249 (N.D. PSC 1981).

²⁶ Re Iowa Public Service Co., *supra*.

build a coal plant, even Applicants might agree in a year or so that continuing to invest in Big Stone II is an unwarranted financial risk – *if* they are paying close enough attention. However, they may well continue to ignore this issue if they are confident they can pass CO₂ costs on to ratepayers like any other environmental compliance cost.

The Commission should apply the lessons regulators learned following the last wave of ill-advised baseload construction. It should give Applicants an incentive to track climate science and laws, and to respond in a prudent way, by putting them on notice now that their shareholders will bear the costs of future CO₂ regulation. Short of denying the site permit on the ample grounds discussed above, this is the best way the Commission can proactively protect South Dakota ratepayers from a major investment mistake.

CONCLUSION

For all of the foregoing reasons, and based on the administrative record for these proceedings, and South Dakota Codified Laws 49-41B-22, Joint Intervenors respectfully request that the Commission deny the Application for an Energy Conversion Facility Siting Permit for the Construction of Big Stone II Project. Although the record herein and applicable South Dakota laws more than support a decision to deny the requested permit, should the Commission nevertheless decide to grant the permit, the minimum protection that the Commission should provide to South Dakota ratepayers is a ruling now that the investor-owned project participants shall not be allowed to recover from South Dakota ratepayers the future regulatory costs associated with Big Stone II's CO₂ emissions.

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Respectfully submitted,

/s/

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